Glosarries of Life Science

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Abstract: This glossary collects 4080 words and phrases in life science fields, especially under the field of stem cells. The glossary contents come from Internet and other related dictionaries.

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Keywords: life; science; dictionary; glossary; word

1 5-alpha reductase (5AR): Enzymes that convert testosterone to dihydrotestosterone.
2 5-alpha reductase inhibitor: A drug used to block the conversion of testosterone to dihydrotestosterone.
3 5-alpha-dihydrotestosterone: Usually known as dihydrotestosterone.
4 5-fluorouracil (5FU) (Adrucil®): A drug in the group of cancer-fighting medicines known as antineoplastics, which interferes with the growth of cancer cells. It is approved for palliative management of colon, rectum, breast, stomach and pancreatic cancer.
5 a1-antichymotrypsin (ACT): One of the many serine protease inhibitors or serpins (short for serine protease inhibitor) which are proteins that inhibit peptidases (proteases). Serine proteases are defined by the presence of a serine (an amino acid) residue in their active domain.
6 abdomen (adj, abdominal): The part of the body below the ribs and above the pelvic bone that contains organs like the intestines, the liver, the kidneys, the stomach, the bladder, and the prostate. In vertebrates, the portion of the trunk containing visceral organs other than heart and lungs; in arthropods, the posterior portion of the body, made up of similar segments and containing the reproductive organs and part of the digestive tract.
7 abiotic: Nonliving; specifically, the nonliving components of an ecosystem, such as temperature, humidity, the mineral content of the soil, etc.
8 ablation: Relating to the removal or destruction of tissue or a system; androgen ablation refers to blocking the effects of androgens by surgical or chemical means.
9 abscess: A localized collection of pus caused by suppuration buried in tissues, organs or confined spaces. Usually due to an infective process.
10 abscisic acid (ABA): A plant hormone that generally acts to inhibit growth, promote dormancy, and help the plant tolerate stressful conditions.
11 abscission: In plants, the dropping of leaves, flowers, fruits, or stems at the end of a growing season, as the result of formation of a two-layered zone of specialized cells (the abscission zone) and the action of a hormone (ethylene).
12 abscopal effect: In cancer treatment, an abscopal effect occurs when a particular treatment has an impact on a tumor that was not treated - “ab-” being the Latin prefix for “away from”, and “scopus” the word for “target”.
13 absolute neutrophil count (ANC): A common blood cell count measured after stem cell transplant. Neutrophils are responsible for much of the body's protection against infection.
14 absorption spectrum: The range of a pigment's ability to absorb various wavelengths of light.
15 absorption: (a) In physiology: a process by which nutrients move from the lower digestive tract (small and large intestine or colon) into the blood stream to be utilized by the body. (b) In spectroscopy: the interaction between atoms and radiation (light, X-rays, UV, infrared), where some of the energy of the radiation is absorbed by the electrons of the atoms, increasing their energy content. The loss of intensity of the radiation can be measured and is an indicator of the structural state of the molecules that absorb the radiation.
16 acclimatization: Physiological adjustment to a change in an environmental factor.
17 accommodation: The automatic adjustment of an eye to focus on near objects.
18 acetyl CoA: The entry compound for the Krebs cycle in cellular respiration; formed from a fragment of pyruvate attached to a coenzyme.
acetylcholine: One of the most common neurotransmitters; functions by binding to receptors and altering the permeability of the postsynaptic membrane to specific ions, either depolarizing or hyperpolarizing the membrane.

achalasia: Constriction of the lower portion of the food pipe (oesophagus) due to inability of the sphincter muscles to relax. Symptoms include difficulty swallowing, chest pain, vomiting and heartburn.

achlorhydria: The absence of hydrochloric acid from the gastric juice.

acid precipitation: Rain, snow, or fog that is more acidic than pH 5.6.

acid α-galactosidase or acid-maltase: An enzyme that breaks down a particular type of fatty substances, Pompe disease is characterized by its absence.

acinus: Any of the small saclike structures that terminate the ducts of some glands, also called alveolus; ACINAR: of, relating to or comprising an acinus.

acoelomate: A solid-bodied animal lacking a cavity between the gut and outer body wall.

acquired immunodeficiency syndrome (AIDS): The name of the late stages of HIV infection; defined by a specified reduction of T cells and the appearance of characteristic secondary infections.

acronym: An abbreviation formed from the initial letters of a name.

acrosome: An organelle at the tip of a sperm cell that helps the sperm penetrate the egg.

actin: A globular protein that links into chains, two of which twist helically about each other, forming microfilaments in muscle and other contractile elements in cells.

action potential: A rapid change in the membrane potential of an excitable cell, caused by stimulus-triggered, selective opening and closing of voltage-sensitive gates in sodium and potassium ion channels.

activation energy: The energy that must be possessed by atoms or molecules in order to react.

active objectified surveillance: Active observation and regular monitoring of a patient without actual treatment; also called watchful waiting.

active site: The specific portion of an enzyme that attaches to the substrate by means of weak chemical bonds.

active transport: The movement of a substance across a biological membrane against its concentration or electrochemical gradient, with the help of energy input and specific transport proteins.

acupuncture: Acupuncture-related therapies stimulate specific skin points by inserting needles, applying heat or pressure, or through contemporary energy-emitting devices. This stimulation promotes the health-enhancing life-force energy called qi.

acute injury: The early stages of an injury.

acute lymphoblastic leukemia (ALL): A fast growing cancer of the lymphocytes, one of the white blood cells. Also called acute lymphocytic leukemia. Appears most often in children, but can occur in adults.

acute myelogenous leukemia (AML): A cancer of the myelocytes, one of the white blood cells. AML occurs in all ages and is the more common acute leukemia in adults. AML affects a different type of white cells than those affected by ALL.

acute non-lymphocytic leukemia (ANLL): Another way of saying acute myelogenous leukemia.

acute urinary retention: The sudden inability to urinate, causing pain and discomfort. Causes can be related to an obstruction in the urinary system, stress, neurologic problems, or certain medications.

acute: Beginning quickly and sharp or severe. Of abrupt onset, in reference to a disease. Acute often also connotes an illness that is of short duration, rapidly progressive, and in need of urgent care.

adaptation: A process in biological evolution as the result of natural selection where a species becomes better adjusted to the living conditions of its environment (temperature, food sources, and predators). In adaptation, individuals that have the most offspring contribute more of their genetic makeup to the next generation.

adaptive peak: An equilibrium state in a population when the gene pool has allele frequencies that maximize the average fitness of a population's members.

adaptive radiation: The emergence of numerous species from a common ancestor introduced into an environment, presenting a diversity of new opportunities and problems.

adenocarcinoma: A form of cancer that develops from a malignant abnormality in the cells lining a glandular organ such as the prostate; almost all prostate cancers are adenocarcinomas.

adenoma: A benign tumor of a glandular structure.

adenosine diphosphate (ADP): A nucleotide consisting of adenine, ribose, and two phosphate groups; formed by the removal of one phosphate from an ATP molecule.
49 adenosine monophosphate (AMP): A nucleotide consisting of adenine, ribose, and one phosphate group; can be formed by the removal of two phosphates from an ATP molecule; in its cyclic form, functions as a "second messenger" for a number of vertebrate hormones and neurotransmitters.

50 adenosine triphosphate (ATP): A nucleotide and universal energy currency for metabolism. Almost all caloric content of food is converted into ATP before it can be utilized for tissue growth, muscle work and other physiological processes.

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52 adenovirus: A (20 sided) virus that contains DNA; there are over 40 different adenovirus varieties, some of which cause the common cold. Modified versions have shown some ability to cause apoptosis in laboratory testing.

53 adenylyl cyclase: An enzyme that converts ATP to cyclic AMP in response to a chemical signal.

54 adhesion molecules membrane: Expressing molecules that mediate interactions of stem cells and progenitors with stromal cells or with extracellular matrix proteins in the bone marrow microenvironment.

55 adhesion: a band of scar tissue abnormally joining two surfaces.

56 adipocyte: The functional cell type of fat, or adipose tissue, which is found throughout the body particularly under the skin. Adipocytes store and synthesize fat for energy, thermal regulation and cushioning against mechanical shock.

57 adipocytes: Cells that store fat.

58 adipose tissue: A type of connective tissue that stores fat.

59 adipsocyte: The functional cell type of fat, or adipose tissue, which is found throughout the body particularly under the skin. Adipocytes store and synthesize fat for energy, thermal regulation and cushioning against mechanical shock.

60 adipogenesis: A fat cell develops as internally produced lipid droplets coalesce into a single large mass.

61 adrenocorticotrophic hormone (ACTH): Adrenal corticotrophic hormone; a pituitary hormone that stimulates the outer portion of the adrenal glands to secrete various hormones including cortisol, DHEA and androstenedione.

62 adrenaline: A hormone, produced by the medulla of the adrenal gland, that increases the concentration of glucose in the blood, raises blood pressure and heartbeat rate, and increases muscular power and resistance to fatigue; also a neurotransmitter across synaptic junctions. Also called epinephrine.

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alkylating agent: An anticancer drug that interferes with cancer cell division by binding to DNA. A class of cytotoxic drugs that damage DNA, causing the cell to undergo apoptosis. Particularly effective against rapidly dividing cancer cells, they are not targeted and also affect normal cells, which can lead to significant toxicity.

allantoius: One of four extraembryonic membranes; serves as a repository for the embryo's nitrogenous waste.

allele frequency: The proportion of a particular allele in a population.

allele: One of two or more alternative forms of a gene. A person may have two copies of the same allele (homozygous) or two different forms (heterozygous). Different alleles arise from changes in the base sequence of that gene through mutations. For example, the gene for eye colour has different alleles resulting in blue or brown eyes.

allergic reaction: An inflammatory response triggered by a weak antigen (an allergen) to which most individuals do not react; involves the release of large amounts of histamine from mast cells.

allogeneic bone marrow transplant: Any bone marrow/blood stem cell transplant in which the cells come from another person rather than the patient's own cells. The donated cells can come from a related or unrelated donor.

allogeneic cell transplantation: Transplantation of cells from one individual to another of the same species.

allogeneic stem cell transplant: Transplantation of stem cells from either a relative or an unrelated volunteer donor.

allogeneic stem cells: Stem cells that are used clinically to augment, repair, replace or regenerate organs and tissues and are derived from a cell source that is genetically different from the host/recipient. A hematopoietic stem cell transplant (bone marrow transplant) is an example of a clinical allogeneic transplant in which the patient receives blood-forming hematopoietic stem cells from a genetically similar, but not identical, donor. Allogeneic hematopoietic stem cells are derived from donated bone marrow or umbilical cord blood. An autologous stem cell transplant uses the patient's own cells to augment, repair, replace or regenerate diseased and/or damaged organs and tissues. There are currently no autologous stem cell therapies in clinical use.

allogeneic stem cell transplant: A transplant involving the infusion of a donor’s genetically
matched bone marrow or stem cells to produce new, healthy marrow.

allogeneic: Biological materials such as genes, proteins, cells, tissues, or organs used for transplantation and derived from another donor individual of the same species as the recipient.

allogenic stem cells: Stem cells that are harvested from another individual and re-implanted into a patient.

allogenic transplantation: A procedure in which a patient receives bone marrow from another person other than an identical twin.

allogenic: Two or more individuals (or cell lines) are stated to be allogeneic to one another when the genes at one or more loci are not identical in sequence in each organism.

allometric growth: The variation in the relative rates of growth of various parts of the body, which helps shape the organism.

allopatric speciation: A mode of speciation induced when the ancestral population becomes segregated by a geographical barrier.

allopolyploid: A common type of polyploid species resulting from two different species interbreeding and combining their chromosomes.

all-or-none event: An action that occurs either completely or not at all, such as the generation of an action potential by a neuron.

allosteric site: A specific receptor site on an enzyme molecule remote from the active site. Molecules bind to the allosteric site and change the shape of the active site, making it either more or less receptive to the substrate.

allozymes: Slightly different versions of the same enzyme, distinguishable via gel electrophoresis.

alopecia: A partial or complete hair loss, usually a temporary effect of the chemotherapy.

alpha-blockers: pharmaceuticals that act on the prostate by relaxing certain types of muscle tissue; these pharmaceuticals are often used in the treatment of BPH; examples are Flomax®, Cardura® and Hytrin®.

alpha-helix: A spiral shape constituting one form of the secondary structure of proteins, arising from a specific hydrogen-bonding structure.

alpha-receptors: A cell site that responds to adrenaline (epinephrine) or adrenaline-like substances, causing various physiological changes related to blood vessels getting smaller.

alprostadil: A prostaglandin that relaxes the smooth muscles of the penis, enhancing blood flow, and producing erection; first produced as Caverject®, an injectable Prostaglandin E1

alteration of generations: A life cycle in which there is both a multicellular diploid form, the sporophyte, and a multicellular haploid form, the gametophyte; characteristic of plants.

alternative splicing: In alternative splicing, the same pre-mRNA molecule, which consists of introns and exons, is spliced in different ways to produce mature mRNAs of different lengths and different functionality.

altruistic behavior: The aiding of another individual at one's own risk or expense.

alveolus (pl. alveoli): (1) One of the deadend, multilobed air sacs that constitute the gas exchange surface of the lungs. (2) One of the milk-secreting sacs of epithelial tissue in the mammary glands.

Alzheimer’s disease: A degenerative brain disease, beginning with memory loss, and progressing to dementia.

amine: A chemical substance in the body whose structure is similar to ammonia; a family of hormones (adrenal medulla - epinephrine & norepinephrine) or neurotransmitters in brain (dopamine, norepinephrine, epinephrine, serotonin).

amino acid (aa): Building block of proteins and enzymes. Dietary proteins need to be broken into their amino acid components before they can be used by the body. Note that there are 20 amino acids found in proteins. Many nutritional lists describe only 18 occluding glutamine and asparagine. Their values are included in those reported for the acidic forms glutamate and aspartate.

amino group: A functional group that consists of a nitrogen atom bonded to two hydrogen atoms; can act as a base in solution, accepting a hydrogen ion and acquiring a charge of +1.

amino terminal fragment (ATF): Highly active part of the uPA molecule.

aminoacyl: tRNA synthetases. A family of enzymes, at least one for each amino acid, that catalyze the attachment of an amino acid to its specific tRNA molecule.

aminogluthethimide (AG): A drug that blocks the production of adrenal hormones such as DHEA, androstenedione and also cortisol.

amitotic: Relating to or marked by amitosis - an unusual form of nuclear division, in which the nucleus simply constricts, rather like a cell without chromosome condensation or spindle formation. Partitioning of daughter chromosomes is haphazard.

ammonification: The process by which decomposers break down proteins and amino acids, releasing the excess nitrogen in the form of ammonia (NH3) or ammonium ion (NH4+).
130 amniocentesis: A procedure used for prenatal diagnosis, which involves insertion of a needle through the abdomen into the amniotic fluid. This procedure is performed using ultrasound guidance, and allows the physician to obtain a small amount of amniotic fluid which can then be used for testing. Amniocentesis is usually performed between 16 and 18 weeks of pregnancy, but some centers offer “early amnio” at 14 weeks of pregnancy.

131 amnion: Innermost of the extra-embryonic membranes enveloping the embryo in utero and containing the amniotic fluid.

132 amniote: A vertebrate possessing an amnion surrounding the embryo; reptiles, birds, and mammals are amniotes.

133 amniotic egg: A shelled, water-retaining egg that enables reptiles, birds, and egg-laying mammals to complete their life cycles on dry land.

134 amniotic fluid: Amniotic cavity fluid is which is produced by the amnion and fetal lungs and kidneys and is used for prenatal testing of the fetus.

135 amniotic stem cells: cells found in the amniotic fluid that surrounds a fetus. They are not pluripotent like embryonic stem cells, but research has shown that they can differentiate into more cell types than adult stem cells.

136 amoeboid: Resembling an amoeba specifically in moving or changing in shape by means of protoplasmic flow.

137 amphibia: The vertebrate class of amphibians, represented by frogs, salamanders, and caecilians.

138 amphiesma: The outer covering of a dinoflagellate, consisting of several membrane layers.

139 amphipathic molecule: A molecule that has both a hydrophilic region and a hydrophobic region.

140 amplicon: The DNA product of a PCR reaction, usually an amplified segment of a gene or DNA.

141 ampulla: A saccular anatomic swelling or pouch.

142 amylase: Enzyme, also called diastase. It is found in both plants and animals.

143 amyotrophic lateral sclerosis (ALS): A progressive, usually fatal, neurodegenerative disease caused by the degeneration of motor neurons, the nerve cells in the central nervous system that control voluntary movement - sometimes called Lou Gerhig’s Disease after the famous baseball player who died from the disorder.

144 anabolic steroids: Synthetic chemical variants of the male sex hormone testosterone; they produce increased muscle mass but also suppress testosterone production, leading to shrinkage of the testes, growth of the breasts, and premature baldness; long-term use increases the risk of kidney and liver damage and of liver cancer.

145 anabolism: Within a cell or organism, the sum of all biosynthetic reactions (that is, chemical reactions in which larger molecules are formed from smaller ones).

146 anaemia: A condition caused by a reduced number of red blood cells or haemoglobin. This results in reduced oxygen-carrying capacity of the blood, and reduced aerobic activity in body cells.

147 anaerobic: Lacking oxygen; referring to an organism, environment, or cellular process that lacks oxygen and may be poisoned by it.

148 anagenesis: A pattern of evolutionary change involving the transformation of an entire population, sometimes to a state different enough from the ancestral population to justify renaming it as a separate species; also called phyletic evolution.

149 anal verge: The external or distal boundary of the anal canal.

150 analgesia: Pain relief without loss of consciousness

151 analgesic: A drug that alleviates pain without causing loss of consciousness.

152 analog: A synthetic chemical or pharmaceutical that behaves like a normal chemical in the body, e.g., LHRH analogs such as Lupron® or Zoladex®.

153 analogous: Applied to structures similar in function but different in evolutionary origin, such as the wing of a bird and the wing of an insect.

154 analogy: The similarity of structure between two species that are not closely related; attributable to convergent evolution.

155 anadron®: Trade or brand name for nilutamide, an antiandrogen; in the USA this is called Nilandron®.

156 anaphase: The third stage of mitosis, beginning when the centromeres of duplicated chromosomes divide and sister chromatids separate from each other, and ending when a complete set of daughter chromosomes are located at each of the two poles of the cell.

157 anaphylaxis: Almost 100 years ago Prince Albert I of Monaco invited two Parisian scientists to perform studies on the toxin produced by the tentacles of a local jellyfish, the Portuguese Man of War. Charles Richet and Paul Portier were able to isolate the toxin and tried to vaccinate dogs in the hope of obtaining protection, or "prophylaxis," against the toxin.

158 anaplasia: Lack of differentiated features in a cancer cell, characterized by cellular pleomorphism (variation in size and shape of cells and their nuclei), enlarged and
hyperchromatic nuclei, prominent nucleoli, atypical mitoses, and bizarre cells, including giant cells.

anastomosis (pl. anastomoses): The connection of separate parts of a branching system to form a network, as of blood vessels; also the surgical connection of separate or severed tubular hollow organs to form a continuous channel, as the severed urethra in radical prostatectomy.

anastrozole (Arimidex®): An aromatase inhibitor that reduces the level of estrogen in the body

Androcur®: Trade name for cyproterone, an antiandrogen with progesterational activity; also called CPA for cyproterone acetate (not available in USA).

androgen ablation therapy (AAT): Preferred terms might be androgen deprivation therapy (ADT) or hormone therapy.

androgen dependent PC (ADPC): PC cells that depend on androgens for continued cell growth and vitality.

androgen deprivation syndrome (ADS): A number of side effects associated with elimination or blockage of androgens from ADT.

androgen deprivation therapy (ADT): A prostate cancer treatment that eliminates or blocks androgens to the PC cell; includes diverse mechanisms such as surgical or chemical castration, antiandrogens, 5 AR inhibitors, estrogenic compounds, agents that interfere with adrenal androgen production, agents that decrease sensitivity of the androgen receptor (AR).

androgen independent prostate cancer (AIPC): PC cells that do not depend on androgen for growth

androgen receptor (AR): A structural entity that is the site of interaction of a chemical substance called a ligand as is a lock and key; a docking site for a ligand.

androgen receptor mutation (ARM): A mutation in the gene located on the androgen receptor that allows the antiandrogen to stimulate PC growth rather than block growth; a paradoxical effect usually occurring in about 30% of patients on long-term antiandrogen therapy in the setting of a rising PSA with a castrate testosterone level.

androgen: A hormone which is responsible for male characteristics and the development and function of male sexual organs (e.g., testosterone) produced mainly by the testicles but also in the cortex of the adrenal glands; androgens have far reaching effects on blood formation, muscle and bone mass, cognitive function, emotional lability, skin and hair, etc.

androgen-dependent PC (ADPC): PC cells that depend on androgens for continued cell growth and vitality.
cells derived from blood vessels and lining irregular blood-filled spaces. Specialists apply the term angiosarcoma to a wide range of malignant endothelial vascular neoplasms that affect a variety of sites. Angiosarcomas are aggressive and tend to recur locally, spread widely, and have a high rate of lymph node and systemic metastases.

angiosperm: A flowering plant, which forms seeds inside a protective chamber called an ovary.

animal cloning: The making of essentially genetically exact copies of animals.

animal model: A laboratory animal with a specific disease that researchers experiment with to find out more about the causes of a disease, its diagnosis in humans, and to investigate or trial new treatments or preventative actions. Animal models of disease may occur naturally in an animal population, be bred using techniques such as genetic engineering, or by exposing animals to environments that induce that disease to develop.

anion: A negatively charged ion.

ankle-foot orthotic (AFO): An externally applied orthopedic appliance which is designed to protect, support and prevent or correct deformity of the foot, ankle and lower leg complex.

annual: A plant that completes its entire life cycle in a single year or growing season.

anomaly: A marked deviation from the normal standard, especially as a result of congenital defects.

anorexia: The uncontrolled lack or loss of the appetite for food.

antacids: Medications that balance acids and gas in the stomach.

antagonist: An agent or drug that does not initiate a biological response itself upon binding to a receptor but blocks the response from the active substance.

antennae: Long, paired sensory appendages on the head of many arthropods.

anterior visceral endoderm (AVE): Specific tissue structure arising in the early embryo that helps establish the anterior: posterior axis of the organism.

anterior: The front; for example, the anterior of the prostate is the part of the prostate that faces forward.

anterolateral: Situated or occurring in front and to the side from the midpoint.

anther: The terminal pollen sac of a stamen, inside which pollen grains with male gametes form in the flower of an angiosperm.

antheridium (pl. antheridia): In plants, the male gametangium, a moist chamber in which gametes develop.
anticodon: A sequence of three bases in a molecule of transfer RNA (tRNA) that binds to a complementary codon in messenger RNA (mRNA). Each anticodon designates a specific amino acid to be added to a growing polypeptide.

antidiuretic hormone (ADH): A hormone important in osmoregulation.

anti-emetic: Medication that prevents or alleviates vomiting.

antiestrogen: A substance capable of preventing full expression of the biological effects of an estrogen.

antigen presenting cells (APCs): One of a variety of cells within the body that can present antigens and display them on their surface in a form recognizable by T cells.

antigen: Any substance that stimulates the production of antibodies in the body. For example, pollen grains, dust, bacteria and viruses are recognized by the body as being foreign and it responds by producing specific antibodies to the antigen.

antigenic determinant: The individual surface feature of an antigen that elicits the production of a specific antibody in the course of the immune response. Each antigenic determinant, typically a few amino acids in size, causes the synthesis of a different antibody and thus exposure to a single antigen may result in the expression of a number of antibodies.

antigen-presenting cell (APC): A type of cell that provokes an immune response from T-cells by binding foreign antigens to its own surface and then interacting with the T-cells. Also known as antigen-processing cell.

antineoplastic: Inhibiting or preventing the development of abnormal tissue growth, checking the maturation and proliferation of malignant cells.

antioxidant: A molecule that protects cells from oxidative damage of oxygen and free radical molecules that are chemically unstable and cause random reactions damaging proteins, nucleic acids, and cell membranes. Examples of dietary antioxidants are vitamins C, E, and K, and diverse plant products such as lycopene, a nutraceutical found in tomatoes.

antipsychotic medication: Drugs to treat psychosis. These include atypical or typical antipsychotics.

antrum: A general term for cavity or chamber which may have specific meaning in reference certain organs or sites in the body. The antrum of the stomach (gastric antrum) is a portion before the outlet which is lined by mucosa which does not produce acid. The paranasal sinuses can be referred to as the frontal antrum, ethmoid antrum, and maxillary antrum.

anus: The opening of the rectum through which solid waste leaves the body.

aorta: The largest artery in the body which has its origin at the heart. It gives off branches to the extremities, neck and major organs for the purpose of supplying oxygenated blood.

aperiodic: Refers to the lack of symmetry in molecular structures or functions. An important insight into the mechanism of biological structures is their aperiodic composition and distribution of atoms causing the extraordinary complexity of cells.

aperture: Small opening, for example the opening in the test of a foram.

apex, apical: The tip or bottom of the prostate, e.g., the part of the prostate farthest away from the bladder; the top of the prostate is called the base.

apheresis: A painless procedure, similar to a blood transfusion, designed to remove certain components of a person’s blood, like platelets or stem cells, and return the remaining blood product back into the person’s body.

aphotic zone: The part of the ocean beneath the photic zone, where light does not penetrate sufficiently for photosynthesis to occur.

apical dominance: Concentration of growth at the tip of a plant shoot, where a terminal bud partially inhibits axillary bud growth.

apical meristem: Embryonic plant tissue in the tips of roots and in the buds of shoots that supplies cells for the plant to grow in length.

aplastic anemia: A condition where the bone marrow makes too few white blood cells, red blood cells and platelets.

aplastic: Lacking in cell production, as in aplastic anaemia.

apomorphic character: A derived phenotypic character, or homology, that evolved after a branch diverged from a phylogenetic tree.

apoplast: In plants, the nonliving continuum of the continuous matrix of cell walls.

apoptosis: A form of cell death in which a programmed sequence of events leads to the elimination of cells without releasing harmful substances into the surrounding area. Apoptosis plays a crucial role in developing and maintaining health by eliminating old cells, unnecessary cells, and unhealthy cells. The human body replaces perhaps a million cells a second. Too little or too much apoptosis plays a role in a great many diseases. When programmed cell death does not
work right, cells that should be eliminated may hang around and become immortal.

237 aposmatic coloration: The bright coloration of animals with effective physical or chemical defenses that acts as a warning to predators.

238 appeal: Application for review of records, medical history, insurance claim.

239 aquaporin: A transport protein in the plasma membranes of a plant or animal cell that specifically facilitates the diffusion of water across the membrane (osmosis).

240 aqueous solution: A solution in which water is the solvent.

241 arachidonic acid: An omega-6 fatty acid that has been shown to be a stimulator of PC growth; found in egg yolk, animal red meat, organ meats; has free-radical generating properties.

242 arachnoid: One of the three layers of the spinal cord meinges, interposed between the dura and pia mater, and separated from the pia mater by the subarachnoid space.

243 archaea: A prokaryotic form of life that forms a domain in the tree of life. There are three domains: bacteria, archaea, and eukarya. Bacteria are also prokaryotic organisms. Eukaryotes include animals, plants, fungi, and protozoan and have very different cell structures, bigger and with internal membrane bound structures (organelles). While bacteria and archaea look similar in structure, they have very different metabolic and genetic activity. One defining physiological characteristic of archaea is their ability to live in extreme environments. They are often called extremophiles and unlike bacteria and eukarya depend on either high salt, high or low temperature, high pressure, or high or low pH.

244 archegonium (pl. archegonia): In plants, the female gametangium, a moist chamber in which gametes develop.

245 archenteron: The endoderm-lined cavity, formed during the gastrulation process, that develops into the digestive tract of an animal.

246 archezoa: Primitive eukaryotic group that includes diplomonads, such as Giardia; some systematists assign kingdom status to archezoans.

247 arcus tendinous: A thickened whitish band of the pelvic fascia.

248 aromatase: An enzyme that converts testosterone to estrogen (estradiol or estrone).

249 arteriole: A very small artery.

250 arteriosclerosis: A chronic disease characterized by abnormal thickening and hardening of the arterial walls.

251 artery: A vessel that carries blood away from the heart to organs throughout the body.

252 arthritis: Inflammation of a joint. When joints are inflamed they can develop stiffness, warmth, swelling, redness and pain. There are over 100 types of arthritis.

253 a partial volume: the presence of different tissue types (e.g. healthy and malignant) within a spectroscopic volume leading to an averaging of the resulting spectra - a loss of resolution due to excessively large voxels, typically caused by scan slices that are too thick.

254 artificial insemination: The placement of sperm inside the female reproductive tract to improve the chances of fertilisation and pregnancy occurring. Artificial insemination is also called intrauterine insemination.

255 artificial organ: A device that performs the function of a natural organ, such as an artificial heart or ventricular assist device, artificial liver, and artificial lung.

256 artificial selection: The selective breeding of domesticated plants and animals to encourage the occurrence of desirable traits.

257 ascites: Abnormal buildup of fluid in the abdomen. Ascites can occur as a result of severe liver disease.

258 ascus (pl. asci): A saclike spore capsule located at the tip of the ascocarp in dikaryotic hyphae; defining feature of the Ascomycota division of fungi.

259 asexual reproduction: A type of reproduction involving only one parent that produces genetically identical offspring by budding or by the division of a single cell or the entire organism into two or more parts.

260 ashworth scale: Commonly used as an indicator of spasticity, measures the resistance of a muscle being stretched with a five-point scale ranging from 1 (no increase in tone) to 5 (limb rigid in flexion or extension).

261 aspiration: The inhalation of either food or stomach contents into the lower airways. This can lead to aspiration pneumonia and aspiration pneumonitis. Although these two diagnoses are managed differently, they are often interchangeably referred to as aspiration pneumonia.

262 assay: a method of performing a standard test for the quality or quantity of a substance. Assay results may vary depending on the methods, reagents and equipment used.

263 assimilation: The energy-requiring process by which plant cells convert nitrate ions (NO$_3^-$) taken up by the roots of plants into ammonium ions (NH$_4^+$), which can then be used in the synthesis of amino acids and other nitrogenous compounds.
264 assisted reproductive technology: Fertility treatments that involve a laboratory handling eggs or embryos, such as in vitro fertilization.

265 associative learning: The acquired ability to associate one stimulus with another; also called classical conditioning.

266 assortative mating: A type of nonrandom mating in which mating partners resemble each other in certain phenotypic characters.

267 astenic: Slender, weak, and lightweight.

268 astrocyte: A type of supporting (glial) cell found in the nervous system. A star-shaped cell that supports the tissue of the central nervous system.

269 asymmetric cell division: Type of cell division distinctive to stem cells. The cell divides into two cells that are different-one a stem cell like its parent, the other a more mature cell.

270 asymmetric division: One daughter cell quiescent and the other proliferating and moving away from site of division.

271 asymmetric carbon: A carbon atom covalently bonded to four different atoms or groups of atoms.

272 asymmetric cell division: The process where a stem cell undergoes mitotic cell division yielding two daughter cells. One daughter cell has much developmental potential as the mother cell to create another stem cell. The second daughter cell is more differentiated than the mother cell, and therefore has less developmental potential than the mother cell.

273 asymptomatic: Descriptive term for a person who does not appear to be affected by their disease (i.e., displays no symptoms); in the context of genetic diseases an “asymptomatic” patient may be a carrier.

274 atelectasis: Absence of air in the alveolar spaces resulting in incomplete expansion of the lungs at birth or collapse of the lungs of an adult.

275 athermal: Without heat.

276 atherosclerosis: A disorder of the arteries leading to reduced blood flow caused by the narrowing of blood vessels due to the accumulation of plaques composed up of cholesterols and fats.

277 atmospheric pressure: The weight of the Earth's atmosphere over a unit area of the Earth's surface.

278 atom (atomistic): The smallest unit of matter as recognized by chemical properties of molecules. Atoms are composed of protons, neutrons and electrons. The latter provide all properties described by molecular interactions and chemical reactions that are essential processes in biology.

279 atomic number: The number of protons in the nucleus of an atom, unique for each element and designated by a subscript to the left of the elemental symbol.

280 atomic weight: The total atomic mass, which is the mass in grams of one mole of the atom.

281 ATP synthase: A cluster of several membrane proteins found in the mitochondrial cristae (and bacterial plasma membrane) that function in chemiosmosis with adjacent electron transport chains, using the energy of a hydrogen-ion concentration gradient to make ATP. ATP synthases provide a port through which hydrogen ions diffuse into the matrix of a mitochondrion.

282 atrioventricular node: A group of slow-conducting fibers in the atrium of the vertebrate heart that are stimulated by impulses originating in the sinoatrial node (the pacemaker) and that conduct impulses to the bundle of His, a group of fibers that stimulate contraction of the ventricles.

283 atrioventricular valve: A valve in the heart between each atrium and ventricle that prevents a backflow of blood when the ventricles contract.

284 atrium [pl. atria]: A chamber that receives blood returning to the vertebrate heart.

285 atrophic: Undergoing atrophy or shrinkage in size and usually function.

286 atrophy: A wasting or decrease in size of a body organ, tissue, or part owing to disease, injury, or lack of use: muscular atrophy of a person affected with paralysis, a wasting away, deterioration, or diminution: intellectual atrophy.

287 attentive DRE: A DRE described for PCA3 test as applying firm digital pressure to the prostate from base to apex and from the lateral to the median line for each lobe with exactly three strokes per lobe.

288 atypia: State of being not typical.

289 atypical hyperplasia (atypia): Non typical enlargement of an organ or tissue.

290 AUA Symptom Score: An evaluation of the lower urinary tract symptoms (LUTS) based on questions published by the American Urological Association.

291 autoantibody: An antibody that reacts with antigens found on the cells and tissues of an individual's ownbody. Autoantibodies can cause autoimmune diseases.

292 autocrine signaling: Signaling in which a cell secretes a hormone or chemical messenger that binds to a cell surface receptor on the same cell that produced it.

293 autocrine: Of, relating to, promoted by, or being a substance secreted by a cell and acting on surface receptors of the same cell.

294 autogenesis model: According to this model, eukaryotic cells evolved by the specialization of internal membranes originally derived from prokaryotic plasma membranes.
Autoimmune disease: A condition that results from T cells and/or antibodies that attack the cells or tissues of an individual's own body.

autoimmune disease: A disease where one own body starts attacking itself and destroying its own cells.

autoimmune: A condition where the immune system attacks some part of the body that it should not consider as foreign, eg, rheumatoid arthritis.

autologous bone marrow transplant: A bone marrow/blood stem cell transplant in which the patient's own cells are used.

autologous stem cells: Stem cells that are used to augment, repair, replace or regenerate organs and tissues and are genetically identical to the recipient. A hematopoietic stem cell transplant (bone marrow transplant) that uses the patient's own hematopoietic stem cells is a clinical example of an autologous transplant in which the patient uses his or her own blood-forming hematopoietic stem cells to treat the disease. Autologous hematopoietic stem cells are derived from the patient's own bone marrow or umbilical cord blood. An allogeneic stem cell transplant uses cells from a donor other than the patient to augment, repair, replace or regenerate diseased and/or damaged organs and tissues.

autologous regenerative medicine: Transplantation of cells, tissues, or organs derived from and genetically essentially identical to the recipient himself.

autologous transplantation: Cell, tissue, or organ transplants from one person back to the same person. Such transplants from self do not induce an immune response and are not rejected. In one example, a cancer patient may have her HSC or bone marrow removed and stored during treatment with sufficient radiation or chemical therapy to kill all blood-forming cells (and, perhaps, all cancer cells), and then her blood-forming capacity is rescued with autologous HSC or bone marrow.

autologous: Biological materials such as cells, tissues, or organs used for transplantation and derived from the recipient himself.

autonomic dysreflexia: A condition associated with damage to the spinal cord above the mid thoracic level characterized by a marked increase in the sympathetic response to minor stimuli such as bladder or rectal distention or a pressure ulcer. Symptoms can include sweating, high blood pressure, headache, heart rate changes, and flushing of the skin.

autonomic nervous system: A subdivision of the motor nervous system of vertebrates that regulates the internal environment; consists of the sympathetic and parasympathetic divisions.

average: A type of polyploid species resulting from one species doubling its chromosome number to become tetraploid, which may self-fertilize or mate with other tetraploids.

autosomal dominant: Some forms of CMD, in particular Ullrich and lamin A/C related CMD, may be inherited in an autosomal dominant fashion. Autosomal dominant means you need only one mutation to have the disease. Autosomal dominant diseases usually have an affected parent, because the parent carries one mutated copy of the gene which then gets passed to the child who has the disease. More often in families with a child affected by CMD, the mutation will be a de novo mutation, meaning it has arisen spontaneously, and the parent does not have it, but the child does.

autosomal recessive: Most forms of CMD are inherited in an autosomal recessive fashion. This means both parents contribute a mutation in the same gene to their child. The child must have both mutations to have CMD. The parents are both carriers of CMD and are unaffected. The child may inherit a different mutation from each parent in the same gene (heterozygous). If the child inherits the same mutation from both parents, it is called homozygous.

autosomal: Refers to genes that are not found on the sex chromosomes. Those chromosomes that are not XX and XY, i.e. sex-linked.

autosome: A chromosome that is not directly involved in determining sex, as opposed to the sex chromosomes. These determine the unique human characteristics. There are 22 from each parent and thus we inherit certain characteristics from each of them while at the same time being physically unique, not to mention the unique souls. Autosomes carry genes that determine human physical, physiological and biochemical makeup. There are about 40,000 genes in each human.

auxin: A class of plant hormones, including indoleacetic acid (IAA), having a variety of effects, such as phototropic response through the...
stimulation of cell elongation, stimulation of secondary growth, and the development of leaf traces and fruit.

auxotroph: A nutritional mutant that is unable to synthesize and that cannot grow on media lacking certain essential molecules normally synthesized by wild-type strains of the same species.

aves: The vertebrate class of birds, characterized by feathers and other flight adaptations.

avian influenza: Referred to as the "bird flu", this is a highly contagious influenza virus that can infect any bird.

avulse: To pull off or tear away.

axial spin-echo T1 weighted image: An image acquired in the axial plane using a pulse-sequence that weights the signal intensity of each pixel to the T1 (the time it takes for water protons to return to thermal equilibrium) relaxation of water.

axillary bud: An embryonic shoot present in the angle formed by a leaf and stem.

axis: A straight line passing through a spherical body between its two poles. The central line of the body or any of its parts. The vertebral column. The central nervous system. An artery that when created, immediately divides into a number of branches.

axon: The cell extension of a neuron (nerve cell) that carries an electrical signal to synapses which are secreting chemical signaling molecules called neurotransmitters to stimulate/inhibit receiving cells.

ayurvedic medicine: The traditional medicine of India.

azotemia: Elevation in blood nitrogen level due to dehydration or kidney dysfunction; in laboratory tests this manifests as elevation in BUN and/or creatinine.

B cell: A lymphocyte (a type of white blood cell) derived from stem cells in the bone marrow. Each B Cell has a unique set of receptor molecules on its surface designed to recognize a specific antigen (substances, usually protein, that the body regards as foreign).

baby aspirin: Low dose aspirin (80-100 mg) used in infertility treatment to increase blood flow to the uterus. Often used in conjunction with Heparin in patients with immune problems.

bacillus thuringiensis: A species of soil bacterium that possess genes for a group of insecticides (Bt toxins). Different strains of the bacterium produce different Bt toxins. Some organic farmers use this bacterium as an alternative to using chemicals to control pest insects. The genes for Bt toxins have been added to GM cotton plants so that the plants produce the insecticides.

bacteria: Microorganisms that consist of a single cell. Bacteria, like all living things, have their own genomes. They also have the ability to exchange genes with other bacteria. This "swapping" of DNA may help explain how genes that confer resistance to anti-bacterial drugs have spread among many species.

bacterial artificial chromosome (BAC): A molecule, derived from bacteria, used to carry the DNA of humans or another species in genetics research.

bacterial vaginosis: It occurs when the normal balance of bacteria in the vagina changes and an overgrowth of some bacteria normally found in the vagina occurs. It is associated with infertility, miscarriage, pre-term birth, and low-birth weight babies.

bacterial: Of or pertaining to bacteria. For example, a bacterial lung infection.

bacteriophage: Virus which infects and destroys a bacterial host. Some phages, however, will incorporate their DNA into that of their host, and remain dormant for an extended period. For this reason, they have become essential tools of genetic engineers.

bacterium (pl. bacteria): A prokaryotic microorganism in Domain Bacteria.

baculovirus: A type of virus that specifically infects insect cells.

bagasse: The dry, fibrous residue that remains after the stalks of sugar cane have been crushed and all the juice extracted. It can be used as a source of cellulose for some paper products.

balanced polymorphism: A type of polymorphism in which the frequencies of the coexisting forms do not change noticeably over many generations.

balanced translocation (BT): Is when a person has the correct number of chromosomes, but the pieces are joined up incorrectly. The problem can be inherited from one parent and then balanced out by the other. If both partners have similar problems, recurrent miscarriage may occur.

barium enema: A radiographic diagnostic procedure that involves the introduction of a barium containing contrast material into the lower gastrointestinal tract via the anus. X-rays taken after instillation of the barium will outline the course and anatomy of the lower GI tract.

bark: All tissues external to the vascular cambium in a plant growing in thickness, consisting of phloem, phelloderm, cork cambium, and cork.

barr body: A dense object lying along the inside of the nuclear envelope in female mammalian cells, representing an inactivated X chromosome.

barrett esophagus: A change in the cells of the tissue that lines the bottom of the esophagus. The
esophagus may become irritated when the contents of the stomach back up (reflux). Reflux that happens often over a period of time can lead to Barrett's esophagus.

basal and squamous cell carcinoma: Most cancer registries in North America do not register cases of basal and squamous cell carcinoma. Most often, basal and squamous cell carcinomas pose little harm to the individuals if they are detected early and treated properly. Mortality from basal and squamous cell carcinoma is low.

basal body temperature (BBT): The body temperature when taken at its lowest point, usually in the morning before getting out of bed. Charting BBT is used to predict ovulation. BBTs are not very reliable while taking fertility medications. Biphasic: A BBT pattern consistent with ovulation and the formation of the corpus luteum, which secretes progesterone. This hormone will elevate the basal body temperature about one-half degree during the latter half of the menstrual cycle. Monophasic: An anovulatory BBT pattern where the temperature remains relatively constant throughout the cycle. Triphasic: Similar to a biphasic BBT pattern, but adds a jump to a third level of temperatures around the time implantation should occur and may indicate pregnancy.

basal body: A eukaryotic cell organelle consisting of a 9 + 0 arrangement of microtubule triplets; may organize the microtubule assembly of a cilium or flagellum; structurally identical to a centriole.

basal metabolic rate (BMR): The minimal number of kilocalories a resting animal requires to fuel itself for a given time.

base pairs: Pairs of complementary bases that form each rung of the DNA double helix. Adenine pairs with thymine and cytosine pairs with guanine.

base sequence: The order of the chemical units (bases) adenine, thymine, cytosine and guanine in DNA that forms the genetic code. The sequence of the bases will determine what protein is produced.

base: Part of 4 types of simple molecules or nucleotides (adenine, thymine, cytosine and guanine) that are the sub-units (building blocks) of DNA and RNA.

baseline PSA (bPSA): The PSA level before a new treatment has begun; used to establish efficacy of a therapy based on response of the PSA to the treatment; can also be used in principle with any other marker, radiologic imaging study or any finding that shows pathology relating to PC.
benign prostatic hyperplasia (BPH): A benign condition in which an overgrowth of prostate tissue pushes against the urethra (which passes through the prostate) and the bladder, blocking the release of urine.

benign prostatic hypertrophy (BPH): Similar to benign prostatic hyperplasia, but caused by an increase in the size of cells rather than the growth of more cells.

benign: Relatively harmless; not cancerous; not malignant.

benthic zone: The bottom surfaces of aquatic environments.

benzene: A colorless and flammable toxic liquid used in organic synthesis, as a solvent, and as a motor fuel. Exposure to benzene can increase the risk of cancer and lead to anemia and a decrease in blood platelets.

Beta-HCG test: A blood test used to detect very early pregnancies and to evaluate embryonic development. A beta test usually refers to a quantitative hCG in which the units of hCG are counted, but it sometimes refers to a qualitative (yes/no) test that reads to an hCG level under 50 (level is lab dependent).

Beta-particle: A charged particle (electron or positron) that is emitted by the decay of certain radioactive atoms.

bevacizumab (Avastin®): An anti-angiogenesis drug used in treatment of cancer. It is used in combination with standard chemotherapy drugs in patients with metastatic colorectal cancer.

bicalutamide (Casodex®): A nonsteroidal antiandrogen available in the USA and some European countries for the treatment of advanced prostate cancer.

bicorunate uterus: A congenital malformation of the uterus where the upper portion (horn) is duplicated.

bid or b.i.d.: To be taken twice a day (morning and evening); stands for "bis in die" (in Latin, 2 times a day)

biennial: A plant that requires two years to complete its life cycle.

big pharma: The giant pharmaceutical corporations of the world, who seek to control all access to health, and to limit the use of healing practices that they do not control.

bilateral symmetry: Characterizing a body form with a central longitudinal plane that divides the body into two equal but opposite halves.

bilateria: Members of the branch of eumetazoans possessing bilateral symmetry.

bile: A yellow secretion of the vertebrate liver, temporarily stored in the gallbladder and composed of organic salts that emulsify fats in the small intestine.

bi-level positive airway pressure: Form of noninvasive ventilation respiratory support providing oxygen and pressure to the lungs to make it easier for a patient to breathe. With BiPAP therapy, there are two different pressure settings for the patient. The bipap machine is able to detect how much pressure a patient needs and supply the adequate amount of air pressure on inhalation and exhalation. The dual settings of the BiPAP machine, allows patients to get more air into, and out of the lungs without the normal muscular activity needed to do so.

billroth operation I (Billroth I anastomosis): Excision of the pylorus with end-to-end anastomosis of stomach and duodenum.

billroth operation II (Billroth II anastomosis): Resection of the pylorus with the greater part of the lesser curvature of the stomach, closure of the cut ends of the duodenum and stomach, followed by a gastrojejunostomy.

bimix, bi-mix: Usually refers to a mixture of papaverine and phentolamine that is injected into the penis to cause an erection.

binary fission: The type of cell division by which prokaryotes reproduce; each dividing daughter cell receives a copy of the single parental chromosome.

binet: A staging system for lymphomas.

binomial: The two-part Latinized name of a species, consisting of genus and specific epithet.

biochemical control: Control of a biochemical marker, such as an antigen (ex: PSA), antibody, abnormal enzyme (ex: PAP), or hormone that is sufficiently altered in a disease to serve as an aid in diagnosing or in predicting susceptibility to the disease.

biochemical failure: Loss of biochemical control.

biochemical pathway: An ordered series of chemical reactions in a living cell, in which each step is catalyzed by a specific enzyme; different biochemical pathways serve different functions in the life of the cell.

biopolymers: Involving chemical processes in living organisms.

biocide: Any chemical agent that can kill a living organism. For example, pesticides kill insects.

biocatalyst: A protein that can speed up biochemical reactions.

biocontainment: A process aimed at keeping biological organisms within a limited space or area. For example, if an outbreak of a cow disease is found on one farm, a biocatalyst process would aim at stopping the disease from spreading to other farms.

biodiesel: An alternative fuel for use in diesel engines that is made from natural renewable
sources such animal fats or vegetable oils, and does not contain petroleum. It has similar properties to petroleum but releases fewer environmental pollutants in its emissions. Biodiesel can be used in diesel engines with little or no modifications, either as a diesel fuel substitute, or added to petroleum-based fuels to reduce their polluting effect. Examples include oils from soybeans, rapeseed, sunflowers or animal tallow. biodiversity hotspot: A relatively small area with an exceptional concentration of species.
bioenergetics: The study of how organisms manage their energy resources.
bioethics: The study of the ethical and moral implications of applications of biomedical research and biotechnology.
biofeedback: A procedure that uses electrodes to help people gain awareness and control of their pelvic muscles.
biofouling: Living organisms that attach to and start living on any object that is submerged in the sea. Commonly seen as barnacles attached to the hulls of ships or the bodies of whales.
biogeochemical cycles: The various nutrient circuits, which involve both biotic and abiotic components of ecosystems.
biochemistry: The study of chemicals that are part of living organisms.
biohazard: A potential threat to human health.
biosafety cabinet: A cabinet that filters air to prevent biohazards from escaping or contamination of the culture from outside air. If the cabinet has a higher safety rating, it can be used in more clinical settings so that a patient’s cells remain safe.
biosciences: The science of biology. In the case of Regenececell - human biology and medicine.
biosphere: The entire portion of Earth that is inhabited by life; the sum of all the planet's communities and ecosystems.
biosynthesis: Formation by living organisms of organic compounds from elements or simple compounds.
biotech: The use of biological knowledge, microorganisms and biological processes in environments
metastases are usually blastic; breast cancer involved by prostate cancer and looking whiter on an ordinary x-ray; associated with increased density of bone. blast crisis: The stage of chronic myelogenous leukemia when large amounts of blast cells are found in the blood. blastocele: The fluid-filled cavity that forms in the center of the blastula embryo. blastocyst stage: An early stage in the development of embryos, when (in mammals) the embryo is a spherical body comprising an inner cell mass that will become the fetus surrounded by an outer ring of cells that will become part of the placenta. (CR) blastocyst transfer: Allowing in vitro fertilized embryos to reach blastocyst stage, usually 5 days, before transferring the embryos into the uterus. blastocyst: An embryo that has developed for five days after fertilization. At this point the embryo has two different cell types and a central cavity. The surface cells (trophoderm) will become the placenta, and the inner cell mass, will become the fetus. A healthy blastocyst should hatch from the zona pellucida by the end of the sixth day. Within about 24 hours after hatching, it should begin to implant into the lining of the uterus. The human blastocyst is an embryo at an early stage of development, it is formed about five days after fertilization and is made of about 70-100 cells.

biotreatment: The treatment of a waste or hazardous substance using organisms such as bacteria, fungi and protozoa.

biphasic: Walking upright on two feet.

biotofact: Scientists who use biological processes to develop novel products.

biotechnology: (1) A broad term generally used to describe the use of biology in industrial processes such as agriculture, brewing and drug development. The term also refers to the production of genetically modified organisms or the manufacture of products from genetically modified organisms. (2) The use of plants, animals and micro-organisms to create products or processes. Traditional applications include animal breeding, brewing beer with yeast, and cheese making with bacteria. Recent developments include the use of enzymes or bacteria in a wide range of applications, including waste management, industrial production, food production and remediation of contaminated land. Modern biotechnology also includes the use of gene technology, which allows us to move genetic material from one species to another.

biotic: Pertaining to the living organisms in the environment.

biotinylation: The attachment of biotin to chemical sites can be used to study various processes including protein interactions and DNA transcription.

biphasic: Having two phases. Used to describe BBT charts that show a clear shift from the follicular phase (before ovulation) to the luteal phase (after ovulation).

bisphosphonates (BPs): Any of a group of carbon-substituted analogs of pyrophosphate that are potent inhibitors of osteoclast-mediated bone resorption.

bladder: The hollow organ in which urine is collected and stored in the body.

blade: (1) The broad, expanded part of a leaf. (2) The broad, expanded photosynthetic part of the thallus of a multicellular alga or a simple plant.

blast cells: Cells that are not fully formed.

blast crisis: The stage of chronic myelogenous leukemia when large amounts of blast cells are found in the blood.

blastic: Having a dense appearance on a plain x-ray; associated with increased density of bone involved by prostate cancer and looking whiter on an ordinary x-ray; prostate cancer bone metastases are usually blastic; breast cancer metastases are usually lytic (showing evidence of less bone density in areas of cancer)

blastocoel: The fluid-filled cavity that forms in the center of the blastula embryo.

blastocyst stage: An early stage in the development of embryos, when (in mammals) the embryo is a spherical body comprising an inner cell mass that will become the fetus surrounded by an outer ring of cells that will become part of the placenta. (CR)
blood chemistry: Measured concentrations of many chemicals in the blood; abnormal values can indicate spread of cancer or side effects of therapy.

blood count: Analysis of blood cells including white blood cells, red blood cells and platelets; abnormal values can indicate cancer in the bone or side effects of therapy.

blood glucose (BG): Blood sugar. Affected by food that is consumed.

blood pressure: The hydrostatic force that blood exerts against the wall of a vessel.

blood stem cells: Cells found in the blood that can grow into a red blood cell, a white blood cell or a platelet. Also called hematopoietic stem cells.

blood transfusion: The transfer of blood or blood products from one person to another.

blood type: The major blood types identify the presence or absence of three proteins on the outside of blood cells. These proteins are called “A”, “B”, and “Rh”. Although it has not been demonstrated to be necessary, umbilical cord blood transfusions are generally matched according to ABO and Rh blood type.

blood urea nitrogen (BUN): A reflection of kidney function.

blood: A circulating tissue composed of fluid plasma and cells (red blood cells, white blood cells and platelets).

blood-borne diseases: Infectious diseases which can be transmitted by exposure to infected blood. Some of these types of diseases are HIV/AIDS, hepatitis B and C, cytomegalovirus, Syphilis, etc. These are infectious, not inherited diseases.

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StemTech Labs checks all donated blood and tissues for blood borne illnesses at a US lab.

Blood-brain barrier: A functional barrier between the circulatory system and the spinal fluid that bathes and nourishes the brain. This barrier prevents passage of many toxic substances into the brain. It may be a barrier to migration of stem cells from the bloodstream into the brain, but some studies have demonstrated the passage of neuronal stem cells through the blood brain barrier. Some stem cell therapist use the sugar mannitol to make the blood brain barrier more permeable and help the stem cells to cross into the brain.

Bloom syndrome: Congenital telangiectatic erythema, primarily in butterfly distribution, of the face and occasionally of the hands and forearms, with sensitivity of skin lesions and dwarfism with normal body proportions except for a narrow face and dolichocephalic skull; chromosomes are excessively fragile; autosomal recessive inheritance.

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blot: A nitrocellulose sheet that contains spots of immobilized macromolecules or their fragments and that is used to identify specific components of the spots by applying a suitable molecular probe.

B-mode acquisition and targeting (BAT): An ultrasound evaluation of the prostate localizing it prior to each and every RT therapy treatment; currently used in conjunction with IMRT and mechanically integrated into the treatment program.

Bond energy: The quantity of energy that must be absorbed to break a particular kind of chemical bond; equal to the quantity of energy the bond releases when it forms.

Bone marrow aspiration: A procedure involving a fine needle used to remove a sample of liquid bone marrow for review under a microscope.

Bone marrow biopsy: The removal of a sample of tissue from the bone marrow with a needle for examination under a microscope.

Bone marrow cell: Refers to both hematopoietic cells and mesenchymal (stromal) cells.

Bone marrow harvest: A surgical procedure used to collect bone marrow. The bone marrow harvest takes place in a hospital operating room, usually under general anesthesia. The bone marrow is extracted with a needle and syringe.

Bone marrow stem cell (BMSC): The most primitive cells in the bone marrow. From them, all the various types of blood cells are descended. Often referred to as an Adult Stem Cell. Bone Marrow stem cells are considered to be pluripotent.

Bone marrow stromal cell: Also known as mesenchymal stem cells, bone marrow stromal cells are a mixed population of cells derived from the non-blood forming fraction of bone marrow. Bone marrow stromal cells are capable of growth and differentiation into a number of different cell types including bone, cartilage and fat.
bone marrow transplant (BMT): A procedure developed to treat some forms of cancer and other diseases. There are several types of BMT’s, depending on who donates the marrow. Stem cells are removed from the bone marrow for transplant.

bone marrow transplant: A procedure in which bone marrow that is diseased or damaged is replaced with healthy bone marrow. The bone marrow to be replaced may be deliberately destroyed by high doses of chemotherapy and/or radiation therapy.

bone marrow transplantation (BMTx): Transplantation of bone marrow from one individual to another. Autologous BMTx is a process in which a patient’s healthy bone marrow is withdrawn and preserved, then injected back into the patient to restore the production of healthy blood and immune cells by the bone marrow. This strategy is often used in patients with certain types of cancer who have undergone radiation therapy or chemotherapy that destroys the bone marrow cells.

bone marrow: The reddish substance found in the central canals of many bones. Bone marrow functions to produce blood cells. Bone marrow is often damaged by chemotherapy or radiotherapy in cancer treatment, and can be reconstituted by transplanting bone marrow or umbilical cord blood cells.

bone mineral density (BMD): A measure of the strength of bones, androgen deprivation can cause the loss of BMD resulting in osteoporosis, usually BMD is tested by dual-energy absorption x-ray (DEXA) or quantitative CAT scan (qCT) methods.

bone morphogenetic proteins (BMPs): Proteins that are involved in the formation of embryonic bone. BMPs operate at several stages in this formation of bone, beginning with the early stages of morphogenesis and continuing to late postnatal life. BMPs also play a critical role in the development of the central nervous system.

bone scan: A technique more sensitive than conventional x-rays which uses a radiolabelled agent to identify abnormal or cancerous growths within or attached to bone; in the case of prostate cancer, a bone scan is used to identify bony metastases which are definitive for cancer which has escaped from the prostate; metastases appear as "hot spots" on the film; however the absence of hot spots does not prove the absence of tiny metastases.

bone: The hard skeleton that forms the structure of the body, composed of calcium phosphate and calcium carbonate.
Bt is an abbreviation of Bacillus thuringiensis, a soil micro-organism called Bacillus thuringiensis. Bt toxins: Insecticidal proteins produced by the ingard® cotton. Bt crops: Crop plants that contain genes for Bt toxins. Examples are Bollgard® cotton and ingard® cotton. Bt toxins: Insecticidal proteins produced by the soil micro-organism called Bacillus thuringiensis. Bt is an abbreviation of Bacillus thuringiensis.
C4 pathway: The set of reactions by which some plants initially fix carbon in the four-carbon compound oxaloacetic acid; the carbon dioxide is later released in the interior of the leaf and enters the Calvin cycle.

C4 plant: A plant that prefaces the Calvin cycle with reactions that incorporate CO₂ into four-carbon compounds, the end-product of which supplies CO₂ for the Calvin cycle.

CA 125 (Cancer Antigen 125): CA 125 is a protein made by certain cells in the body which include those of the uterus, uterine tubes, cervix, abdomen, and chest (pleura and lungs). Elevated CA 125 can be caused by many conditions such as peritonitis, pleuritis, menstruation, pregnancy, endometriosis, liver disease, benign ovarian growths, and by cancers of the uterine tubes, endometrium, lung, breast, and gastrointestinal tract.

cachexia: Physical wasting with loss of weight and muscle mass caused by disease.

calcification: Impregnation with calcium or calcium salts. Also called calcareous infiltration.
calcitriol (1,25-dihydroxycholecalciferol): A hormone related to vitamin D that is synthesized in the liver and kidney and stimulates the intestinal absorption of calcium and phosphorus.
calcium: A silver-white bivalent metallic element originating when most of the major body plans of animals appeared in a relatively brief time in geological history; recorded in the fossil record about 545 to 525 million years ago.
cAMP (cyclic adenosine monophosphate): A molecular mediator or messenger of important cellular and neuronal processes.
cancer cells: Uncontrolled growth of abnormal cells in the body. Cancer cells can grow, divide, and invade normal tissue in the body.
cancer control: Cancer Control is the conduct of research and the translation of knowledge from research into strategies and actions to prevent cancer and to increase survival and quality of life for those touched by cancer. A simplified definition of "cancer control" is: Any activity that reduces the morbidity (sickness, disease) or mortality (death) from cancer.
cancer prevention: Cancer prevention research involves the development and evaluation of strategies for reducing cancer incidence. Such strategies could be aimed at preventing the initiation of the neoplastic process or at avoiding the progression to malignancy of already initiated cells. These efforts, which may be multidisciplinary and multifactorial, can involve a broad range of studies at the molecular, cellular, organismal and population levels.
cancer stem cell: Stem cells, which make up only a very small percentage of the total tumor mass, have been found to be the source of some, and possibly most cancers. The cancer stem cell hypothesis states that certain stem cells remain in tissues to replenish them after injury or disease, yet because they are self-renewing and can survive for a longer period of time, the adult stem cells can also accumulate mutations which would cause them to spin off cells that divide uncontrollably, forming a tumor. Since current cancer treatments reduce tumor mass but might not affect the stem cells seeding the tumor, new therapeutic strategies may be directed at the cancer-causing stem cells.
cancer: Cancer is a group of more than 100 different diseases. Benign tumours are not cancer; malignant tumours are cancer. Most cancers are
named for the type of cell or the organ in which they begin. When cancer spreads (metastasizes), the new tumour has the same name as the original (primary) tumour.

cancer-initiating cell: General term that encompasses both cancer cell of origin and cancer stem cell.

candidiasis (yeast): An infection that may be uncomfortable and itchy and may impair fertility.
cannula: A hollow tube like that used for insemination.
capacitation: A process that sperm undergo as they travel through the woman's reproductive tract. Capacitation enables the sperm to penetrate the egg.

capecitabine (trade name Xeloda®): A drug first used to treat metastatic breast cancer in patients who had not responded well to chemotherapy. In some patients, capecitabine helps shrink tumor size by killing cancer.
capillary action: The movement of water or any liquid along a surface; results from the combined effect of cohesion and adhesion.
capillary: A microscopic blood vessel that penetrates the tissues and consists of a single layer of endothelial cells that allows exchange between the blood and interstitial fluid.
capsid: The protein shell that encloses the viral genome; rod-shaped, polyhedral, or more completely shaped.
capsular penetration: Tumor extends through the wall of the prostate.
capsule: (1) A slimy layer around the cells of certain bacteria. (2) The sporangium of a bryophyte.
carbohydrate: A chemical compound that contains only carbon (C), hydrogen (H), and oxygen (O) and has the general formula Cx (H2O)y. Examples include sugars, starches and cellulose. Plant carbohydrates constitute a major food class and are a basic source of energy for all animals.
carbon cycle: Worldwide circulation and reutilization of carbon atoms, chiefly due to metabolic processes of living organisms. Inorganic carbon, in the form of carbon dioxide, is incorporated into organic compounds by photosynthetic organisms; when the organic compounds are broken down in respiration, carbon dioxide is released. Large quantities of carbon are "stored" in the seas and the atmosphere, as well as in fossil fuel deposits.
carbon fixation: The incorporation of carbon from CO2 into an organic compound by an autotrophic organism (a plant, another photosynthetic organism, or a chemoautotrophic bacterium).
carotenoid: Orange, yellow or red-colored accessory photosynthetic pigments, related to vitamin A, found in higher plants and photosynthetic bacteria.

carotenoids: Accessory pigments, yellow and orange, in the chloroplasts of plants; by absorbing wavelengths of light that chlorophyll cannot, they broaden the spectrum of colors that can drive photosynthesis.

carpel: The female reproductive organ of a flower, consisting of the stigma, style, and ovary.

carrier testing: Carrier testing can determine if a person carries one of the altered genes that cause a recessive disease. DNA carrier testing establishes the presences or absences of particular mutation(s). Enzymatic testing evaluates the level of activity of an enzyme, which when absent causes disease. In some diseases the enzyme test is not sensitive enough to determine carrier status.

carrier: A person who possesses at least one gene that may contribute to disease in offspring. Carriers may not develop the disease themselves, but they can transmit it by passing the mutated gene (or genes) to their offspring.

cartilage: A type of connective tissue that is firm but resilient. It is found in joints and also as supportive structure, for example in the ears.

casefinding cycle: Identifying source documents; determine reporting methods (active, passive, or a combination); linking the identified cases.

casefinding: Casefinding is a system for locating every patient - inpatient or outpatient, public or private - who is diagnosed and/or treated with a reportable malignancy.

casodex®: Brand or trade name of bicalutamide in the USA, a non-steroidal antiandrogen.

caspsonian strip: A water-impermeable ring of wax around endodermal cells in plants that blocks the passive flow of water and solutes into the stele by way of cell walls.

castration: A level associated with what occurs after castration; traditionally surgical removal of the testicles; a castrate testosterone is defined by most physicians as less than 20 ng/ml or less than 0.69 nM/L; (nM/L x 28.8 = ng/dl).

castration: The use of surgical or chemical techniques to eliminate testosterone produced by the testes.

castration-resistant prostate cancer: Progression of disease with serum testosterone controlled below a castrate level.

catabolic pathway: A metabolic pathway that releases energy by breaking down complex molecules into simpler compounds.
potential. This cell forms the main part of the RegeneCell treatment regimen. CD stands for “cluster of differentiation” molecule and is the molecule found on the surface of the cell, which enables identification of this cell type.

CD cluster designation: Used with a number to indicate a cell surface marker.

CD133: Also referred as Prominin. A marker of LHSC.

CD33: Present on committed progenitors in the myeloid lineages.

CD38: Not detectable on Lymphohematopoietic stem cells but begin to appear as the cells commit towards a lineage.

CD4: Another name for a “helper” T-cell. In humans, it is a receptor for HIV, enabling the virus to gain entry into its host.

CD4: Helper T cells that are instrumental in initiating an immune response by supplying help in the form of special cytokines to both CD 8 cytotoxic T cells and B cells.

CD8: Cytotoxic (killer) T cells that are capable of killing infected cells once activated by cytokines secreted by antigen-specific CD4 helper T cells.

CDK-1 (cyclin-dependent kinase inhibitor): A regulator of cell growth; an enzyme inhibitor.

celecoxib (Celebrex®): An FDA-approved drug for the treatment of rheumatoid arthritis, osteoarthritis and pain; it has also been reported to block Akt function and cause the death of human prostate cancer cell lines.

celiac disease: A disorder in children and adults; inability to tolerate wheat protein (gluten); symptoms include foul-smelling diarrhea and emaciation; often accompanied by lactose intolerance.

cell based therapies: This is the treatment in which stem cells are induced to differentiate into the specific cell type required to repair damaged or depleted adult cell populations or tissues. Many degenerative diseases, as well as damage to organs, may be treated this way.

cell center: A region in the cytoplasm near the nucleus from which microtubules originate and radiate.

Cell characterization: Identification of cells as those of a particular type, such as mesenchymal stem cells, muscle cells, blood cell precursors, etc. Since most stem cells and cell precursors look the same under the microscope, characterization of stem cells usually calls for the use of specialized molecular probes and sophisticated instruments, like a flow cytometer.

Cell culture: The growth of cells in the laboratory in an artificial medium for the purposes of experimental research.

cell cycle: The cell cycle, or cell-division cycle, is the series of events that takes place in a cell that lead to the replication of its DNA and the division of the parent cell into two daughter cells. In cells without a nucleus (prokaryotes), the cell cycle occurs via a process termed binary fission. In cells with a nucleus (eukaryotes), the cell cycle consists of 4 phases: G1 phase (growth), S phase (synthesis), G2 phase (collectively known as interphase) and M phase (mitosis). One of the hurdles facing the therapeutic use of iPS cells is their tumorigenic potential, which is caused by the up-regulation or over-expression of the known proto-oncogene (increasing cell cycle) and reprogramming factor, c-Myc. Recent scientific evidence has shown that c-Myc is a dispensable reprogramming factor, bringing the field one step closer to therapeutic application. Many research groups have demonstrated that reprogramming efficiency is greatly improved when tumor suppressor proteins, such as p53, are temporarily down-regulated. This finding further supports the importance of an active cell cycle for the reprogramming process.

cell division: The method by which a single cell divides to create two cells. There are two main types of cell division depending on what happens to the chromosomes: mitosis and meiosis.

cell fate: In developmental biology, cell fate describes what a particular cell at a given stage of development will eventually give rise to.

cell fractionation: The disruption of a cell and separation of its organelles by centrifugation.

cell fusion: Merging of two cells into one, creating a hybrid cell. The hybrid usually takes on characteristics from both of the original cells.

cell line: Cells of a particular type that can be maintained and grown in culture, outside the body in a Petri dish. Culture conditions can vary widely for different cell types, with many factors adjusted to enable the cells to thrive and divide. These factors may include temperature, gas composition, pH, glucose concentration, and the presence of growth factors and other nutrients. Cell lines can be used in biological assays to decipher molecular pathways or screen for new therapeutics, greatly facilitating the study of natural and disease biology in the laboratory.

cell membrane: The outer membrane of a cell, which separates it from the environment. Also called a plasma membrane or plasmalemma.

cell migration: Cell acquire motility and move to a different location.

cell passaging: In order to grow cells for extended periods scientists passage or split groups up. In
the case of embryonic stem cells, passaging helps to keep the cells in their primitive state.

cell plate: A double membrane across the midline of a dividing plant cell, between which the new cell wall forms during cytokinesis.

cell release: Movement of bone marrow cells out of the sinus into the peripheral circulation.

cell replacement therapy: Reconstitution of tissue by functional incorporation of transplanted stem-cell progeny. Distinct from 'bystander' trophic, anti-inflammatory, or immunomodulatory effects of introduced cells.

cell theory: All living things are composed of cells; cells arise only from other cells. No exception has been found to these two principles since they were first proposed well over a century ago.

cell type: A specific subset of cells within the body, defined by their appearance, location and function. E.g. heart cells, liver cells, nerve cells etc.

cell wall: A protective layer external to the plasma membrane in plant cells, bacteria, fungi, and some protists. In the case of plant cells, the wall is formed of cellulose fibers embedded in a polysaccharide-protein matrix. The primary cell wall is thin and flexible, whereas the secondary cell wall is stronger and more rigid, and is the primary constituent of wood.

cell: The cell is the basic structural and functional unit in people and all living things. Each cell is a small container of chemicals and water wrapped in a membrane. Each cell in the human body — there are 100 trillion cells in each of us — contains the entire human genome, all the genetic information necessary to build a human being. This information is encoded within the cell nucleus in 6 billion base pairs, subunits of DNA, packaged in 23 pairs of chromosomes, one chromosome in each pair coming from each parent. Each of the 46 human chromosomes contains the DNA for thousands of individual genes, the units of heredity.

cell-based therapies: Involve transplanting stem cells into damaged tissues to regenerate the various cell types of that tissue. For example, bone marrow transplants are a form of cell-based therapy that have been used to treat leukaemia for more than 30 years. New stem cell research may lead to cell-based therapies to treat a range of conditions, including heart disease, spinal injuries, diabetes and Parkinson disease.

cell-cycle control system: A cyclically operating set of proteins that triggers and coordinates events in the eukaryotic cell cycle.

cell-mediated immunity: Immunity dependent upon T-cells’ recognition of an antigen and their subsequent destruction of cells bearing the antigen

cellular aging: Most cells in the human body can replicate only a finite number of times and then cease dividing in what is called cell aging, or cell senescence.

Cellular Respiration:
The most prevalent and efficient catabolic pathway for the production of ATP, in which oxygen is consumed as a reactant along with the organic fuel.

Cellular Therapy:
A field of medicine that uses cells to repair tissues that have been damaged by human disease or to generate new tissues with desired functional activities.

Cellulose:
A structural polysaccharide of cell walls, consisting of glucose monomers joined by (1-4) glycosidic linkages.

Celsius Scale:
A temperature scale (°C) equal to 5/9 (°F – 32) that measures the freezing point of water at 0°C and the boiling point of water at 100°C.
central line or central venous catheter: A small, plastic tube inserted in a large vein to inject or remove fluids. The central line used in stem cell transplant allows blood samples to be drawn, drugs to be given, and the actual transplant to occur with little discomfort.

central line: A small, soft plastic tube inserted into the large vein above the heart through which medication can be given and blood drawn without multiple needle sticks.

central nervous system: The brain and the spinal cord. Receives sensory impulses from the rest of the nervous system and then controls the body's response to those impulses.

central pattern generator: A spinal-cord neuronal circuit responsible for coordinated rhythmic activity, such as walking.

central venous catheter (CVC): a tubular device typically inserted into a large vein in the neck. A CVC can also be inserted into the chest or the groin. A CVC is used to administer multiple medications, intravenous fluids, and to draw blood samples to perform tests.

centrifuge: A device which spins at a high rate of speed, causing centrifugal force to be exerted on objects placed in it. A centrifuge is often used to separate stem cell-containing layers from other cells.

centriole: A cylinder-shaped organelle composed of microtubules and found in the nucleus of a cell. During nuclear division it forms the spindle, which ensures that the duplicated chromosomes are equally divided between the daughter cells.

centromere: The most condensed and constricted region of a chromosome. Joins the two chromatids of the chromosome and is also the attachment point of spindle fibres during cell division when the two chromatids separate.

centrosome: Material present in the cytoplasm of all eukaryotic cells and important during cell division; also called microtubule-organizing center.

cervical: Of or relating to the head.

cephalic: Of or relating to the head.

cephalochordate: A chordate without a backbone, represented by lancelets, tiny marine animals.

cerclage: A surgical stitch (suture) used to try to keep cervix tightly closed. Used for women with Incompetent Cervix.

cerebellum: Part of the vertebrate hindbrain (rhombencephalon) located dorsally; functions in unconscious coordination of movement and balance.

cerebral cortex: The surface of the cerebrum; the largest and most complex part of the mammalian brain, containing sensory and motor nerve cell bodies of the cerebrum; the part of the vertebrate brain most changed through evolution.

cerebral palsy: It is a persistent brain disorder that presents before the age of 3 and is due to brain damage. It is not progressive and has no treatment except for the symptoms. It effects mainly movement and muscle flexibility, but can have cognitive disability and epilepsy. Stem cell therapy seems to elicit a response in more than 90% of these patients under the age of 4. The results in some of these patients have been dramatic.

cerebrospinal fluid: A blood serum-like fluid that bathes parts of the brain and the interior cavity of the spinal cord.

cerebrum: The dorsal portion, composed of right and left hemispheres, of the vertebrate forebrain; the integrating center for memory, learning, emotions, and other highly complex functions of the central nervous system.

cervical cancer: A malignant disease in the neck of the womb located at the top of the vagina.

cervical: Of or relating to the head.

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cervical Mucus: A viscous fluid plugging the opening of the cervix. Most of the time this thick mucus plug prevents sperm and bacteria from entering the womb. However, at midcycle, under the influence of estrogen, the mucus becomes thin, watery, and stringy to allow sperm to pass into the womb.

cervical region: Corresponding to the neck region. The cervical spine begins at the base of the skull and is composed of seven vertebrae and eight pairs of cervical nerves.

cervical smear: A sample of the cervical mucus examined microscopically to assess the presence of estrogen (ferning) and white blood cells, indicating possible infection.

cervical stenosis: A blockage of the cervical canal from a congenital defect or from complications of surgical procedures.

cervix: The opening between the uterus and the vagina. The cervical mucus plugs the cervical canal and normally prevents foreign materials from entering the reproductive tract. The cervix remains closed during pregnancy and dilates during labor and delivery to allow the baby to be born.

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chakras: In Eastern healing traditions, chakras are tornado-like energy vortexes, which convert higher vibrational energy into energy that the body can assimilate.
chemoprevention: The use of a pharmaceutical or other substance to prevent the development of cancer.

chemoreceptor: A receptor that transmits information about the total solute concentration in a solution or about individual kinds of molecules.

chemosynthetic: Applied to autotrophic bacteria that use the energy released by specific inorganic reactions to power their life processes, including the synthesis of organic molecules.

chemotaxis: Attraction of a cell to an area where there is a gradient increase of a particular factor.

chemotherapeutic: related to the use of chemotherapy.

chemotherapy: Chemotherapy is the treatment of cancer with drugs that can destroy cancer cells. These drugs often are called "anticancer" drugs. Anticancer drugs destroy cancer cells by stopping them from growing or multiplying. Healthy cells can also be harmed, especially those that divide quickly. Harm to healthy cells is what causes side effects. These cells usually repair themselves after chemotherapy. The term chemotherapy was coined in this regard by Paul Ehrlich (1854-1915).

cherry-red spot: The term 'cherry red spot' describes the appearance of the retina when viewed by an eye specialist that is associated with metabolic neurological disorders like Tay-Sachs, Sandhoff, GM-1, Niemann-Pick, MPS and other similar disorders. Warren Tay described the cherry red spot in Symmetrical changes in the region of the yellow spot in each eye of an infant, published in Transactions of Ophthalmology Society UK in 1881:…in the region of the yellow spot in each eye there was a conspicuous, tolerably defined, large white patch, more or less circular in outline, and showing at its centre a brownish-red, fairly circular spot, contrasting strongly with the white patch surrounding it.

chiasma (pl. chiasmata): The X-shaped, microscopically visible region representing homologous chromatids that have exchanged genetic material through crossing over during meiosis.

chimera: An organism composed of cells derived from at least two genetically different zygotes, from the same or different species. Chimerism can be produced experimentally at different stages of development, from embryo through to adult.

chiropractic: Focuses on diagnosing and treating musculoskeletal disorders that affect the nervous system.
chitin: A structural polysaccharide of an amino sugar found in many fungi and in the exoskeletons of all arthropods.

chlamydia: A common bacterial sexually transmitted disease that can lead to Pelvic Inflammatory Disease.

chlorophyll: A green pigment located within the chloroplasts of plants.

chloroelast: An organelle found only in plants and photosynthetic protists that absorbs sunlight and uses it to drive the synthesis of organic compounds from carbon dioxide and water.

chocolate cyst: A cyst in the ovary that is filled with old blood; endometrioma. Occurring when endometriosis invades an ovary, it causes the ovary to swell. Frequently, patients with large endometriomas do not have any symptoms. If the cyst ruptures or the ovary containing the cyst twists, emergency surgery may be necessary. Usually treatment can be carried out through the laparoscope.

cholangiocarcinoma: Cholangiocarcinoma is a malignant (cancerous) growth in one of the ducts that carries bile from the liver to the small intestine.

cholecytokinin: A hormone secreted especially by the duodenal mucosa that regulates the emptying of the gallbladder and secretion of enzymes by the pancreas and that has been found in the brain.

cholesterol: A long-chain molecule that is absorbed from food in the intestine or produced in the liver. It is needed as a part of blood plasma and of cell membranes.

choline: A B-complex vitamin that is a constituent of lecithin; essential in the metabolism of fat.

chondrichthyes: The vertebrate class of cartilaginous fishes, represented by sharks and their relatives.

chondrin: A protein-carbohydrate complex secreted by chondrocytes; chondrin and collagen fibers form cartilage.

chondrocyte: The functional cell type that makes cartilage for joints, ear canals, trachea, epiglottis, larynx, the discs between vertebrae and the ends of ribs.

chordate: A member of a diverse phylum of animals that possess a notochord; a dorsal, hollow nerve cord; pharyngeal gill slits; and a postanal tail as embryos.

chorion (adj. chorionic): The highly vascular outer embryonic membrane of reptiles, birds, and mammals that in placental mammals is associated with the allantois in the formation of the placenta.

chorionic villae sampling (CVS): An alternative to amniocentesis that can be done earlier in the pregnancy. It is a biopsy of the placenta that is used to check for genetic abnormalities in the fetus.

chorionic villi: Tiny membrane projections in the developing placenta (the tissue that connects the umbilical cord to the uterus). Cells samples can sometimes be obtained from the chorionic villi and used for prenatal diagnosis of certain LSDs.

chorionic villus sampling (CVS): A technique for diagnosing genetic and congenital defects while the fetus is in the uterus. A small sample of the fetal portion of the placenta is removed and analyzed.

cromatid: Either of the two strands of a replicated chromosome, which are joined at the centromere.

chromatin: The complex of DNA and DNA-binding protein that makes up a eukaryotic chromosome. The DNA is wrapped around histone proteins, each of which is composed of 4 core histones, H2A, H2B, H3 and H4. The wrapping of the DNA around histones effectively packages over 2 meters of human DNA into compacted nucleosomes. The chromatin can exist in two forms: tightly coiled chromatin called heterochromatin that is not actively transcribed or loosely coiled chromatin called euchromatin that is actively transcribed. In mature, fully differentiated somatic cells, several of the genes that encode for the iPS reprogramming factors are located within the heterochromatin and are therefore considered transcriptionally silent. Because the reprogramming factors are not actively expressed, scientists must induce the expression of these genes artificially using transgenic strategies. International research efforts are currently exploring alternative methods to help unlock necessary reprogramming genes that are located within the tightly packed heterochromatin.

chromista: In some classification systems, a kingdom consisting of brown algae, golden algae, and diatoms.

chromogranin A (CGA): A small cell prostate cancer or neuroendocrine cell marker; a progressive increase in CGA indicates an aggressive clone of PC cells that often metastasizes to lymph nodes, liver and lungs.

chromosome map: A diagram of the linear order of the genes on a chromosome.

chromosome synopsis: Close side-by-side position of homologous chromosomes before cell division. In synopsis the homologous chromosome pairs join.
physical cycle of about 24 hours, present in circadian rhythms [L. circa, about + dies, day]: A based on a 24 hour interval. circadian rhythm: A daily rhythmic activity cycle to produce locomotion or in higher forms a current of fluid. cilium (pl. cilia): A minute, short hairlike process often forming part of a fringe; especially: one on a cell that is capable of lashing movement and usually forming part of a fringe; especially: one on a cell that is capable of lashing movement and serves especially in free unicellular organisms to produce locomotion or in higher forms a current of fluid. ciprofloxacin (trade name Cipro®): An antibiotic of fluid. cilia: Tiny hairlike projections lining the inside surface of the fallopian tubes. The waving action of these "hairs" sweeps the egg toward the uterus. ciliation (pl. cilia): A minute, short hairlike process of these "hairs" sweeps the egg toward the uterus. chronic: Referring to a disease or condition that develops slowly and persists over a long period of time. chronic alcoholism. cirrhosis: A chronic disease interfering with the normal functioning of the liver; the major cause is chronic alcoholism. citrate: A salt or ester of citric acid. C-kit protein: Receptor for Stem cell factor. cladistics: A taxonomic approach that classifies organisms according to the order in time at which branches arise along a phylogenetic tree, without considering the degree of morphological divergence. cladogenesis: A pattern of evolutionary change that produces biological diversity by budding one or more new species from a parent species that continues to exist; also called branching evolution. cladogram: A dichotomous phylogenetic tree that branches repeatedly, suggesting a classification of organisms based on the time sequence in which evolutionary branches arise. class: A taxonomic grouping of related, similar orders; category above order and below phylum. classical conditioning: A type of associative learning; the association of a normally irrelevant stimulus with a fixed behavioral response. classification scheme: A logical system for the arrangement of knowledge. A fully developed classification scheme specifies categories of knowledge and provides the means to relate the categories to each other and to specify in the classification number all or the most important of the aspects and facets of a subject. cleavage: The process of cytokinesis in animal cells, characterized by pinching of the plasma membrane; specifically, the succession of rapid cell divisions without growth during early embryonic development that converts the zygote into a ball of cells.cline: Variation in features of individuals in a population that parallels a gradient in the environment. clinical practice: Treatments and procedures performed by doctors. clinical stage: Staging of prostate cancer as determined by the digital rectal examination. clinical trial: The process of taking a treatment that has been proven in the laboratory to testing in human volunteers. clinical trial: A carefully planned process by which researchers evaluate experimental new therapies and drugs through an orderly series of phases. Phase I trials evaluate how a new therapy or drug should be given, how often, and what dose is safe. Phase II trials continue to test safety but also begin to evaluate how well it works.
Phase III trials test a new therapy or drug in comparison to the current standard of care. Participants are randomly assigned to the standard or new therapy. A placebo is only used when there is no standard therapy for comparison. Placebos are not used in Phase I or II. Phase IV trials are required when a drug manufacturer wishes to test an approved therapy for a different condition or with a different formulation.

Clinical: Used in medical practice, as opposed to just in research. Clinical trials are trials of the actual use of a therapy in people, rather than in a test tube.

Clinicopathological: Relating to or concerned both with the signs and symptoms directly observable by the physician and with the results of laboratory examination.

ClinMACS® machine: A cell sorting machine used by scientists to achieve pure cultures of a particular type of cell that is sorted according to the biomarker that binds to it.

cloaca: A common opening for the digestive, urinary, and reproductive tracts in all vertebrates except most mammals.

clopid: A brand name of clomiphene citrate.

clophemine citrate challenge test (CCCT, CCT): This test entails the oral (by mouth) administration of 100 milligrams of clomiphene citrate on menstrual cycle days 5-9. Blood levels of FSH are measured on cycle day 3 and again on cycle day 10. Elevated blood levels of FSH on cycle day 3 or cycle day 10 are associated with very low pregnancy.

clophemine citrate: A fertility drug that stimulates ovulation through the release of gonadotropins from the pituitary gland.


clonal selection: The mechanism that determines specificity and accounts for antigen memory in the immune system; occurs because an antigen introduced into the body selectively activates only a tiny fraction of inactive lymphocytes, which proliferate to form a clone of effector cells specific for the stimulating antigen.

clonality derived stem cell: A cell is said to be clonally derived or to exhibit clonality if it was generated by the division of a single cell and is genetically identical to that cell.

clonality: A line of cells that is genetically identical to the originating cell; in this case, a stem cell.

clone: (v) To generate identical copies of a region of a DNA molecule or to generate genetically identical copies of a cell, or organism; (n) The identical molecule, cell, or organism that results from the cloning process. (1) In reference to DNA: To clone a gene, one finds the region where the gene resides on the DNA and copies that section of the DNA using laboratory techniques. (2) In reference to cells grown in a tissue culture dish: a clone is a line of cells that is genetically identical to the originating cell. This cloned line is produced by cell division (mitosis) of the original cell. (3) In reference to organisms: Many natural clones are produced by plants and (mostly invertebrate) animals. cloning (Reproductive): the cloned embryo is replaced into the uterus of a mature female of the species where it may implant and grow.

cloning reproductive: Sometimes used to refer to cloning of an embryo for transplantation into a uterus with the intent of producing offspring genetically identical to the nuclear donor.

cloning therapeutic: The cloned embryo is grown in the laboratory. The cells from the inner cell mass of the blastocyst when grown in tissue culture can sometimes produce a stem cell line. As with reproductive cloning, the success rate is low for the production of stem cell lines. However, if a stem cell line is produced, these cells are very primitive and totipotent which means that they have the potential to develop into any and all of the different cell types in the body. Also, the stem cell line is a perfect genetic match to the parent.

cloning vector: An agent used to transfer DNA in genetic engineering, such as a plasmid that moves recombinant DNA from a test tube back into a cell, or a virus that transfers recombinant DNA by infection.

cloning: The process in which an organism produces one or more genetically alike copies of itself by asexual means. Cloning may occur by propagation of cuttings, as in the case of plants; continual budding, as in the case of hydra; fission, as in the case of bacteria and protozoa; parthenogenenic asexual reproduction as in the case of aphids; or somatic cell nuclear transfer, as in the case of higher order animals such as mammals. The term cloning can also be applied to a group of cells undergoing replication by repetitive mitoses (cell divisions).

closed circulatory system: A type of internal transport in which blood is confined to vessels.
cluster of differentiation (CD): Used with a number (eg, CD52) to name a specific antigenic marker found on lymphocytes.

c-Myc: A well known proto-oncogene. The c-Myc gene codes for a transcription factor that regulates the expression of many genes involved in the control of cell proliferation, growth, differentiation and apoptosis. Aberrant expression of c-Myc on the other hand is associated with tumor formation and cancer. c-Myc is one of four factors originally used by the Yamanaka group to reprogram somatic cells into pluripotent stem cells. Recent studies have demonstrated that c-Myc is not an essential reprogramming factor, but does greatly improve reprogramming efficiency.

cnidocyte: A stinging cell containing a nematocyst; characteristic of cnidarians.

cogulate: Change from liquid to solid, ex. blood clotting.

coopation: Joining together or fitting of two surfaces.

coarsening of the facial features: Short noses, flat faces and large head is often described as coarsening of facial features.

coccyx: The coccyx or tailbone is the final segment of vertebral column composed of typically four fused vertebrae.

cochlea: The complex, coiled organ of hearing that contains the organ of Corti.

codominance: A phenotypic situation in which both alleles are expressed in the heterozygote.

codon: A three-nucleotide sequence of DNA or mRNA that specifies a particular amino acid or termination signal; the basic unit of the genetic code.

coeolum: A body cavity completely lined with mesoderm.

coelomate: An animal whose body cavity is completely lined by mesoderm, the layers of which connect dorsally and ventrally to form mesenteries.

coenecytic: Condition in which an organism consists of filamentous cells with large central vacuoles, and whose nuclei are not partitioned into separate compartments. The result is a long tube containing many nuclei, with all the cytoplasm at the periphery.

coenzyme Q10 (COQ10): important in cardiac function; a substance that energizes the mitochondria within the heart cells and allows them to function better; an anti-oxidant that protects LDL cholesterol from oxidation.

coenzyme: An organic molecule serving as a cofactor. Most vitamins function as coenzymes in important metabolic reactions.

cofactor: Any nonprotein molecule or ion that is required for the proper functioning of an enzyme. Cofactors can be permanently bound to the active site or may bind loosely with the substrate during catalysis.

cognition: Cognition is the process of knowing and, more precisely, the process of being aware, knowing, thinking, learning and judging. Some types of CMD do not affect cognition, other types of CMD may impair cognitive abilities.

cognitive: Relating to, or being conscious intellectual activity (as thinking, reasoning, remembering, imagining, or learning words).

cohesion species concept: The idea that specific evolutionary adaptations and discrete complexes of genes define species.

cohesion: The binding together of like molecules, often by hydrogen bonds.

cohesion-tension theory: A theory accounting for the upward movement of water in plants. According to this theory, transpiration of a water molecule results in a negative (below 1 atmosphere) pressure in the leaf cells, inducing the entrance from the vascular tissue of another water molecule, which, because of the cohesive property of water, pulls with it a chain of water molecules extending up from the cells of the root tip.

cohort: A group of individuals having a statistical factor (as age or risk) in common.

cold aclimation response: The process by which plants increase their tolerance to freezing by exposure to low, nonfreezing temperatures.

coleoptile: The sheath enclosing the apical meristem and leaf primordia of a germinating monocot.

collagen: A glycoprotein in the extracellular matrix of animal cells that forms strong fibers, found extensively in connective tissue and bone; the most abundant protein in the animal kingdom. Collagen is the most abundant protein in the animal kingdom.

collecting duct: The location in the kidney where filtrate from renal tubules is collected; the filtrate is now called urine.

Collection Center-National Marrow Donor Program: accredited hospitals with experience and facilities to collect stem cells and care for...
stem cell donors before and after the stem cell donation procedure.

collenchyma cell: A flexible plant cell type that occurs in strands or cylinders that support young parts of the plant without restraining growth.

collimator: A device used to define the size and shape of a radiation beam in radiation therapy treatment machines; A collimator typically consists of large blocks of heavy metals, such as steel or tungsten, moved by mechanical motors to define rectangular fields.

colon: the part of the large intestine that extends to the rectum.

colonial: Condition in which many unicellular organisms live together in a somewhat coordinated group. Unlike true multicellular organisms, the individual cells retain their separate identities, and usually, their own membranes and cell walls.

colony stimulating factors (CSF): Generally referred to groups of cytokines and other growth factors that can stimulate Lymphohematopoietic stem cells and bone marrow progenitors. (In general, they are the hematopoietic stimulators).

colony-forming cells: Groups of cells growing on a solid nutrient surface with each group being created from the multiplication of an individual cell.

colony-stimulating factors: Diffusible proteins that stimulate the proliferation of hematopoietic stem cells.

color Doppler ultrasound (CDU): an ultrasound imaging technology utilizing sound waves that can simultaneously show blood flow superimposed on detailed gray scale anatomic images – “power Doppler” and “tissue harmonic” are enhancements to basic CDU.

colorectal: Relating to the colon and rectum, or to the entire large bowel (large intestine).

color-flow Doppler ultrasound: An ultrasound method that more clearly images tumors by observing the Doppler shift in sound waves caused by the rapid flow of blood through tiny blood vessels that are characteristic of tumors.

colostomy: A surgical opening in the abdomen to bypass a portion of the colon.

colposcope: A magnifying and photographic device used as an aid in the diagnostic examination of the vaginal and cervical epithelia.

colposcopy: Use of a scope to examine the cervix for abnormal cells.

combidx: (also called Ferumoxtran-10) – an investigational imaging agent consisting of iron oxide nanoparticles used in conjunction with magnetic resonance imaging (MRI) to aid in the differentiation of cancerous from normal lymph nodes.

combination hormone blockade (CHB): Also referred to as CHT, MAB, TAB or ADT (androgen deprivation therapy); therapy usually involving an LHRH agonist and an antiandrogen; may involve other agents such as Proscar® or prolactin inhibitors such as Dostinex®; preferred term is ADT with number attached to show number of agents e.g. ADT3 (Flutamide®, Lupron®, Proscar®) or ADT3 (FLP).

combined hormonal therapy (CHT): The use of more than one variety of hormone therapy; especially the use of LHRH analogs (e.g., Lupron®, Zoladex®) to block the production of testosterone by the testes, plus antiandrogens (e.g., Casodex® (bicalutamide), Eulexin® (Flutamide), Anandron® (nilutamide), or Androcur® (cyproterone)) to compete with DHT and with T (testosterone) for cell androgen receptors thereby depriving cancer cells of DHT and T needed for growth; also referred to as CHB, MAB, TAB; the preferred term is ADT.

combined therapy: ADT with designation ADT1 vs ADT2 or ADT3 is preferred since this communicates the number of drugs used in the androgen deprivation therapy; ADT also more clearly communicates the mechanism of this form of treatment.

commensal: A kind of symbiotic relationship which benefits one organism while the other is unharmed. Commensal bacteria in the human gut are totally dependent on nutrition, but they don't harm the human.

commensalism: A symbiotic relationship in which the symbiont benefits but the host is neither helped nor harmed.

commercializing: Bringing a product or technology to market or making it commercially viable.

commitment: Engaging in a programme leading to differentiation. For a stem cell, this means exit from self-renewal.

community gnomics: The study of communities of organisms in nature using the tools of genomics. Sequencing the DNA of microorganisms found in a liter of ocean water is an example of community genomics.

community screenings: Organized carrier testing outreach events to educate high risk ethic groups on the importance of genetic screening and to provide convenient free or reduced cost testing.

community: All the organisms that inhabit a particular area; an assemblage of populations of different species living close enough together for potential interaction.
comorbidity: A condition that exists along with and usually independently of another medical condition.

companion cell: A type of plant cell that is connected to a sieve-tube member by many plasmodesmata and whose nucleus and ribosomes may serve one or more adjacent sieve-tube members.

cumulative genomics: The science of comparing the genome sequences of humans and other species in order to discover similarities and differences in biology. For instance, scientists who study evolution might compare the genomes of humans and chimpanzees, while scientists who study the bacterium E. coli might compare strains that harm humans and those that do not.

competition: Interaction between members of the same population or of two or more populations using the same resource, often present in limited supply.

competitive exclusion principle: The concept that when the populations of two species compete for the same limited resources, one population will use the resources more efficiently and have a reproductive advantage that will eventually lead to the elimination of the other population.

competitive inhibitor: A substance that reduces the activity of an enzyme by entering the active site in place of the substrate whose structure it mimics.

complement fixation: An immune response in which antigen-antibody complexes activate complement proteins.

complement system: A group of at least 20 blood proteins that cooperate with other defense mechanisms; may amplify the inflammatory response, enhance phagocytosis, or directly lyse pathogens; activated by the onset of the immune response or by surface antigens on microorganisms or other foreign cells.

complementary DNA (cDNA): A DNA molecule made in vitro using mRNA as a template and the enzyme reverse transcriptase. A cDNA molecule therefore corresponds to a gene, but lacks the introns present in the DNA of the genome.

complete blood count (CBC): A blood test done in a laboratory to find out the number of red blood cells (RBC’s), white blood cells (WBC’s), platelets, hemoglobin, and hematocrit in your blood. These blood cells are made in the marrow of your bones.

complete digestive tract: A digestive tube that runs between a mouth and an anus; also called alimentary canal. An incomplete digestive tract has only one opening.
condensation reaction: A reaction in which two molecules become covalently bonded to each other through the loss of a small molecule, usually water; also called dehydration reaction.

conditioning regimen: Chemotherapy or radiation that is administered prior to transplant to kill any remaining cancer cells and to make room for new stem cells.

conditioning: A phase in the bone marrow/stem cell transplant process designed to destroy cancer cells more chemotherapy. Conditioning involves combining high doses of chemotherapy and/or radiation.

condom therapy: Therapy prescribed to reduce the number of sperm antibodies in the woman by using a condom during intercourse for six months or more and by the woman refraining from all skin contact with the husband's sperm. The woman's antibody level may fall to levels that will not adversely affect the sperm.

cone biopsy: A surgical procedure used to remove precancerous cells from the cervix. The procedure may damage the cervix and thus disrupt normal mucus production or cause an incompetent cervix, which may open prematurely during pregnancy.

cone cell: (1) In plants, the reproductive structure of a conifer. (2) In vertebrates, a type of photoreceptor cell in the retina, concerned with the perception of color and with the most acute discrimination of detail.

confidential: Spoken or written in secret and intended to be kept secret. In the cancer registry, all identifiable data is considered to be confidential.

confirmatory typing (CT): A repeat tissue typing test done to make sure the donor and patient match. This is one of the final tests done before transplant.

confirmatory typing (CT): This test confirms the HLA compatibility of the donor and the patient and is performed on all potential family or unrelated donors.

confluent monolayer: An unbroken layer of cells, one cell thick

conformal therapy: the use of careful planning and delivery techniques designed to focus external radiation on the areas of the prostate and surrounding tissue which need treatment and protect areas which do not need treatment; three-dimensional conformal radiation therapy (3DCRT) is a sophisticated form of this method.

conformality: Pertaining to the ability to achieve conformal therapy.

congenital adrenal hyperplasia: A congenital condition characterized by elevated androgens which suppress the pituitary gland and interfere with spermatogenesis or ovulation. Women may have ambiguous genitalia from the excess production of male hormone.

congenital defect: A birth defect, acquired during pregnancy but not necessarily hereditary.

congenital disorder: Any disorder present at birth.

congenital hypothyroidism: An inherited trait that results in reduced activity of the thyroid gland, generally due to reduced production of thyroid stimulating hormone. The trait reduces the base rate of the body's chemical reactions, and results in tissue swelling and weight gain. It can cause neurological and development problems.

congenital: Existing at birth; referring to certain mental or physical traits, malformations, or diseases, which may be hereditary or due to an influence occurring during gestation (in utero).

congenital: Present at birth.

conidium (pl. conidia): A naked, asexual spore produced at the ends of hyphae in ascomycetes.

conifer: A gymnosperm whose reproductive structure is the cone. Conifers include pines, firs, redwoods, and other large trees.

conization: Surgery to remove a cone-shaped piece of tissue from the cervix and cervical canal. Conization may be used to diagnose or treat a cervical condition. Also called cone biopsy.

conjugation: In bacteria, the transfer of DNA between two cells that are temporarily joined.

connective tissue: The supporting or framework tissue of the body, formed of fibrous and ground substance with more or less numerous cells of various kinds; it is derived from the mesenchyme, and this in turn from the mesoderm; the varieties of connective tissue are: areolar or loose; adipose; dense, regular or irregular, white fibrous; elastic; mucous; and lymphoid tissue; cartilage; and bone; the blood and lymph may be regarded as connective tissues the ground substance of which is a liquid.

conservation biology: A goal-oriented science that seeks to counter the biodiversity crisis, the current rapid decrease in Earth's variety of life.

consumer, in ecological systems: A heterotroph that derives its energy from living or freshly killed organisms or parts thereof. Primary consumers are herbivores; higher-level consumers are carnivores.

continental drift: The gradual movement of the Earth's continents that has occurred over hundreds of millions of years.

continuing infertile: Someone who has gone through primary infertility, successfully given birth, and is trying for another child.
continuous variation: A gradation of small differences in a particular trait, such as height, within a population; occurs in traits that are controlled by a number of genes.

contraception: The prevention of pregnancy.

contractile vacuole: In many protists, a specialized vacuole with associated channels designed to collect excess water in the cell. Microtubules periodically contract to force this excess water out of the cell, regulating the cell’s osmotic balance.

contracture: A contracture is a condition of abnormal shortening or shrinkage of a muscle, tendon, etc., often with persistent flexion or distortion at a joint. People affected with neuromuscular disease often develop contractures over time. A physical or occupational therapist will probably be able to teach stretches that, when done regularly, can help decrease contractures.

contraindication: any condition which renders some particular line of treatment improper or undesirable.

contrast agent: A dye or other substance that helps show abnormal areas inside the body.

control group: participants in a clinical trial who are receiving placebo or current standard of care for comparison to those receiving the new therapy being evaluated.

controlled ovarian hyperstimulation (COH): Using fertility medications to stimulate the growth of multiple follicles for ovulation. Also called Superovulation.

contusion injury: A common injury due to impact, which bruises the spinal cord.

conus medullaris: The terminal end of the spinal cord.

convection: The mass movement of warmed air or liquid to or from the surface of a body or object.

convergent evolution: The independent development of similarity between species as a result of their having similar ecological roles and selection pressures.

cooley's anemia: Another name for thalassemia major.

cooperativity: An interaction of the constituent subunits of a protein causing a conformational change in one subunit to be transmitted to all the others.

coordinating center: The NMDP Coordinating Center, office located in Minneapolis, Minnesota, establishes standards, policies, and procedures for its Network of Transplant, Donor, Apheresis and Collection Centers, Cord Blood Banks, Recruitment Groups and Cooperative Registries. From this office, Network Centers performance is monitored; patients' searches for compatible unrelated donors are coordinated; and communication between Network members is facilitated. The scheduling, coordination, transport and tracking of unrelated stem cell collections are managed by the Coordinating Center.

Cord Blood Bank: An organization that helps to collect and store umbilical cord blood for transplant.

cord blood stem cell: A stem cell collected from the umbilical cord at birth that can produce all of the blood (hematopoietic) cells in the body. Cord blood is currently used to treat patients who have undergone chemotherapy to destroy their bone marrow due to cancer or other blood-related disorders.

cord blood transplant: A procedure where umbilical blood stem cells are used in a stem cell transplant.

cord blood: Stem cells can be derived from blood the umbilical cord at the time of birth. Umbilical cord stem cells are rich in hematopoietic stem cells, which normally reside in the bone marrow and can be used for the treatment of leukemia and other blood diseases. Numerous public and private cord blood banks have emerged to collect and store neonatal cord blood as future "insurance" against diseases that might be treatable using a stem cell approach.

cord: The blood that remains in the umbilical cord and placenta following birth.

core biopsy: Similar to needle biopsy, but a larger needle is used because actual tissue is removed, rather than a tiny sampling of cells. A sample of the tumor is removed, but not the whole tumor. The types of core biopsies include ultrasound-guided core biopsy and stereotactic biopsy.

core: A tissue sample removed during biopsy.

cork cambium: A cylinder of meristematic tissue in plants that produces cork cells to replace the epidermis during secondary growth.

cork: A secondary tissue that is a major constituent of bark in woody and some herbaceous plants; made up of flattened cells, dead at maturity; restricts gas and water exchange and protects the vascular tissues from injury.

cornea: Transparent tissue at the front of the eye.

corolla: Petals, collectively; usually the conspicuously colored flower parts.

coronavirus: A single-stranded RNA virus that resembles a crown when viewed under an electron microscope because of its petal-shaped...
cortisols: A steroid hormone produced by the adrenal cortex, that promotes the formation of glucose from protein and fat; also suppresses the inflammatory and immune responses.

countercurrent exchange: The opposite flow of adjacent fluids that maximizes transfer rates; for example, blood in the gills flows in the opposite direction in which water passes over the gills, maximizing oxygen uptake and carbon dioxide loss.
cotransport: The coupling of the "downhill" diffusion of one substance to the "uphill" transport of another against its own concentration gradient.
cotyledon: The one (monocot) or two (dicot) seed leaves of an angiosperm embryo.
cough assist machine: The Cough Assist Machine helps to clear secretions from the lungs by helping you with your breathing. When you breathe in (inspiration), the machine gives you air (positive pressure) to help expand your lungs. When you blow out (expiration), the machine creates a sucking force (negative pressure) that pulls the air out of your lungs. This rapid change in pressure during the two phases of breathing (inspiration and exhalation) helps make your cough stronger and more effective.
cranial: The bones of the skull which contain the brain, the brain case.
craniosacral system: A physiological system surrounding the brain and spinal cord.
craniosacral therapy: A gentle hands-on procedure for evaluating and enhancing the function of the craniosacral system.
cranium: The bones of the skull which contain the brain, the brain case.
crassulacean acid metabolism: A process by which some species of plants in hot, dry climates take in carbon dioxide during the night, fixing it in organic acids; the carbon dioxide is released
during the day and used immediately in the Calvin cycle.

910 C-reactive protein (CRP): A plasma protein that can be a marker for inflammatory activity.

911 creatine kinase: Any of three enzymes found especially in skeletal and heart muscle and the brain that accelerate the transfer of a high-energy phosphate group and typically occur in elevated levels in the blood following injury to brain or muscle tissue.

912 creatine: A compound which is made by the body and is used to store energy in the form of phosphate molecules.

913 creatinine: A chemical substance resulting from the metabolism of creatine, that is found in muscle tissue and blood; creatinine is normally excreted in the urine as a metabolic waste; when elevated in the blood it indicates impairment of kidney function.

914 cripto: Transcription factor expressed by pluripotent stem cells and early embryos.

915 crista (pl. cristae): An infolding of the inner membrane of a mitochondrion that houses the electron transport chain and the enzyme catalyzing the synthesis of ATP.

916 cRNA: Complementary RNA.

917 crohn disease: Crohn disease is an inflammatory bowel disease (IBD); it is the general name for diseases that cause inflammation in the intestines. Crohn's disease causes inflammation in the small intestine. Crohn's disease usually occurs in the lower part of the small intestine, called the ileum, but it can affect any part of the digestive tract, from the mouth to the anus.

918 crossed phrenic pathway: A normally dormant, backup pathway that can be used to restore some respiratory function after cervical injury.

919 cross-fertilization: Fusion of gametes formed by different individuals; as opposed to self-fertilization.

920 crossing over: The reciprocal exchange of genetic material between nonsister chromatids during synopsis of meiosis I.

921 cryobag: An alternative to storage with cryovials; a cryobag is a small storage "bag" designed for storing cells in extremely low temperatures. Cryobags can be created by fusing the two sides together which causes them to be "seamed", or, they can be blowmolded and "seamless".

922 cryogenic: Storage at very low temperatures (below -150 degrees Celsius).

923 cryogenics: Extreme cold. Cells may be frozen by special techniques, and kept at extremely cold temperatures until needed. They are then thawed out and injected or infused.

924 cryopreservation: Freezing quickly and then storing, as in sperm, embryos, and, more recently, unfertilized eggs.

925 cryopreserved embryos: Embryos, generally those produced by in vitro fertilization exceeding the number that can be transferred for uterine implantation, that have been frozen.

926 cryoprobe: A surgical instrument used to apply extreme cold to tissues during cryosurgery.

927 cryosurgery: The use of liquid nitrogen probes to freeze a particular organ to extremely low temperatures to kill the tissue, including any cancerous tissue; When used to treat prostate cancer, the cryoprobes are guided by transrectal ultrasound (TRUS).

928 cryovial: Small storage unit specifically designed for storing cells in extremely low temperatures.

929 cryptic coloration: A type of camouflage that makes potential prey difficult to spot against its background.

930 cryptorchidism: A condition in which one or both testicles fail to move from the abdomen, where they develop before birth, into the scrotum. Cryptorchidism may increase the risk for development of testicular cancer. Also called undescended testicles.

931 CT scan: A type of imaging scan that shows the internal structure of a person's brain.

932 C-terminus/N-terminus: On a protein or polypeptide. One end of the amino acid chain that ends in a free carboxyl group. The end of the chain that ends in an amine group. N-terminus contains contains targeting signals and C-terminus contains retention signals for protein sorting.

933 culdoscopy: The introduction of a viewing tube through the end of the vagina into the cul-de-sac. The cul-de-sac is also called the rectouterine pouch, an extension of the peritoneal cavity between the rectum and back wall of the uterus.

934 culture medium: The broth that covers cells in a culture dish, which contains nutrients to feed the cells as well as other growth factors that may be added to direct desired changes in the cells.

935 culture plate: A flat, transparent dish capable of holding some sort of liquid (medium) on which cells are grown.

936 cumulus cell: The nutrient cells that surround the egg (ova).

937 cumulus oophorus: The protective layer of cells surrounding the egg.

938 curanderismo: Traditional Mexican-American healing.

939 curcumin: a biologically active substance derived from the curcuma longa plant; found within the Indian spice called turmeric; curcumin and its
cystic-related to a cyst: any closed cavity or sac that is lined by epithelium often contains liquid or semi-solid material.

cystitis: Inflammation of the bladder that may be caused by infection or chemical injury or radiation; characterized by increased urinary frequency, discomfort on urination and often red blood cells, white blood cells and/or bacteria in the urine.

cystoscope: An instrument used by physicians to look inside the urethra and the bladder.

cystoscopy: The use of a cystoscope to look inside the urethra and the bladder.

cystosol: The soluble components of the fluid matter enclosed within the cellular membrane.

cytadren®: The trademarked name for aminoglutethimide.

cytochrome C: A protein that carries electrons released from the mitochondria to initiate cell death.

cytochrome P-450 dependent 14-demethylation: an enzyme system that is important in the endocrine pathways of hormone production and activation.

cytochrome: An iron-containing protein, a component of electron transport chains in mitochondria and chloroplasts.

cytogenetics: The study of chromosomes, the visible carriers of DNA, the hereditary material. Cytogenetics is a fusion science due to joining of cytology (the study of cells) with genetics (the study of inherited variation).

cytokine: Soluble protein substances produced by cells that are critical to the development and functioning of the immune response. Each cytokine binds to a specific cell-surface receptor. Cytokines have been variously named as lymphokines, interleukins and chemokines.

cytokinesis: The division of the cytoplasm to form two separate daughter cells immediately after mitosis.

cytokinin: A class of related plant hormones that retard aging and act in concert with auxins to stimulate cell division, influence the pathway of differentiation, and control apical dominance.

cytology: Science that deals with the structure and function of cells.

cytomegalovirus (CMV): A group of viruses that cause enlargement of cells of various organs. Infection in a fetus can cause jaundice, high-tone deafness, eye problems, malformation, or fetal death.

cytometry: Cell measurement.

cytoplasm: Cell measurement.
eukaryotic cells, the cell nucleus is a distinct compartment of the cell that is encased by the nuclear membrane. The cytoplasm is comprised mostly of fluid called the cytosol. Also contained within the cytoplasm are cytoskeletal proteins and membrane-bound organelles such as the mitochondria, endoplasmic reticulum, and Golgi bodies. The cytoplasm is the site where most cellular activities occur, including glycolysis and protein translation.

cytoplasmic determinants: In animal development, substances deposited by the mother in the eggs she produces that regulate the expression of genes affecting the early development of the embryo.

cytoplasmic streaming: A circular flow of cytoplasm, involving myosin and actin filaments, that speeds the distribution of materials within cells.

cytoplasmic transfer: An extension of in vitro fertilization which takes the genetic material from a mother's egg and combines it with the cytoplasm of a donor egg. Two methods of cytoplasm transfer were developed, one which transfers a small amount of cytoplasm by tiny needle from the donor to the recipient egg, the other transfers a larger amount of cytoplasm which is then fused to the recipient cytoplasm with electricity.

cytoskeleton (adj. cytoskeletal): The internal scaffolding of cells which determines cell shape, and organizes structures within cells.

cytoskeleton: Integrated system of molecules within eukaryotic cells which provides them with shape, internal spatial organization, motility, and may assist in communication with other cells and the environment. Red blood cells, for instance, would be spherical instead of flat if it were not for their cytoskeleton.

cytoplasm: The semifluid portion of the cytoplasm.

cytotoxic T cell (TC): A type of lymphocyte that kills infected cells and cancer cells.

cytotoxin, cytotoxic: chemicals that have direct toxicity to cancer cells, preventing their reproduction or growth. Cytotoxic agents can, as a side effect, damage healthy, non-cancerous tissues or organs which have a high proportion of actively dividing cells, for example, bone marrow and hair follicles.

Cytoxan®: A genotoxic drug, a chemotherapy agent that affects DNA and alters its function.

D34: Present on Lymphohematopoietic stem cells and their progenitors. Express at high densities in the most primitive cells and become dim as the cells mature towards differentiation.
where it can create a life-threatening pulmonary embolism.

definitive local treatment: Generally that treatment which includes generally accepted procedures necessary to ultimately produce recovery of the patient. For prostate cancer this is usually considered to include radical prostatectomy, radiation therapy, and cryosurgery.

degenerative disease: A disease in which the function or structure of the affected tissues or organs will progressively deteriorate over time, whether due to normal bodily wear or lifestyle choices such as exercise or eating habits.

degradation: A gradual wearing down or away. Also, with regard to soil, a lowering of the nutrient content and associated ability to support continuing crop growth.

dehydration reaction: A chemical reaction in which two molecules covalently bond to one another with the removal of a water molecule.

deletion mutation: DNA is the genetic language and is read from left to right in 3 letter words.

deletion: (1) A deficiency in a chromosome resulting from the loss of a fragment through breakage. (2) A mutational loss of a nucleotide from a gene.

demography: The study of statistics relating to births and deaths in populations.

demyelination: The conduction-compromising loss of the insulating myelin around nerves due to injury or disease.

denaturation: For proteins, a process in which a protein unravels and loses its native conformation, thereby becoming biologically inactive. For DNA, the separation of the two strands of the double helix. Denaturation occurs under extreme conditions of pH, salt concentration, and temperature.

dendrite: Extension of a nerve cell, typically branched and relatively short, that receives stimuli from other nerve cells.

dendrite: One of usually numerous, short, highly branched processes of a neuron that conveys nerve impulses toward the cell body.

dendritic cells (DC): Cells that process antigens (proteins) and present them to immune lymphocytes called T cells playing a major role in the initiation of the immune response against tumor and other types of abnormal cells; antigen presenting cells; e.g. Provenge® is an investigational therapy employing DC.

denervation: The loss of nerve connection to, for example, a muscle.

denitrification: The process by which certain bacteria living in poorly aerated soils break down nitrates, using the oxygen for their own respiration and releasing nitrogen back into the atmosphere.

denovillier’s fascia: Thin layer of connective tissue that separates prostate and seminal vesicles from rectum.


denovo: In a new form or manner.


density gradient cell separation: A blood separation technique that accomplishes separation based on the density and size differences in a mixture of blood components. Ficoll-Hypaque is a density gradient cell separation method.

density gradient centrifugation: A method for separating materials of differing densities that involves spinning them at high speed.

density: The number of individuals per unit area or volume.

density-dependent factor: Any factor influencing population regulation that has a greater impact as population density increases.

density-dependent inhibition: The phenomenon observed in normal animal cells that causes them to stop dividing when they come into contact with one another.

density-independent factors: Any factor influencing population regulation that acts to reduce population by the same percentage, regardless of size.

dental pulp: The soft part inside a tooth, containing blood vessels and nerves.

dental stem cells: Adult stem cells found in both baby teeth and wisdom teeth. Dental stem cells have been shown to be able to differentiate into a wide variety of tissues such as dental tissue, bone, cartilage, and muscle. Some evidence suggests that these cells may be capable of differentiating into neural tissue. These stem cells have potential applications in both medicine and dentistry. The collection, processing and cryostorage of dental stem cells is primary service offered by StemStore Technologies for your young child.

deoxyribonucleic acid (DNA): A double-stranded, helical nucleic acid molecule capable of replicating and determining the inherited structure of a cell’s proteins.

deoxyribose: The sugar component of DNA, having one less hydroxyl group than ribose, the sugar component of RNA.

dependent variable: In an experiment, the dependent variable is the factor that responds when another factor is manipulated.

depolarization: An electrical state in an excitable cell whereby the inside of the cell is made less negative relative to the outside than at the resting
membrane potential. A neuron membrane is depolarized if a stimulus decreases its voltage from the resting potential of −70 mV in the direction of zero voltage.

1026 deposit-feeder: A heterotroph, such as an earthworm, that eats its way through detritus, salvaging bits and pieces of decaying organic matter.

1027 deriving: The creation of a cell line from one original cell or set of cells.

1028 dermal tissue system: The protective covering of plants; generally a single layer of tightly packed epidermal cells covering young plant organs formed by primary growth.

1029 dermatome map: A body map that shows skin sensitivity associated with various levels of spinal cord injury.

1030 dermatophytes: A parasitic fungus that attacks and causes a disease of the skin.

1031 dermis: The inner layer of the skin, beneath the epidermis.

1032 desmosome: A type of intercellular junction in animal cells that functions as an anchor.

1033 determinate cleavage: A type of embryonic development in protostomes that rigidly casts the developmental fate of each embryonic cell very early.

1034 determinate growth: A type of growth characteristic of animals, in which the organism stops growing after it reaches a certain size.

1035 determination: The progressive restriction of developmental potential, causing the possible fate of each cell to become more limited as the embryo develops.

1036 detritivores: Organisms that live on dead and discarded organic matter; include large scavengers, smaller animals such as earthworms and some insects, as well as decomposers (fungi and bacteria).

1037 detritus: Dead organic matter.

1038 detrusor muscle: Contracts when urinating to squeeze out urine.

1039 deuterostome: One of two distinct evolutionary lines of coelomates, consisting of the echinoderms and chordates and characterized by radial, indeterminate cleavage, enterocoelous formation of the coelom, and development of the anus from the blastopore.

1040 development: The progressive production of the phenotypic characteristics of a multicellular organism, beginning with the fertilization of an egg.

1041 developmental biology: The study of the process by which organisms grow and develop, including the formation and specialization of cells and tissues, from embryo to adulthood. Modern research in developmental biology examines the processes of cell growth and differentiation, and the role in which stem cells seed and control the development of tissues and organs.


1043 dexamethasone: A powerful oral steroid drug that has an anti-cancer effect and has an important role in the treatment of MM.

1044 dextran: a group of glucose polymers made by certain bacteria.

1045 diabetes: The disease that occurs when the body does not properly produce or use insulin (a hormone required to convert food to energy). Diabetes is classified as Type 1 or Type 2. Type 1 diabetes (formerly known as insulin-dependent diabetes), is characterized by loss of the insulin: producing beta cells of the islets of Langerhans of the pancreas leading to a deficiency of insulin. Diet and exercise cannot reverse or prevent type 1 diabetes. Type 2 diabetes (previously known as adult: onset diabetes) is due to a combination of defective insulin secretion and insulin resistance or reduced insulin sensitivity. Type 2 diabetes is usually first treated by attempts to change physical activity (generally an increase is desired), the diet (generally to decrease carbohydrate intake), and weight loss.

1046 diagnosis (Dx): The evaluation of signs, symptoms and selected test results by a physician to determine the physical and biological causes of the signs and symptoms and whether a specific disease or disorder is involved.

1047 diapause: A period of suspended growth and development requiring very specific conditions to trigger it and then to release the organism from it. Embryonic diapause is also known as "delayed implantation." There is a cessation of metabolic activity.

1048 diapedesis: Passage of blood cells (especially white blood cells) through intact capillary walls and into the surrounding tissue.

1049 diaphragm: The diaphragm is the primary muscle of inspiration. It is a thin, dome-shaped sheet of muscle that inserts into the lower ribs. When it contracts, it pushes downward and spreads out, increasing the vertical dimension of the chest cavity and driving up abdominal pressure. This increase in pressure drives the abdominal contents down and out, which in turn increases the transverse size of the chest cavity.

1050 diarrhea: Frequent, loose, and watery bowel movements. Common causes include gastrointestinal infections, irritable bowel syndrome, medicines, and malabsorption.
diastole: The stage of the heart cycle in which the heart muscle is relaxed, allowing the chambers to fill with blood.

diastolic pressure: The pressure in an artery during the ventricular relaxation phase of the heart cycle.

dicot: A subdivision of flowering plants whose members possess two embryonic seed leaves, or cotyledons.

dicotyledon: A member of the class of flowering plants having two seed leaves, or cotyledons, among other distinguishing features; often abbreviated as dicot.

diethylstilbestrol (DES): A drug given to pregnant women from the early 1940s until 1971 to help with common problems during pregnancy. The drug has been linked to cancer of the cervix or vagina in women whose mother took the drug while pregnant.

differential: In performing the blood count, a total of 100 cells are counted. The percent of each type found in these 100 cells is the cell "differential" for each type.

differentiation: (1) The process by which cells become progressively more specialized; a normal process through which cells mature. This process of specialization for the cell comes at the expense of its breadth of potential. Stem cells can, for example, differentiate into secretory cells in the intestine. (2) In cancer, differentiation refers to how mature (developed) the cancer cells are in a tumor. Differentiated tumor cells resemble normal cells and tend to grow and spread at a slower rate than undifferentiated or poorly differentiated tumor cells, which lack the structure and function of normal cells and grow uncontrollably.

diffusion: The spontaneous tendency of a substance to move down its concentration gradient from a more concentrated to a less concentrated area.

digestive tract: The organs that are involved in digestion, including the mouth, salivary glands, oesophagus, stomach, pancreas, liver, gallbladder, small intestine, and large intestine.

digital rectal examination (DRE): The use by a medical provider of a lubricated and gloved finger inserted into the rectum to feel for abnormalities of the prostate and rectum.

dihybrid cross: A breeding experiment in which parental varieties differing in two traits are mated.

dihybrid: A hybrid individual that is heterozygous for two genes or two characters.

dihydrotestosterone (DHT or 5 alpha-dihydrotestosterone): A male hormone more potent than testosterone that is converted from testosterone within the prostate by 5 alpha reductase.

dikaryotic: Having two different and distinct nuclei per cell; found in the fungi. A dikaryotic individual is called a dikaryon.

dimorphism: Displaying two separate growth forms.

dioecious: Referring to a plant species that has staminate and carpellate flowers on separate plants.

diploid: Having one complete set of normally paired chromosomes, i.e., a normal amount of DNA; diploid cancer cells tend to grow slowly and respond well to hormone therapy; a diploid number of chromosomes would equal 46, a haploid set would equal 23.

directed reprogramming: The process of taking fully mature, differentiated stem cells and inducing them to become another cell type without going through a stem cell (iPS) state. The transition from one cell type directly to another is referred to as "transdifferentiation." In the case of pancreatic cells, the method employs three developmental factors (different from the ones used to create iPS cells) causing acinar cells to switch directly to a insulin producing beta cells.

directed differentiation (Homing): Whatever processes are needed in manipulating stem cell culture conditions to induce differentiation into a particular cell type. Certain chemicals can force the cells to become pre-defined specialized cells.

directed differentiation: Manipulating stem cell culture conditions to induce differentiation into a particular cell type.

directed molecular evolution: A laboratory version of evolution at the molecular level that can produce "designer molecules." A large starting population of molecules (typically nucleic acids) that varies randomly in base sequence and shape is subjected to replication with variation, followed by selection. After
several cycles of replication and selection, the population of molecules will evolve toward one containing a high proportion of molecules well adapted to the selection criterion applied.

directional selection: Natural selection that favors individuals on one end of the phenotypic range.

disaccharide: A double sugar, consisting of two monosaccharides joined by dehydration synthesis.

disease index: A computerized listing of patients seen in a hospital (inpatient and outpatient) organized by discharge diagnosis code. For example: unspecified hypertension is coded 401.9 (in ICD-9, but is 110 in ICD-10) and malignant neoplasm of the central portion of the female breast is coded 174.1 (in ICD-9, but is C50.1 in ICD-10).

disease registry: An organized system for the collection, storage, analysis, and interpretation of data on persons with the particular disease of concern.

dispersion: The distribution of individuals within geographical population boundaries.

dissection: The cutting apart of an organism to examine its structure.

distal: Points away from the center of the body. Distal muscles are in the limbs, opposite of proximal.

distended abdomen-alternate names: Swollen belly; Swelling in the abdomen; Abdominal distention
distensibility: The ability to enlarge or distend.
diuretic: A substance which increases the production and elimination of urine
diurna: Applied to organisms that are active during the daylight hours.

diurnal: Pertaining to the day; having a cyclic nature involving the 24-hour day; prolactin levels are at their peak in the early morning- they have a diurnal variation; calcium utilization appears highest in the evening close to bedtime.

diversifying selection: Natural selection that favors extreme over intermediate phenotypes.

diverticulum: A small sac-like structure that sometimes forms in the walls of the intestines, diverticula can trap particles of food (especially small seeds and undigested grains) and become very inflamed and painful (this condition is called diverticulitis).

division: A taxonomic grouping of related, similar classes; a high- level category below kingdom and above class. Division is generally used in the classification of prokaryotes, algae, fungi, and plants, whereas an equivalent category, phylum, is used in the classification of protozoa and animals.

DNA (deoxyribonucleic acid): A chemical found primarily in the nucleus of cells. DNA carries the instructions or blueprint for making all the structures and materials the body needs to function. DNA consists of both genes and non-gene DNA in between the genes.

DNA analysis: DNA analysis looks for particular or known mutations in the genome or genetic make up.

DNA based HLA typing: Determining a person's HLA type by direct examination of the DNA. DNA-based typing is favored by the NMDP because it is very accurate and efficient.

DNA carrier -1: Substance or particle that can transfer genes into a cell. These include viruses, liposomes (fat globules) and artificial chromosomes (sequences of DNA created in a laboratory) that can transport large amounts of DNA.

DNA fingerprinting / profiling: A genetic tool used to compare and contrast DNA sequences using electrophoresis. DNA profiling is used in forensic science and to help in establishing parentage.

DNA methylation: A type of chemical modification of DNA that can be inherited and subsequently removed without changing the original DNA sequence.

DNA microarray (Also called gene chip): A device for monitoring the activity of genes. Most DNA microarrays are glass slides or microchips “embedded" with thousands of genes. DNA microarrays have many applications in research and have been used, for instance, to identify genes involved in cancer and to develop drugs.

DNA polymerase: An enzyme that catalyzes the elongation of new DNA at a replication fork by the addition of nucleotides to the existing chain.

DNA probe: A chemically synthesized, radioactively labeled segment of nucleic acid used to find a gene of interest by hydrogen-bonding to a complementary sequence.

DNA sequence: The sequence of genetic “letters,” or nucleotides, in a piece of DNA.

DNA vaccine: Enables a broad range of applications, including the induction of protective immunity against viral, bacterial, and parasitic infections, and open up new perspectives for the treatment of cancer. Furthermore, based on their Th1-promoting properties, DNA vaccines also balance Th2-mediated immune reactions, which renders them a promising alternative for immunotherapy against allergy.

docetaxel (Taxotere®): one of a type of chemotherapy agents called taxanes that block microtubule formation during cell division.
Dolly sheep: The first mammal cloned using somatic cell nuclear transfer (SCNT). Dolly was a female domestic sheep born on July 5, 1996 and was cloned by Ian Wilmut and his team at the Roslin Institute, which is located just outside Edinburgh, Scotland. Dolly sheep lived from July 5, 1996 to Feb. 14, 2003. The success of SCNT and the cloning of Dolly proved that a somatic cell's genetic material can be reprogrammed to an embryonic state by epigenetic factors. This hypothesis that cells only differentiate unidirectionally towards terminal differentiation was challenged in 1962 by John Gurdon's pioneering work in nuclear transfer and also with the historic birth of Dolly the Sheep in February of 1997 via somatic cell nuclear transfer (SCNT). Somatic cell nuclear transfer, or SCNT, requires the injection of a nucleus from a somatic cell into an enucleated oocyte to form a pluripotent cell capable of developing into an entire organism. The success of SCNT stimulated developmental biologists to begin exploring the possibility of creating pluripotent stem cells (e.g. induced pluripotent stem cells) through cellular reprogramming of fully differentiated somatic cells.

Domain: A taxonomic category above the kingdom level; the three domains are Archaea, Bacteria, and Eukarya.

Dominance hierarchy: A linear "pecking order" of animals, where position dictates characteristic social behaviors.

dominant allele: In a heterozygote, the allele that is fully expressed in the phenotype.

dominant inheritance: A pattern of inheritance whereby a single gene mutation may lead to a specific genetic disease. Children of an individual affected with a dominantly inherited condition (often referred to as autosomal dominant if the gene is not located on the X or Y chromosomes) have a 50% chance to inherit the gene mutation.

dominant negative: This describes the mechanism by which a dominant mutation can cause disease. A mutation whose gene product adversely affects the normal (wild type) gene product within the same cell. The mutated copy may associate with the normal copy and cause dysfunction of both. In some cases, such as collagen (Ullrich CMD), one dominant negative mutation may be more harmful than having one mutation causing the production of no gene product (null mutation or null alleles), which only cause disease when present in both gene copies so that absolutely no product can be made.

dominant: A dominant gene will almost always be expressed and lead to a specific physical characteristic. A dominant trait will be expressed in individuals that are either homozygous or heterozygous.

donor: The person from whom bone marrow is harvested. Donors are referred to as "related" if he or she is a brother or sister of the patient; or "unrelated" if they are not related to the patient.

dopamine: A brain neurotransmitter (a chemical that carries messages between brain cells). In people with Parkinson's disease, their dopamine-producing cells degenerate causing loss of normal muscle function.

doppler: A method in ultrasound imaging to monitor a moving structure or fluid (esp. blood).
dormancy: A period during which growth ceases and metabolic activity is greatly reduced; dormancy is broken when certain requirements, for example, of temperature, moisture, or day length, are met.
dorsal: A collection of afferent nerves from the periphery, which brings sensory information into the spinal cord.
dorsal root: A collection of afferent nerves from the periphery, which brings sensory information into the spinal cord.
dose volume histogram (DVH): A graph that displays the distribution of the absorbed radiation dose in tissue resulting from the delivery of a particular treatment plan.
dosimetry: Relating to the doses of radiation employed in treating a tumor.
double autologous transplant: Also known as a tandem autologous transplant; a patient undergoing 2 planned autologous stem cell transplants sequentially, using their own stem cells collected before the initial transplant.
double blind: An investigative procedure designed to reduce experimental bias; neither subject nor patient knows who is receiving placebo or active agent.
double circulation: A circulation scheme with separate pulmonary and systemic circuits, which ensures vigorous blood flow to all organs.
double fertilization: A mechanism of fertilization in angiosperms, in which two sperm cells unite with two cells in the embryo sac to form the zygote and endosperm.
double helix: Twin, parallel spirals that form the backbone of DNA. The backbone is formed from alternating sugar and phosphate groups.
double membrane: In mitochondria and plastids, there is a two-layered membrane which surrounds the organelle. This is believed to be the result of endosymbiosis, with the outer membrane coming from the eukaryotic cell, and the inner membrane belonging to the original prokaryote which was "swallowed".
double-blind: A form of clinical trial in which neither the physician nor the patient knows the actual treatment which any individual patient is receiving; double-blind trials are a way of minimizing the effects of the personal opinions of patients and physicians on the results of the trial.

doubling time: The time that it takes a value to double.

down syndrome: A combination of birth defects caused by the presence of an extra #21 chromosome in each cell of the body. Many children with Down syndrome also have congenital heart disease—usually atrioventricular canal defect.

down-regulation: The process of reducing or suppressing a response to a stimulus; specifically reduction in a cellular response to a molecule (as insulin) due to a decrease in the number of receptors on the cell surface.

downsizing: The use of hormonal or other forms of management to reduce the volume of prostate cancer in and/or around the prostate prior to attempted curative treatment.

downtstaging: The use of hormonal or other forms of management in the attempt to lower the clinical stage of prostate cancer prior to attempted curative treatment (e.g., from stage T3a to stage T2b); this technique is highly controversial.

doxorubicin (trade name Adriamycin®): an anticancer drug that belongs to the family of anthracycline.

dry orgasm: ejaculation without the release of semen.

dsDNA: Double-stranded DNA.

ductal: a tubular bodily canal or passage, especially one for carrying a glandular secretion: a tear duct.

duodenum: The first section of the small intestine, where acid chyme from the stomach mixes with digestive juices from the pancreas, liver, gallbladder, and gland cells of the intestinal wall.

duplication: An aberration in chromosome structure resulting from an error in meiosis or mutagens; duplication of a portion of a chromosome resulting from fusion with a fragment from a homologous chromosome.

dura mater: The tough and fibrous outer membrane of the three membranes (i.e., meninges) that cover the spinal cord.

dutasteride (trade name Avodart®): An inhibitor of the enzyme (5 alpha-reductase or 5AR) that stimulates the conversion of testosterone to DHT.

Dx: standard abbreviation for diagnosis.

dynein: A large contractile protein forming the sidearms of microtubule doublets in cilia and flagella.

dysarthria: Speech that is characteristically slurred, slow, and difficult to produce (difficult to understand). The person with dysarthria may also have problems controlling the pitch, loudness, rhythm, and voice qualities of their speech.

dysfunction: Abnormal or impaired functioning, especially of a bodily system or organ.

dysplasia: Premalignant change characterized by alteration in the size, shape and organization of the cellular components of a tissue.

dystrophin: This is a vital part of a protein complex that connects the cytoskeleton of a muscle fiber to the surrounding extracellular matrix through the cell membrane. A deficiency of dystrophin is one of the main causes of muscular dystrophy.

dysuria: Painful urination.

edcysone: A steroid hormone that triggers molting in arthropods.

echocardiogram: An ultrasound of the heart to determine the ability to pump blood. It is given as a percentage called an ejection fraction. Recent stem cell treatments have significantly improved ejection fraction in cardiac failure patients.

echography: Echography (ultrasound, ultrasonography or sonography) is a diagnostic test using high frequency sound waves that is utilized by many medical specialities.

eccentricity: The view that considers the whole environment or ecosphere as important and deserving of consideration, without giving preference to organisms such as animals and humans. It states that all elements of the environment have worth and should be valued and cared for.

ECOG performance status: Criteria used by doctors and researchers to assess how a patient’s disease is progressing, assess how the disease affects the daily living abilities of the patient, and determine appropriate treatment and prognosis. ECOG is Eastern Cooperative Oncology Group, one of the clinical trials groups.

ecological efficiency: The ratio of net productivity at one trophic level to net productivity at the next lower level.

ecological niche: The sum total of an organism's utilization of the biotic and abiotic resources of its environment.

ecological pyramid: A graphic representation of the quantitative relationships of numbers of organisms, biomass, or energy flow between the trophic levels of an ecosystem. Because large amounts of energy and biomass are dissipated at
every trophic level, these diagrams nearly always take the form of pyramids.

1152 ecological succession: Transition in the species composition of a biological community, often following ecological disturbance of the community; the establishment of a biological community in an area virtually barren of life.

1153 ecology: The study of how organisms interact with their environments.

1154 ecosystem: A level of ecological study that includes all the organisms in a given area as well as the abiotic factors with which they interact; a community and its physical environment.

1155 ecotype: A locally adapted variant of a species, differing genetically from other ecotypes of the same species.

1156 ectoderm: The ectoderm is the outer layer of cells produced from the inner cell mass of a blastocyst (early stage human embryo). The sensory organs (eyes, ears, etc.) nervous system, skin and other structures are created from the ectoderm.

1157 ectodermal layer: Here the original stem cells have differentiated to become primitive cells that make up the skin and its appendages (oil and sweat glands, hair and nails). It is from an off shoot of this layer that the Neurectoderm arises and is the progenitor of the brain, spinal cords and peripheral and autonomic nervous system.

1158 ectopic expression: The expression of a gene in an abnormal place in an organism. This can be caused by a disease, or it can be artificially produced as a way to help determine what the function of that gene is.

1159 ectopic pregnancy: A pregnancy that occurs outside of the uterus. The large majority of ectopic (tubal) pregnancies occur in the fallopian tube, but some can occur in the abdominal cavity as well.

1160 ectotherm: An animal such as a reptile, fish, or amphibian, that must use environmental energy and behavioral adaptations to regulate its body temperature.

1161 edema: Swelling of the spinal cord after injury due to the accumulation of fluids.

1162 Edmonton protocol: A procedure (developed in Canada) for transplanting pancreatic islet cells to the liver of a patient with Type I diabetes.

1163 efferent: Moving or carrying outward or away from a central part. Refers to vessels, nerves, etc. For example: blood vessels carrying blood away from the heart or nerves carrying signals from the brain.

1164 efficacy: The greatest ability of a drug of treatment to produce a result, regardless of dosage.

1165 egg cylinder: An asymmetric embryonic structure that helps to determine the body plan of the mouse.

1166 egg: A female gamete, which usually contains abundant cytoplasm and yolk; nonmotile and often larger than a male gamete.

1167 eicosanoid: Any of a class of compounds derived from polyunsaturated fatty acids and involved in cellular activity.

1168 eicosapentenoic acid (EPA): A fish oil supplement, an omega 3 fatty acid that inhibits the delta 5 desaturase enzyme that converts DGLA (dihomo-gamma-linolenic acid) to arachidonic acid.

1169 ejaculation: The release of semen through the penis during orgasm; ejaculation may be termed “dry” if there is scanty or no fluid component to the ejaculate resulting from radiation therapy or surgery.

1170 ejaculatory duct: In the male, a duct from each testis that join to form the urethra.

1171 ejection-fraction: The measurement of the left ventricle’s ability to pump blood and is a good predictor of longevity in patients. It needs to be above 55% in females and above 63% in males.

1172 electric potential: The difference in the amount of electric charge between a region of positive charge and a region of negative charge. The establishment of electric potentials across the plasma membrane and across organelle membranes makes possible a number of phenomena, including the chemiosmotic synthesis of ATP, the conduction of nerve impulses, and muscle contraction.

1173 electrochemical gradient: The diffusion gradient of an ion, representing a type of potential energy that accounts for both the concentration difference of the ion across a membrane and its tendency to move relative to the membrane potential.

1174 electroencephalography (EEG): A test in which electrodes are placed on the scalp to measure electrical activity produced by the brain.

1175 electrogenic pump: An ion transport protein generating voltage across the membrane.

1176 electrolyte: A substance that, when dissolved in a suitable solvent or when fused, becomes an ionic conductor.

1177 electromagnetic spectrum: The entire spectrum of radiation; ranges in wavelength from less than a nanometer to more than a kilometer.

1178 electromyography (EMG): The electrical recording of muscle activity for diagnostic purposes.
electron acceptor: Substance that accepts or receives electrons in an oxidation-reduction reaction, becoming reduced in the process.

electron carrier: A molecule that conveys electrons; one of several membrane proteins in electron transport chains in cells. Electron carriers shuttle electrons during the redox reactions that release energy used to make ATP.

electron donor: Substance that donates or gives up electrons in an oxidation-reduction reaction, becoming oxidized in the process.

electron microscope (EM): A microscope that focuses an electron beam through a specimen, resulting in resolving power a thousandfold greater than that of a light microscope. A transmission electron microscope (TEM) is used to study the internal structure of thin sections of cells. A scanning electron microscope (SEM) is used to study the fine details of cell surfaces.

electron shell: An energy level at which an electron orbits the nucleus of an atom.

electron transport chain: A sequence of electron-carrier molecules (membrane proteins) that shuttle electrons during the redox reactions that release energy used to make ATP.

electron negativity: The tendency for an atom to pull electrons toward itself.

electrophoresis: Using an electric charge to separate molecules in a solution or gel according to size. It is routinely used to separate fragments of DNA.

electrophysiology: The study of electrical activity or conduction in nerves.

electroporation: Method of introducing DNA into a cell.

element: Any substance that cannot be broken down to any other substance.

ELISA: Enzyme-linked immunosorbent assay; a sensitive immunoassay that uses an enzyme linked to an antibody or antigen as a marker for the detection of a specific protein, especially an antigen or antibody; often used as a diagnostic test to determine exposure to a particular infectious agent, such as the AIDS virus, by identifying antibodies present in a blood sample.

emboli: Material, usually blood clot but may be fat, bone fragment, nitrogen bubble or bullet, that travels through the circulation, eventually obstructing blood flow through a smaller calibre vessel (for example stroke, pulmonary embolism, central retinal artery occlusion).

embolus: A mass, such as an air bubble, a detached blood clot, or a foreign body, that travels through the bloodstream and lodges so as to obstruct or occlude a blood vessel.

embryo acceptor: Substance that accepts or receives electrons in an oxidation-reduction reaction, becoming reduced in the process.

electron acceptor: A molecule that conveys electrons; one of several membrane proteins in electron transport chains in cells. Electron carriers shuttle electrons during the redox reactions that release energy used to make ATP.

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embryoid bodies (EBs): Spheroid colonies seen in culture produced by the growth of embryonic stem cells in suspension. Embryoid bodies are of mixed cell types, and the distribution and timing of the appearance of specific cell types corresponds to that observed within the embryo.

embryonal carcinoma (EC) cells: A type of pluripotent stem cell derived from teratocarcinoma (usually a testis tumor).

embryonic germ cell: An embryonic germ cell is derived from fetal tissue. Specifically, they are isolated from the primordial germ cells of the gonadal ridge of the 5 - to 10 week fetus. Later in development, the gonadal ridge develops into the testes or ovaries and the primordial germ cells give rise to eggs or sperm. Embryonic stem and embryonic germ cells are pluripotent but are not identical in the properties.

embryonic pluripotent stem cell: Cell lines derived from early embryos before formation of the tissue germ layers.

embryonic stem cell (ESC): Primitive (undifferentiated) cell derived from a preimplantation embryo (up to nine days after fertilization in humans) that has the potential to become a wide variety of specialized cell types. ESCs are self-renewing (can replicate themselves), pluripotent (can form all cell types found in the body), and can divide indefinitely in culture.

embryonic stem cell line: Embryonic stem cells, which have been cultured under in vitro conditions that allow proliferation without differentiation for months to years.
1203 embryonic stem cell: Pluripotent stem-cell lines derived from preimplantation embryos before the formation of the tissue germ layers. Primitive (undifferentiated) cells derived from a 5-day preimplantation embryo that are capable of dividing without differentiating for a prolonged period in culture, and are known to develop into cells and tissues of the three primary germ layers.

1204 embryonic: Stem cells derived from the inner cell mass of a 4–5 day post fertilization egg (blastocyst) at which time they consist of 50–150 cells.

1205 enantiomer: One of a pair of molecules that are mirror-image isomers of each other.

1206 endangered species: A species that is in danger of extinction throughout all or a significant portion of its range.

1207 endangered: A species with such a low population number that it is in danger of extinction.

1208 endemic species: Species that are confined to a specific, relatively small geographic area.

1209 endemic: An organism found only in one particular location.

1210 endergonic reaction: A nonspontaneous chemical reaction in which free energy is absorbed from the surroundings.

1211 endocrine gland: A ductless gland that secretes hormones directly into the bloodstream.

1212 endocrine system: The internal system of chemical communication involving hormones, the ductless glands that secrete hormones, and the molecular receptors on or in target cells that respond to hormones; functions in concert with the nervous system to effect internal regulation and maintain homeostasis.

1213 endocrine: A system in the body in which substances (hormones) are made and released (secreted) in the body. If the endocrine system is affected by certain drugs then there can be changes in hormones which can affect growth or sexual development and functions.

1214 endocrine: Pertaining to ductless glands that secrete hormones into the blood stream.

1215 endocrinology: the study of hormones, their function, the organs that produce them and how they are produced.

1216 endocytosis: The cellular uptake of macromolecules and particulate substances by localized regions of the plasma membrane that surround the substance and pinch off to form an intracellular vesicle.

1217 endoderm: The innermost of the three primary germ layers in animal embryos. The endoderm gives rise to the liver, pancreas, lungs, and the lining of the digestive tract in species that have these structures. Induced pluripotent stem cells and embryonic stem cells are capable of differentiating into cell types of all three germ layers-endoderm, ectoderm and mesoderm.

1218 endodermal layer: Here lay the precursor cells of the GI tract, liver, gall bladder, pancreas and kidneys.

1219 endodermal: The epithelial lining of the body including the digestive tube, glands which open into the digestive tube gland (liver and pancreas) and other bodily tissues (epithelium).

1220 endodermis: The innermost layer of the cortex in plant roots; a cylinder one cell thick that forms the boundary between the cortex and the stele.

1221 endogenous stem cells: Stem cells that are already present in the body.

1222 endogenous: Inherent naturally to the organism; originating or produced within an organism, tissue, or cell, e.g. endogenous secretions.

1223 endomembrane system: The collection of membranes inside and around a eukaryotic cell, related either through direct physical contact or by the transfer of membranous vesicles.

1224 endometrium: The inner lining of the uterus, which is richly supplied with blood vessels.

1225 endoplasmic reticulum: A system of interconnected vesicular and lamellar cytoplasmic membranes that functions especially in the transport of materials within the cell and that is studded with ribosomes in some places.

1226 endorectal coil: A device that is inserted into a patient's rectum beneath the prostate and is used to acquire spectroscopy for prostate MRI/MRSI exams.

1227 endorectal MRI: Magnetic resonance imaging performed with a coil placed in the rectum, may be combined with endorectal magnetic resonance spectroscopy.

1228 endorectal: Within the rectum.

1229 endorphin: A hormone produced in the brain and anterior pituitary that inhibits pain perception.

1230 endoscope: An instrument for examining visually the interior of a bodily canal or hollow organ such as the colon, bladder, or stomach.

1231 endoscopic biopsy: Endoscopic biopsy is done through an endoscope (a fiber optic cable for viewing inside the body) which is inserted into the body along with sampling instruments. The endoscope allows the physician to visualize the abnormality and guide the sampling.

1232 endoscopy: The use of an endoscope, a flexible, lighted tube, for examining the inside of the body.

1233 endoskeleton: A hard skeleton buried within the soft tissues of an animal, such as the spicules of sponges, the plates of echinoderms, and the bony skeletons of vertebrates.
The process by which collected stem cells received during transplant start to grow and make new blood cells. The definition of engraftment in transplant is very specific and relates to a neutrophil and platelet count recovery. Neutrophil engraftment is defined as the first day of three consecutive days where the neutrophil count (absolute neutrophil count) is 500 cells/mm3 (0.5 x 10^9/L) or greater. Platelet engraftment is defined as 20,000/mm3 (20 x 10^9/L) unsupported by a platelet transfusion.

Enzyme assay: Definitive test used to diagnose most LSDs. Enzyme levels are analyzed in a tissue sample taken from the patient and compared to known normal levels. Lower-than-normal levels for certain enzymes provides a conclusive diagnosis for the LSD associated with the enzyme. Measurement of enzyme activity with particular substrate, for example an enzyme assay for Tay-Sachs disease measures the Hex A activity with GM2 gangliosides.

Enzyme replacement therapy (ERT): A form of treatment used for some LSDs in which patients get an intravenous infusion to replace the missing or faulty enzyme causing the LSD.

Enzyme: A protein molecule which assists in a change in another molecule or molecules. Enzymes are like catalysts, in that they cause a reaction to occur at a higher rate, without becoming used up in the reaction. Enzymes are used in most, but not all, chemical reactions in life. Some enzymes are used in stem cell processing to release stem cells from their culture containers, or to release them from the tissues in which they are found.

Enzyme-linked immunosorbent assay (ELISA): A sensitive immunoassay that uses an enzyme linked to an antibody or antigen as a marker for...
the detection of a specific protein, especially an antigen or antibody; often used as a diagnostic test to determine exposure to a particular infectious agent, such as the AIDS virus, by identifying antibodies present in a blood sample.

1258 eosinophil: A type of leukocyte (white blood cell) with coarse round granules of uniform size within its cytoplasm and typically a two-lobed nucleus. Eosinophils normally constitute 1 to 3% of the peripheral blood leukocytes. The eosinophil count in the blood often rises above the normal range with allergic reactions and parasitic infections.

eosinophilia: Elevated eosinophil count in the circulating blood. Commonly associated with chronic parasitic infections.

1260 EPCA-2: A novel biomarker associated with prostate cancer that has high sensitivity and specificity and accurately differentiates between men with organ-confined and non-organ-confined disease.

1261 epiblast stem cell (EpiSC): A type of stem cell derived from an early post-implantation mouse embryo (epiblast) that has some properties of embryonic stem cells, but not the level of pluripotency associated with embryonic stem cells. EpiSCs are cultured under the same conditions required for human embryonic stem cell culture.

epiblast: Gives rise to the ectoderm and mesoderm. The mesoderm then displaces the hypoblast cells and forms the entodermal cell layer on its inner surface.

epidemiology: the branch of medicine that deals with the study of the causes, distribution, and control of disease in populations.

1264 epidermal growth factor (EGF): A polypeptide hormone that stimulates cell proliferation by binding to receptor proteins on the cell surface. A cell messenger protein that has effects including stimulation of epidermal development, in newborn animals it hastens eyelid-opening and tooth-eruption.

1265 epidermal stem cell: A stem cell from the skin able to produce hair follicle, epidermal or sebaceous gland tissue.

1266 epidermis: (1) The dermal tissue system in plants. (2) The outer covering of animals.

1267 epididymis: tightly coiled, thin-walled tube that conducts sperm from the testes to the vas deferens and provides for the storage, transmission, and maturation of sperm; inflammation of the epididymis is called epididymitis.

1268 epidural anesthesia: A form of anesthesia for which medication is inserted into the outer (epidural) layer of the spinal cord to block any painful sensations from the point of insertion to the lower extremities. The donor is awake with this form of anesthesia. About 20 percent of NMDP stem cell donors receive epidural anesthesia. Epidural anesthesia is a form of regional anesthesia.

epidural: Outside the outer membrane surrounding the brain or spinal column.

1270 epigallocatechin gallate (EGCG): The active ingredient of green tea that relates to the potency of the green tea product.

1271 epigenesis: The progressive development of form in an embryo.

epigenetic: Alterations in gene-expression patterns, without changes in DNA sequence. This could occur by modification of proteins that surround the genomic DNA: Cytosine DNA methylation (a methyl group is transferred from S-adenosylmethionine to C-5 position of cytosine by a family of cytosine-methyltransferases.

1273 epinephrine: a hormone and neurotransmitter (Also called adrenaline); one of the secretions of the adrenal glands. It helps the liver release glucose (sugar) and limit the release of insulin; it also makes the heart beat faster and can raise blood pressure.

1274 epiphyte: A plant that nourishes itself but grows on the surface of another plant for support, usually on the branches or trunks of tropical trees.

1275 episome: A plasmid capable of integrating into the bacterial chromosome.

1276 epistasis: A phenomenon in which one gene alters the expression of another gene that is independently inherited.

1277 epithelial cell: In PC the cells within the prostate that line the ducts and functionally secrete chemicals such as PSA into the blood stream or into the duct openings or lumen.

1278 epithelial stem cells: These are stem cells found in the digestive tract. They give rise to absorptive cells, paneth cells, goblet cells, and enteroendocrine cells.

1279 epithelial tissue: Sheets of tightly packed cells that line organs and body cavities.

1280 epithelial: Mesenchymal Transition: Program of development characterized by loss of cell adhesion, repression of E-Cadherin expression and increased cell mobility. This process is essential for mesoderm formation and neural tube formation.

1281 epithelium: Layers of cells in various organs, such as the epidermis of the skin or the lining of the gut. These cells serve the general functions of protection, absorption, and secretion, and play a specialized role in moving substances through tissue layers. Their ability to regenerate is
1298 excellent; the cells of an epithelium may replace themselves as frequently as every 24 hours from the pools of specialized stem cells.
1299 epitope: A localized region on the surface of an antigen that is chemically recognized by antibodies; also called antigenic determinant.
1300 epothilones: A new class of natural and potent agents that stabilize microtubules to inhibit the growth and spread of malignant cells.
1301 equilibrium species: Species characterized by low reproduction rates, long development times, large body size, and long adult life with repeated reproductions.
1302 equilibrium: The state of a system in which no further net change is occurring; result of counterbalancing forward and backward processes.
1303 erectile dysfunction (ED): An inability to get or maintain an erection.
1304 ergometer: A device for evaluating the amount of work done by a muscle or group of muscles.
1305 ergotamine: An alkaloid derived from ergot that is less toxic than ergot; causes constriction of blood vessels and is used to treat migraine.
1306 urum glutamic pyruvic transaminase: A liver cell enzyme; elevation of SGOT is seen as an effect of liver cell injury by drugs, alcohol and viruses.
1307 erythrocyte: A red blood cell. Erythrocytes are responsible for transporting oxygen throughout the body.
1308 erythropoiesis: Development of red blood cells.
1309 erythropoietin: A glycoprotein hormone produced primarily by cells of the peritubular capillary endothelium of the kidney that is responsible for the regulation of red blood cell production.
1310 esophagus: A channel that conducts food, by peristalsis, from the pharynx to the stomach.
1311 essential amino acids: The amino acids that an animal cannot synthesize itself and must obtain from food. Eight amino acids are essential in the human adult.
1312 ester: Any of a class of organic compounds corresponding to the inorganic salts and formed from an organic acid and an alcohol, usually with the elimination of water.
1313 estivation: A physiological state characterized by slow metabolism and inactivity, which permits survival during long periods of elevated temperature and diminished water supplies.
1314 estradiol: The most potent naturally occurring estrogen. In men it is naturally produced in small amounts.
1315 estramustine phosphate sodium (EMCYT): A chemotherapeutic agent; a hybrid drug combination of nitrogen mustard and estrogen that disrupts cytoplasmic microtubules.
1316 estramustine: A nitrogen mustard linked to estradiol, usually as phosphate; used to treat prostatic neoplasms; also has radiation protective properties.
1317 estrogen receptor (ER): The docking site on the cell or in the cell for estrogen.
1318 estrogen: Any of various natural steroids (as estradiol) that are formed from androgen precursors, that are secreted chiefly by the ovaries, placenta, adipose tissue, and testes, and that stimulate the development of female secondary sex characteristics and promote the growth and maintenance of the female reproductive system.
1319 estrous cycle: A type of reproductive cycle in all female mammals except higher primates, in which the nonpregnant endometrium is reabsorbed rather than shed, and sexual response occurs only during midcycle at estrus.
1320 ethics: A branch of philosophy that deals with morality. It is concerned with distinguishing between right and wrong human actions, both at an individual and societal level. Ethics may also apply to the rules or standards that specify how particular members of an organisation should conduct themselves.
1321 ethology: The comparative study of patterns of animal behavior, with emphasis on their adaptive significance and evolutionary origin.
1322 ethylene: The only gaseous plant hormone, responsible for fruit ripening, growth inhibition, leaf abscission, and aging.
1323 etidronate: A white disodium bisphosphonate salt C2H6Na2O7P2 used to treat osteoporosis called also etidronate disodium.
1324 etiolation: In plants, a condition characterized by stem elongation, poor leaf development, and lack of chlorophyll; occurs in plants growing in the dark or with greatly reduced light.
1325 etiology: the study of all of the factors involved in the development of a disease.
1326 etoposide: A genotoxic drug, a chemotherapy agent that affects DNA and alters its function.
1327 euchromatin: The more open, unraveled form of eukaryotic chromatin, which is available for transcription.
1328 eucharyote: An organism whose cells have cytoskeletons for support and their DNA contained in a nucleus, separated from the other contents of the cell; e.g., protists, plants, animals, and fungi; eukaryotic- adj.
1329 eucharyotic cell: A type of cell with a membrane-enclosed nucleus and membrane-enclosed organelles, present in protists, plants, fungi, and animals; also called eukaryote.
eukaryotic: A single-celled or multicellular organism whose cells contain a distinct membrane-bound nucleus.

euxin®: The brand or trade name of flutamide in the USA.

eumetazoa: Members of the subkingdom that includes all animals except sponges.

eusocial: Applied to animal societies, such as those of certain insects, in which sterile individuals work on behalf of reproductive individuals.

eutherian mammals: Placental mammals; those whose young complete their embryonic development within the uterus, joined to the mother by the placenta.

eutrophic lake: A highly productive lake, having a high rate of biological productivity supported by a high rate of nutrient cycling.

eutrophication: A process in which an aquatic environment accumulates high nutrient levels due to factors such as industrial or urban pollution or run-off of fertilizers from nearby agricultural lands. The nutrients lead to dense blooms of algae and aquatic plants that cloud lake water, deplete specific minerals and dissolved gases, and can cause natural plant and animal populations to decline.

eutrophication: Death of organisms in a lake or pond due to an overabundance of algae that consume all of the dissolved oxygen in the water. This usually happens when the water becomes rich in mineral and organic nutrients, often due to fertilizer run off from farms.

Evaporative cooling: The property of a liquid whereby the surface becomes cooler during evaporation, owing to a loss of highly kinetic molecules to the gaseous state.

evoked potentials: Measures nerve-fiber viability by sending an electromagnetic signal from the brain and recording the signal after it passes through the cord.

evolution: All the changes that have transformed life on Earth from its earliest beginnings to the diversity that characterizes it today.

evolutionary species concept: The idea that evolutionary lineages and ecological roles can form the basis of species identification.

ex vivo: Treatments or experiments performed in or on living tissue in an environment outside the organism.

exaptation: A structure that evolves and functions in one environmental context but that can perform additional functions when placed in some new environment.

excise: Surgically remove, removal.

excision: Surgically remove, removal.

excessional biopsy: Also known as a surgical or open biopsy, the purpose of an excisional biopsy is to attempt to remove the entire mass or a large portion of the mass. The tissue that is removed is then sent to the pathologist for diagnosis.

excitatory amino acids: Amino acid neurotransmitters (e.g., glutamate) released from a pre-synaptic neuron that promulgates the nerve impulse in a nearby post-synaptic neuron.

excitatory postsynaptic potential (EPSP): An electrical change (depolarization) in the membrane of a postsynaptic neuron caused by the binding of an excitatory neurotransmitter from a presynaptic cell to a postsynaptic receptor; makes it more likely for a postsynaptic neuron to generate an action potential.

excitotoxicity: The process by which nerve cells are damaged by glutamate and similar substances.

excretion: The disposal of nitrogen-containing waste products of metabolism.

excretory system: The organ system that disposes of nitrogen-containing metabolic wastes.

exergonic reaction: A spontaneous chemical reaction in which there is a net release of free energy.

exocrine glands: Glands, such as sweat glands and digestive glands, that secrete their products into ducts that empty onto surfaces, such as the skin, or into cavities, such as the interior of the stomach.

exocytosis: The release of cellular substance contained in cell vesicles by fusion of the vesicular membrane with the plasma membrane and subsequent release of the contents to the exterior of the cell.

exogenous: developed or originating outside the organism, as exogenous disease.

exon/intron: An exon is the part of the gene that codes for the actual protein. On the chromosome the exons that make up the coding sequence for the protein are separated by introns. Upon reading of the gene, the cell cuts out the introns and puts the exons together (a process called splicing) so that the exons are now continuous with all the information necessary to make a protein. Mutations usually affect the information in exons or the way they are spliced together.

exon: The coding region of a eukaryotic gene that is expressed. Exons are separated from each other by introns.

exophthalmus: An abnormal protrusion of the eyeball(s).

exoskeleton: A hard encasement on the surface of an animal, such as the shells of mollusks or the cuticles of arthropods, that provides protection and points of attachment for muscles.
exotoxin: A toxic protein secreted by a bacterial cell that produces specific symptoms even in the absence of the bacterium.

expansion: Increasing the numbers of a particular line of stem cells by growing them out in cell culture. Expansion allows the administration of increased numbers of cells, thus increasing the probability that the stem cells will successfully repair the lesions in the body.

experimental: An unproven (or even untested) technique or procedure; note that certain experimental treatments are commonly used in the management of prostate cancer.

exponential growth: In populations, the increasingly accelerated rate of growth due to the increasing number of individuals being added to the reproductive base. Exponential growth is very seldom approached or sustained in natural populations.

expression vector: A vector that allows a DNA sequence cloned into it to be transcribed when the vector is introduced into a cell.

expression: The process by which a gene's coded information is converted into the structures present and operating in the cell. Expressed genes include those that are transcribed into mRNA and then translated into protein and those that are transcribed into RNA but not translated into protein.

expressivity: In genetics, the degree to which a particular genotype is expressed in the phenotype of individuals with that genotype.

extension: The movement of a joint that results in increased angle between two bones or body surfaces at a joint.

extent of disease (EOD): Part of what should be a standard approach to staging the bone scan; after work by Soloway.

external beam radiation therapy (EBRT): External beam radiation treatment that can include conventional photons, or use protons, neutrons, or electrons. This may be given conventionally or with 3D conformal techniques.

extinct: No longer existing.

extra-capsular extension (ECE): Cancer extending beyond the prostate capsule.

extracellular matrix (ECM): Region outside of metazoan cells which includes compounds attached to the plasma membrane, as well as dissolved substances attracted to the surface charge of the cells. The ECM functions both to keep animal cells adhered together, and well as buffering them from their environment.

eextracellular: outside a cell or cells.

extraembryonic membranes: Four membranes that support the developing embryo in reptiles, birds, and mammals.

extraembryonic tissues: Intra-embryo tissues that support the embryo's placenta, umbilical cord, and amniotic sac.

extramedullary: Outside the bone marrow.

extraprostatic: Located outside the prostate.

extrapyramidal symptoms: A group of side effects from medication. Includes symptoms such as uncontrollable restlessness (i.e. finding it difficult to stand still), muscle stiffness, shaking and other uncontrollable movements.

extravasation: Movement of a cell in or out of the bone marrow through endothelial barrier. Chemotaxis cannot account for this type of movement.

extravascular compartment: Areas in the bone marrow microenvironment that are not blood vessels.

extremophile: An organism that lives in an extreme environment such as ice in Antarctica, Chilean deserts, and thermal vents deep in the ocean. Most extremophiles are microorganisms, but a few species of plants and animals, including certain worms and snails, endure extremely harsh conditions.

eyespot: Light-sensitive organelle found in many groups of protists, and in some metazoans.

F factor: A fertility factor in bacteria, a DNA segment that confers the ability to form pili for conjugation and associated functions required for the transfer of DNA from donor to recipient. May exist as a plasmid or integrated into the bacterial chromosome.

F1 (first filial generation): The first filial or hybrid offspring in a genetic cross-fertilization.

F2 (second filial generation): Offspring resulting from interbreeding of the hybrid F1 generation.

facet joints: Small stabilizing joints located between and behind adjacent vertebrae.

facilitated diffusion: The spontaneous passage of molecules and ions, bound to specific carrier proteins, across a biological membrane down their concentration gradients.

factor VIII and IX: Soluble blood proteins that form part of the cascade of the 12 reactions of blood clotting. Factor VIII deficiency is associated with haemophilia A while factor IX deficiency is associated with haemophilia B.

facultative anaerobe: An organism that makes ATP by aerobic respiration if oxygen is present but that switches to fermentation under anaerobic conditions.

false negative: An erroneous negative test result; for example, an imaging test that fails to show the
presence of a cancer tumor later found by biopsy to be present in the patient is said to have returned a false negative result.

false positive: A positive test result mistakenly identifying a state or condition that does not in fact exist.

familial polyposis: Hereditary, autosomal dominant precancerous syndrome characterized by innumerable adenomatous polyps of the colon.

family: A taxonomic grouping of related, similar genera; the category below order and above genus.

fanconi anemia (congenital pancytopenia): A rare congenital anemia characterized by pancytopenia and hypoplasia of the bone marrow.

fanconi anemia: A rare, inherited type of aplastic anemia. Found most often in young children.

fascia: Fascia, a connective tissue, is the packing material of the body. It envelopes the muscles, bones and joints and holds us together supporting the body structure and giving us our shape. Fascia organizes and separates: it provides protection and autonomy for the individual muscles and viscera. It joins and bonds these separate entities and establishes spatial relationships. Chemically it is the collagen in the fascia that enables it to change.

fasciculations: Muscle twitches are fine or tiny uncontrollable movements of a small area of muscles. Some are common while others are associated with neurological disease.

fast echo spin (FSE): In MRI, echo sequence is characterized by a series of rapidly applied 180° rephasing pulses and multiple echoes.

fat: A biological compound consisting of three fatty acids linked to one glycerol molecule.

fate (of cell progeny): The normal outcome of differentiation of a cell's progeny.

fatty acid: A long carbon chain carboxylic acid. Fatty acids vary in length and in the number and location of double bonds; three fatty acids linked to a glycerol molecule form fat.

FDA: The Food and Drug Administration, an agency within the U.S. Public Health Service, which is a part of the Department of Health and Human Services.

feedback inhibition: A method of metabolic control in which the end-product of a metabolic pathway acts as an inhibitor of an enzyme within that pathway.

feedback systems: Control mechanisms whereby an increase or decrease in the level of a particular factor inhibits or stimulates the production, utilization, or release of that factor; important in the regulation of enzyme and hormone levels, ion concentrations, temperature, and many other factors.

feeder layer: Cells used in co-culture to maintain pluripotent stem cells. For human embryonic stem cell culture, typical feeder layers include mouse embryonic fibroblasts (MEFs) or human embryonic fibroblasts that have been treated to prevent them from dividing.

feral: Domestic or introduced animals living in wild conditions, or plants that have become wild.

fermentation: A catabolic process that makes a limited amount of ATP from glucose without an electron transport chain and that produces a characteristic end-product, such as ethyl alcohol or lactic acid.

ferritin: An iron-containing protein complex, found principally in the intestinal mucosa, spleen and liver that functions as the primary form of iron storage in the body.

fertilization: The process of union of two gametes whereby the somatic chromosome number is restored and the development of a new individual is initiated.

fetal calf serum: A type of culture medium often used in the culture of stem cells. It provides a number of growth factors.

fetal stem cells: Stem cells processed from aborted human fetuses. These usually are of two types, “somatic” stem cells, from the liver of the fetus, and “neuronal” stem cells, from the fetal brain.

fetal tissue: Tissues obtained from therapeutic termination of pregnancies between 8–20 weeks’ of gestation.

fetus: The unborn offspring from the end of the 8th week after conception (when the major structures have formed) until birth. Up until the eighth week, the developing offspring is called an embryo.

feulgen stain: A histology stain used in microscopy to identify chromosomal material or DNA.

FGF: Fibroblast growth factor (contributes to blood vessel development).

FGF-1 to FGF-10: Fibroblast growth factor 1 to 10. A growth factor molecule.

fiber: A lignified cell type that reinforces the xylem of angiosperms and functions in mechanical support; a slender, tapered sclerenchyma cell that usually occurs in bundles.

fibril: A small thread-like structure that is often part of a cell.

fibrin: The activated form of the blood-clotting protein fibrinogen, which aggregates into threads that form the fabric of the clot.
fibroblast: A type of cell that synthesizes and maintains the extracellular matrix of many animal tissues. Fibroblasts provide a structural framework (stroma) for many tissues, and play a critical role in wound healing.

fibrosis: Refers to the presence of scar tissue or collagen fibers in any tissue. In the liver, fibrosis or scarring of the liver damages the architecture and thus the functionality of the organ. Fibrosis, combined with the liver's ability to regenerate, causes cirrhosis (regeneration within the scar tissue).

fibrous protein: Insoluble structural protein in which the polypeptide chain is coiled along one dimension. Fibrous proteins constitute the main structural elements of many animal tissues.

fiducial: Used as a fixed standard of reference for comparison or measurement.

filament: Long chain of proteins, such as found in hair, muscle, or in flagella.

filgrastim: A protein that helps bone marrow make more white blood cells. Filgrastim is also known as GCSF (granulocyte-colony stimulating factor) or by the tradename Neupogen®. It is given to donors who have agreed to donate peripheral blood stem cells. This moves blood stem cells from the marrow into the blood stream so that they can be collected by apheresis. It is also given to patients to help increase their white blood cell count after the transplant.

filtrate: Fluid extracted by the excretory system from the blood or body cavity. The excretory system produces urine from the filtrate after extracting valuable solutes from it and concentrating it.

filtration: The first stage of kidney function; blood plasma is forced, under pressure, out of the glomerular capillaries into Bowman's capsule, through which it enters the renal tubule.

finasteride (Proscar®): An inhibitor of the enzyme (5 alpha-reductase or 5AR) that stimulates the conversion of testosterone to DHT; used to treat BPH.

fine motor: Fine motor refers to functions which require tiny muscle movements. For example, writing or typing would require fine motor movement.

first filial generation (F1): The first filial or hybrid offspring in a genetic cross-fertilization.

first law of thermodynamics: The principle of conservation of energy. Energy can be transferred and transformed, but it cannot be created or destroyed.

first-degree relatives: Children, parents, brothers, and sisters.

fission: Division of single-celled organisms, especially prokaryotes, in which mitosis does not occur. Also used to refer to mitosis in certain unicellular fungi.

fistula: In medicine, a fistula is an abnormal channel that creates an open passageway between two bodily structures that do not normally connect.

fitness: The genetic contribution of an individual to succeeding generations relative to the contributions of other individuals in the population.

fixed action pattern: A highly stereotypical behavior that is innate and must be carried to completion once initiated.

flagellum (pl. flagella): A long cellular appendage specialized for locomotion, formed from a core of nine outer doublet microtubules and two inner single microtubules, ensheathed in an extension of plasma membrane.

flagellum: Hair-like structure attached to a cell, used for locomotion in many protists and prokaryotes. The prokaryotic flagellum differs from the eukaryotic flagellum in that the prokaryotic flagellum is a solid unit composed primarily of the protein flagellin, while the eukaryotic flagellum is composed of several protein strands bound by a membrane, and does not contain flagellin. The eukaryotic flagellum is sometimes referred to as an undulipodium.

flare reaction: The transient increase in serum testosterone for the first few weeks after starting an LHRH agonist. This increase in testosterone can potentially worsen the signs and symptoms of disease, especially in those patients with vertebral metastases and/or urinary obstruction; may be prevented by taking an antiandrogen (Casodex® or Eulexin®) several days before starting an LHRH agonist or by the use of an LHRH antagonist such as abarelix (Plenaxis®).

flavin adenine dinucleotide (FAD): A coenzyme that functions as an electron acceptor in the Krebs cycle.

flexion: The bending of a joint so that the bones forming the joint are brought closer together.

flow cytometry: Counting and measurement of cells as they flow past a laser light. The amount and direction of reflection of light from a laser, and the activation of fluorescent dyes tagging the cell, are detected as the cell moves by in a stream of fluid. This is the primary means of identifying, characterizing, and counting different cell types.
1427 flower: The reproductive structure of angiosperms; a complete flower includes sepals, petals, stamens (male structures), and carpels (female structures).
1428 fludarabine therapy: A form of CLL treatment that involves a chemotherapy that interferes with the making of DNA so new leukemia cells cannot grow and shortens the life of existing leukemia cells.
1429 fluence: Particles per unit time; similar to current only the particles are photons.
1430 fluid-feeder: An animal that lives by sucking nutrient-rich fluids from another living organism.
1431 fluorescein isothiocyanate (FITC): Use to tag other proteins for immunofluorescence.
1432 fluorescence activated cell sorter (FACS): An indispensable instrument in stem cell research, FACS enables the rapid characterization, counting and isolation of cells suspended in a stream of fluid. The technology employs a laser beam of a single wavelength directed into the stream and fluorescence detectors that measure the scattered light. If a fluorescing molecule is detected in the stream (such as a tagged antibody attached to the surface of a stem cell), the data is recorded, and optionally, the stream briefly diverted to collect the tagged cell.
1433 fluorescent marking: Marking the specific proteins on the outside of a cell with antibodies tagged with a fluorescent dye. This dye will glow in a characteristic color when exposed to ultraviolet light, causing the marked protein to show up as a colored spot. Fluorescent marking is one of the common tools used in characterization of cells.
1434 fluorescent: Glowing under ultraviolet (UV) light. Fluorescent dyes are used to mark specific proteins that identify or characterize cell types.
1435 fluoroscope: A device consisting of a fluorescent screen, used in conjunction with an X-ray tube, that shows the images of objects between the tube and the screen.
1436 fluorouracil: An antineoplastic chemotherapy agent that inhibits certain DNA building blocks, used especially in the treatment of cancers of the skin, breast, and digestive system.
1437 flutamide (Eulexin®): An antiandrogen used in the palliative hormonal treatment of advanced prostate cancer and in the adjuvant and neoadjuvant hormonal treatment of earlier stages of prostate cancer; normal dosage is 2 capsules three times a day.
1438 focal therapy: A more localized treatment directed at the cancerous foci within the gland, rather than removing or destroying the entire prostate.
1439 focus (pl. foci): Group of cells, identifiable by distinctive distribution or structure.
1440 foetus: A developing human baby evolved from the embryo at about two months after conception and continues to birth.
1441 foley: A transurethral (Foley) catheter.
1442 follicle stimulating hormone (FSH): A protein hormone secreted by the anterior pituitary that stimulates the production of eggs by the ovaries and sperm by the testes.
1443 follicle stimulating hormone (FSH): In the male, stimulates the Sertoli cells of the testicle to make sperm.
1444 follicle: A microscopic structure in the ovary that contains the developing ovum and secretes estrogens.
1445 follicular stem cells: Stem cells that give rise to hair follicles and the epidermis (skin).
1446 follistatin: An inhibitory factor produced during embryonic development that affects the growth and differentiation of the pancreas.
1447 Food and Drug Administration (FDA): A federal agency of the United States government. Charged with protecting the public from adulterated food and dangerous drugs, this agency has transmogrified into a front for the big pharmaceutical corporations. Through a “revolving door” system, FDA researchers and lawyers tend to leave the agency for better paying jobs in industry. Rather than protect the public against dangerous drugs, FDA employees approve drugs whenever possible, thus preserving their chances at a more lucrative job with industry. They also have restricted use of natural, unpatentable therapies, in favor of synthetic, patentable therapies profitable to Big Pharma.
1448 food chain: The pathway along which food is transferred from trophic level to trophic level, beginning with producers.
1449 foramen magnum: The opening in the skull through which the spinal cord passes to become the medulla oblongata.
1450 formal search: A search becomes formal when a physician at an NMDP-accredited Transplant Center asks that one or more volunteer stem cell donors who are potential matches for a patient be contacted to undergo additional compatibility testing. The Donor Center where volunteer stem cell donors are registered contacts them to arrange collection of blood samples. Once a
free PSA: PSA molecules in the bloodstream that are not "bound" to other proteins.

frustrule: The mineral "skeleton" of a diatom or other unicellular organism.

fulguration: Destroying tissue using an electric current.

functional electrical stimulation (FES): The use of low levels of electrical current to stimulate physical or bodily functions lost through nervous-system impairment.

functional group: A specific configuration of atoms commonly attached to the carbon skeletons of organic molecules and usually involved in chemical reactions.

functional independence measure: A predictor of the amount of assistance or adaptive equipment an individual may need in everyday life.

functional magnetic stimulation (FMS): The use of magnetic fields to promote functional benefits.

fungicide: A substance or chemical that kills fungi.

fusion: Combining two or more inputs of data so that they can be overlaid one upon another to provide a sense of agreement or concordance; fusion imaging studies such as ProstaScint-CT-PET are examples.
G protein: A GTP-binding protein that relays signals from a plasma-membrane signal receptor, known as a G-protein linked receptor, to other signal-transduction proteins inside the cell. When such a receptor is activated, it in turn activates the G protein, causing it to bind a molecule of GTP in place of GDP. Hydrolysis of the bound GTP to GDP inactivates the G protein.

G0 Phase: A phase of the cell cycle.

G0G1 growth phase: with G0 being the relatively dormant phase of the cell growth cycle and G1 the phase just preceding DNA synthesis or S-phase.

G1 arrest: Arrest or halting the cell cycle at the stage of G1; the normal sequence is G1-S-G2-M.

G1 phase: The first growth phase of the cell cycle, consisting of the portion of interphase before DNA synthesis begins.

G2 phase: The second growth phase of the cell cycle, consisting of the portion of interphase after DNA synthesis occurs.

gait trainer: A gait trainer is a type of walker, which provides considerable postural support for patients who require moderate to maximum support for ambulation. Gait trainers come in a variety of sizes to meet the needs of small children up through adults. A gait trainer may be considered medically necessary for children and adults who require moderate to maximum support for walking and when the patient is unable to ambulate independently due to a chronic neuromuscular condition.

gametangium (pl. gametangia): The reproductive organ of bryophytes, consisting of the male antheridium and female archegonium; a multichambered jacket of sterile cells in which gametes are formed.

gamete provider: A person who is a biological parent of the embryo, but does not necessarily have custody of the embryo or any authority to make decisions regarding its disposition.

gamete: A haploid egg or sperm cell; gametes unite during sexual reproduction to produce a diploid zygote.

gametophyte: The multicellular haploid form in organisms undergoing alternation of generations, which mitotically produces haploid gametes that unite and grow into the sporophyte generation.

gamma globulin: Component of blood serum (plasma) containing antibodies.

gamma ray: A highly energized, deeply penetrating photon that radiates from the nucleus during fission and frequently accompanies radioactive decay.

gamma-interferon: A type of small protein with antiviral activity, made by T lymphocytes.

ganglion (pl. ganglia): A mass of nerve tissue containing nerve cells external to the brain or spinal cord.

ganglioside: Any of a group of glycolipids that yield a hexose sugar on hydrolysis and are found especially in the plasma membrane of cells of the gray matter.

gantry: Radiation therapy hardware from which the linear accelerator delivers its energy; the multileaf collimator MLC is attached to the gantry and modulates the radiation beam as it exits.

gap junction: A type of intercellular junction in animal cells that allows the passage of material or current between cells.

gap phases: In the cell cycle, the phases that precede (G1) and follow (G2) the synthesis (S) phase in which DNA is replicated; in the G1 phase, the cell doubles in size, and its enzymes, ribosomes, and other cytoplasmic molecules and structures increase in number; in the G2 phase, the replicated chromosomes begin to condense and the structures required for mitosis or meiosis are assembled.

gastrectomy: A surgical procedure where all or a portion of the stomach is removed.

gastric: Relating to the stomach.

gastrin: A digestive hormone, secreted by the stomach, that stimulates the secretion of gastric juice.

gastrointestinal: Adjective referring collectively to the stomach and small and large intestines.

gastroplasty: Excision of the pylorus.

gastrostomy: The operation of making a permanent opening into the stomach, for the introduction of food.

gastrovascular cavity: The central digestive compartment, usually with a single opening that functions as both mouth and anus.

gastrula: Animal embryo at an early stage of development in which cells are enclosed in a sheath to form the beginning of a gut cavity.

gastrulation: The formation of a gastrula from a blastula.

GATA4: Transcription factor. Important in embryonic stem differentiation into yolk sac endoderm.

GATA6: Important for embryonic stem cell differentiation into heart smooth muscle.

gated ion channel: A specific ion channel that opens and closes to allow the cell to alter its membrane potential.


GDNF: Glial cell-derived neurotrophic factor. A growth factor molecule.
gene splicing: A technique used to join segments of DNA to form a new genetic combination.

gene amplification: The selective synthesis of DNA, which results in multiple copies of a single gene, thereby enhancing expression.

gene bank: A collection of cells or artificial chromosomes containing known genetic information.

gene chip (Also called DNA microarray): A device for monitoring the activity of genes. Most DNA microarrays are glass slides or microchips “embedded” with thousands of genes. DNA microarrays have many applications in research and have been used, for instance, to identify genes involved in cancer and to develop drugs.

gene cloning: The production of multiple copies of a gene.

gene expression profiling: A technique for classifying cells, such as tumor cells, based on the activity of their genes. Research physicians use the technique in diagnosing disease and in selecting therapies for patients. Eventually this technique may be useful in the general practice of medicine.

gene expression: The translation of information encoded in a gene into protein or RNA. Expressed genes include genes that are transcribed into messenger RNA (mRNA) and then translated into protein, as well as genes that are transcribed into types of RNA such as transfer RNA (tRNA) and ribosomal RNA (rRNA) that are not translated into protein. Gene expression is a highly specific process in which a gene is switched on at a certain time and "speaks out."

gene flow: The loss or gain of alleles from a population due to the emigration or immigration of fertile individuals, or the transfer of gametes, between populations.

gene mapping: The process of determining where genes are located on individual chromosomes, their position in relation to other genes and the distance between them.

gene pool: All of the genetic information, including all variations, contained within a population of a particular species at a particular time.

gene splicing: A technique used to join segments of DNA to form a new genetic combination.

genetic code: The system of nucleotide triplets in DNA and RNA that carries genetic information; referred to as a code because it determines the amino acid sequence in the enzymes and other protein molecules synthesized by the organism.

gefitinib (Iressa®): a drug that blocks cancer cell growth signals caused by an enzyme called tyrosine kinase. Iressa® blocks several of these tyrosine kinases, including one associated with Epidermal Growth Factor Receptor (EGF).

gel electrophoresis: The separation of nucleic acids or proteins, on the basis of their size and electrical charge, by measuring their rate of movement through an electrical field in a gel.

gene therapy: An experimental field of medicine that aims to treat disease by delivering to patients new copies of a gene that is missing or not working properly in their bodies. To date there have been no unqualified successes in gene therapy, and the field has struggled to find safe and effective methods of delivering therapeutic genes to where they are needed in the body.

gene: A discrete amount of information encoded on a portion of DNA. The genetic information is encoded in its own language. The genetic information on genes is first transcribed from DNA to RNA. The RNA is then used to make cellular proteins. There are multiple genes on each chromosome. Each human has 23 pairs of chromosomes. If the analogy is building a tower with legos, each lego (of different lengths) is a gene, when you stack the legos on top of each other, you are linking the genes and the stack of legos equals a chromosome. Each chromosome has a matching chromosome and forms a pair.

gene target: A gene or its product (protein) which plays a critical role in disease.

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gene splicing: A technique used to join segments of DNA to form a new genetic combination.
genetic disorder: A hereditary condition that results from a defective gene or chromosome.

genetic drift: Changes in the gene pool of a small population due to chance.

genetic engineering: A term covering all laboratory or industrial techniques used to alter the genetic material of organisms. These techniques assist organisms to produce new substances or perform new functions, for example increase yields of compounds already produced by the organism, form new compounds, or allow organisms to adapt to drastically altered environments.

genetic factor: A characteristic or trait that is influenced or encoded by one or more genes.

genetic map: An ordered list of genetic loci (genes or other genetic markers) along a chromosome.

genetic marker: A sequence of DNA with a known location on a chromosome and is known to be associated with a particular gene or trait. Some genetic markers are associated with certain diseases. Detecting these genetic markers in the blood can be used to determine whether an individual is at risk of developing the disease. They are also used as a reference point for mapping other genes.

genetic modification (GM): Any process that alters the genetic material of living organism. This includes duplicating, deleting or inserting one or more new genes or altering the activities of an existing gene. It can be performed on microbes, plants or animals (humans included). Where this is done in humans, it is gene therapy, and only human genes are used.

genetic programming: The precise engineering of the genome of animals.

1920 by combining the words GENe and chromosomes. A precise definition of genome is "all the DNA in a cell" because this includes not only genes but also DNA that is not part of a gene, or non-coding DNA.

genetic recombination: The general term for the production of offspring that combine traits of the two parents.

genetic reprogramming: The forced expression of genes either on viruses, plasmids or other genetic material to turn a mature, differentiated adult cell into an iPS cell.

genetic screening: Testing a population for alterations in the activity (mutations) of particular genes.

genetic: Having to do with inherited traits, or the DNA and chromosomes on which they are inherited. Stem cells can cure genetic disorders by replacing cells with abnormal genes with cells that have normal genes.

genetically modified organism (GMO): An organism (plant, animal, bacteria, or virus) that has had its genetic material altered, either by the duplication, insertion or deletion of one or more new genes, or by changing the activities of an existing gene.

geneticist: A physician who specializes in genetics, the study of heredity and variation of organisms.

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genomics: The science of identifying the sequence of DNA in various species, and subsequent processing of that information.

genotype: The genetic make-up of an individual's cells. The genotype together with the biologic environment produce the phenotype, or the outward manifestations.

genus (pl. genera): A taxonomic category above the species level, designated by the first word of a species' binomial Latin name.

to fertilize eggs and sperm. The fertilization of the ovum leads to the development of the organism from fertilization of the ovum until birth.

GFP: Green fluorescent protein.

gibberellin: A class of related plant hormones that stimulate growth in the stem and leaves, trigger the germination of seeds and breaking of bud dormancy, and stimulate fruit development with auxin.

gill: A localized extension of the body surface of many aquatic animals, specialized for gas exchange.

gland volume (GV): The size in cubic centimeters or grams of the prostate gland.

gland: A structure or organ that produces a substance which is used in another part of the body.

glans penis: Cap-shaped expansion at the end of the penis, having the urethral opening at the center.

gleason grade: A widely used method for classifying prostate cancer tissue for the degree of loss of the normal glandular architecture (size, shape and differentiation of glands); a grade from 1–5 is assigned successively to each the two most predominant tissue patterns present in the examined tissue sample and are added together to produce the Gleason score; high numbers indicate poor differentiation and therefore more aggressive cancer.

gleason score: Two Gleason Grade numbers are added together to produce the Gleason Score. The first Gleason Grade number indicates the Gleason Grade of the cancer cells found most commonly within the sample, the second number the second most commonly found grade. For example, a Gleason Score of 4+3=7 means that Gleason Grade 4 is the most commonly found type of cell, Gleason Grade 3 the second most commonly found, producing a total Gleason Score of 7.

gleason: Name of physician who developed the Gleason grading system commonly used to grade prostate cancer.

Glial: Supportive tissue of the brain. There are three types of glial tissue: astrocytes, oligodendrocytes and microglia. Glial cells do not conduct electrical impulses, as do neurons.

GFP: Green fluorescent protein.
glial fibrillary acidic protein (GFAP): A structural protein specifically produced by astrocytes. GFAP is often used as a marker of astrocytes.

globular protein: A polypeptide chain folded into a roughly spherical shape.

glomerulus: A ball of capillaries surrounded by Bowman's capsule in the nephron and serving as the site of filtration in the vertebrate kidney.

glossitis: Inflammation of the tongue.

glucagon: A protein hormone that is produced especially by the islets of Langerhans and that promotes an increase in the sugar content of the blood by increasing the rate of glycogen breakdown in the liver.

glucocerebrosidase: The glucocerebrosidase enzyme is necessary for the breakdown of a particular fatty substance, glucocerebroside into glucose and ceramide. Gaucher disease is characterized by its absence.

glucocerebroside: A type of fat (lipid) molecule accumulates in individuals with Gaucher disease and is used as a building block to make certain cell membranes. When the cells wear out, the glucocerebroside can be recycled. This recyclable material comes mainly from the breakdown of old red and white blood cells. In the brain, glucocerebroside comes from the processing of lipids during brain development and the formation of the myelin sheath (the fatty coating around each nerve fiber).

glucocorticoid: Any of a group of anti-inflammatory steroid like compounds, such as hydrocortisone, that are produced by the adrenal cortex, are involved in carbohydrate, protein, and fat metabolism, and are used as anti-inflammatory agents.

glucose: An optically active sugar C6H12O6 that has an aldehydic carbonyl group; especially: the sweet colorless soluble dextrorotatory form that occurs widely in nature and is the usual form in which carbohydrate is assimilated by animals.

glutathione S-transferase: A protein which plays an important role in inactivating chemicals that are able to cause gene damage and promote genetic instability. A recent study has shown that this protein is deactivated very early in the development of prostate cancer.

glutathione: A compound of the amino acids glycine, cystine, and glutamic acid occurring widely in plant and animal tissues and forming reduced and oxidized forms important in biological oxidation-reduction reactions.

glycerol: A three-carbon molecule with three hydroxyl (OH) groups attached; a glycerol molecule can combine with three fatty acid molecules to form a fat or an oil.

glycocalyx: A fuzzy coat on the outside of animal cells, made of sticky oligosaccharides.

glycogen storage disorders: A class of disorders characterized by the build-up of glycogen causes progressive muscle weakness throughout the body and affects various body tissues, particularly in the heart, skeletal muscles, liver, and nervous system.

glycogen: An extensively branched glucose storage polysaccharide found in the liver and muscle of animals; the animal equivalent of starch.

glycolipids: Organic molecules similar in structure to fats, but in which a short carbohydrate chain rather than a fatty acid is attached to the third carbon of the glycerol molecule; as a result, the molecule has a hydrophilic "head" and a hydrophobic "tail." Glycolipids are important constituents of the plasma membrane and of organelle membranes.

glycolysis: The splitting of glucose into pyruvate. Glycolysis is the one metabolic pathway that occurs in all living cells, serving as the starting point for fermentation or aerobic respiration.

glycoprotein: A molecule that consists of a carbohydrate plus a protein. Glycoproteins play essential roles in the body. For instance, in the immune system almost all of the key molecules involved in the immune response are glycoproteins.

GM2 Ganglioside: A fatty substance or lipid that is part of normal metabolism, in Tay-Sachs and Sandhoff lack of enzyme function causes the GM2 gangliosides to accumulate which is toxic and eventually causes cell death.


goblet cell: A mucus-secreting epithelial cell (as of intestinal columnar epithelium) that is distended at the free end.

goiter: Goiter is an enlargement of the thyroid gland. The resulting bulge on the neck may become extremely large, but most simple goiters are brought under control before this happens. Occasionally a simple goiter may cause some difficulty in breathing and swallowing.

Golgi apparatus: Eukaryotic organelle which package cell products, such as enzymes and hormones, and coordinate their transport to the outside of the cell.

gonad ridge: Within an embryo, the area of cells that will develop into the gonads of foetus. This usually develops around 32 days after fertilisation.
gonad: An organ that produces sex cells (testes or ovaries).

gonadal ridge: Embryonic structures arising in humans at about five weeks, eventually developing into gonads (either testes or ovaries).

gonadotropins: Hormones that stimulate the activities of the testes and ovaries; a collective term for follicle-stimulating and luteinizing hormones.

gonads: The embryonic sex gland before it becomes a definitive testis or ovary.

Gonadotropin (adj. Gonadotropic): A hormone secreted by the pituitary gland that stimulates gonads.

Goosecoid: A signaling molecule. Gene that encodes a transcription factor that is important for determining craniofacial orientation and features in the vertebrate embryo.

goserelin acetate (Zoladex®): a luteinizing hormone releasing hormone (LHRH) analog used in the hormonal treatment of advanced prostate cancer and in the adjuvant and neoadjuvant hormonal treatment of earlier stages of prostate cancer.

Gp130: Glycoprotein. Signal transducing receptor of cytokines.

G-protein linked receptor: A signal receptor protein in the plasma membrane that responds to the binding of a signal molecule by activating a G protein.

grade: A means of describing the potential degree of severity of a cancer.

graded potential: A local voltage change in a neuron membrane induced by stimulation of a neuron, with strength proportional to the strength of the stimulus and lasting about a millisecond.

gradualism: A view of Earth's history that attributes profound change to the cumulative product of slow but continuous processes.

graft failure: Complication after a transplant in which the stem cells do not grow in the recipient’s bone marrow and do not produce new white blood cells, red blood cells, and platelets.

graft versus host disease: A transplantation syndrome wherein mature T lymphocytes from an allogeneic donor undergo an immune response against tissues and organs of the host. These immune responses can vary in degree, from mild skin, gut, and liver damage to lethal disease. The usual circumstance is an allogeneic bone marrow (BM) or mobilized peripheral blood (MPB) transplant from healthy donors to hosts who have received substantial pre-transplant conditioning, which prevents host immune rejection of donor cells. In that circumstance, donor mature T lymphocytes are present as contaminants of HSC and blood progenitors. Pure allogeneic HSC transplants do not cause graft versus host disease.

gram stain: A staining method that distinguishes between two different kinds of bacterial cell walls.

granule: A small quantity of a solid substance, smaller than a grain.

granulocyte colony stimulating factor (GCSF): Used to mobilize bone marrow in the periphery and to differentiate granulocyte precursor to neutrophils.

granulocyte: A type of white blood cell responsible for engulfing and digesting microorganisms. Granulocytes consist of three types of phagocytic, or cell-eating, cells: basophils, eosinophils and neutrophils.

granulocyte-colony stimulating factor (G-CSFs): also known as growth factors, are molecules that stimulate cell growth. There are 2 types of G-CSFs – white cell G-CSFs and red cell G-CSFs. White cell G-CSFs stimulate the production of neutrophils and red cell G-CSF stimulate the production of RBCs.

granulose cells: Cells surrounding and maintaining the ovarian follicle.


grey's gisease: Also known as myasthenia gravis, Grave's disease is a defect in the immune system which causes production of immunoglobulins (antibodies) which stimulate and attack the thyroid gland, causing hyperthyroidism (abnormal growth of the thyroid gland) and overproduction of thyroid hormone. Similar antibodies also attack the tissues in the eye muscles (causing exophthalmus).

gravitropism: A response of a plant or animal in relation to gravity.

gray (Gy): The SI (Systeme International) unit of absorbed radiation dose: 1 Gy = 1 joule/kg = 100 rads, 1/100 Gy = 1 centigray (cGy).

gray matter: The portion of the spinal cord comprised mainly of neuronal cell bodies and dendrites, and not myelinated axons.

green fluorescent protein (GFP): A protein naturally occurring in some animals including jelly fish that spontaneously fluoresces. It can be used as a noninvasive marker in living cells by attaching it to different proteins and then letting it fluoresce so as to track the cell.

greenhouse effect: The warming of planet Earth due to the atmospheric accumulation of carbon dioxide, which absorbs infrared radiation and slows its escape from the irradiated Earth.
Haematopoietic stem cells provide rapid and sustained reconstitution of blood formation and are found in adult bone marrow, umbilical cord blood, peripheral blood and in foetal liver.

Haematopoietic stem cell: A stem cell from which all red and white blood cell develop. The precursors of mature blood cells that are defined by their ability to replace the bone marrow system, following damage or disease, and are able to continue producing mature blood cells. Now commonly recognised as stem cells collected from the peripheral blood.

Haemoglobulin: The part of the red blood cells that carries oxygen.

Haemophilia: An inherited disease that is due to a deficiency or lack of certain compounds, such as factor VIII or IX, in the blood. This results in excessive internal or external bleeding due to impaired blood clotting.

Haemorrhage: The loss of large amounts of blood from the blood vessels.

Hairy cell leukaemia (HCL): A rare type of chronic leukaemia usually found in middle-aged men. HCL rarely requires BMT as a treatment.

Half life: The time it takes for half of the nuclei of a radioactive substance to decay or the amount of time required to reduce a drug level to one half of the initial value

Hallucinations: A sensory experience in which a person can see, hear, smell, taste, or feel something that is not there.
human genome in different ethnic populations. The project is mapping collections of DNA variations, or haplotypes. When complete, the "Hap Map" will be used to study genetic variations associated with disease and the different responses people have to drugs.

haptonema: Peg-like structure unique to the Prymnesiophyta; its function is not known.

hardy-Weinberg equilibrium: The steady-state relationship between relative frequencies of two or more alleles in an idealized population; both the allele frequencies and the genotype frequencies will remain constant from generation to generation in a population breeding at random in the absence of evolutionary forces.

Hardy-Weinberg theorem: An axiom maintaining that the sexual shuffling of genes alone cannot alter the overall genetic makeup of a population.

harvesting: Collecting bone marrow cells for transplantation.

haustorium (pl. haustoria): In parasitic fungi, a nutrient-absorbing hyphal tip that penetrates the tissues of the host but remains outside the host cell membranes.

Haversian system: One of many structural units of vertebrate bone, consisting of concentric layers of mineralized bone matrix surrounding lacunae, which contain osteocytes, and a central canal, which contains blood vessels and nerves.

HDL cholesterol: High density lipoprotein cholesterol; a beneficial cholesterol composed of a high proportion of protein (with little triglyceride and cholesterol) and that is associated with decreased probability of developing atherosclerosis.

healing touch: An energy therapy in which practitioners consciously use their hands in an in a heart-centered and intentional way to support and facilitate physical, emotional, mental, and spiritual health.

heart disease: Any disorder that affects the heart. Sometimes the term "heart disease" is used narrowly and incorrectly as a synonym for coronary artery disease. Heart disease is synonymous with cardiac disease but not with cardiovascular disease which is any disease of the heart or blood vessels. Among the many types of heart disease, see, for example: Angina; Arrhythmia; Congenital heart disease; Coronary artery disease (CAD); Dilated cardiomyopathy; Heart attack (myocardial infarction); Heart failure; Hypertrophic cardiomyopathy; Mitral regurgitation; Mitral valve prolapse; and Pulmonary stenosis.

heart: The muscle that pumps blood received from veins into arteries throughout the body. It is positioned in the chest behind the sternum (breastbone; in front of the trachea, esophagus, and aorta; and above the diaphragm muscle that separates the chest and abdominal cavities. The normal heart is about the size of a closed fist, and weighs about 10.5 ounces. It is cone-shaped, with the point of the cone pointing down to the left. Two-thirds of the heart lies in the left side of the chest with the balance in the right chest.

heat of vaporization: The amount of heat required to change a given amount of a liquid into a gas; 540 calories are required to change 1 gram of liquid water into vapor.

heat: The total amount of kinetic energy due to molecular motion in a body of matter. Heat is energy in its most random form.

heat-shock protein: A protein that helps protect other proteins during heat stress, found in plants, animals, and microorganisms.

hEG cells: Human embryonic germ cells.

Helicase: A class of enzymes vital to all living organisms. Helicases are often utilized to separate strands of a DNA double helix.

helminthes: Species such as flukes, tape worms, and hook worms; most are parasitic to humans.

helper T cell (TH): A type of T cell that is required by some B cells to help them make antibodies or that helps other T cells respond to antigens or secrete lymphokines or interleukins.

hemogram: The official name for a blood test.

hemangioblast: This is a multipotent cell, a common precursor to hematopoietic and endothelial cells.

hematopoietic stem cell (HSC): A stem cell from which all red and white blood cells evolve.

hematocrit (Hct): a measure of the number of red cells found in the blood, stated as a percentage of the total blood volume. Hematocrit is the percentage of the volume of a blood sample occupied by cells, as determined by a centrifuge or device which separates the cells and other particulate elements of the blood from the plasma. The remaining fraction of the blood sample is called plasmocrit (blood plasma volume).

hematogenous: Originating in the blood or spread through the bloodstream.

hematologic: Pertaining to the blood and bone marrow.

hematological oncologist: A medical doctor who specializes in diagnosing and treating malignancies, or cancers, of the blood and blood-forming tissues.

hematologist: A medical doctor who specializes in diagnosing and treating medical diseases of the blood and blood-forming tissues.
hematology: A medical science that deals with the blood and blood-forming organs.

hematopoietic stem cell: An adult stem cell from which all white and red blood cells evolve.

hematopoietic: Blood Forming. Most of the research on Umbilical Cord Stem Cells has been on the hematopoietic stem cells found among them. Because these are the cells important in reconstituting blood marrow after chemotherapy and radiotherapy, and because there is lots of money for cancer research, these cells were extensively studied, long before the current wave in stem cell research.

hematopoiesis: Formation of 8 distinct lineages from a Lymphohematopoietic Stem Cell (LHSC).

hematopoietic cell transplantation (HCT): Transplantation of cells with blood-forming potential, usually bone marrow (BM). HSC are the only cells in HCT that provide rapid and sustained reconstitution of blood formation. HSC are found in adult BM, umbilical cord blood, mobilized peripheral blood (MPB, the nucleated cell fraction of blood after treatment of the donor with agents that increase the passage of HSC from BM to blood), and in fetal liver.

hematopoietic cell: The functional cell type that makes blood. Hematopoietic cells are found within the bone marrow of adults. In the fetus, hematopoietic cells are found within the liver, spleen, bone marrow and support tissues surrounding the fetus in the womb.

hematopoietic stem cell: A stem cell from which all red and white blood cell develop. The precursors of mature blood cells that are defined by their ability to replace the bone marrow system, following damage or disease, and are able to continue producing mature blood cells. Now commonly recognized as stem cells collected from the peripheral blood.

hematopoietic: Pertaining to hematopoiesisImmune: Protected against infection. The Latin immunis means free, exempt.

hematospemiria: The occurrence of blood in the semen.

hematuria: The occurrence of blood in the urine.

heme: The iron-containing group of heme proteins such as hemoglobin and the cytochromes.

hemi-ablation: Destruction of tissue of one half of the prostate

hemigastrectomy: Excision of the distal one-half of the stomach.

hemiprostae: The left or right side of the prostate

hemizygous: A genetic term that describes people who have only one copy of a chromosome pair rather than the usual two.

hemoglobin (Hb or Hgb): A bright red substance that gives red cells their color. It transports oxygen and carbon dioxide between the lungs and all of the body's other organs. When the hemoglobin level drops, the condition is known as anemia.

hemolymph: In invertebrates with an open circulatory system, the body fluid that bathes tissues.

hemophilia: A group of hereditary disorders characterized by failure of the blood to clot and consequent excessive bleeding from even minor wounds.

hemorrhage: To undergo heavy or uncontrollable bleeding.

hemostatic: An agent that shortens the clotting time of blood.

hematopoiesis (Adj. Hematopoietic): The formation of blood or of blood cells in the living body.

heparin: A drug given directly into a vein that thins the blood when there is a danger of clotting (an anticoagulant)

hepatic flexure: The hepatic flexure is situated between the ascending and the transverse part of the colon, beneath the liver.

hepatic: Pertaining to the liver.

hepatitis: Liver inflammation usually caused by a virus.

hepatocyte: The functional cell type of the liver that makes enzymes for detoxifying metabolic waste, destroying red blood cells and reclaiming their constituents, and the synthesis of proteins for the blood plasma.

hepatomegaly: Enlargement of the liver; may be a symptom with several LSDs.

hepatosplenomegaly: Enlargement of the liver and spleen; may be a symptom with several LSDs.

herbaceous: In plants, nonwoody.

herbicide: A substance that kills plants. Used in agriculture, horticulture and gardening. Can be selective (kill selected species) or non-selective (broad spectrum - kill all plants).

herbivore: A heterotrophic animal that eats plants.

herceptin®: The trade name for trastuzumab.

hereditary: Inherited from one's parents and earlier generations.

heredity: The historical distribution of biological characteristics through a group of related individuals via their DNA.
hermaphrodite: An individual that functions as both male and female in sexual reproduction by producing both sperm and eggs.

hermetically: To form an airtight closure. A vessel or tube is hermetically sealed when it is closed completely against the passage of air or another fluid by fusing the extremity.

hernia: The bulging of an internal organ through a weak area or tear in the muscle or other tissue that holds it in place. Most hernias occur in the abdomen.

hES cell: Human embryonic stem cell; a type of pluripotent stem cell.

Hesx1: Pituitary transcription factor.

heterochromatin: Eukaryotic chromatin that remains highly compacted during interphase and is generally not transcribed. As embryonic stem cells differentiate into mature specialized cell types, many pluripotency-related genes are silenced or down regulated because of their location within the highly compacted heterochromatin. Research efforts are currently exploring alternative methods to uncoil the tightly wound DNA into less condensed euchromatin to unlock necessary reprogramming genes located within the tightly packed heterochromatin.

heterochrony: Evolutionary changes in the timing or rate of development.

heterocyst: A specialized cell that engages in nitrogen fixation on some filamentous cyanobacteria.

heterodimer: When two different molecules are held together.

heterogeneous (heterogeneity): Non-uniform; composed of mixtures of different kinds; in reference to tumors meaning composed of different clones of cells.

heterologous transplants: These are from a different species. The pig valve transplants to replace damaged human heart valves (mitral) are one example.

heterologous: Not homologous or uniform. In the context of cells, heterologous is a mixed or divergent cell population or of a divergent origin.

heterotroph: An organism that obtains organic food molecules by eating other organisms or their by-products.

heterozygote advantage: A mechanism that preserves variation in eukaryotic gene pools by conferring greater reproductive success on heterozygotes over individuals homozygous for any one of the associated alleles.

heterozygote: A diploid organism that carries two different alleles at one or more genetic loci.

heterozygous: Having two different forms of a particular gene, one inherited from each parent. For example, a person with brown eyes may also carry a gene for blue eyes.

hex: Hexosaminidase. Enzyme for processing lipid (fat).

hexosaminidase A: Tay-Sachs is caused by a mutation in the Hex A gene on chromosome 15. The Hex A gene codes for the alpha subunit of the hexosaminidase A enzyme which is necessary for breaking down GM2 gangliosides in nerve cells. When there is a mutation in the coding for alpha subunit of the hexosaminidase A it does not function properly and leads to an accumulation of GM2 which is toxic and eventually causes cell death. Sandhoff is characterized by loss of function of both the alpha and beta subunit of hexosaminidase A enzyme.

hexosaminidase B: Sandhoff is caused by a mutation in the Hex B gene on chromosome 5. The Hex B gene codes for part of two essential nervous system enzymes: the beta subunit of hexosaminidase A and the beta subunit of hexosaminidase B. When there is a mutation in the coding for beta subunit of hexosaminidase A and the beta subunit of hexosaminidase B both enzymes do not function properly and lead to an accumulation of GM2 which is toxic and eventually causes cell death. Tay-Sachs is characterized by loss of function of only the alpha subunit of the hexosaminidase A enzyme.

Hiatal Hernia: A type of hernia that occurs when a portion of the stomach protrudes through the diaphragm (where the oesophagus normally passes through).

hibernation: A physiological state that allows survival during long periods of cold temperatures and reduced food supplies, in which metabolism decreases, the heart and respiratory system slow down, and body temperature is maintained at a lower level than normal.

high dose radiation: radiation delivered by temporary insertion of radioactive Iridium wire into flexible needles placed in the prostate through the perineum.

high throughput screening: Technology that employs automation and robotics to conduct hundreds or thousands of biological assay experiments within a short period of time. Typically, high throughput screening (HTS) systems will use rectangular plastic trays containing 96, 384, 1536, or 3456 wells (or more in microfluidic systems), where each well may hold a small amount of liquid sample containing cells. Automated liquid handling can add factors or compounds to test the effect on the cells. HTS can be used (for example) to screen hundreds of thousands of chemical compounds as potential...
drug candidates, or to identify factors that determine the ultimate fate of a differentiating stem cell.

1753 high-intensity focused ultrasound (HIFU): A procedure which utilizes transrectal ultrasound that is highly focused into a small area, creating intense heat which is lethal to prostate cancer tissue.

1754 highly active antiretroviral therapy (HAART): A combination of anti-HIV medications designed to keep the virus from making copies of itself, while minimizing potential side effects and pill burden.

1755 hilum: a shallow depression in one side of a lymph node through which blood vessels pass and efferent lymphatic vessels emerge.

1756 hippotherapy: Uses equine rhythmic movement to help individuals with a variety of neurological disorders, including SCI.

1757 histamine: Histamine is a chemical present in cells throughout the body that is released during an allergic reaction. Histamine is one of the substances responsible for the symptoms on inflammation and is the major reason for running of the nose, sneezing, and itching in allergic rhinitis. It also stimulates production of acid by the stomach and narrows the bronchi or airways in the lungs.

1758 histiocytosis: A rare and often fatal blood disease. A type of white blood cell called a histiocytosis grows wildly and attacks body organs.

1759 histocompatibility antigens: Glycoproteins on the surface membranes of cells that enable the body’s immune system to recognize a cell as native or foreign and that are determined by the major histocompatibility complex.

1760 histocompatibility: A system that determines how closely the patient and donor blood stem cells match.

1761 histocompatible: A tissue or organ from a donor (the person giving the organ or tissue) that will not be rejected by the recipient (the patient in whom the tissue or organ is transplanted). Rejection is caused because the immune system of the recipient sees the transplanted organ or tissue as foreign and tries to destroy it. Tissues from most people are not histocompatible with other people. In siblings, the probability of histocompatibility is higher, while identical twins are almost always histocompatible.

1762 histological studies: The anatomical study of the microscopic structure of tissues. Such studies are often carried out in SCI research to evaluate the neuroprotective impact of various interventions at the injury site.

1763 histology: The study of the appearance and behavior of tissue, usually carried out under a microscope by a pathologist (who is a physician) or a histologist (who is not necessarily a physician).

1764 histomorphometry: The quantitative measurement and characterization of the microscopic organization and structure of a tissue especially by computer-assisted analysis of images.

1765 histone: A small protein with a high proportion of positively charged amino acids that binds to the negatively charged DNA and plays a key role in its chromatin structure.

1766 histopathologic: Tissue changes that affect a part or accompany a disease


1768 HIV: Abbreviation of human immunodeficiency virus, the infectious agent that causes AIDS; HIV is an RNA retrovirus.

1769 HLA (human leukocyte antigens): These are identification proteins found on the outside of cells, including white blood cells, that allow the immune system to recognize tissues as “self” or “non-self”. HLA proteins are responsible for rejection of transplanted organs, as well as for ejection of splinters and other foreign materials from the body. HLA typing is thus extremely important in transplantation of most organs or tissues. Bone marrow replacement with HLA-matched umbilical cord blood stem cells is recommended to prevent graft vs host disease in the recipient, but HLA-unmatched transplantation of umbilical cord stem cells in persons with an intact immune system does not trigger a rejection response, unlike other cells or tissues. This is a major reason that umbilical cord stem cells are preferable to adult stem cells.

1770 HLA typing laboratories: Laboratories under contract with the National Marrow Donor Program to perform HLA typing on donor or recipient blood and cell samples.

1771 HLA typing: The identification of a person’s key antigens used for identifying compatible donors.

1772 hoarseness: Abnormally rough or harsh-sounding voice caused by vocal abuse and other disorders.

1773 Hodgkin disease: A lymphoma that most often occurs in young adults. Hodgkin disease that does not respond to chemotherapy may be treated by an autologous marrow or blood stem cell transplant and less often by an allogeneic marrow or blood stem cell transplant. Also called Hodgkin lymphoma.

1774 Hoechst dye: A dye used to identify hematopoietic stem cells (HSCs).

1775 Hofmeister-Finsterer Operation: Partial gastrectomy with closure of a portion of the lesser
will recognize the similar sequences of the gene within the cell, and replace it. But the cell is then left with a piece of DNA in the gene that has the wrong sequence and this interrupts the function of the gene. The gene is then said to be knocked out. From these embryonic stem cells, an entire mouse can be made by injecting the altered stem cells into a blastocyst, and implanting the blastocyst into a female mouse. This is one way to make genetically manipulated mice and other animals with altered gene function. These experiments are crucial to understand how specific genes work and interact in living animals.

1790 homologous: Similar or uniform, often used in the context of genes and DNA sequences. In the context of stem cells, the term homologous recombination is a technique used to disable a gene in embryonic stem cells.

1791 homology: Similarity in characteristics resulting from a shared ancestry.

1792 homosporous: Referring to plants in which a single type of spore develops into a bisexual gametophyte having both male and female sex organs.

1793 homozygote: A diploid organism that carries identical alleles at one or more genetic loci.

1794 homozygous: Having two forms of a particular gene that are the same, one inherited from each parent. For example, a person with brown eyes who carries another gene for brown eyes - two of the same forms of the eye colour gene.

1795 hormonal therapy: Treatment of cancer by alteration of the hormonal balance. Some cancer will only grow in the presence of certain hormones.

1796 hormone refractory PC (HRPC): A loosely used term that really should apply to progressive PC in the setting of a testosterone level less than 20 ng/dl and when an ARH has been excluded; the preferred term is AIPC or androgen independent PC.

1797 hormone therapy (HT): The use of hormones, hormone analogs, and certain surgical techniques to treat disease (in this case prostate cancer) either on their own or in combination with other hormones or in combination with other methods of treatment; because prostate cancer is usually dependent on male hormones (ex: testosterone) to grow, hormone blockade or deprivation (also called androgen deprivation therapy) can be an effective means of alleviating symptoms and retarding the development of the disease.

1798 hormone: Biologically active chemicals that are responsible for the development of secondary sexual characteristics and other biologic activities.

curvature and retrocolic anastomosis of the remainder to the jejunum.

1776 holoblastic cleavage: A type of cleavage in which there is complete division of the egg, as in eggs having little yolk (sea urchin) or a moderate amount of yolk (frog).

1777 homeobox: A 180-nucleotide sequence within a homeotic gene encoding the part of the protein that binds to the DNA of the genes regulated by the protein.

1778 homeopathy: A system of healing that normally involves remedies being administered in reduced doses.

1779 homeosis: Evolutionary alteration in the placement of different body parts.

1780 homeostasis: The ability or tendency of an organism or cell to maintain internal equilibrium by adjusting its physiological processes.

1781 homeotherm: An organism, such as a bird or mammal, capable of maintaining a stable body temperature independent of the environment.

1782 homeotic gene: Genes that control the overall body plan of animals by controlling the developmental fate of groups of cells.

1783 homing: Occurs when new, infused stem cells begin traveling through the circulatory system and to the bone marrow.

1784 hominid: Humans and closely related primates; includes modern and fossil forms, such as the australopithecines, but not the apes.

1785 hominoid: Hominids and the apes.

1786 homodimer: When two identical molecules are held together.

1787 homogeneous (homogeneity): Uniform; composed of the same element; in reference to a tumor cell population meaning that the cells are of the same clone in contrast to a mixed cell population that would exhibit heterogeneity or be heterogeneous.

1788 homologous chromosomes: Chromosome pairs of the same length, centromere position, and staining pattern that possess genes for the same characters at corresponding loci. One homologous chromosome is inherited from the organism's father, the other from the mother.

1789 homologous recombination: A technique used to inactivate a gene and determine its function in a living animal. The process of homologous recombination is more efficient in embryonic stem cells than in other cell types. It is achieved by introducing a stretch of DNA that is similar or identical (homologous) to part of a gene and to some of the DNA surrounding the gene, but different (not homologous) to a specific section of the gene. The DNA is then introduced into the stem cells and the stretch of homologous DNA
host: An animal or plant on which, or in which, a parasite lives. While the parasite receives nourishment and support from the host, the host does not benefit and is often harmed by the association.

hot flush: A sudden flash of heat particularly affecting the face, neck and chest and lasting from a few seconds to several minutes.

hox genes: Consists of at least 38 encoded nucleotides that contain genes found in four clusters on four different chromosomes. An important function of hox genes in blood is the regulation of cell proliferation.

human embryonic stem cell (hES cell): A stem cell that is derived from the inner cell mass of a blastocyst and can differentiate into several tissue types in a dish. They are similar to embryonic stem cells from the mouse; however, in the mouse, it is possible to inject those cells into a blastocyst, to make a new mouse, while this is not, and should not, be possible in humans for ethical reasons. Human embryonic stem cells are harder to grow than mouse embryonic stem cells.

human fertilisation and embryology authority (HFEA): The governmental authority in the United Kingdom that regulates in vitro fertilization and embryo research.

Human genome: The project that has identified and located all of the genes in human DNA, and determined the sequences of the chemical bases that make up human DNA. This information is stored in computer databases.

human immunodeficiency virus (HIV): The infectious agent that causes AIDS; HIV is an RNA retrovirus.

human leukocyte antigen (HLA): Antigens found on a person’s cells that help the body to identify its own cells from invading or foreign cells.

human serum albumin: Soluble blood proteins that make up about 55% of plasma proteins. They are involved in maintaining fluid balance in the blood.

human T-Cell lymphotic virus (HTLV): A rare virus transmitted by cellular components of blood. Two forms of the virus have been identified, HTLV-I and HTLV-II.

humoral immunity: The type of immunity that fights bacteria and viruses in body fluids with antibodies that circulate in blood plasma and lymph, fluids formerly called humors.

Huntington disease: An inherited disease due to a defective gene on the short arm of chromosome 4. It results in loss of motor control and mental deterioration. Symptoms frequently do not appear until after reproductive age, meaning the defective gene may already have been passed on to offspring when symptoms develop.

Huntington's chorea: Huntington's disease or Huntington's chorea is an inherited disorder characterized by abnormal body movements called chorea, and loss of memory.

hurler syndrome: A heritable condition involving deficiency of an enzyme (alpha-L-iduronidase), leading to abnormal accumulations of materials inside cells, then resulting in abnormal development of cartilage and bone and other systems.

hyaline: Transparent or nearly so and usually homogeneous.

hybrid zone: A region where two related populations that diverged after becoming geographically isolated make secondary contact and interbreed where their geographical ranges overlap.

hybrid: Something of mixed origin or composition. In the case of a plant or animal, a hybrid is produced by breeding together plants or animals of different varieties, species or race. A hybrid is the offspring of genetically dissimilar parents.

hybridization protection assay (HPA): A process that hybridizes the amplicon to singlestranded nucleic acid probes that are labeled with an Acridinium Ester (AE) molecule and then it selects and detects the hybridized probes.

hybridoma: A hybrid cell produced by the fusion of an antibody-producing cell and a multiple myeloma cell. The cell has the capability to produce a continuous supply of identical antibodies.

hydatidiform mole: In human pregnancy, abnormal growth of the chorion, the outermost vascular membrane that in a normal pregnancy would enclose the embryo and ultimately give rise to the placenta. In the situation in which the hydatidiform mole develops, the embryo is usually either absent or dead.

hydrocarbon: An organic molecule consisting only of carbon and hydrogen.

hydrocortisone (HC): A steroid compound synthesized in the adrenal cortex and vital to survival.

hydrogen bond: A type of weak chemical bond formed when the slightly positive hydrogen atom of a polar covalent bond in one molecule is attracted to the slightly negative atom of a polar covalent bond in another molecule.

hydrogen ion: A single proton with a charge of +1. The dissociation of a water molecule (H2O) leads to the generation of a hydroxide ion (OH−) and a hydrogen ion (H+).
1836 hyperplasia: Enlargement of an organ or tissue because of an increase in the number of cells in that organ or tissue.

1837 hypertrophy: The enlargement or overgrowth of a part or organ, not due to tumor formation. Hypertrophy denotes greater bulk through increase in size, but not in number, of cells or other individual tissue elements.

1838 hyperplasia: Enlargement of an organ or tissue because of an increase in the number of cells in that organ or tissue.

1839 hyperpolarization: An electrical state whereby the inside of the cell is made more negative relative to the outside than at the resting membrane potential. A neuron membrane is hyperpolarized if a stimulus increases its voltage from the resting potential of $-70$ mV, reducing the chance that the neuron will transmit a nerve impulse.

1840 hypertension: Arterial disease in which chronic high blood pressure is the primary symptom.

1841 hypothermia: Treatment that uses heat; for example heat produced by microwave radiation.

1842 hypertonic solution: A solution with a greater solute concentration than another, a hypertonic solution.

1843 hypercalcemia: Abnormally high concentrations of calcium in the blood, indicating leeching of calcium from bone (tumors raise serum calcium levels by destroying bone or by releasing PTH or a PTH-like substance, osteoclast-activating factor, prostaglandins, and perhaps, a vitamin D-like sterol). Symptoms of hypercalcemia may include: feeling tired, difficulty thinking clearly, lack of appetite, abdominal pain, frequent urination, increased thirst, constipation, nausea, and vomiting.

1844 hypervascular: Containing an excessive number of blood vessels.

1845 hypea: A filament that collectively makes up the body of a fungus.

1846 hyperplastic: Non-allergy producing. A term applied to a preparation in which every possible care has been taken in formulation and production to ensure minimum allergic reactions.

1847 hypoblast: The inner cell layer, or endoderm, which develops during the formation of the embryonic germ layers.

1848 hypocalcemia: Low blood calcium; symptoms may include irritability, muscle spasms or contractions of hands, feet or legs.

1849 hypochromic Anemia: Anemia characterized by a decrease in the concentration of corpuscular hemoglobin.

1850 hypodermis: The layers beneath the epidermis, comprising thick-walled sclerenchymatous cells.

1851 hypovascular: A region in an ultrasound image in which the echoes are weaker or fewer than normal or in the surrounding regions; the opposite of hyperechoic.

1852 hypofractionated: A radiation treatment that is divided into fewer individual sessions (but
correspondingly higher doses of radiation) than usual.

1853 hypoglycemia: Less than normal level of sugar in the blood.

1854 hypointensity: A term used to describe dark areas of a scan image due to a decreased enhancement of that region.

1855 hypertension: Arterial disease in which chronic low blood pressure is the primary symptom.

1856 hypothalamus (adj. hypothalamic): A portion of the brain which secretes substances that control metabolism by exerting an influence on pituitary gland function.

1857 hypothalamus: The ventral part of the vertebrate forebrain; functions in maintaining homeostasis, especially in coordinating the endocrine and nervous systems; secretes hormones of the posterior pituitary and releasing factors, which regulate the anterior pituitary.

1858 hypothermia therapy: The use of cooling procedures, which potentially preserve post-injury neurological function by reducing the cord’s metabolic and energetic requirements.

1859 hypothesis: A temporary working explanation or supposition based on accumulated facts and suggesting some general principle or relation of cause and effect; a postulated solution to a scientific problem that must be tested if not validated, discarded.

1860 hypotonia: A condition of diminished tone of the skeletal muscles, and the reduced resistance of muscles to passive stretching; may be a symptom with several LSDs.

1861 hypotonic solution: A solution with a lesser solute concentration than another, a hypertonic solution.

1862 hypotonic: Hypotonic or hypotonia means having less than normal tone or tension. Children with CMD are often hypotonic at, or shortly after, birth.

1863 Hypoventilation: The state in which a reduced amount of air enters the alveoli in the lungs, resulting in decreased levels of oxygen and increased levels of carbon dioxide in the blood. Hypoventilation can be due to breathing that is too shallow (hypopnea) or too slow (bradypnea) or to diminished lung function.

1864 hypoxia: A deficiency in oxygen reaching tissues.

1865 ichthyologist: Biologists who specialize in the study of fish behavior, anatomy, physiology, and evolution.

1866 ICM cells: Cells from the inner cell mass, a population of cells inside the blastula that give rise to the body of the new organism rather than to the chorion or other supporting structures.

1867 identical twinning: Process in which genetically identical organisms arise from symmetrical division and separation of totipotent cells.

1868 idiopathic: Refers to a disease or condition of unknown cause or origin.

1869 IgE antibodies: A type of immunoglobulin whose overproduction by plasma cells results in allergic reactions.

1870 IL-1 (interleukin-1): A cell product involved in the immune response (cytokine) which facilitates osteoblast growth among its many functions.

1871 IL-6 (interleukin-6): A cytokine that stimulates osteoclast precursors and mature osteoclasts among its many functions.

1872 iliac bone: The largest bone of the pelvis, which is a source of autologous, bone-marrow stem cells.

1873 imaginal disk: An island of undifferentiated cells in an insect larva, which are committed (determined) to form a particular organ during metamorphosis to the adult.

1874 imaging: A radiology technique or method allowing a physician to see a graphic representation of something that would not normally be visible.

1875 imbibition: The capillary movement of water into germinating seeds and into substances such as wood and gelatin, which swell as a result.

1876 immortal strand: The hypothesis of selective retention of parental DNA strands during asymmetric self-renewal. Potential mechanism to protect stem cells from the mutations associated with replication.

1877 immortalization: While human cells generally have a finite capacity to divide, they can occasionally be made to divide without limit, usually by restoring telomeres through the protein telomerase. Cells that divide without limit are said to be immortal. The process of transforming a mortal cell to immortality is immortalization.

1878 immulite®: Laboratory console manufactured by Diagnostics Products Company (DPC) that evaluates biomarkers such as ultrasensitive PSA.

1879 immune compromised: A condition in which the patient has a much higher risk of infection due to a weak immune system.

1880 immune privilege: Certain organs are not easily accessible to immune cells and are referred to as immune privileged sites e.g. eye

1881 immune reaction: A bodily defense reaction that recognizes an invading substance (an antigen: such as a virus or fungus or bacteria or transplanted organ) and produces antibodies specific against that antigen.

1882 immune rejection: Can occur as a result of a transplant when the donor type of cell or organ is
not a close enough match to the recipient type. Drugs to suppress the patient's immune system help reduce this problem.

1883 immune response: A highly specific defensive reaction of the body to invasion by a foreign substance or organism; consists of a primary response in which the invader is recognized as foreign, or "not-self," and eliminated and a secondary response to subsequent attacks by the same invader. Mediated by two types of lymphocytes B cells, which mature in the bone marrow and are responsible for antibody production, and T cells, which mature in the thymus and are responsible for cell-mediated immunity.

1884 immune system ablation: The destruction of the patient's immune system by medication, in order to create a "compartment" (blood space) for new cells to fit into and to minimize rejection risk. This carries a significant risk of mortality and is unnecessary in certain conditions. Diseases that were previously treated after ablation, now respond to stem cell therapy without this procedure.

1885 immune system cells: White blood cells or leukocytes that originate from the bone marrow. They include antigen-presenting cells, such as dendritic cells, T and B lymphocytes, and neutrophils, among many others.

1886 immune system modulation: The response of the immune system, sometimes to mesenchymal stem cells, that is characterised by reduction of immune system over-activity and significant amelioration of the affected disease state.

1887 immune system: An intricate system of cellular and chemical responses designed to protect the body from foreign substances and prevent recurrent illness by counteracting previous diseases through immunity. Bone marrow represents the body's primary producer of immune cells.

1888 immune-function assay: A general term for a number of tests based on an immune cell's ability to carry out a particular immune function.

1889 immunoassay: A laboratory technique that makes use of the binding between an antigen and its homologous antibody in order to identify and quantify the specific antigen or antibody in a sample.

1890 immunoblot: A blot in which a radiolabeled antibody is used as the molecular probe.

1891 immunocompromised mice: These genetically altered mice are used for transplantation experiments because they usually do not reject the transplanted tissue.

1892 immunocontraception: A method (not currently used) of reducing fertility of a pest species by controlling or preventing conception and pregnancy.

1893 immunodeficient mice: Genetically altered mice used in transplantation experiments because they usually do not reject transplanted tissue.

1894 immunodeficient: Unable to develop a normal immune response to, for example, a foreign substance.

1895 immunofluorescence: The detection of antibodies by using special proteins labeled with fluorescein. When present, the specific organism or antibody is observed as a fluorescent material when examined microscopically while illuminated with a fluorescent light source.

1896 immunogenic: Anything that can evoke an immune response or produce immunity.

1897 immunoglobulin: An antibody or, more generally, antibodies which provide protection against infectious agents. Immunoglobulins are produced by lymphocytes of the B cell type in response to the stimulation of infectious agents or the contents of vaccines. Immunoglobulins are soluble proteins present in blood serum and other body fluids. Temporary protection via immunoglobulins can be transferred to another person through injection of a purified portion of a donor's serum.

1898 immunohistochemistry: Of or relating to the application of tissue chemistry and immune reaction methods to analysis of living cells and tissues.

1899 immunohistology: Examination of tissues through specific immunostaining techniques.

1900 immunoperoxidase: Stains which are used in the microscopic examination of tissues. These stains are based on antibodies which will bind to specific antigens, usually of protein or glycoprotein origin.

1901 immunophenotyping: Identification of various types of immune cells by sorting them according to their cell-surface markers.

1902 immunopositive: A positive result is observed on immunostaining for the target substance.

1903 immunostaining: The staining of a specific substance by using an antibody against it which is complexed (formed into a complex) with a staining medium.

1904 immunosuppression: The artificial suppression of the immune response, usually through drugs, so that the body will not reject a transplanted organ or tissue. Drugs commonly used to suppress the immune system after transplant include prednisone, azathioprine (Imuran), cyclosporin, OKT3 and ALG.
in vitro fertilization (IVF): A procedure where an egg cell (the oocyte) and sperm cells are brought together in a laboratory dish (i.e., in vitro), so that a sperm cell can fertilize the egg. The resulting fertilized egg, called a zygote, will start dividing and after a several divisions, forms the embryo that can be implanted into the womb of a woman and give rise to pregnancy.

in vitro stem cell: Self-renewal ex vivo in cells that do not overtly behave as stem cells in vivo. Occurs due to liberation from inductive commitment signals or by creation of a synthetic stem-cell state.

in vitro: Describing a process carried out in the laboratory, reflecting a similar process that occurs inside the body.

in vivo: Latin for in the living, in the body, within the living. In vivo is used to indicate the presence of a whole/living organism (for example, in an experiment), in distinction to a partial or dead organism or a computer model. Animal testing and clinical trials are both forms of in vivo research.

inborn errors of metabolism: The genetic absence or malfunction of a certain gene, or the protein that it encodes, which causes a baby to be born without the ability to process, or metabolize, certain compounds. This kind of genetic error is not enough to cause the death of the fetus, as the mother has been able to process the compounds not enough to cause the death of the fetus, as the mother has been able to process the compounds without the ability to process, or metabolize, certain compounds. This kind of genetic error is not enough to cause the death of the fetus, as the mother has been able to process the compounds not enough to cause the death of the fetus, as the mother has been able to process the compounds without the ability to process, or metabolize, certain compounds. This kind of genetic error is not enough to cause the death of the fetus, as the mother has been able to process the compounds not enough to cause the death of the fetus, as the mother has been able to process the compounds without the ability to process, or metabolize, certain compounds. This kind of genetic error is not enough to cause the death of the fetus, as the mother has been able to process the compounds not enough to cause the death of the fetus, as the mother has been able to process the compounds.
as latent prostate cancer) is a form of prostate cancer which is of no clinical significance to the patient in whom it is discovered.

Incisional biopsy: An incisional biopsy is different from an excisional biopsy because the surgeon does not attempt to remove the entire mass. An incisional biopsy is performed to obtain a fragment of tissue to send to the pathologist for diagnosis.

Using the knowledge that the independent variable is the factor that is manipulated, a second factor responds. The independent variable is the factor that is manipulated, and to the written document that describes that program to be provided to a child with a disability who is found to meet the federal and state requirements for special education. The IEP must be designed to provide the child with a Free Appropriate Public Education. The IEP refers both to the educational program to be provided to a child with a disability and to the written document that describes that educational program. IEPs are written for children aged 3 and older.

Indolent: Minimal disease, defined as < 0.5 cc of cancer confined to the prostate with no Gleason grade 4 or 5.

Indomethacin: An anti-inflammatory, antipain, and antifever drug. Its primary use is in rheumatoid arthritis and degenerative joint disease when aspirin-based products are ineffective or cannot be tolerated.

Induced fit: The change in shape of the active site of an enzyme so that it binds more snugly to the substrate, induced by entry of the substrate.

Induced pluripotent stem (iPS) cell: Somatic cells induced to a pluripotent embryonic stem cell-like state. The process of creating these cells, often referred to as "reprogramming" involves introducing a combination of three to four genes for transcription factors, delivered by retroviruses, into the somatic cell. Cells can be taken from patients with specific diseases such as ALS, Parkinson's, or cardiovascular disease and induced to form iPS cells. Multiple uses can be derived from iPS cells when they are differentiated to more specialized cell types, including the development of assays for studying disease processes, scanning drug candidates for
safety and effectiveness, or application to regenerative medicine.

1943 induction: (1) The ability of one group of embryonic cells to influence the development of another. (2) In genetics, the phenomenon in which the presence of a substrate (the inducer) initiates transcription and translation of the genes coding for the enzymes required for its metabolism.

1944 inert gases: An elemental family with unique properties, which includes helium, neon, argon, krypton, and xenon.

1945 infection: The growth of a parasitic organism within the body. (A parasitic organism is one that lives on or in another organism and draws its nourishment therefrom.) A person with an infection has another organism (a "germ") growing within him, drawing its nourishment from the person.

1946 infectious disease markers: Elements in a person's blood which indicate if a person has had an infectious disease.

1947 infectious disease testing: The method to determine if a person has or did have an infectious disease.

1948 infertile: Incapable of initiating, sustaining, or supporting reproduction. Alternatively, not fertilised and therefore incapable of growing and developing.

1949 infiltrate (adj. infiltrative): To penetrate through a porous tissue.

1950 inflammation: Any form of swelling or pain or irritation.

1951 inflammatory response: A line of defense triggered by penetration of the skin or mucous membranes, in which small blood vessels in the vicinity of an injury dilate and become leakier, enhancing the infiltration of leukocytes; may also be widespread in the body.

1952 informatics: Storing, manipulating, analyzing and visualizing information using computer systems.

1953 informed consent: A term describing the responsibility of doctors or researchers to ensure that patients or people have an understanding of the relevant facts regarding their care or participation in research. Consumers also have a right to practice informed consent when they buy particular foods. Informed consent relies on our having access to reliable, truthful, and complete information.

1954 infrared: Denoting thermal radiation of wavelength greater than that of the red end of the spectrum (the recorded band of wavelengths of electromagnetic vibrations of variable light).

1955 infundibulum: Any of various funnel-shaped organs or parts.

1956 infusion: The introduction of a fluid other than blood into a vein, often over a long period of time. Many medicines (including enzyme replacement therapy) are administered by infusion.

1957 ingestion: A heterotrophic mode of nutrition in which other organisms or detritus are eaten whole or in pieces.

1958 inherited: Traits or characteristics that come from one's ancestors and are transmitted from parents to offspring through genes. The traits will therefore be present at birth.

1959 inhibitory postsynaptic potential (IPSP): An electrical charge (hyperpolarization) in the membrane of a postsynaptic neuron caused by the binding of an inhibitory neurotransmitter from a presynaptic cell to a postsynaptic receptor; makes it more difficult for a postsynaptic neuron to generate an action potential.

1960 injection: Administering a substance inside of the body, by means of a syringe and hypodermic (“under skin”) needle. Stem cells may be injected into specific sites, or injected under the skin to allow them to migrate elsewhere.

1961 injury: Harm or hurt. The term "injury" may be applied in medicine to damage inflicted upon oneself as in a hamstring injury or by an external agent on as in a cold injury. The injury may be accidental or deliberate, as with a needlestick injury. The term "injury" may be synonymous (depending on the context) with a wound or with trauma.

1962 innate releasing mechanism: In ethology, a circuit within an animal's brain that is hypothesized to respond to a specific stimulus, setting in motion, or "releasing," the sequence of movements that constitute a fixed action pattern.

1963 inner cell mass (ICM): A small group of cells attached to the wall of the blastocyst (the embryo at a very early stage of development that looks like a hollow ball). Embryonic stem cells are made by isolating and culturing the cells that make up the inner cell mass. In development, it is the inner cell mass that will eventually give rise to all the organs and tissues of the future embryo and fetus, but do not give rise to the extra-embryonic tissues, such as the placenta.

1964 innervate: To supply with nerves; to make contact with target muscles or nerves.

1965 inorganic: (1) Chemicals that are not organic, that is, not manufactured within living organisms. (2) Any chemical compound not based on carbon chains or rings (except oxides, sulphides of carbon and metallic carbides that are also inorganic).
insulin: A hormone produced by special cells in the pancreas. Insulin allows glucose to enter the body's cells, where it is used as an energy source. In type 1 diabetes (insulin-dependent diabetes) the body does not produce insulin, causing glucose to build up in the blood, giving high blood sugar levels. Type 1 diabetics can't make their own insulin so they must inject it every day.

interleukin (IL): any of various compounds of low molecular weight that are produced by T-cells and macrophages and that function especially in regulation of the immune system and cell-mediated immunity

integrative care: At CTCA, a patient meets with both an oncologist specializing in conventional therapies as well as practitioners of complementary and alternative medicines such as nutritional, physical, psychological and spiritual therapies.

 Disease Characteristics and Treatment Options: An example of cancer type includes the following:

- **Intestinal**
  - Insulin: The second messenger, which functions as an intermediate between certain nonsteroid hormones and the third messenger, a rise in cytoplasmic Ca2+ concentration.
  - Insulin-promoting factor 1: A transcription factor expressed in the pancreas and necessary for the production of insulin.

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platelets). IL-4 is released by a subset of CD4 cells, and helps stimulate antibody production. IL-6 is produced by macrophages and mediates acute systemic immune responses (e.g., fever). IL-10 stimulates B-cells (which produce antibodies), modulates macrophage function, enhances humoral macrophage function, and enhances humoral immunity, while suppressing cell-mediated immune function. IL-12 is produced by various immune cells, activates natural killer cells and cytotoxic T-lymphocytes and induces the production of interferon-gamma. IL-12 is associated with the cell-mediated immune response.

1988 intermediate filament: A component of the cytoskeleton that includes all filaments intermediate in size between microtubules and microfilaments.

1989 intermittent androgen deprivation: ADT that discontinues testosterone lowering therapy with the intent to allow the patient to recover from symptoms of ADS as testosterone levels recover to normal.

1990 interneuron: An association neuron; a nerve cell within the central nervous system that forms synapses with sensory and motor neurons and integrates sensory input and motor output.

1991 internode: The segment of a plant stem between the points where leaves are attached.

1992 interphase: The period in the cell cycle when the cell is not dividing. During interphase, cellular metabolic activity is high, chromosomes and organelles are duplicated, and cell size may increase. Interphase accounts for 90% of the time of each cell cycle.

1993 interspecific: Between species.

1994 interstitial cells: Cells scattered among the seminiferous tubules of the vertebrate testis that secrete testosterone and other androgens, the male sex hormones.

1995 interstitial fluid: The internal environment of vertebrates, consisting of the fluid filling the spaces between cells.

1996 interstitial: Within a particular organ; for example, interstitial prostate radiation therapy is radiation therapy applied within the prostate using implanted radioactive pellets or seeds.

1997 intertidal zone: The shallow zone of the ocean where land meets water.


1999 intestinal Stem Cell: A multipotent cell found in the intestine, giving rise to all types of cells in the gut such as enterocytes, goblet cells, paneth cells, and endocrine cells.

2000 intracavernosal: Within the corpus cavernosum.

2001 intracrinology: The part of endocrinology that focuses on the fact that, in men and women, an important proportion of androgens and estrogens are synthesized locally at their site of action in peripheral target tissues.

2002 intraductal: Within a duct.

2003 intraepithelial: Within the layer of cells that forms the surface or lining of an organ.

2004 intramedullary: Inside the bone marrow.

2005 intraoperative: Occurring, carried out, or encountered in the course of surgery.

2006 intraperitoneal: The injection of a substance into the peritoneum or body cavity.

2007 intrathecal: Inside of the spinal canal, or inside of the skull, but outside the brain, in the spinal fluid. Intrathecal injection of neuronal stem cells, placing them directly into the spinal fluid that surrounds the brain and spinal cord, is one possible route of administering them, to allow them to access spinal cord and brain lesions. Spinal puncture is the usual route for intrathecal injections.

2008 intravascular compartment: Blood vessels within the bone marrow microenvironment.

2009 intravascular: Within a vessel or vessels.

2010 intravenous pyelogram (IVP): A procedure that introduces an X-ray absorbing dye into the urinary tract.

2011 intravenous: Administered by injection into a vein.

2012 intrinsic rate of increase: The difference between the number of births and the number of deaths, symbolized as rmax; the maximum population growth rate.

2013 introgression: The transplantation of genes between species resulting from fertile hybrids mating successfully with one of the parent species.

2014 intron: A sequence of DNA, found within a gene, which is initially copied into messenger RNA but is cut out before the messenger RNA is translated and does not have a function in coding for proteins.

2015 introns/exons: Genes have both noncoding (introns) and coding (exons) regions. The noncoding regions contain genetic information that gets cut out when the genetic information goes from DNA to RNA and is not integral to protein manufacture. Point mutations in the introns usually have no effect, unless they cause a shift in the reading frame through an insertion or deletion. Exons contain the actual genetic information that will be used to manufacture proteins. Point mutations, insertions, duplications
and deletions all are types of mutations that change the genetic code and can lead to disease.

invagination: The local infolding of a layer of tissue, especially in animal embryos, so as to form a depression or pocket opening to the outside.

invasive: Requiring an incision or the insertion of an instrument or substance into the body.

inverse planning: Treatment planning for radiation therapy in which various aspects of the treatment plan are generated by a computer in order to achieve the dose distribution prescribed by a physician.

inversion: An aberration in chromosome structure resulting from an error in meiosis or from mutants; reattachment in a reverse orientation of a chromosomal fragment to the chromosome from which the fragment originated.

invertebrate: An animal without a backbone; invertebrates make up 95% of animal species.

investigational: A drug or procedure allowed by the FDA for use in clinical trials.

involution: A normal process marked by decreasing size of an organ.

iodine-125: Radioactive source used for brachytherapy. I=125 gives off energy at a slow and continuous rate. The half life of iodine is 60 days.

ion channel: A protein that serves as a pore in the cell membrane, allowing the regulated flow of ions (e.g., potassium, sodium, and calcium ions) across the membrane and, in turn, neuronal conduction.

ion: Atom or molecule that has acquired an electric charge by the loss or gain of one or more electrons.

ionic bond: A chemical bond resulting from the attraction between oppositely charged ions.

ionize: to dissociate atoms or molecules into electrically charged atoms or radicals

ionizing radiation: Corpuscular (e.g., neutrons, electrons) or electromagnetic (e.g., gamma) radiation of sufficient energy to ionise the irradiated material.

iPS vell volony: Refers to the tightly packed homogenous cluster of induced pluripotent cells. Undifferentiated embryonic stem cells and induced pluripotent stem cells grow in colonies in vitro. As the pluripotent cells begin to differentiate, the cells will no longer form colonies and will instead appear flattened. The emergence of colonies is one of the first signs that somatic cells have been successfully reprogrammed into iPS cells.

ipsilateral: Pertaining to, situated on, or affecting the same side of the body.

irradiate: Application of radiation from a source (heat, light, Xrays) to a structure or organism.

ischemia: A reduction in blood flow.

islet cell: The functional cell of the pancreas that is responsible for secreting insulin, glucagon, gastrin and somatostatin. Together, these molecules regulate a number of processes including carbohydrate and fat metabolism, blood glucose levels and acid secretions into the stomach.

islets of Langerhans: Also called ISLANDS OF LANGERHANS, irregularly shaped patches of endocrine tissue located within the pancreas of most vertebrates. They are named for the German physician Paul Langerhans, who first described them in 1869. The normal human pancreas contains about 1,000,000 islets.

isodose contour: A two or three-dimensional shape that contains the volume receiving a dose greater than or equal to a specified amount.

isodose line: A two-dimensional line that circumscribes an area receiving a dose greater than or equal to a specified amount.

isof orm: One of a set of similar proteins that have the same function but slightly different composition, e.g. free and complexed PSA.

isogamy: A condition in which male and female gametes are morphologically indistinguishable.

isolating mechanisms: Mechanisms that prevent genetic exchange between individuals of different populations or species; they prevent mating or successful reproduction even when mating occurs; may be behavioral, anatomical, or physiological.

isomer: One of several organic compounds with the same molecular formula but different structures and therefore different properties. The three types are structural isomers, geometric isomers, and enantiomers.

isomorphic generations: Alternating generations in which the sporophytes and gametophytes look alike, although they differ in chromosome number.

isotherm: A line on a chart representing the locations of zones having a particular temperature.

isotonic solution: Solutions of equal solute concentration.

isotope: One of several atomic forms of an element, each containing a different number of neutrons and thus differing in atomic mass.

iterations: Repeated series of steps, performed either by the computer or by the user, implemented to develop a treatment plan.
2046 Jackson-Pratt drain: a suction drain inside the body and connected to clear plastic tubing through the skin.

2047 joint stiffness: Allied diseases often interfere with muscle control and subsequent joint movement leading to stiffness and reduced range of motion.

2048 joule (J): A unit of energy: 1 J = 0.239 cal; 1 cal = 4.184 J.

2049 junk DNA (non-coding DNA): DNA in the genome that is not directly involved in making proteins or other molecules. About 98 percent of the human genome consists of non-coding DNA. The term "junk" reflects the outdated belief that this DNA accumulated over the course of evolution and no longer serves a purpose in humans. But it's now clear that some non-coding DNA controls the activity of genes and may have other functions.

2050 juvenile diabetes: An autoimmune disease where the β-cells in the pancreas are destroyed and therefore the individual loses some or all of his/her ability to regulate and produce insulin. If left untreated, it can have severe side effects such as kidney failure, blindness, stroke and even death.

2051 juvenile hormone (JH): A hormone in arthropods, secreted by the corpora allata glands, that promotes the retention of larval characteristics.

2052 juxtaglomerular apparatus (JGA): Specialized tissue located near the afferent arteriole that supplies blood to the kidney glomerulus; the JGA raises blood pressure by producing renin, which activates angiotensin.

2053 Kahler disease: A fatal condition with occurrence of multiple malign tumours disease (multiple myeloma) in the bone marrow, causing disturbances of its function. AKA: Kahler-Bozzolo disease, Bence Jones syndrome, Huppert disease, MacIntyre syndrome, Rustitskii disease, von Rustitskii syndrome.

2054 Kaplan-Meier method: A statistical method that produces a graph showing the percent of a patient population surviving at various intervals of time after the start of the study or treatment.

2055 kaposi sarcoma: A malignant neoplastic vascular proliferation characterized by soft purplish nodules that usually occur first on the toes or feet and then slowly spread over the skin, increasing in size and number.

2056 Karnofsky Performance Status: index that allows cancer patients to be classified using a standard way of measuring the ability to perform ordinary tasks.

2057 karyogamy: The fusion of nuclei of two cells, as part of syngamy.

2058 karyokinesis: Division of the nucleus during the cell cycle.

2059 karyotype: A method of organizing the chromosomes of a cell in relation to number, size, and type.

2060 Kegel exercises: A set of exercises designed to improve the strength of the muscles used in urinating.

2061 keratin: Any of various sulfur containing fibrous proteins that form the chemical basis of horny epidermal tissues (as hair and nails) and are typically not digested by enzymes of the gastrointestinal tract.

2062 keratinocytes: Cells that synthesize keratin and are found in the skin, hair, and nails. A fibrous protein is produced by keratinocytes and may be hard or soft. The hard keratin is found in hair and nails. The soft keratin is found in the epidermis of the skin in the form of flattened non-nucleated scales that slough continually.

2063 keystone predator: A predatory species that helps maintain species richness in a community by reducing the density of populations of the best competitors so that populations of less competitive species are maintained.

2064 keystone species: A species that is of exceptional importance in maintaining the species diversity of a community; when a keystone species is lost, the diversity of the community decreases and its structure is significantly altered.

2065 kidney: In vertebrates, the organ that regulates the balance of water and solutes in the blood and the excretion of nitrogenous wastes in the form of urine.

2066 killer cells: White blood cells that attack tumor cells and body cells that have been invaded by foreign substances.

2067 kilocalorie (kcal): A thousand calories; the amount of heat energy required to raise the temperature of 1 kg of water 1°C.

2068 kin selection: A phenomenon of inclusive fitness, used to explain altruistic behavior between related individuals.

2069 kinase: An enzyme that catalyzes the conversion of a pro-enzyme to an active enzyme.

2070 kinesis: A change in activity rate in response to a stimulus.

2071 kinetic energy: The energy of motion, which is directly related to the speed of that motion. Moving matter does work by transferring some of its kinetic energy to other matter.

2072 kinetics: The study of acceleration, motion or rate of change.

2073 kinetochore: A specialized region on the centromere that links each sister chromatid to the mitotic spindle.
2074 kingdom: A taxonomic category, the second broadest after domain.
2075 Klf The Krüppel: Like family of transcription factors, named for their homology to the Drosophila Krüppel protein. All KLF family members are characterized by their three Cys2 His2 zinc fingers located at the C-terminus, separated by a highly conserved H/C link.
2076 Klinefelter syndrome: Syndrome in males that is characterized by small testes and long legs and enlarged breasts and reduced sperm production and mental retardation; a genetic defect in which an extra X chromosome (XXY) is present in the male.
2077 knock: Down reduction of gene expression via RNA interference, mediated by short interfering RNA (siRNA) or short hairpin (shRNA).
2078 knock-out mouse: A mouse that has had one or both copies of a specific gene deleted or inactivated.
2079 Koch's postulates: A set of four criteria for determining whether a specific pathogen is the cause of a disease.
2080 Krebs cycle: A chemical cycle involving eight steps that completes the metabolic breakdown of glucose molecules to carbon dioxide; occurs within the mitochondrion; the second major stage in cellular respiration.
2081 Kruppel-like factor 4 (Klf-4): A transcription factor that is highly expressed in undifferentiated embryonic stem cells and is also expressed elsewhere in the adult organism, including the gut, testis and lungs, and regulates proliferation, differentiation and cell survival. In 2006, the Yamanaka lab identified Klf-4 as one of the four factors that, when co-transfected and expressed in mouse adult fibroblasts, caused the fibroblasts to revert to a pluripotent-like state. One year later, the same four factors where used to successfully reprogram human adult fibroblast cells into induced pluripotent stem cells. These four factors are Oct-4, SOX2, Klf-4 and c-Myc.
2082 Kruppel-like factor 4 (Klf-4): A transcription factor that is highly expressed in undifferentiated ES cells and is also expressed elsewhere in the adult organism including the gut, testis and lungs and functions to regulate proliferation, differentiation and cell survival.
2083 K-selection: The concept that in certain (K-selected) populations, life history is centered around producing relatively few offspring that have a good chance of survival.
2084 label: Retaining cell candidate for adult tissue stem cell because of slow division rate and/or immortal strand retention. Interpret with caution.
2085 laboratory: A place for doing tests and research procedures and preparing chemicals, etc. Although "laboratory" looks very like the Latin "laboratorium" (a place to labor, a work place), the word "laboratory" came from the Latin "elaborare" (to work out, as a problem, and with great pains), as evidenced by the Old English spelling "elaboratory" designating "a place where learned effort was applied to the solution of scientific problems."
2086 lacteal: A tiny lymph vessel extending into the core of an intestinal villus and serving as the destination for absorbed chylomicrons.
2087 lactoferrin: A breast milk protein that promotes infant growth.
2088 Lacunae: The spaces occupied by cells (e.g., chondrocytes and osteocytes) of calcified tissues.
2089 LAD: A standard medical abbreviation for LymphADenopathy (lymphadenopathy) -- LAD = enlarged or swollen lymph nodes.
2090 lagging strand: A discontinuously synthesized DNA strand that elongates in a direction away from the replication fork.
2091 lamella: Layer, thin sheet.
2092 lamina propria: A highly vascular layer of connective tissue under the basement membrane lining a layer of epithelium.
2093 laminectomy: A surgical procedure which removes a portion of vertebral structures and is used for a variety of purposes, such as decompressing or accessing the spinal cord.
2094 Laparoscopic surgery: A surgical technique in which abdominal operations are carried out with small incisions with the assistance of a laparoscope.
2095 laparoscopy: A technique that allows the physician to observe internal organs directly through a piece of optical equipment inserted directly into the body through a small surgical incision.
2096 laparotomy: An operation in which the abdomen is opened to look for the cause of an undiagnosed illness.
2097 larva (pl. larvae): A free-living, sexually immature form in some animal life cycles that may differ from the adult in morphology, nutrition, and habitat.
2098 lasers: Amplify light by producing coherent light beams. Laser is an acronym for light amplification by stimulated emission of radiation.
2099 latent: (1) Insignificant or irrelevant; for example, latent prostate cancer (also known as incidental prostate cancer) is a form of prostate cancer which is of no clinical significance to the patient in whom it is discovered; (2) pathology, in a dormant or hidden stage.
lateral line system: A mechanoreceptor system consisting of a series of pores and receptor units (neuromasts) along the sides of the body of fishes and aquatic amphibians; detects water movements made by an animal itself and by other moving objects.

lateral meristem: The vascular and cork cambium, a cylinder of dividing cells that runs most of the length of stems and roots and is responsible for secondary growth.

LDL cholesterol: Low density lipoprotein cholesterol; a lipoprotein of blood plasma that is composed of a moderate proportion of protein with little triglyceride and a high proportion of cholesterol and that is associated with increased probability of developing atherosclerosis.

leaching: The dissolving of minerals and other elements in soil or rocks by the downward movement of water.

leading strand: The new continuous complementary DNA strand synthesized along the template strand in the mandatory 5' to 3' direction.

leaf: The main site of photosynthesis in a plant; consists of a flattened blade and a stalk (petiole) that joins the leaf to the stem.

learning: The process that leads to modification in individual behavior as the result of experience.

lefty: A developmental factor that helps determine right-left asymmetry in vertebrates.

leiomyosarcoma: A rare malignant tumor consisting of smooth muscle cells and small cell sarcoma tumor.

leptin: A hormone produced by the placenta and fetal tissues that acts as a growth factor and modulator of metabolic and immune functions.

lesion: An abnormal change in structure of an organ or part due to injury or disease; especially: one that is circumscribed and well-defined.

leukaemia: An increase in the number of ineffective and immature white blood cells, causing a weakened immune system. This leaves the body susceptible to infection.

leukapheresis: The process of separating white blood cells from the rest of the blood.

leukemia inhibitory factor (LIF): A growth factor necessary for maintaining mouse embryonic stem cells in a proliferative, undifferentiated state.

leukemia simply: Cancer of the white blood cells. More technically: cancer that begins in developing blood cells in the bone marrow. As a result, large numbers of immature blood cells are produced and released into the bloodstream, and the cancer cells in the marrow crowd out normal developing cells. European physicians who, in the 19th century, observed patients with marked elevation of their white blood cells, coined the term "Weisses blut" or "white blood". Later, the term leukemia, which is derived from the Greek words "leukos" meaning "white" and "haima" meaning "blood", was used to indicate the disease. The major forms of leukemia are divided into 4 categories. Myelogenous leukemia and lymphocytic leukemia each have an acute or chronic form (therefore, there is ALL, AML, CLL, and CML). The terms myelogenous or lymphocytic denote the cell type involved. Acute leukemia is a rapidly progressing disease that affects mostly cells that are unformed or primitive (not yet fully developed or differentiated). These immature cells cannot carry out their normal functions. Chronic leukemia progresses slowly and permits the growth of greater numbers of more developed cells. In general, these more mature cells can carry out some of their normal functions.

leukemia: Malignant proliferation of hematopoietic cells, characterized by replacement of bone marrow by neoplastic cells. The leukemic cells usually are present in peripheral blood, and may infiltrate other organs of the reticuloendothelial system, such as liver, spleen and lymph nodes. Leukemia is broadly classified into acute and chronic leukemia, with multiple distinct clinicopathologic entities subclassified in each category.

leukocyte (white blood cell): The general name for a white blood cell. Leukocytes are responsible for maintaining the immune system’s response to foreign substances and infection. Three different types of leukocytes exist: monocytes, granulocytes and lymphocytes.

leukocytosis: A condition where the patient has elevated white blood cells in the blood.

leukodystrophy: A group of rare genetic disorders that affect the central nervous system by disrupting the growth or maintenance of the myelin sheath that insulates nerve cells. Myelin is commonly referred to as the brain’s “white matter,” myelin covers nerve cells and ensures the clear transmission of nerve impulses from one part of the body to another. These disorders are progressive, meaning that they tend to get worse throughout the life of the patient. The word leukodystrophy comes from the Greek words leuko (meaning white), trophy (meaning growth),
and dys (meaning ill). If you put these words together, the word leukodystrophy describes a set of diseases that affect the growth or maintenance of the white matter (myelin).

2120 leukotriene: A type of prostaglandin produced by various white blood cells involved in the inflammatory and immune responses and in allergic reactions.

2121 leuprolide acetate: A LHRH analog, one trade name is Lupron®.

2122 levator: A muscle that raises a structure in the body such as the muscles that support the pelvic organs.

2123 Lewy body dementia: A dementing illness associated with protein deposits called Lewy bodies, found in the cortex of the brain.

2124 Leydig cells: Cell population within the testicles that produces testosterone; the other main cell population are the Sertoli cells that make sperm.

2125 LFTs: A standard medical abbreviation for Liver Function Tests.

2126 LHRH analogs (or agonists): Synthetic compounds that are chemically similar to Luteinizing Hormone Releasing Hormone (LHRH), but are sufficiently different that they suppress testicular production of testosterone by binding to the LHRH receptor in the pituitary gland and either have no biological activity and therefore competitively inhibit the action of LHRH, or has LHRH activity that exhausts the production of LH by the pituitary; used in the hormonal treatment of advanced prostate cancer; LHRH agonist (mimics natural LHRH but then shuts down LH production after continuous exposure).

2127 libido: Interest in sexual activity; the psychic and emotional energy associated with instinctual biological drives.

2128 lichen: An organism formed by the symbiotic association between a fungus and a photosynthetic alga.

2129 life cycle: The entire sequence of stages in the life of an organisms, from the adults of one generation to the adults of the next.

2130 life table: A table of data summarizing mortality in a population.

2131 life-history pattern: A group of traits, such as size and number of offspring, length of maturation, age at first reproduction, and the number of times reproduction occurs, that affect reproduction, survival, and the rate of population growth.

2132 ligament: A band of fibrous tissue that connects bones or cartilages, serving to support and strengthen joints.

2133 ligand: An ion, a molecule, a molecular group, a substance or messenger that binds to another chemical entity at a receptor to form a larger complex which is then activated.

2134 ligand-gated ion channel receptor: A signal receptor protein in a cell membrane that can act as a channel for the passage of a specific ion across the membrane. When activated by a signal molecule, the receptor either allows or blocks passage of the ion, resulting in a change in ion concentration that usually affects cell functioning.

2135 ligase: An enzyme that is used to join fragments of DNA together, for example in gene splicing.

2136 light microscope (LM): An optical instrument with lenses that refract (bend) visible light to magnify images of specimens.

2137 light reactions: The steps in photosynthesis that occur on the thylakoid membranes of the chloroplast and convert solar energy to the chemical energy of ATP and NADPH, evolving oxygen in the process.

2138 light-independent reactions: The carbon-fixing reactions of the second stage of photosynthesis; energy stored in ATP and NADPH by the light-dependent reactions is used to reduce carbon from carbon dioxide to simple sugars; light is not required for these reactions.

2139 lignin: A hard material embedded in the cellulose matrix of vascular plant cell walls that functions as an important adaptation for support in terrestrial species.

2140 limbic system: A group of nuclei (clusters of nerve cell bodies) in the lower part of the mammalian forebrain that interact with the cerebral cortex in determining emotions; includes the hippocampus and the amygdala.

2141 Lin-28 homolog: Also known as LIN28, is a human gene. It is marker of undifferentiated human embryonic stem cells and has been used to enhance the efficiency of the formation of induced pluripotent stem (iPS) cells from human fibroblasts. It encodes a cytoplasmic mRNA-binding protein that binds to and enhances the translation of the Igf2 mRNA. Lin28 has also been shown to block the let-7 pre-miRNA and block production of the mature let-7 microRNA in mouse embryonic stem cells.

2142 lineage surface antigen (Lin): A mixture of monoclonal antibodies that are directed against antigens found on mature hematopoietic cells of different lineages. A usual Lin mix includes eight different antibodies directed against B and T cells, myeloid cells, and erythroid cells.

2143 lineage: The descendants of a common ancestor.

2144 linear accelerator: A type of high energy X-ray machine that generates radiation fields for
external beam radiation therapy. A linear accelerator is typically mounted with a collimator and/or a multileaf collimator in a gantry that revolves vertically around a treatment couch.  

Linitis plastica: The name "Linitis plastica" is derived from a Latin word meaning "hard", which refers to gastric cancers with symptoms of the entire stomach swelling up as for an inflammation.

Linkage analysis: Linkage is the tendency for genes and other genetic markers to be inherited together because of their location near one another on the same chromosomes. Linkage analysis uses the location relationship to determine carrier status of particular genes.

Linkage group: A pair of homologous chromosomes.

Linkage map: A genetic map based on the frequencies of recombination between markers during crossing over of homologous chromosomes. The greater the frequency of recombination between two genetic markers, the farther apart they are assumed to be.

Linkage: The tendency for certain alleles to be inherited together because they are located on the same chromosome.

Linked genes: Genes that are located on the same chromosome.

Lipase: An enzyme produced by many tissues. Lipase is an important regulator of fat in the blood. A deficiency of this enzyme leads to low levels of high-density lipoproteins (HDLs).

Lipid peroxidation: A biochemical process that mediates secondary neurological damage to the injured cord.

Lipid: Any one of a group of fats or fat-like substances characterized by their insolubility in water and solubility in fat solvents such as alcohol, ether, and chloroform.

Lipomatosis: Condition characterized by abnormal localized, or tumor-like, accumulations of fat in the tissues

Lipopolysaccharides: Lipid-containing compounds; lipopolysaccharides are endotoxins and important group-specific antigens. They are often derived from the cell wall of gram-negative bacteria and induce immunoglobulin secretion. The lipopolysaccharide molecule consists of three parts: lipid a, core polysaccharide, and O-specific chains (O antigens).

Lipoprotein: A protein bonded to a lipid; includes the low-density lipoproteins (LDLs) and high-density lipoproteins (HDLs) that transport fats and cholesterol in blood.

Liposarcoma: The soft tissue sarcomas are a group of cancers which develop from a number of different supportive tissues in the body including fibrous tissue, muscle, ligaments, tendons and fat.

Liquid nitrogen: Nitrogen gas frozen into its liquid state, which is usually at 67 degrees Kelvin or -210 degrees Celsius. Liquid nitrogen is a fairly inert substance and is used to freeze tissue and fluid samples quickly, preventing the damage that often occurs when living organisms and cells are frozen slowly. Tissue and fluid samples can be kept for months or years since the super low temperature stops the tissue from aging.

Live cell therapy: A therapy used since the 1920s in Europe and other countries, wherein cells from specific fetal animal organs (usually lamb cells) are injected into humans. These cells migrate into the recipient’s tissues, and stimulate them to repair or to function better. Sometimes, these animal cells continue to live in the recipient’s tissues. Sometimes, they fuse with the recipient’s cells to form a hybrid cell. Most of the time, the cells are rejected by the body and die, after stimulating repair and improved function of the target tissue.

Liver: An organ in the upper abdomen that aids in digestion and removes waste products and worn-out cells from the blood. The liver is the largest solid organ in the body. The liver weighs about three and a half pounds (1.6 kilograms). It measures about 8 inches (20 cm) horizontally (across) and 6.5 inches (17 cm) vertically (down) and is 4.5 inches (12 cm) thick.

Lobe: One of the two sides of an organ that clearly has two sides (e.g., the prostate or the brain).

Local therapy: Treatment that is directed at the prostate and closely surrounding tissue.

Localized: Restricted to a well defined area.

Locus (pl. loci): A particular place along the length of a certain chromosome where a given gene is located.

Logistic population growth: A model describing population growth that levels off as population size approaches carrying capacity.

Long-acting injectable: Medication or treatment that can be given by injection and which is active over a long period of time.

Long-day plant: A plant that flowers, usually in late spring or early summer, only when the light period is longer than a critical length.

Long-term reconstitution: Lifelong renewal of tissue by transplanted cells. The definitive assay for hematopoietic, epidermal, and spermatogonial stem cells. Transplantation assay may not be appropriate for all tissues.

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spermatogonial stem cells. Transplantation assay may not be appropriate for all tissues.

**2170** long-term self-renewal: The ability of stem cells to renew themselves by dividing into the same non-specialized cell type over long periods (many months to years) depending on the specific type of stem cell.

**2171** loop of Henle: The long hairpin turn, with a descending and ascending limb, of the renal tubule in the vertebrate kidney; functions in water and salt reabsorption.

**2172** Lorenzo’s oil: Is a combination of two fats extracted from olive oil and rapeseed oil and is specific to adrenoleukodystrophy (ALD), does not repair myelin, and does not have any known effect on other demyelinating disorders. In ALD presymptomatic boys Lorenzo’s Oil often (but not always) prevents the onset of the disease by stopping the body from producing the very long chain fatty acids, whose buildup leads to demyelination.

**2173** lorica: A vase-shaped or cup-shaped outer covering. Found in many protists, including some flagellates, ciliates, chrysophytes, and choanoflagellates, as well as in some animal cells.

**2174** lower motor neurons: Nerves that leave the spinal cord to connect to muscles.

**2175** lower urinary tract symptoms: include symptoms of hesitancy in initiating urination, slow urination, dribbling after urination, getting up at night to urinate (nocturia) and frequency of urination.

**2176** low-level laser therapy: The use of coherent light beams for biostimulation.

**2177** lumbar puncture: A procedure in which a needle is carefully inserted into the spinal canal in the back’s lower lumbar area. It is a mechanism by which stem cells can be transplanted into the cerebrospinal fluid and, hopefully, be transported to the spinal-cord injury site.

**2178** lumbar region: Corresponding to the lower back; the lumbar spine has five lumbar vertebrae.

**2179** lumbar: Portion of body between chest and pelvis, often referring to the lower back or spine.

**2180** lumen: The cavity of a tubular structure, such as endoplasmic reticulum or a blood vessel.

**2181** lungs: The invaginated respiratory surfaces of terrestrial vertebrates, land snails, and spiders that connect to the atmosphere by narrow tubes.

**2182** Lupron®: The USA trade or brand name of a leuprolide acetate, a LH-RH agonist.

**2183** luteinizing hormone (LH): A pituitary hormone that stimulates the Leydig cells of the testicles to make the male hormone testosterone.

**2184** luteinizing hormone (LH): A protein hormone secreted by the anterior pituitary that stimulates ovulation in females and androgen production in males.

**2185** luteinizing hormone releasing hormone (LHRH): A hormone responsible for stimulating the production of testosterone in the body by interacting with the LHRH receptor to release LH which in turn stimulates cells in the testicles (Leydig cells) to make testosterone; luteinizing hormone-releasing hormone is also known as GnRH or gonadotrophin-releasing hormone.

**2186** luteinizing hormone-releasing hormone (LHRH, also known as GnRH or gonadotrophin releasing hormone; hormone from the hypothalamus that interacts with the LHRH receptor in the pituitary to release LH).

**2187** LY294002: A lipid-modifying enzyme that inhibits PI3 kinase.

**2188** lyase: An enzyme important in the adrenal androgen pathways that converts 17 alpha hydroxyprogesterone to androstenedione and also converts 17 alpha hydroxy pregnenolone to DHEA.

**2189** lycopene: A carotenoid responsible for the red color of the tomato, watermelon and pink grapefruit. Recent findings indicate that lycopene may be an important part of the human organism’s natural defense mechanism that protects from harmful oxidizing agents.

**2190** lye: A strong caustic alkaline solution of potassium salts, obtained by leaching wood ashes. It is much used in making soap, etc.

**2191** lymph (also lymphatic fluid): The clear fluid in which all of the cells in the body are constantly bathed; carries cells that help fight infection.

**2192** lymph node: A small, bean-shaped gland responsible for filtering germs and other foreign substances from the body. Lymph nodes are clustered together with other nodes in the underarms, abdomen and groin.

**2193** lymph: The colorless fluid, derived from interstitial fluid, in the lymphatic system of vertebrate animals.

**2194** lymphadenectomy: also known as a pelvic lymph node dissection, this procedure involves the removal and microscopic examination of selected lymph nodes, a common site of metastatic disease with prostate cancer; this procedure can be performed during surgery prior to the removal of the prostate gland, or by means of a small incision a "laparoscopic lymphadenectomy" may be performed, a simple operation requiring only an overnight stay in the hospital.

**2195** lymphadenopathy: Abnormally enlarged lymph nodes. Commonly called "swollen glands."
lymphangiogram: X-rays of the lymphatic system. A dye is injected to outline the lymphatic vessels and organs.

lymphatic system: A network of lymph vessels and nodes that drain and filter antigens from tissue fluids before returning lymphocytes to the blood.

lymphocele: Cystic mass containing lymph from diseased lymphatic channels or following surgical trauma or other injury.

lymphocyte: Any of the colorless weakly motile cells originating from stem cells and differentiating in lymphoid tissue (as of the thymus or bone marrow) that are the typical cellular elements of lymph, include the cellular mediators of immunity, and constitute 20 to 30 percent of the white blood cells of normal human blood.

lymphocytopenia: An abnormally small number of lymphocytes in the circulating blood.

lymphography: Radiologic depiction of lymphatic vessels and lymph nodes after use of a contrast material.

lymphohematopoietic (LHSC): General Bone Marrow System that generates immune and blood cells.

lymphoid cell: Lymphocytes, cells involved in mounting an immune response.

lymphoid: Cells derived from stem cells of the lymphoid lineage: large and small lymphocytes, plasma cells.

lymphokine: A chemical, released by an activated cytotoxic T cell, that attracts macrophages and stimulates phagocytosis.

lymphoma: A cancer of the lymphatic system, a network of thin vessels and nodes throughout the body. Its function is to fight infection.

lymphopoiesis: Development of lymphoid cells: T-cell, B-cells, NK cells and Dendritic cells, DC (only if NK and DC cells are formed from the lymphoid lineages).

lysis: Disintegration of a cell by rupture of its plasma membrane.

lysenic bacteria: Bacteria carrying a bacteriophage integrated into the bacterial chromosome. The virus may subsequently set up an active cycle of infection, causing lysis of the bacterial cells.

lysenic cycle: A type of phage replication cycle in which the viral genome becomes incorporated into the bacterial host chromosome as a prophage.

lysosomal storage disorders: A class of genetic disorders caused by the deficiency or malfunction of specific enzymes found in cell lysosomes, causing accumulation of waste material in cells.

lysosome: Eukaryotic organelle which carries digestive enzymes. The lysosome fuses with a vacuolar membrane containing ingested particles, which are then acted upon by the enzymes.

lysozyme: An enzyme in perspiration, tears, and saliva that attacks bacterial cell walls.

lytic cycle: A type of viral replication cycle resulting in the release of new phages by death or lysis of the host cell.

lytic: Of, relating to, or causing a specified kind of decomposition through rupture of cell membranes and loss of cytoplasm.

lymph: A body. Its function is to fight infection.

lymphangiogram: X-rays of the lymphatic vessels and organs.

lymphangiography: Radiologic depiction of lymphatic vessels and lymph nodes after use of a contrast material.

lymphangiogram: X-rays of the lymphatic vessels and organs.

macrophage: A type of white blood cell that plays a role in the immune system by phagocytosing foreign particles and releasing cytokines.

macroglossia: Enlargement of the tongue; may be a symptom with several LSDs.

macromolecule: A giant molecule of living matter formed by the joining of smaller molecules, usually by condensation synthesis. Polysaccharides, proteins, and nucleic acids are macromolecules.

macronutrient: An inorganic nutrient required in large amounts for plant growth, such as nitrogen, potassium, calcium, phosphorus, magnesium, and sulfur.

macrophage: A lymphocyte that has left the circulation and settled and matured in a tissue. Because of their placement in the lymphoid tissues, macrophages serve as the major scavenger of the blood, clearing it of abnormal or old cells and cellular debris as well as pathogenic organisms.

macular degeneration: Deterioration in the macula, which is the spot on the retina at the back of the eye, with the highest visual resolution, or the highest concentration of vision cells. Macular degeneration is generally associated with aging and often with arteriosclerosis. Some cases of macular degeneration have been helped by injecting neural stem cells, through a catheter, into the central retinal artery, which goes down the optic nerve into the eye.

magnetic marking: A means of characterizing cells, magnetic marking involves attaching microscopic magnetic particles to target proteins.
on the cell surface, using antibodies developed against the target proteins. Once tagged with the magnetic particles, the marked cells can be removed from a suspension of cells by using a magnet.

magnetic resonance imaging (MRI): the use of magnetic resonance with atoms in body tissues to produce distinct cross-sectional, and even three-dimensional images of internal organs.

magnetic resonance: Absorption of specific frequencies of radio and microwave radiation by atoms placed in a strong magnetic field.

major histocompatibility complex (MHC): A large set of cell surface antigens encoded by a family of genes. Foreign MHC markers trigger T-cell responses that may lead to the rejection of transplanted tissues and organs.

major histocompatibility complex: A group of genes that control several aspects of the immune response. They code for markers located on the surface of all body cells and are recognised by the body as 'self' (belonging to the body). These genes define a person's tissue type and are used to determine whether a transplant would be compatible.

malaise: A vague feeling of bodily discomfort.

malignancy: a growth or tumor composed of cancerous cells.

malignant: cancerous; tending to become progressively worse and to result in death; having the invasive and metastatic (spreading) properties of cancer.

malpighian tubule: A unique excretory organ of insects that empties into the digestive tract, removes nitrogenous wastes from the blood, and functions in osmoregulation.

mammalia: The vertebrate class of mammals, characterized by body hair and mammary glands that produce milk to nourish the young.

mammalian: The group of vertebrates that have internal development of the embryo; mammary glands that can produce milk; live-born young with a body covering of hair or fur; a four-chambered heart; a well-developed cerebral cortex; the ability to maintain a constant body temperature; a permanent set of teeth.

mammography: Mammography is a procedure that involves taking x-rays of the breasts to detect breast cysts or tumors, especially those that cannot be felt (palpable) by the fingers during a physical examination. A mammogram is the photographic result. The procedure does not prevent breast cancer; it is used to detect cancer early when it is more likely to be successfully treated.
matter: Anything that takes up space and has mass.
mature: Usually referred to the differentiated cells of hematopoietic lineages.
MCF-7: human breast cancer cell line.
meg (micrograms): A unit of mass equal to one thousandth (10^-6) of a milligram or one millionth (10^-9) of a gram.
mechanoreceptor: A sensory receptor that detects physical deformations in the body's environment associated with pressure, touch, stretch, motion, and sound.
media: A liquid or gel designed to encourage the growth of cells in a culture. The media can contain different nutrients, enzymes or stimulants, depending on what it is designed to do.
mediastinum: The space in the chest between the pleural sacs of the lungs that contains all the viscera of the chest except the lungs and pleurae; also: this space with its contents.
medical oncologist: A physician primarily trained in the use of medicines (rather than surgery) to treat cancer.
medical treatment: Treatment from a trained medical practitioner for a disease or condition.
medulla oblongata: The lowest part of the vertebrate brain; a swelling of the hindbrain dorsal to the anterior spinal cord that controls autonomic, homeostatic functions, including breathing, heart and blood vessel activity, swallowing, digestion, and vomiting.
medulla: The inner, as opposed to the outer, part of an organ, as in the adrenal gland.
medusa: The floating, flattened, mouth-down version of the cnidarian body plan. The alternate form is the polyp.
megakaryocyte: Very large bone marrow cells which release mature blood platelets.
megapascal (MPa): A unit of pressure equivalent to 10 atmospheres of pressure.
megaspore: In plants, a haploid (n) spore that develops into a female gametophyte.
meiosis: Meiosis is process of cellular division that reduces the number of chromosomes in a cell by half. This process always results in the formation of gametes (sperm and eggs) in animals. Meioses results in four haploid cells because the genome of the diploid germ cell undergoes DNA replication, which is followed by TWO round of cell division.
meiotic prophase: Part of the process of cell division. Chromosomes line up along the spindle in homologous pairs.
melanocyte: A cell that produces the dark pigment melanin; responsible for the pigmentation of skin and hair.
melanoma: A type of cancer that begins in the melanocytes (the skin cells that produce pigments). It can spread to other areas of the body if not detected and treated early.
Memelaton: A hormone produced by the pineal gland and a commonly available, sleep-inducing nutritional supplement that may be neuroprotective after spinal cord injury.
membrane potential: The charge difference between the cytoplasm and extracellular fluid in all cells, due to the differential distribution of ions. Membrane potential affects the activity of excitable cells and the transmembrane movement of all charged substances.
membrane: In biology, a boundary layer inside or around a living cell or tissue.
memory cell: A clone of long-lived lymphocytes, formed during the primary immune response, that remains in a lymph node until activated by exposure to the same antigen that triggered its formation. Activated memory cells mount the secondary immune response.
memory: The ability of antigen-specific T or B cells to "recall" prior exposure to an antigen and respond quickly without the need to be activated again by CD4 helper T cells.
Mendelian disorder (Also called single-gene disorder): A disease caused by a single gene that is inherited in a straightforward manner from parent or parents to child. Huntington’s disease and cystic fibrosis are examples. The term "Mendelian" refers to Gregor Mendel, an Austrian who did pioneering work on genes and traits in ordinary garden peas by showing that a single trait, such as color, can be determined by a single gene. Compared to “complex diseases,” Mendelian disorders are relatively rare.
Mendelian inheritance: A hereditary process where genetic traits are passed from parents to offspring and are explained in terms of chromosomes separating, independent assortment of genes and the homologous exchange of segments of DNA. There are three modes of Mendelian inheritance: autosomal dominant, autosomal recessive and X-linked inheritance. Named after Gregor Mendel, who first studied and recognised the existence of genes and this method of inheritance by breeding experiments with different varieties of peas.
Meninges: The three membranes that cover the spinal cord, including the dura (outside), arachnoid, and pia mater (inside).
Meningioma: Common benign brain tumours that arise from the pia-arachnoid cells of the meninges. Meningiomas tend to occur along the
superior sagittal sinus, along the sphenoid ridge or in the vicinity of the optic chiasm.

Meningitis: A bacterial infection of the membranes surrounding the brain.

Meniscus: The curved top surface of a column of liquid.

menstrual cycle: A type of reproductive cycle in higher female primates, in which the nonpregnant endometrium is shed as a bloody discharge through the cervix into the vagina.

Meridians: Under traditional Chinese medicine, meridians are channels for life-force energy called qi. Energy flow through these meridians can be balanced through the use of acupuncture.

meroblastic cleavage: A type of cleavage in which there is incomplete division of yolk-rich egg, characteristic of avian development.

mesenchymal stem cell: Also known as bone marrow stromal cells, mesenchymal stem cells are rare cells, mainly found in the bone marrow, that can give rise to a large number of tissue types such as bone, cartilage (the lining of joints), fat tissue, and connective tissue (tissue that is in between organs and structures in the body).

mesencephalic tissue: Tissue from the mid-brain or mesencephalon.

mesenchymal (marrow stromal) stem cell (MSC): Cells from the immature embryonic connective tissue. A number of cell types come from mesenchymal stem cells, including cartilage, bone, muscle and adipose tissue. MSCs have the capability for renewal and differentiation into various lineages of mesenchymal tissues. Mesenchymal stem cells are considered to be multipotent.

mesenchymal cells: Stem cells which develop into connective tissue.

mesenchymal stem cell: A type of adult stem cell found in bone marrow that gives rise to a number of different kinds of cells (eg, bone cells and fat cells). They are also known as bone marrow stromal cells.

mesenchymal: Mesenchymal cells are also known as multipotent mesenchymal stromal cells. MSC are able to renew and differentiate into body fat, bone, and cartilage tissue.

mesentery: The membranes, or one of the membranes (consisting of a fold of the peritoneum and inclosed tissues), which connect the intestines and their appendages with the dorsal wall of the abdominal cavity. The mesentery proper is connected with the jejunum and ilium, the other mesenteries being called mesocolon, mesocolon, mesorectum, etc.

mesangioblast: This is a mesenchymal-like cell, associated with the walls of the large vessels. Mesoangioblasts exhibit many similarities to pericytes found in the small vessels. Mesoangioblasts are relatively undifferentiated cells with the potential to progress down the endothelial or mesodermal lineages.

mesoderm: The middle layer of cells produced from the inner cell mass of the blastocyst. The cells give rise to muscle, bone, connective tissue, kidneys, and other structures.

mesodermal layer: Here the stem cells have differentiated to become the primitive cells that will ultimately differentiate further into muscle, bone, connective tissues and the cardiovascular system.

mesokaryotic: Nuclear condition unique to the dinoflagellates in which the chromosomes remain permanently condensed.

mesophyll: The ground tissue of a leaf, sandwiched between the upper and lower epidermis and specialized for photosynthesis.

mesothelioma: Mesothelioma is a rare form of cancer that invades mesothelial cells, which are specialized cells that make up the membranes lining the chest and abdominal cavity. Mesothelial, or the tissue formed by mesothelial cells, helps protect the organs by producing a lubricating fluid that allows the organs to move without irritating nerves.

messenger RNA (mRNA): Messenger RNA is transcribed from the DNA by RNA polymerase. mRNA carries the genetic information required for protein synthesis. mRNA attaches to ribosomes, where it becomes the template for protein translation. The genetic information in mRNA is organized into codons, each consisting of three nucleotide sequences (e.g. AUG, GGA). Each codon corresponds to a single amino acid. During translation, the mRNA is read in the 5' to 3' direction and the appropriate amino acid is attached to form the polypeptide chain.

metabolic: Relating to metabolism, a term used to describe the chemical and physical changes that occur in the body when molecules are either broken down or built up in cells and tissues.

metabolism: The totality of an organism's chemical processes, consisting of catabolic and anabolic pathways.

metabolite: a substance necessary for or taking part in a particular metabolic (chemical) process in the body.

metachromatic leukodystrophy: A heritable metabolic disorder, usually of infancy,
characterized by myelin loss and other abnormalities of the white matter of the nervous system, leading to progressive paralysis and mental retardation or dementia.

metamorphosis: The resurgence of development in an animal larva that transforms it into a sexually mature adult.

metanephridium (pl. metanephridia): In annelid worms, a type of excretory tubule with internal openings called nephrostomes that collect body fluids and external openings called nephridiopores.

metaphase: Phase of mitosis, or cell division, when the chromosomes align along the center of the cell. Because metaphase chromosomes are highly condensed, scientists use these chromosomes for gene mapping and identifying chromosomal aberrations.

metapopulation: A subdivided population of a single species.

metastasis (plural metastases): A secondary tumor formed as a result of a cancer cell or cells from the primary tumor site (e.g., the prostate) traveling through the body to a new site and then growing.

metastasize: Spread of a malignant tumor to other parts of the body.

metastatic work up: A group of tests, including physical examination, bone scans, X-rays, other imaging studies and blood tests to ascertain whether cancer has metastasized.

metastatic: Having the characteristics of a secondary tumor formed as a result of a cancer cell or cells from the primary tumor site (e.g., the prostate) traveling through the body to a new site and then growing there.

Metastron®: The brand or trade name of strontium-89, a radioactive isotope used in the treatment of bone pain from metastatic prostate cancer.

mg (milligram): a unit of mass equal to one thousandth \( (10^{-3}) \) of a gram.

MHC-Class I: Major Histocompatibility Complex, Class I: Expressed on all cells.

MHC-Class II: Major Histocompatibility Complex, Class II: Expressed on bone marrow Lymphohematopoietic stem cells, antigen presenting cells, mesenchymal stem cells, activated T-cells

microbe: A microscopic organism.

microchimerism: A state in an embryo, fetus, animal or person in which a small number of cells occur that have a different genome. Arises naturally because cells (rarely, stem cells) can cross between a mother and her fetus, or experimentally by introducing foreign stem cells into an embryo, usually at the stage of blastocyst, when the introduced cells become part of the inner cell mass.

microenvironment: The molecules and compounds such as nutrients and growth factors in the fluid surrounding a cell in an organism or in the laboratory, which play an important role in determining the characteristics of the cell.

microevolution: A change in the gene pool of a population over a succession of generations.

microfilament: A solid rod of actin protein in the cytoplasm of almost all eukaryotic cells, making up part of the cytoskeleton and acting alone or with myosin to cause cell contraction.

micromets, micrometastatic cells: Microscopic cancer cells in other parts of the body that are similar to those of the original tumor.

micronutrient: An inorganic nutrient required in only minute amounts for plant growth, such as iron, chlorine, copper, manganese, zinc, molybdenum, and boron.

Microorganisms: Organisms that can be seen only with the aid of a microscope. They are also known as microbes.

microRNAs: Small molecules found in plants and animals that may regulate the activity of genes.

microspore: In plants, a haploid (n) spore that develops into a male gametophyte; in seed plants, it becomes a pollen grain.

microtubule organizing center (MTOC): MTOCs are bundles of protein tubes which may be found at the base of a eukaryotic flagellum. In animals, they also function in creating the arrays of microtubules that pull the chromosomes apart during mitosis.

microtubule: An elongated, hollow tubular structure present in the cell. Microtubules help certain cells maintain their rigidity, convert chemical energy into work, and provide a means of transportation of substances in different directions within a cell.

microvessel density: An objective measure of angiogenesis (blood vessel formation).

microvilli: Thin fingerlike protrusions from the surface of a cell, often used to increase absorptive capacity or to trap food particles. The “collar” of choanoflagellates is actually composed of closely spaced microvilli.

microvillus (pl. microvilli): One of many fine, fingerlike projections of the epithelial cells in the lumen of the small intestine that increase its surface area.

middle lamella: A thin layer of adhesive extracellular material, primarily pectins, found between the primary walls of adjacent young plant cells.
midgland: The section between the apex and base of the prostate.
migration: Move from one site to the other, in the absence of a known chemoattractant.
mimicry: A phenomenon in which one species benefits by a superficial resemblance to an unrelated species. A predator or species of prey may gain a significant advantage through mimicry.
mineral: In nutrition, one of many chemical elements, other than carbon, hydrogen, oxygen, and nitrogen, that an organism requires for proper body functioning.
mineralocorticoid: A corticosteroid hormone secreted by the adrenal cortex that regulates salt and water homeostasis.
minimal genome: The smallest number of genes an organism needs to stay alive in a particular environment. A goal of research on the minimal genome is to design synthetic microorganisms that can perform useful tasks such as generating biological forms of energy.
minimum dynamic area: The amount of suitable habitat needed to sustain a viable population.
minimum viable population size (MVP): The smallest number of individuals needed to perpetuate a population.
missense mutation: A missense mutation is a genetic change involving the substitution of one base in the DNA for another which results in the substitution of one amino acid in a polypeptide for another. A missense mutation is a “readable” genetic message although its “sense” (its meaning) is changed. This is in contrast to a nonsense mutation which has no meaning except to halt the reading of the genetic message.
missstaging: The assignment of an incorrect clinical stage at initial diagnosis because of the difficulty of assessing the available information with accuracy.
mitochondria: A spherical or elongated organ in the cytoplasm of nearly all eukaryotic cells, containing genetic material and many enzymes important for cell metabolism, including those responsible for the conversion of food to usable energy.
mitochondrial DNA: Genetic material inside the mitochondria. Essentially all the mitochondria of an individual come from the cytoplasm of the egg, so all mitochondrial DNA is inherited through the maternal line.
mitochondrial matrix: The compartment of the mitochondrion enclosed by the inner membrane and containing enzymes and substrates for the Krebs cycle.
mitochondrial proteins: Proteins that are part of the mitochondria.
mitochondrion: Complex organelle found in most eukaryotes; believed to be descended from free-living bacteria that established a symbiotic relationship with a primitive eukaryote. Mitochondria are the site of most of the energy production in most eukaryotes; they require oxygen to function.
mitosis: Cell division following duplication of the genome and resulting in two daughter cells with an even segregation of the genetic material. Mitosis allows a population of cells to increase or, in the case of cell death, maintain their number.
mitoxantrone (Novantrone®): A drug used to treat advanced prostate cancer that does not respond to hormones. It is also being studied in the treatment of other cancers. It belongs to the family of drugs called antitumor antibiotics.
mixed lymphocyte culture (MLC): A test that shows if the patient's and donor's cells react to each other.
MNC (Mononuclear Nucleated Cell): A purified subset of the TNC; stem cells are contained in the mononuclear fraction.
mobilization: Moving more stem cells from the bone marrow into the blood stream through chemotherapy and/or a growth factor.
modality: A therapeutic method or agent, such as surgery, chemotherapy, or electrotherapy, that involves the physical treatment of a disorder.
model organism (Also called Animal Model): A creature, like the mouse or the fruit fly, used in the laboratory to study biology. Many genes in humans are found in other species, and biologists study model organisms to learn about how these genes might operate in the human body.
modern synthesis: A comprehensive theory of evolution emphasizing natural selection, gradualism, and populations as the fundamental units of evolutionary change; also called neo-Darwinism.
modified citrus pectin (MCP): A substance that is able to interfere with PC growth by preventing cell-cell interaction and adhesiveness by binding to a carbohydrate substance called galectin-3 found on the surface of tumor cells.
molarity: A common measure of solute concentration, referring to the number of moles of solute in 1 L of solution.
mold: A rapidly growing, asexually reproducing fungus.
mole: The number of grams of a substance that equals its molecular weight in daltons and contains Avogadro’s number of molecules.
molecular biology: The branch of biology focused on the formation, structure, and function of DNA, RNA and proteins, and their roles in the transmission of genetic information.

molecular formula: A type of molecular notation indicating only the quantity of the constituent atoms.

molecular HLA typing: At the level of a molecule. Molecular HLA typing is the same as DNA typing. Molecular typing is done at the smallest level of the cells.

molecular pathway: A series of interactions between genes, proteins, and other biological factors that leads to a biological effect, such as the differentiation of one cell type to another, the division of a cell, the production of antibodies, cell homing, the formation of tissue and body patterns during development, the secretion of factors such as insulin, etc.

molecular weight: The sum of the atomic weights of the constituent atoms in a molecule.

mole: The smallest unit of matter of a substance that retains all the physical and chemical properties of that substance, consisting of a single atom or a group of atoms bonded together; e.g., Ne, H2, H2O.

molting: A process in arthropods in which the exoskeleton is shed at intervals to allow growth by the secretion of a larger exoskeleton.

monoclonal antibody (MoAb): An exceptionally pure and specific antibody derived from hybridoma cells. Because each of the clones is derived from a single B cell, all of the antibody molecules it makes are identical.

monoclonal protein: Abnormal proteins found in the blood or urine of MM patients and seen as the "M" spike or peak on electrophoresis. It is measured for diagnosis and monitoring treatment.

monoclonal: Formed from a single group of identical cells

monocot: A subdivision of flowering plants whose members possess one embryonic seed leaf, or cotyledon.

monocotyledon: A member of the class of flowering plants having one seed leaf, or cotyledon, among other distinguishing features; often abbreviated as monocot.

monoculture: Cultivation of large land areas with a single plant variety.

monocyte: Largest of the white blood cells which migrates into the connective tissue where it differentiates into a macrophage.

monoeious: Referring to a plant species that has both staminate and carpellate flowers on the same individual.

monohybrid cross: A breeding experiment that uses parental varieties differing in a single character.

monohybrid: A hybrid individual that is heterozygous for one gene or a single character.

monomer: The subunit that serves as the building block of a polymer.

mononuclear fraction: The fraction of bone marrow or umbilical cord blood, obtained by centrifugation, that contains mesenchymal stem cells. MSCs adhere to plastic allowing them to be separated from other cell types in the mononuclear fraction.

mononuclear: Having only one nucleus; used in reference to blood cells. Stem cells are found in the mononuclear cell population of the WBC.

mononucleocyte: A cell containing a single nucleus. Generally refers to a white blood cell.

monophyletic: Pertaining to a taxon derived from a single ancestral species that gave rise to no species in any other taxa.

monopotent: A bone marrow progenitor that has matured but is committed towards one lineage.

monosaccharide: The simplest carbohydrate, active alone or serving as a monomer for disaccharides and polysaccharides. Also known as simple sugars, the molecular formulas of monosaccharides are generally some multiple of CH₂O.

monosomy: The presence of only one chromosome of a pair.

monotherapy: A treatment that uses one major drug or one major modality of treatment; androgen deprivation therapy using only an LHRH agonist is an example of monotherapy.

monotrema: An egg-laying mammal, represented by the platypus and echidna.

mono-unsaturated: Molecules, such as fats, with only one double bond in their chemical structure. Some plant oils and margarines, avocados, olives, nuts and seeds contain mostly mono-unsaturated fats.

mood-incongruent delusions: A sensory experience in which a person can see, hear, smell, taste, or feel something that isn’t there.

moral standing: To say that a group of organisms has moral standing is to say that their wellbeing must be given some consideration. It does not decide the question of whether they have the same moral standing as people (and thus have 'human' rights).

morbidity: A diseased condition or state, the incidence of a disease or of all diseases in a population.

morphogen: A substance, such as bicoid protein, that provides positional information in the form
of a concentration gradient along an embryonic axis.

morphogenesis: The development of body shape and organization during ontogeny.

morphogenetic field: The electromagnetic field surrounding and interpenetrating the body, which carries the blueprint that cells follow to create the body. More specific than DNA, the morphogenetic field interacts with cellular DNA to stimulate the creation of body structures. It appears that ORMUS increases stem cell ability to repair body structures and follow the morphogenetic field.

morphological species concept: The idea that species are defined by measurable anatomical criteria.

morphological: Pertaining to form and structure, at any level of organization.

morphology, morphologic: A branch of biology that deals with the form and structure of animals and plants

morphometry, morphometric: the quantitative measurement of the form and distribution of parts, especially in living systems

morphospecies: A species defined by its anatomical features.

mortality rate: Death rate.

mortality: (1) The quality of being subject to death; (2) the number of deaths in a given time or place or the proportion of deaths to population

morula: A solid mass of 12 or more cells that resembles a mulberry, occurring at 3 to 4 days after fertilization and that results from the cleavage of the zygote.

mosaic development: A pattern of development, such as that of a mollusk, in which the early blastomeres each give rise to a specific part of the embryo. In some animals, the fate of the blastomeres is established in the zygote.

mosaic evolution: The evolution of different features of an organism at different rates.

motility: The ability to move spontaneously

motor evoked potentials: Electrophysiological response recorded from muscles following direct electromagnetic stimulation of brain.

motor neuron: A nerve cell that transmits signals from the brain or spinal cord to muscles or glands.

motor unit: A single motor neuron and all the muscle fibers it controls.

motor: Any of various power units that develop energy or impart motion.

mouse embryonic fibroblast (MEF): Mouse embryonic fibroblast cells are used as feeder cells when culturing pluripotent stem cells.

mouse model: A laboratory mouse is useful for medical research because it has specific characteristics that resemble a human disease or disorder. Strains of mice having natural mutations similar to human ones may serve as models of such conditions. Scientists can also create mouse models by transferring new genes into mice or by inactivating certain existing genes in them.

MPC or MAPC: Multiple progenitor or multiple adult progenitor: These are terminologies used by Dr. C. Verfaillie (Univ. of Minnesota) to describe her stem cell that others referred as mesenchymal stem cell.

MPF (M-phase promoting factor): A protein complex required for a cell to progress from late interphase to mitosis; the active form consists of cyclin and cdc2, a protein kinase.


MRI (magnetic resonance imaging): Medical imaging that allows a noninvasive view of the internal organs, including bone marrow. Sometimes used to aid in the monitoring of LSDs.

MRI/MRSI: The integration of magnetic resonance imaging with magnetic resonance spectroscopic imaging.

MRI: A diagnostic procedure that uses a magnetic field to provide three-dimensional images of internal body structures.

MRI: A standard abbreviation for Magnetic Resonance Imaging.

MRI: Magnetic resonance imaging; a medical imaging technique that uses strong magnet fields and high-frequency radio waves to form very clear pictures of the inside of the body that can be viewed in any direction.

mucin: The main part of mucus that protects body surfaces from rubbing or wearing down.

mucosa (pl. mucosae): A moist tissue layer that lines hollow organs (stomach, etc.) and body cavities.

mucosa: superficial lining cells involving body cavities like the mouth, rectum, bladder; a membrane lining all body passages that communicate with the air, such as the respiratory and alimentary tracts, and having cells and associated glands that secrete mucus.

mucosal linings: Inner lining of the mouth, nasal passages, etc.

mucostitis: The inflammation of the mucous membranes lining the digestive tract including the mouth, the windpipe, the stomach and the anus.

Müllerian mimicry: A mutual mimicry by two unpalatable species.

multicellular: Any organism which is composed of many cells is termed multicellular.
2425 multi-drug resistance gene (MDR gen): A gene that cells utilize to pump substances such as chemotherapy out of the cell across the cell membrane. The increase in the MDR gene is felt to be a tumor mechanism to overcome the effect of chemotherapy. Nizoral® and tamoxifen decrease MDR activity.
2426 multifocal, multifocality: Arising from or pertaining to many locations.
2427 multigene family: A collection of genes with similar or identical sequences, presumably of common origin.
2428 multileaf collimator (MLC): A type of collimator that can define irregularly shaped radiation fields. An MLC has two rows of narrow metal blocks (leaves) that can be independently driven in or out of the radiation beam from opposite sides under computer control.
2429 multileaf intensity modulating collimator (MIMIC): A multileaf collimator designed specifically for intensity modulated radiotherapy. The MIMIC treats two slices, each 1 or 2 cm thick with a fan beam of radiation, when the linear accelerator gantry rotates through an arc around the patient. The patient couch is moved to treat adjacent slices if the target is too large to treat with a single arc.
2430 multiple myeloma: Blood cancer caused by the proliferation and spread of abnormal plasma cells in the bone marrow, causing bone destruction at many sites (hence “multiple” myeloma).
2431 multiple sclerosis: A disease of the central nervous system (CNS), wherein the nerve fibers lose the “insulation” or myelin sheath surrounding them, causing diminished transmission of nerve impulses, and diminished function of the brain and spinal cord. This degenerative process seems to be caused by the immune system attacking the nerve tissue, and may be related to hidden or latent infections with viruses such as measles, poliomyelitis, and human herpesvirus type 6. Transplantation of umbilical cord blood stem cells has regulated the immune system attack on the CNS, and neuronal stem cells have repaired much of the damage, giving increased function to MS patients.
2432 multiplicity of infection (MOI): Represents the average number of viral particles per single cell. The MOI is calculated by dividing the total number of transducing unites by the number of cells plated.
2433 multipotent stem cells: Bone marrow stem cells always retain the capacity and information necessary to become any one of four types of bone marrow cells. Red blood cells (erythrocytes) that carry oxygen, white blood cells of two types. They are B-lymphocytes, some of which transform into plasma cells and produce antibodies and some of which remain B-lymphocytes to fight viral infections and inflammation. They are also T-lymphocytes which go to the thymus gland in the chest where they are processed to become either “helper” T-cells.
2434 multipotent adult progenitor cells (MAPC): Cells isolated from bone marrow that can be differentiated into cells with characteristics of cartilage, fat, and bone.
2435 multipotent stem cells: Stem cells whose progeny are of multiple differentiated cell types, but all within a particular tissue, organ, or physiological system. For example, blood-forming (hematopoietic) stem cells (HSC) are single multipotent cells that can produce progeny that include HSC, blood cell-restricted oligopotent progenitors, and all cell types and elements (e.g., platelets) that are normal components of the blood.
2436 multipotent: A multipotent cell is not a stem cell but is close to a stem cell with regards to cell maturation. Thus, a multipotent cell has less potential to survive for a long period as compared to a pluripotent stem cell. These types of cells are considered as ‘cell in transition’.
2437 murine: From or pertaining to mice
2438 muscle biopsy: A muscle biopsy is a minor surgical procedure done under general or local anesthetic, using a needle or a small incision to remove a small sample of muscle. The procedure may be done to confirm a clinical diagnosis, distinguish between nerve and muscle disorders, identify a metabolic defect of muscle, diagnose diseases of connective tissue and blood vessels, detect muscle inflammation, or rule out muscle disease. Afterwards, there may be minor discomfort and bruising at the biopsy site which usually takes a week to heal fully.
2439 muscle fiber: Muscle cell; a long, cylindrical, multinucleated cell containing numerous myofibrils, which is capable of contraction when stimulated.
2440 muscle: Muscle is the tissue of the body which primarily functions as a source of power. There are three types of muscle in the body. Muscle which is responsible for moving extremities and external areas of the body is called "skeletal muscle." Heart muscle is called "cardiac muscle." Muscle that is in the walls of arteries and bowel is called "smooth muscle."
2441 Muscular Dystrophy Association (MDA): The MDA is a national voluntary health agency working to defeat neuromuscular diseases
through worldwide research, comprehensive services, and public health education. The MDA is dedicated to conquering more than 40 neuromuscular diseases.

Muscular Dystrophy Coordinating Committee (MDCC): Plan devised in August 2005, by recognized experts in all the muscular dystrophies. The Action Plan serves as a roadmap to identify and prioritize high yield research objectives for the scientific community and all organizations targeting the muscular dystrophies. The Action Plan specifically addresses the following areas: disease mechanisms, diagnosis and screening, therapy, living with muscular dystrophy and research infrastructure. Cure CMD mission and goals are closely aligned with the MDCC Action Plan and seek to build the infrastructure to support these goals. These goals are: identification of therapeutic targets; support for basic science research; support to translate basic science research into therapeutic targets; support to test therapeutic targets in animal models graduating to clinical trial format where applicable; support for registry development and establishment of biorepository and longitudinal data base.

muscularis propria: The muscular wall typically made up of two layers of smooth muscle, an inner circular layer and an outer longitudinal layer.

mutagen: A chemical or physical agent that interacts with DNA and causes a mutation.

mutagenicity: The creation of mutations.

mutagenicity: Tendency to promote mutations, that is, genetic alterations.

mutant: An organism carrying a gene that has undergone a mutation.

mutate: Change form.

mutation: A change in the genetic code, either brought about spontaneously, though chemicals or radiation or inherited. Point mutations refer to changes in a single nucleotide, such as the insertion of an adenine for a guanine. Point mutations can either be silent (meaning they do not cause a change in the triplet/codon resulting in no net change in amino acid insertion), nonsense (a nucleotide change that results in a stop codon, thus a shortened or truncated often nonfunctional protein) and a missense mutation (a nucleotide change that results in a substitution for a different amino acid, leading to a structurally missshapen but possibly still somewhat functional protein). Other mutations result from insertions or deletions during replication or transcription.

mutualism: A symbiotic relationship in which both the host and the symbiont benefit.

myalgia: Muscle aches, pain or tenderness.

Myc (c-Myc): An oncogene that codes for a protein that binds to the DNA of other genes. When c-Myc is mutated, or overexpressed, the protein doesn't bind correctly, and often causes cancer.

mycelium: The densely branched network of hyphae in a fungus.

mycoplasma: A general category of microorganisms that shares some characteristics of bacteria.

mycorrhizae: Mutualistic associations of plant roots and fungi.

mycosis fungoides: A type of non-Hodgkin's lymphoma that first appears on the skin. Also called cutaneous T-cell lymphoma.

myelin basic protein (MBP): A structural protein within the myelin sheath surrounding neurons.

myelin sheath: Insulating layer of specialized cell membrane wrapped around vertebrate axons. This sheath is produced by oligodendrocytes in the central nervous system and by Schwann cells in the peripheral nervous system.

myelin: Is the white matter coating our nerves, enabling them to conduct impulses between the brain and other parts of the body. It consists of a layer of proteins packed between two layers of lipids. Myelin is produced by specialized cells: oligodendrocytes in the central nervous system, and Schwann cells in the peripheral nervous system. Myelin sheaths wrap themselves around axons, the threadlike extensions of neurons that make up nerve fibers. Each oligodendrocyte can myelinate several axons. Oligodendrocytes produce the myelin sheath, which wraps in layers around axons. Myelin is produced by specialized cells: oligodendrocytes in the central nervous system, and Schwann cells in the peripheral nervous system. Myelin sheaths wrap themselves around axons, the threadlike extensions of neurons that make up nerve fibers. Each oligodendrocyte can myelinate several axons.

myelodysplasia: Myelodysplasia is a diagnosis that includes several subcategories with very different findings and different prognoses.

myelodysplastic syndrome or disorder: Formerly called pre-leukemia or 'smoldering' leukemia. It is a disease of the bone marrow in which too few platelets, red blood cells and white blood cells are made.

myelofibrosis: A disease that causes scar tissue to form in the bone marrow. As a result of the scar tissue, normal blood cell production is blocked. Normal blood cell production then moves to the spleen which then becomes enlarged. Anemia results because blood production in the spleen does not work as well as in the bone marrow.
myelography: A form of x-ray examination of the spinal cord using an injected dye for contrast.

myeloid precursor cell: Myeloid-committed stem cells in the spleen which replenish mature myeloid lineage (tissue within the bone marrow that produces blood cells). These are basically precursor blood cells.

myeloid stem cells: Precursors to the other lines of blood cells: erythrocytes, granulocytes, monocytes, and platelets. The second-generation cells are still pluripotent but their developmental potency is limited because neither can form an offsprings of the other type.

myeloid: A collective term for the non-lymphocyte groups of white blood cells. It includes cells from the granulocyte, monocyte, and platelet lineages.

myelomeningocele: A neural tube birth defect in which some of the spinal cord protrudes through the vertebral column.

myelopoiesis: Lineages distinct from the lymphoid lineages.

myeloproliferative disorder: A group of disorders caused by increased production of blood cells by the bone marrow. The four types of Myeloproliferative Disorders are: Polycythemia Vera: too many red blood cells; Chronic Myelomonocytic Leukemia: too many white blood cells; Primary Thrombocytosis: too many platelets; Myelofibrosis: a disease that causes scar tissue to form in the bone marrow.

myelotomy: Surgical incision of the spinal cord.

Myf-5: Myogenic regulatory factor molecule.

myoblast: This is a kind of stem cell found in muscle. When they fuse together they can form skeletal muscle fibers, which helps us move.

myocardial infarction: Commonly called heart attack. Myocardial infarction results in a disruption of blood supply to the cells in the affected area of the heart.

myocardiocytes: Heart muscle cells (cardiac myocytes).

myocardium: Muscle tissue of the heart made up of involuntary muscle cells.

myocyte: The functional cell type of muscles.

MyoD1: A group of four basic myogenic regulatory factors (helix-loop-helix transcription) and a newly discovered factor called muscle enhancer factor-2 which appears to work away from the other three factors. However, all four of the factors in this MyoD family have the capacity of converting nonmuscle cells into cells expressing the full range of muscle proteins.

myofibril: A fibril collectively arranged in longitudinal bundles in muscle cells (fibers); composed of thin filaments of actin and a regulatory protein and thick filaments of myosin.

myogenic: Originating in or able to form in muscle cells.

myoglobin: An oxygen-storing, pigmented protein in muscle cells.

myometrium: Uterine smooth muscle.

myosin light chain: There are four light chain subunits containing complex molecules that form contractile units in skeletal muscle.

myosin: A type of protein filament that interacts with actin filaments to cause cell contraction.

myxoma: A virus that causes myxomatosis in rabbits. It is carried by mosquitoes and fleas.

myxomatosis: A disease of rabbits caused by the myxoma virus. It is an early form of biological control.

N0, N1, Nx: notation of lymph nodes metastasis.

N-acetyl-lactic acid (NAA): Aspartoacylase breaks down NAA into aspartic acid (an amino acid used in making proteins) and acetic acid. The cycle of production and breakdown of NAA appears to be critical for maintaining the brain’s white matter, which consists of nerve fibers covered by myelin. NAA is likely essential for making certain fats (lipids) that are used to produce myelin.

NAD+ (nicotinamide adenine dinucleotide): Abbreviation of nicotinamide adenine dinucleotide, a coenzyme present in all cells that helps enzymes transfer electrons during the redox reactions of metabolism.

nadir: The lowest point.

NADP: Abbreviation of nicotinamide adenine dinucleotide phosphate, a coenzyme that functions as an electron acceptor in the light-dependent reactions of photosynthesis.

nanoengineering: The practice of engineering in the field of nanotechnology, or the control of matter on the molecular level in scales smaller than one billionth of a meter.

nanog: A transcription factor critically involved with self-renewal of undifferentiated embryonic stem cells.

nano-gel: A nano-engineered material containing molecules programmed to come together into nano-structures. When exposed to living tissues, it triggers the self-assembly of the molecules and is transformed into a gel. When the gel is injected, it then self-assembles into a scaffold that will allow axons to grow down the spinal cord.

nanometer: A unit of measure; one millionth (10-9) of a meter.

nanotechnology: The control of matter on an atomic and molecular scale.

National Institutes of Health (NIH): An agency of the Department of Human and Health Serves, its
mission is the pursuit of knowledge about nature and behavior of living systems. It provides leadership and direction to programs designed to improve health by conducting and supporting research: in the causes, diagnosis, prevention, and cure of human diseases; in the processes of human growth and development; in the biological effects of environmental contaminants; in the understanding of mental, addictive and physical disorders; in directing programs for the collection, dissemination, and exchange of information in medicine and health, including the development and support of medical libraries and the training of medical librarians and other health information specialists.

2497 native: Organisms that have not been recently introduced into an ecosystem.

2498 natural killer cell: A cell type of the immune system that destroys tumor cells and cells infected with some types of organisms.

2499 natural killer cells: Natural killer cells are large lymphocytes. They are the first line of defense against viruses and other invaders because they do not need to wait for an antibody response to identify foreign cells and invaders.

2500 natural logarithm: The logarithm (log) to base e where \( e \approx 2.718 \). The natural logarithm is represented by the symbol \( \ln \).

2501 natural selection: Differential success in the reproduction of different phenotypes resulting from the interaction of organisms with their environment. Evolution occurs when natural selection causes changes in relative frequencies of alleles in the gene pool.

2502 naturopathy: Treatment of disease using natural agents and physical manipulation; avoids drugs and surgery.

2503 nausea: An unpleasant sensation in the stomach usually accompanied by the urge to vomit. Common causes are early pregnancy, sea and motion sickness, emotional stress, intense pain, food poisoning, and various stomach infections.

2504 necrosis (adj. necrotic): Death of cells or tissues through injury or disease.

2505 necrosis: The sum of the morphological changes indicative of cell death and caused by the progressive degradative action of enzymes, it may affect groups of cells or part of a structure or an organ.

2506 nectar: A sugary fluid that attracts insects to plants.

2507 needle biopsy: Needle biopsy is a procedure using a needle to take a sample of tissue or fluid. The procedure is also called fine needle aspiration.

2508 negative feedback: A primary mechanism of homeostasis, whereby a change in a physiological variable that is being monitored triggers a response that counteracts the initial fluctuation.

2509 negative predictive value: Refers to the chance that a negative test result will be correct.

2510 negative: The term used to describe a test result which does not show the presence of the substance or material for which the test was carried out; for example, a negative bone scan would show no sign of bone metastases.

2511 nematocyst: A threadlike stinger, containing a poisonous or paralyzing substance, found in the cnidocyte of cnidarians.

2512 neoadjuvant hormone blockade (NHB): Use of ADT prior to other therapies such as radiation therapy, surgery or possibly chemotherapy to reduce tumor volume and/or prostate gland volume with the goal to allow these other therapies to work better; also called NHT (Neoadjuvant Hormone Therapy)


2514 neoplasm: Also called tumor. Any new and abnormal growth; specifically a new growth of tissue in which the growth is uncontrolled and progressive. Malignant neoplasms are distinguished from benign in that the former show a greater degree of anaplasia and have the properties of invasion and metastasis.

2515 neoplastic: Having the characteristic of a potentially malignant growth.

2516 nephridium (pl. nephridia): A tubular excretory structure found in many invertebrates.

2517 nephron: The nephron is the functional unit of the kidney that is responsible for the actual purification and filtration of the blood. About one million nephrons are in the cortex of each kidney, and each one consists of a renal corpuscle and a renal tubule which carry out the functions of the nephron.

2518 nephrostomy: Establishment of an opening for a catheter from the kidney to the exterior of the body.

2519 neritic zone: The shallow regions of the ocean overlying the continental shelves.

2520 nerve fiber: A filamentous process extending from the cell body of a neuron and conducting the nerve impulse; an axon.

2521 nerve impulse: A rapid, transient, self-propagating change in electric potential across the membrane of an axon.

2522 nerve radicles: Small nerve roots that are seen microscopically within specific tissue, like the prostate

2523 nerve sparing: Term used to describe a type of prostatectomy in which the surgeon saves the nerves that affect sexual and related functions.
nerve: A bundle of fibers that uses chemical and electrical signals to transmit sensory and motor information from one body part to another.

nervous system: All the nerve cells of an animal; the receptor-conductor-effector system; in humans, the nervous system consists of the central nervous system (brain and spinal cord) and the peripheral nervous system.

nestin: An intermediate filament protein found in cells such as neural and pancreatic precursors.

net primary production: In a community or an ecosystem, the increase in the amount of plant or algal material between the beginning and end of a specified time period, such as a growing season.

net primary productivity (NPP): The gross primary productivity minus the energy used by the producers for cellular respiration; represents the storage of chemical energy in an ecosystem available to consumers.

net productivity: In a trophic level, a community, or an ecosystem, the amount of energy (in calories) stored in chemical compounds or the increase in biomass (in grams or metric tons) in a particular period of time; it is the difference between gross productivity and the energy used by the organisms in respiration.

Neumega® (oprelvekin): A medication which helps the body produce more platelets in the blood.

neural crest: A band of cells that extend lengthwise along the neural tube of an embryo and give rise to cells that form the cranial, spinal, and autonomic ganglia, as well as becoming odontoblasts, which form the calcified part of the teeth.

neural groove: Dorsal, longitudinal groove that forms in a vertebrate embryo; bordered by two neural folds; preceded by the neural-plate stage and followed by the neural-tube stage.

neural plate: Thickened strip of ectoderm in early vertebrate embryos that forms along the dorsal side of the body and gives rise to the central nervous system.

neural stem cell (NSC): A stem cell found in adult neural tissue that can give rise to neurons and glial (supporting) cells. Neural stem cells are considered to be multipotent.

neural tube: Primitive, hollow, dorsal nervous system of the early vertebrate embryo; formed by fusion of neural folds around the neural groove.

neuronal: Related to the cells of the nervous system.

neurilemma: The plasma membrane surrounding a Schwann cell of a myelinated nerve fiber and separating layers of myelin.

neurite: Any process, including both dendrites and axons, growing out of a neuron. The term is often used when referring to immature or developing neurons, especially when grown in culture, where it is difficult to distinguish axons from dendrites.

neuroblastoma: A childhood tumor that arises in the adrenal gland or in tissue in the nervous system that is related to the adrenal gland.

neurodegenerative diseases: Diseases of the nervous system characterized by gradual and progressive loss of neural tissue resulting in increasing debility.

neurodegenerative diseases: Diseases of the nervous system characterised by gradual and progressive loss of neural tissue resulting in increasing debility. These are the diseases most commonly treated with stem cells.

neurodegenerative: Describes a process which degrades neurones (nerves) so they do not conduct messages optimally.

neuroectoderm: The central region of the early embryonic ectoderm, which later forms the brain and spinal cord, as well as evolving into nerve cells of the peripheral nervous system.

neuroendocrine: Descriptive of cells that release a hormone into the circulating blood in response to a neural stimulus. Such cells may comprise a peripheral endocrine gland (e.g., the insulin-secreting beta cells of the islets of Langerhans in the pancreas and the adrenaline-secreting chromaffin cells of the adrenal medulla); others are neurons in the brain (e.g., the neurons of the supraoptic nucleus that release antidiuretic hormone from their axon terminals in the posterior lobe of the hypophysis).

neuroendocrine: Pertaining to the relationships between the nervous and the endocrine systems.

neuroepithelium: A specialized epithelial structure that forms the termination of a nerve of a special sense, i.e., olfactory cells, hair cells of the inner ear, and the rods and cones of the retina. It is the embryonic layer of the epiblast that develops into the cerebrospinal axis.

neurofibromatosis: A disorder inherited as an autosomal dominant and characterized especially by brown spots on the skin, neurofibromas of peripheral nerves, and deformities of subcutaneous tissue and bone.

neurofilament (NF): A type of intermediate filament found in nerve cells.

neurogenesis: Is the process by which neurons are created.

neurogenic: Capable of generating neurons. Neuronal precursors or neuronal stem cells. Also means coming from or caused by the nervous system.
neuroglia: Supporting tissue intermingled with the essential elements of nervous tissue especially in the brain, spinal cord, and ganglia.

neurohormone: Any of a group of substances produced by specialized cells (neurosecretory cells) structurally typical of the nervous (rather than of the endocrine) system, but that serve as a link between the two systems.

neurologic: Of or relating to the central nervous system.

neurologist: A physician trained to specialize in diseases affecting the nervous system. These diseases include the muscular dystrophies, Lou Gehrigs (ALS), Parkinsons, dementia, stroke and neuropathies. For the first time, this year, the American Academy of Psychiatrists and Neurologists is offering special board certification in the muscle diseases. This is a voluntary certification and would probably indicate a special interest on the part of that physician to pursue further certification. Because the CMD’s are rare diseases, it is possible that your local neurologist will not have seen a child or adult with CMD before. Especially in the early stages of diagnosis, it is important to find a knowledgeable neurologist to guide testing and diagnosis. Contacting the MDA, can be a resource to find a neurologist with expertise in CMD.

neuromodulator: A chemical agent that is released by a neuron and diffuses through a local region of the central nervous system, acting on neurons within that region; generally has the effect of modulating the response to neurotransmitters.

neuromuscular disorder: A disorder involving the relationship between nerves and muscles, and especially the weakening or dysfunction of the muscles.

neuromuscular junction: The junction between an axon terminal of a motor neuron and a muscle fiber innervated by that motor neuron; the axon terminal of a motor neuron is typically branched, forming neuromuscular junctions with a number of different muscle fibers.

neuron: The functional cell type of the brain that is specialized in conducting impulses; the principal functional units of the nervous system. A neuron consists of a cell body and its processes—an axon and one or more dendrites. Neurons transmit information to other neurons or cells by releasing neurotransmitters at synapses.

neuronal stem cells: Stem cells that are precursors for brain or nerve cells. They may be harvested from fetal brains, or produced by differentiation of more primitive precursors. Neuronal stem cells often differentiate into a mixture of neurons, and glial cells and oligodendrocytes, the neuron’s support cells.

neuronal/neural stem cells: cells capable of becoming tissues of the brain and central nervous system.

neuronopathic: A word used to describe a disorder that affects the brain or nervous system. Many LSDs have both neuronopathic and non-neuronopathic types.

neurons: Nerve cells, the structural and functional unit of the nervous system. A neuron consists of a cell body and its processes, an axon, and one or more dendrites. Neurons function by the initiation and conduction of impulses and transmit impulses to other neurons or cells by releasing neurotransmitters at synapses.

neuropathy: Peripheral neuropathy is a condition of the nervous system that usually begins in the hands or feet with symptoms of numbness, tingling, burning and/or weakness.

neurosecretory cells: Hypothalamus cells that receive signals from other nerve cells, but instead of signaling to an adjacent nerve cell or muscle, they release hormones into the bloodstream.

neurosphere: A primitive neural tissue that arises when embryonic stem cells are grown in certain culture conditions.

neurotoxicity: Toxicity to nervous tissue (both brain and peripheral nerves).

neurotransmitter: A chemical that acts as messenger between cells in the brain and nervous system; it transmits impulses across the gap from a neuron to another neuron, a muscle, or a gland.

neurotrophic factors: Hormones which help growth of neurons, also called nerve growth factors.

neurovascular bundles: Two bundles of nerves between the prostate and the rectum that control erection

neurovascular: To both the neurologic and vascular systems or structures.

neutral variation: Genetic diversity that confers no apparent selective advantage.

neutron: A neutron is a subatomic particle found in the nucleus of every atom except that of simple hydrogen. The particle derives its name from the fact that it has no electrical charge; it is neutral.

neutrophil: An electrically neutral particle (a particle having no electrical charge), found in the atom.

neutropenia, neutropenic: A deficiency of neutrophils. A person is considered neutropenic when their white blood cell count drops below 1000.

neutropenia: A blood condition caused by a large decrease in a type of white blood cell called a
neutrophil. This decrease can occur when leukemia cells infiltrate and overcrowd the bone marrow, or during the high- dose chemotherapy regimen administered before a bone marrow transplant.

neutrophil: The most abundant type of white blood cells (70% of WBC population are neutrophils) and form an integral part of the immune system. Neutrophils deal with bacterial infection and are usually first responders to bacterial infection, their activity and death in large numbers forms pus. Neutrophil count is used as a measure of engraftment success in transplants.

niches: Places in the body where adult stem cells can be found. This microenvironment is a storage space for stem cells and will ultimately determine what the stem cell will become. The niche contains stimulants that either instruct the stem cell to self-maintain or turn into various cells of the organ where the niche is located.

NIH: National Institutes of Health is a part of the U.S. Department of Health and Human Services, and is the primary Federal agency for conducting and supporting medical research. NIH is composed of 27 Institutes and Centers, the NIH provides leadership and financial support to researchers in every state and throughout the world. There are 4 institutes that primarily follow quality of medical care and research funding for muscular dystrophies: NINDs, NIAMs, NICHD and NHLBI. Together with the department of defense, CDC, and advocacy groups, these institutes sit on MDCC and direct and implement goals and strategies to improve funding and patient care.

nilutamide (Nilandron®): A non-steroidal antiandrogen.

nitrification: The oxidation of ammonia or ammonium to nitrates and nitrates, as by nitrifying bacteria.

nitrogen cycle: Worldwide circulation and reutilization of nitrogen atoms, chiefly due to metabolic processes of living organisms; plants take up inorganic nitrogen and convert it into organic compounds (chiefly proteins), which are assimilated into the bodies of one or more animals; bacterial and fungal action on nitrogenous waste products and dead organisms return nitrogen atoms to the inorganic state.

nitrogen fixation: The assimilation of atmospheric nitrogen by certain prokaryotes into nitrogenous compounds that can be directly used by plants.

nitrogenase: An enzyme, unique to certain prokaryotes, that reduces N2 to NH3. nitrogenous base: An organic base that contains the element nitrogen.

Nizoral®: The brand name of ketoconazole; a medication that blocks testicular and adrenal androgen production while having a direct cytotoxic effect on the PC cell; Nizoral® also is synergistic with certain chemotherapy agents and inhibits the development of the MDR gene.

NMN receptor: N-methyl-d-aspartate receptor. A neurotransmitter receptor for excitatory synapses.

nocturia: the act of needing to getting up at night to urinate. This is usually scored as nocturia x number of times on average patient awakens to urinate. Nocturia x 3, for example, means getting up at night 3 times nocturnal: Applied to organisms that are active during the hours of darkness.

node: A point along the stem of a plant at which leaves are attached.

nodes of ranvier: The small gaps in the myelin sheath between successive glial cells along the axon of a neuron; also, the site of high concentration of voltage-gated ion channels.

nodule: A growth or lump that may be cancerous or noncancerous.

non-coding RNA: A non-coding RNA (ncRNA) that is any RNA molecule that is not translated into a protein. A previously used synonym, particularly with bacteria, was small RNA (sRNA).

noncycling: In genetics, noncoding DNA describes DNA which does not contain instructions for making proteins (or other cell products such as RNAs).

noncompetitive inhibitor: A substance that reduces the activity of an enzyme by binding to a location remote from the active site, changing its conformation so that it no longer binds to the substrate.

noncyclic electron flow: A route of electron flow during the light reactions of photosynthesis that involves both photosystems and produces ATP,
blood pressure and heartbeat rate, and increases concentration of glucose in the blood, raises medulla of the adrenal gland, that increases the noradrenaline: A hormone, produced by the destroyed by the cell. shorted proteins are not functional and are shorted protein will be made. Most of these mRNA and then a protein, a truncated or mutation, then when the gene encodes first arises in the middle of a gene because of a into a 3 letter code for a stop sign. If a stop sign a point mutation that changes a genetic sequence Nonsense mutation: a nonsense mutation refers to two atoms of similar electronegativity. in which electrons are shared equally between nonpolar covalent bond: A type of covalent bond to handle. chemotherapy/radiation are easier for the patient other health problems because lower doses of treatment option for older patients or those with immune system to kill the disease. It may be a prepare a patient for transplant. It relies on the lower doses of chemotherapy and/or radiation to Intensity Regimen): A type of transplant that uses Non-Myeloablative Transplant ('Mini' or Low Intensity Regimen): A type of transplant that uses lower doses of chemotherapy and/or radiation to prepare a patient for transplant. It relies on the immune system to kill the disease. It may be a treatment option for older patients or those with other health problems because lower doses of chemotherapy/radiation are easier for the patient to handle. nonpolar covalent bond: A type of covalent bond in which electrons are shared equally between two atoms of similar electronegativity. Nonsense mutation (premature stop codon): Nonsense mutation: a nonsense mutation refers to a point mutation that changes a genetic sequence into a 3 letter code for a stop sign. If a stop sign arises in the middle of a gene because of a mutation, then when the gene encodes first mRNA and then a protein, a truncated or shortened protein will be made. Most of these shortened proteins are not functional and are destroyed by the cell. noradrenaline: A hormone, produced by the medulla of the adrenal gland, that increases the concentration of glucose in the blood, raises blood pressure and heartbeat rate, and increases muscular power and resistance to fatigue; also one of the principal neurotransmitters; also called norepinephrine. NORD (National Organization for Rare Disorders): A federation of voluntary health organizations dedicated to helping people with rare “orphan” diseases and assisting the organizations that serve them. NORD is committed to the identification, treatment, and cure of rare disorders through programs of education, advocacy, research, and service. NORD is not a government agency. It is a non-profit, voluntary health agency that exists to serve rare-disease patients and their families norm of reaction: The range of phenotypic possibilities for a single genotype, as influenced by the environment. notochord: An axial mesodermal tissue found in embryonic stages of all chordates and protochordates, often regressing as maturity is approached. Typically a rod shaped mass of vacuolated cells. It lies immediately below the nerve cord and may provide mechanical strength to the embryo. nuclear envelope: The membrane in eukaryotes that encloses the nucleus, separating it from the cytoplasm. nuclear medicine: Nuclear medicine is a medical specialty that uses very small amounts of radioactive materials or radiopharmaceuticals to diagnose and and treat disease. It is safe, painless, and cost-effective. nuclear membrane: The double membrane which surrounds the eukaryotic nucleus. It has many pores in its surface which regulate the flow of large compounds into and out of the nucleus. nuclear transfer (NT): Replacing the nucleus of one cell with the nucleus of another cell. nuclear transfer technology: A method of cloning a living organism. The process involves removing the nucleus of an egg cell and replacing it with a nucleus from any cell of the organism being cloned. nuclear transfer: For the generation of embryonic stem cells, the process by which the DNA-containing nucleus of any specialized cell (except eggs and sperm) is transferred into an oocyte whose own nuclear genome has been removed. The egg is activated to develop and will divide to form a blastocyst with genetic material identical to those of the donor of the specialized cell and not those of the donor of the oocyte. This process was used to generate Dolly the sheep. nucleated: Formed into a nucleus. nucleic acid probe: In DNA technology, a labeled single-stranded nucleic acid molecule used to tag
a specific nucleotide sequence in a nucleic acid sample. Molecules of the probe hydrogen-bond to the complementary sequence wherever it occurs; radioactive or other labeling of the probe allows its location to be detected.

2619 nucleic acid: A polymer consisting of many nucleotide monomers; serves as a blueprint for proteins and, through the actions of proteins, for all cellular activities. The two types are DNA and RNA.

2620 nucleoid region: The region in a prokaryotic cell consisting of a concentrated mass of DNA.

2621 nucleoid: Region in prokaryotes where the DNA is concentrated. Unlike a nucleus, it is not bound by a membrane.

2622 nucleolus: A specialized structure in the nucleus, consisting of chromatin regions containing ribosomal RNA genes, along with ribosomal proteins imported from the cytoplasmic site of rRNA synthesis and ribosomal subunit assembly.

2623 nucleosome: The basic, beadlike unit of DNA packaging in eukaryotes, consisting of a segment of DNA wound around a protein core composed of two copies of each of four types of histone.

2624 nucleotide: The subunit of nucleic acids, DNA and RNA, that consists of a 5-carbon sugar, a phosphate group and a nitrogenous base. The bases are adenine, thymine, guanine and cytosine in DNA and adenine, uracil, guanine and cytosine in RNA.

2625 nucleus: A part of the cell, situated more or less in the middle of the cell, that is surrounded by a specialized membrane and contains the DNA of the cell. This DNA is packaged into structures called chromosomes, which is the genetic, inherited material of cells.

2626 null hypothesis: In statistical analysis, a hypothesis proposing that there is no statistically significant difference between the observed results of an experiment and the expected results.

2627 nutraceutical (or nutriceutical): a food or dietary supplement thought to provide a beneficial health effect

2628 obligate aerobe: An organism that requires oxygen for cellular respiration and cannot live without it.

2629 oblique: a plane or section not perpendicular to the xyz coordinate system, such as long and short axis views of the heart.

2630 occult: detectable only by microscopic examination or chemical analysis, as a minute blood sample.

2631 Occupational Therapy: A special education related service which is usually focused upon the development of a student’s fine motor skills and/or the identification of adapted ways of accomplishing activities of daily living when a student’s disabilities preclude doing those tasks in typical ways.

2632 oceanic zone: The region of water lying over deep areas beyond the continental shelf.

2633 Octamer Binding Factor: Important in ES and prevents differentiation.

2634 Octamer-4 (Oct-4): Oct-4, encoded by the gene POU5F1, is a transcription factor that is highly expressed in undifferentiated embryonic stem cells compared to other somatic cells. Oct-4 expression in embryonic stem cells is critical to maintain pluripotency. In fact, when Oct-4 expression is experimentally knocked out, ES cells spontaneously differentiate. In 2006, the Yamanaka lab identified Oct-4 as one of the four factors that, when co-transfected and expressed in mouse adult fibroblasts, caused fibroblasts to revert to an embryonic-like state. One year later, the same four factors where used to successfully reprogram human adult fibroblast cells into induced pluripotent stem cells. These four factors are Oct-4, SOX2, KIf-4 and c-Myc.

2635 octreotide (Sandostatin®): A synthetic protein that is similar to the naturally-occurring hormone called somatostatin. Octreotide decreases the production of many substances in the body such as insulin and glucagon (involved in regulating blood sugar), growth hormone, and chemicals that affect digestion.

2636 Oesophageal stricture: A narrowing of the oesophagus.

2637 Oesophagitis: Inflammation of the oesophagus.

2638 Oesophagus: The canal down through which solids and fluids pass from the mouth to reach the stomach.

2639 Office of the Gene Technology Regulator (OGTR): A part of the Australian Department of Health and Ageing that assists the Gene Technology Regulator, a statutory office holder, to administer the Gene Technology Act 2000 (the Act). The objective of the Act is to protect the health and safety of people and to protect the environment by identifying risks posed by, or resulting from, gene technology and by managing those risks through regulating certain dealings with genetically modified organisms.

2640 Olfactory bulb: A part of the brain involved in detecting and discriminating among different smells.

2641 Olfactory Ensheathing Cells (OECs): A part of nasal tissue, OECs appear to have special regeneration-promoting properties when transplanted into the injured spinal cord.

2642 Olfactory Stem Cells: An unusual source of nerve stem cells has been found in the nose, where the
sensors for smell reside. Apparently, these exposed nerve cells are constantly being repaired, so they come with their own supply of stem cells. Dr. Lima of Portugal has tried transplanting the patch of olfactory cells in the nose into damaged spinal cord lesions, often with profound success. It is likely that injecting neural stem cells into the spinal cord lesions will be as effective, without need for surgery or sacrifice of the sense of smell!

Olfactory: Pertaining to the sense of smell. Because olfactory tissue has considerable regenerative potential, it has been transplanted into the injured spinal cord.

Oligodendrocyte: A supporting cell that provides insulation to nerve cells by forming a myelin sheath (a fatty layer) around axons.

Oligonucleotide: Sequence of nucleic acids used as a probe in DNA based tissue typing.

oligopotent progenitor cells: Progenitor cells that can produce more than one type of mature cell. An example is the myeloid progenitor cell which can give rise to mature blood cells of different types.

Oligopotent progenitor cells: Progenitor cells that can produce more than one type of mature cell. For example, the clonal common myeloid progenitor is a progenitor cell which can give rise to blood granulocytes, monocytes, red blood cells, platelets, basophiles, eosinophiles and dendritic cells, but not T lymphocytes, B lymphocytes, or natural killer (NK) cells.

Oligopotent: Able to form two or more lineages within a tissue. Example: a neural stem cell that can create a subset of neurons in the brain.

Oligotrophic lake: A nutrient-poor, clear, deep lake with minimum phytoplankton.

Omalizumab (Xolair): A monoclonal antibody for the treatment of allergic disorders. Monoclonal means that all of the omalizumab is the same, unlike antibodies that we produce naturally in our bodies. Omalizumab is most like a human antibody but a small part (5%), similar to mouse antibody, may attach to IgE. When a substance, such as ragweed pollen, comes in contact with the mast cell, the IgE that is already on the mast cell may attach to the pollen causing the mast cell to release chemical substances, such as histamine. Omalizumab may reduce allergic reactions by causing free IgE to disappear from the body so that the IgE cannot attach to pollen (and other substances).

Omega 3 fatty acids are nutritional elements essential to human health which cannot be produced by the body. They can be found in fish and other marine life. Also known as polyunsaturated fatty acids.

Omentum: A free fold of the peritoneum, or one serving to connect viscera, support blood vessels, etc. The great, or gastrocolic, omentum forms, in most mammals, a great sac, which is attached to the stomach and transverse colon, is loaded with fat, and covers more or less of the intestines. The lesser, or gastrohepatic, omentum connects the stomach and liver and contains the hepatic vessels. The gastroplenic omentum, or ligament, connects the stomach and spleen.

Omnivore: A heterotrophic animal that consumes both meat and plant material.

Oncogene: A gene found in viral or cellular genomes that is involved in triggering molecular events that can lead to cancer. c-Myc, one of the four reprogramming factors originally used by the Yamanaka group to reprogram somatic cells into induced pluripotent stem cells, is a well known proto-oncogene. The c-Myc gene codes for a transcription factor that regulates the expression of many genes involved in the control of cell proliferation, growth, differentiation and apoptosis. Abberant expression of c-Myc on the other hand is associated with tumor formation and cancer.

Oncogenesis: The process of cellular changes leading to the formation of a malignant tumor.

Oncologist: A physician who specializes in the treatment of various types of cancer.

Oncology: the branch of medical science dealing with tumors; an oncologist is a specialists in the study of cancerous tumors

Oncoytic virus: A virus that causes death of a tumor cell; after the Greek word onkos for tumor or mass

Oncovirus: A virus associated with cancer.

Ooocyte: A female cell that develops into an ovum (egg) after meiosis; an egg before maturation.

Oogamy: A condition in which male and female gametes differ, such that a small, flagellated sperm fertilizes a large, nonmotile egg.

Oogenesis: The process in the ovary that results in the production of female gametes.

Operant conditioning: A type of associative learning that directly affects behavior in a natural context; also called trial-and-error learning.

Operator: A segment of DNA that interacts with a repressor protein to regulate the transcription of the structural genes of an operon.
operon: A unit of genetic function common in bacteria and phages, consisting of coordinately regulated clusters of genes with related functions.

opioid: originally, a term denoting synthetic narcotics resembling opiates, but increasingly used to refer to both opiates and synthetic narcotics.

Opsonization: An immune response in which the binding of antibodies to the surface of a microbe facilitates phagocytosis of the microbe by a macrophage.

orbital: In the current model of atomic structure, the volume of space surrounding the atomic nucleus in which an electron will be found 90 percent of the time.

orchietectomy (orchiectomy): the surgical removal of the testicles; surgical castration.

Order: A taxonomic grouping of related, similar families; the category below class and above family.

organ confined disease (OCD): PC that is apparently confined to the prostate clinically or pathologically; not going beyond the confines of the prostatic capsule.

organ of Corti: The actual hearing organ of the vertebrate ear, located in the floor of the cochlear canal in the inner ear; contains the receptor cells (hair cells) of the ear.

Organ: A relatively independent part of the body that carries out one or more special functions. The organs of the human body include the eye, ear, heart, lungs, and liver.

organelle: A structure within a cell that performs a particular function. Examples include mitochondria, endoplasmic reticulum, vacuoles, chloroplasts and lysosomes. Organelles are like smaller versions of the organs in your body, each performing a particular function to keep the whole cell alive.

organic chemistry: The study of carbon compounds (organic compounds).

organic compound: A chemical compound containing the element carbon and usually synthesized by cells.

organic: Pertaining to (1) organisms or living things generally, or (2) compounds formed by living organisms, or (3) the chemistry of compounds containing carbon.

organ-identity gene: A plant gene in which a mutation causes a floral organ to develop in the wrong location.

organism: A living thing that contains DNA and is capable of cell replication by itself; for example, bacteria, plants and animals.

organogenesis: An early period of rapid embryonic development in which the organs take form from the primary germ layers.

orgasm: The highest point of sexual excitement, characterized by strong feelings of pleasure and marked normally by ejaculation of semen by the male and by vaginal contractions in the female; also called climax.

origin of replication: A specific sequence of bases in a nucleic acid molecule to which the enzymes responsible for replicating the nucleic acid bind to initiate the copying process.

ORMUS: A unique form of matter which seems related to life energies. Ormus or ormes appear to be di-atomic (2 atoms) forms of metallic elements, especially in the platinum group, but including precious metals such as silver and copper. Ormus appears to increase the healing abilities of the body, and to increase the ability of the stem cells to follow the morphogenetic field.

ornithine decarboxylase: A rate-limiting enzyme in the pathway of mammalian polyamine biosynthesis. Polyamines affect DNA, RNA and protein synthesis. For these reasons, ODC activity is said to be closely associated with tumor promotion. Green tea polyphenols inhibit ODC resulting in a decrease in polyamine synthesis and cell growth.

orphan drug: a category created by US FDA for medications used to treat diseases that occur rarely (less than 200,000 cases) or that there is no hope for recovery of development costs, so there is little financial incentive for industry to develop them; orphan drug status gives the manufacturer financial incentives to provide the drug.

Orthopedic doctor: A doctor trained to specialize in bony injury. Individuals with CMD will see an orthopedic doctor to check for scoliosis and contractures. An orthopedic surgeon may perform a surgery to release a contracture or fix scoliosis. An orthopedic doctor may also write the prescription for occupational and physical therapy.

Orthostatic hypotension: A sudden fall in blood pressure when a person stands up from the sitting position.

orthotopic: in the normal or usual position.

Osmoconformer: An animal that does not actively adjust its internal osmolarity because it is isotonic with its environment.

osmolarity: Solute concentration expressed as molarity.

Osmoregulation: Adaptations to control the water balance in organisms living in hypertonic, hypotonic, or terrestrial environments.
Osmoregulator: An animal whose body fluids have a different osmolarity than the environment, and that must either discharge excess water if it lives in a hypotonic environment or take in water if it inhabits a hypertonic environment.

Osmosis: Movement of a solvent through a semipermeable membrane (as of a living cell) into a solution of higher solute concentration that tends to equalize the concentrations of solute on the two sides of the membrane.

Osmotic potential: The tendency of water to move across a selectively permeable membrane into a solution; it is determined by measuring the pressure required to stop the osmotic movement of water into the solution.

Osmotic pressure: A measure of the tendency of a solution to take up water when separated from pure water by a selectively permeable membrane.

Osmotic: Pertaining to or of the nature of osmosis.

Osseous: consisting of or resembling bone

Osteichthyes: The vertebrate class of bony fishes, characterized by a skeleton reinforced by calcium phosphate; the most abundant and diverse vertebrates.

Osteoarthritis: noninflammatory degenerative joint disease occurring chiefly in older persons characterized by changes in the bone and cartilage the joints and a progressive wearing down of joint surfaces.

Osteocalcin (OC): A cytokine produced by osteoblasts that promotes bone formation.

Osteoclast: Cells that break down bone. The relative activity of osteoblasts and osteoclasts determine the overall bone mass at any one time.

Osteocyte: A cell from the bone tissue.

Osteogenesis imperfecta: A large and miscellaneous group of conditions of abnormal fragility and plasticity of bone, with recurring fractures on trivial trauma.

Osteogenesis: The process of laying down new bone material by osteoblasts.

Osteoid: Uncalculated bone matrix, the product of osteoblasts. Consists mainly of collagen.

Osteolysis: Destruction of bone.

Osteonecrosis: Condition resulting in death of bone tissue.

Osteopenia: a reduction in bone density that is more than one standard deviation from the normal bone density; using the T score it is T=-1.0 down to T=-2.4; once the T score is less than 2.4, the patient is defined as having osteoporosis.

Osteoporosis: A disease of the bones where the bones get very hard and the bone marrow cannot grow.

osteoporosis: A reduction in bone density resulting in a T score of -2.5 or less; a loss of bone due to increased osteoclastic activity leading to bone resorption.

Osteoprogenitor: A cell-type that differentiates into a mature osteocyte.

ostroderm: An extinct agnathan; a fishlike creature encased in an armor of bony plates.

Otx2: A transcription factor molecule.

Outgroup: A species or group of species that is closely related to the group of species being studied, but clearly not as closely related as any study-group members are to each other.

Output traits: Traits produced in GM crops, which are beneficial or of direct value to the consumer. For example, improving the quality of food, increasing fibre, lowering the fat content or increasing anti-oxidant levels.

Ovarian cycle: The cyclic recurrence of the follicular phase, ovulation, and the luteal phase in the mammalian ovary, regulated by hormones.

Ovarian follicle: A developing oocyte and the specialized cells surrounding it; located near the surface of the ovary; following ovulation, forms the corpus luteum.

Ovarectomy: Surgical removal of an ovary.

Ovulation: The release of an egg from ovaries. In humans, an ovarian follicle releases an egg during each menstrual cycle.

Ovule: A structure that develops in the plant ovary and contains the female gametophyte.

Ovum: An egg in the ovary of the female. This egg is called the female "gamete" or sex cell. It
combines with the male gamete, called a sperm, to form a zygote. This formation process is called fertilization.

oxidant: a substance that causes another substance to combine with oxygen

oxidation: a process where the amount of oxygen of a chemical compound is increased

oxidative phosphorylation: The production of ATP using energy derived from the redox reactions of an electron transport chain.

oxidizing agent: The electron acceptor in a redox reaction.

oxygen debt: In muscle, the cumulative deficit of oxygen that develops during strenuous exercise when the supply of oxygen is inadequate for the demand; ATP is produced anaerobically by glycolysis, and the resulting pyruvic acid is converted to lactic acid, which is subsequently metabolized when adequate oxygen is available.

Oxygen: A colorless, odorless and tasteless gas that makes up about 20% of the air we breathe (and at least half the weight of the entire solid crust of the earth) and which combines with most of the other elements to form oxides. Oxygen is essential to human, animal and plant life.

Ozone (Medical): There is ozone and there is medical ozone, and they are very different. Ozone produced from air is toxic because of the nitrogen oxides, nitrites, nitric acids, sulphur dioxides and other compounds formed. This type of ozone is poisonous. Medical ozone is produced by passing clinical (pure) oxygen through high voltage tubes. Ozone purification treatment(s) purify toxins in the blood, tissues and organs and deliver an oxygen boost to the all the cells in the body. Ozone acts in the body in two ways: by oxidation and oxygenation. When ozone (O3) is administered to the body, its third unstable oxygen atom readily attaches itself to bacteria, fungi, mold, parasites, and tumors, and in the process of doing this, it oxidizes or destroys them. This is oxidation. It then reverts to O2, which adds much needed oxygen to the body. This is oxygenation. This oxygen has a high PH of between 7 and 9 needed to balance an unhealthy body. These pathogens (bacteria, fungi, mold, parasites, and tumors) are lower life organisms and are mostly anaerobic; that is, they cannot survive in an oxygen/ozone rich environment. Ozone within the body has powerful antibacterial, anti-viral, and anti-tumor benefits with very few side effects. Ozone has been used successfully on scores of diseases in Europe, especially Germany, for over 50 years. Over 6,000 articles on the medical usage's of ozone are in the world literature. Nearly every disease process responds favorably to any therapy that effectively increases cellular oxygen content. Ozone therapies are among the safest therapies ever used. One European study of over 5.5 million treatments showed a side effect rate of 0.0007%, probably among the lowest of any therapy known. Side effects (like fever and weakness) are minor and temporary.

p27: A protein that helps to regulate cell growth and a loss of p27 expression is associated with poor prognosis in prostate cancer.

p53: A protein that detects and repairs gene damage, coordinating events that cause the cell to stop its growth and repair the damage. If the damage is too great, p53 becomes the catalyst directing the damaged cell to commit suicide.

Pacemaker: A specialized region of the right atrium of the mammalian heart that sets the rate of contraction; also called the sinoatrial (SA) node.

Packaging plasmid: Lentiviral vectors that contain all necessary elements to efficiently generate active viral particles. For improved safety, third generation packaging plasmids have necessary element separated between 2 or 3 plasmids, eliminating the possibility of homologous recombination and generation of wild-type virus.

paclitaxel (Taxol®): One of the chemotherapy agents called taxanes that block cell division.

paedogenesis(pee-doh-jen-eh-sis): The precocious development of sexual maturity in a larva.

paedomorphosis(pee-doh-mor-foh-sis): The retention in an adult organism of the juvenile features of its evolutionary ancestors.


paleontology: The scientific study of fossils.

palisade cells: In plant leaves, the columnar, chloroplast-containing parenchyma cells of the mesophyll.

Palladium-103: radioactive source used for brachytherapy. Pd-103 gives off energy more quickly than iodine. The radioactive half-life of palladium is 17 days.

palliative: Designed to relieve a particular problem without necessarily solving it; for example, palliative therapy is given in order to relieve symptoms and improve quality of life, but does not cure the patient

Palliative: Palliative means "relief of symptoms." Most often, palliation is the relief of pain.
Pallor: An unnatural lack of colour in the skin (due to bruising, sickness or emotional distress).

Palpable: Capable of being felt during a physical examination by an experienced physician; in the case of prostate cancer, this normally refers to some form of abnormality of the prostate which can be felt during a digital rectal examination.

Palpation: Physical examination in medical diagnosis by pressure of the hand or fingers to the surface of the body especially to determine the condition (as of size or consistency) of an underlying part or organ.

Palpitation: A rapid or strong heartbeat.

Paracrine: A form of signaling in which the target cell is close to the signal-releasing cell; compare to endocrine.

Paracrine factors: Cytokines or hormones that act on cells or tissues within an extremely limited area.

Paracrine regulator: A cell from a group that produces amines or peptides.

Paracrine signaling: Cell signaling in which the cell being signaled is close to the cell doing the signaling.

Paralysis: A functional loss of voluntary muscle activity due to loss of neural transmission from the brain to the muscles.***

Paraplegia: Spinal cord injury below the cervical level, affecting lower body function.

Parasthesia: Sensation of tingling, usually resulting from deficiency of the calcium-regulating hormones in the body.

Parasympathetic: A part of the autonomic nervous system; generally enhances body activities that gain and conserve energy, such as digestion and reduced heart rate.

Parasympathetic Nervous System: A part of the autonomic nervous system that serves to slow the heart rate, increase the intestinal and gland activity, and relax sphincter muscles.

Parathyroid glands: Four endocrine glands, embedded in the surface of the thyroid gland, that secrete parathyroid hormone and raise blood calcium levels.

Parathyroid hormone (PTH): one of the principal calcium-regulating hormones in the body.

Parkinson disease: A neurological syndrome usually resulting from deficiency of the dopamine neurotransmitter.

Parkinsonian: Pertaining to a taxon that excludes some members that share a common ancestor with members included in the taxon.

Parental generation: In an experimental genetic cross, the parents of the F1 generation; homozygous for the trait(s) being studied.

Parenchyma: The essential elements of an organ, used in anatomical nomenclature as a general term to designate the functional elements of an organ, as distinguished from its framework or stroma.
neurotransmitter dopamine; characterized by rhythmical muscular tremors... (SMD)

2786 Parkinson’s Disease: This disease affects about 1% of all people over 55 years of age and is due to degeneration of a portion of the brain. It is characterised by tremor, slowness of movement, rigidity and a progressive course which can eventually result in dementia and death. There is treatment for the symptoms of the disease, but no cure. It seems as if 7 out of 10 Parkinson’s patients respond to stem cell therapy and booster doses might be necessary.

2787 Parthenogenesis: A form of reproduction where an egg develops without the fusion of sperm with the egg cell. Parthenogenesis occurs commonly among insects and other arthropods. Artificially inducing parthenogenesis with human eggs may be a means to isolate stem cells from an embryo, without fertilization.

2788 partial pressures: The concentration of gases; a fraction of total pressure.

2789 partial response (PR): A 50% or greater decline in parameters that are being used to measure anti-cancer activity; parameters include abnormalities involving physical exam findings, lab and radiologic studies.

2790 Partin tables: Tables constructed based on results of the PSA, clinical stage and Gleason score involving thousands of men with PC; used to predict the probability that the prostate cancer has spread to the lymph nodes, seminal vesicles, penetrated the capsule or that it remains confined to the prostate; developed by a group of scientists at the Brady Institute for Urology at Johns Hopkins University.

2791 Passage: In cell culture, the process in which cells are disassociated, washed, and seeded into new culture vessels after a round of cell growth and proliferation. The number of passages a line of cultured cells has gone through is an indication of its age and expected stability.


2793 Patency: The state of being freely open or exposed.

2794 patent: A grant made by a government that allows the creator of an invention the sole right to make, use, and sell that invention for a set period of time.

2795 pathogen (adj. pathogenic): An organism that causes disease in another organism.

2796 Pathogenesis: The underlying origin or cause of a disease.

2797 pathogenicity: The ability to cause disease.

2798 pathologist: a physician who specializes in the examination of tissues and blood samples to help decide what diseases are present and therefore how they should be treated.

2799 pathology, pathological: a science which specializes in the examination of tissues and blood samples to help decide what diseases are present and therefore how they should be treated.

2800 pathways: Pathway is short for signaling pathway. A signal, often from the outside, approaches a cell to tell it to perform a specific action.

2801 Patient advocate: A person who acts in the best interest of the patient or serves the patient’s needs and may act on his/her behalf.

2802 pattern formation: The ordering of cells into specific three-dimensional structures, an essential part of shaping an organism and its individual parts during development.


2804 PCA3 score: ratio of PCA3 to PSA mRNA.

2805 PCA3: a specific gene that is profusely expressed in prostate cancer tissue, and not expressed in any other kind of human tissue.

2806 Pedigree: A family tree describing the occurrence of heritable characters in parents and offspring across as many generations as possible.

2807 pelagic zone: The area of the ocean past the continental shelf, with areas of open water often reaching to very great depths.

2808 Pelvic floor muscles: Muscles at the base of the pelvis that help support the bladder, uterus, urethra, vagina and rectum.

2809 pelvic lymph node dissection: removal of lymph nodes in the area of the pelvis to check for presence of cancer.

2810 Pelvis: The lower part of the abdomen, located between the hip bones.

2811 Penetration: In genetics, the proportion of individuals with a particular genotype that show the phenotype ascribed to that genotype.

2812 penile bulb: the base of the penis that attaches to the perineal membrane.

2813 penile: of the penis.

2814 penis: the male organ used in urination and intercourse.

2815 peptide bond: The covalent bond between two amino acid units, formed by condensation synthesis.

2816 peptide: An organic compound composed of two or more amino acids linked together chemically by peptide bonds. A component of a polypeptide.

2817 peptidoglycan: A type of polymer in bacterial cell walls consisting of modified sugars cross-linked by short polypeptides.

2818 Perception: The interpretation of sensations by the brain.
2819 percutaneous: Through the skin.
2820 perennial: A plant that lives for many years.
2821 perfluorocarbon liquid: A colorless and odorless liquid in which all hydrogen atoms have been replaced by fluorine atoms. This liquid is injected within the MEDRAD endorectal coil instead of air to increase image and spectral quality.
2822 perfusion: Fluid passing through an organ or tissue.
2823 Perichondrium: A membrane around the surface of cartilage.
2824 pericycle: A layer of cells just inside the endodermis of a root that may become meristematic and begin dividing again.
2825 pericyte: This is an old terminology. Currently, these cells might be the recently defined mesenchymal stem cells.
2826 periderm: The protective coat that replaces the epidermis in plants during secondary growth, formed of the cork and cork cambium.
2827 perineal: An area of the body between the scrotum and the anus.
2828 perineum: The area of the body between the scrotum and the anus; a perineal procedure uses this area as the point of entry into the body.
2829 perineural invasion (PNI): PC invading the nerve sheath surrounding the nerves that enter the prostate
2830 peripheral blood or peripheral blood stem cells (PBSC): Peripheral blood flows through the bloodstream in the body. Some blood stem cells are found in the peripheral blood.
2831 peripheral blood stem cell (PBSC) donation: Hematopoietic stem cells are collected from a donor's circulating blood through an apheresis procedure following mobilization from the marrow with Filgrastim. The stem cells are then transplanted into a recipient.
2832 peripheral blood stem cell transplant (PBSCT): A method of separating and collecting stem cells from the circulating blood stream using a process called pheresis. The stem cells are immediately frozen after collection, allowing the patient to receive higher-than-conventional doses of chemotherapy and/or radiation to destroy the leukemia-producing bone marrow. After completing high-dose chemotherapy or radiotherapy, the frozen stem cells are prepared and reintroduced to the patient via an intravenous, or IV, infusion.
2833 peripheral blood stem cells (PBSCs): Stem cells that leave the bone marrow and circulate in the bloodstream.
2834 peripheral nervous system: A division of the nervous system consisting of all nerves not part of the brain or spinal cord. It carries messages from all over the body to the central nervous system and vice versa.
2835 peripheral neuropathy (PN): Any disorder of the nervous system outside the brain and spinal column, such as tingling or numbness in the hands or feet.
2836 peripheral zone: the largest portion of the prostate located in the back closest to the rectum.
2837 peripheral: Situated away from the center, as opposed to centrally located.
2838 periprostatic: pertaining to the soft tissues immediately adjacent to the prostate.
2839 perirectal: the tissues surrounding the rectum.
2840 peristalsis: Rhythmic waves of contraction of smooth muscle that push food along the digestive tract.
2841 peritoneum: The smooth serous membrane which lines the cavity of the abdomen and covers most of the abdominal organs forming a closed, or nearly closed sac.
2842 peritubular capillaries: In the vertebrate kidney, the capillaries that surround the renal tubule; water and solutes are reabsorbed into the bloodstream through the peritubular capillaries and some substances are secreted from them into the renal tubule.
2843 permeable: Penetrable by molecules, ions, or atoms; usually applied to membranes that let given solutes pass through.
2844 peroxisome: A microbody containing enzymes that transfer hydrogen from various substrates to oxygen, producing and then degrading hydrogen peroxide.
2845 personalized cell replacement therapies: Treatment in which stem cells are created to genetically match a patient to reduce the risk of immune rejection and then induced to differentiate into a specific cell type ex vivo. These cells are then transplanted into the patient to repair damaged or destroyed cells or tissues.
2846 pesticide: A chemical that kills pests.
2847 petechiae: Pin-head-sized sites of bleeding in the skin. This type of bleeding results from a very low platelet count. The small punctate hemorrhages are frequently seen on the legs, feet, trunk and arms. They evolve from red to brown and are eventually disappear. They stop developing when the platelet count increases.
2848 petiole: The stalk of a leaf, which joins the leaf to a node of the stem.
2849 Peyer's patch: These are quite large aggregates of lymphoid tissue found in the small intestine, part of the lymphatic system which help to fight infection.
pH scale: A measure of hydrogen ion concentration equal to \(-\log [\text{H}^+]\) and ranging in value from 0 to 14.

P: A measure of acidity and alkalinity of a solution. The measure is a number on a scale on which a value of 7 represents neutrality and lower numbers indicate increasing acidity and higher numbers increasing alkalinity. On the scale, each unit of change represents a tenfold change in acidity or alkalinity.

Phage (fage): A virus that infects bacteria; also called a bacteriophage.

Phagocytic: Capable of functioning as a phagocyte. A phagocyte is a cell that is able to engulf and break down foreign particles, cell debris and disease producing micro-organisms in the body. Form an important part of the natural defence mechanism in most animals.

Phagocytosis: A type of endocytosis involving large, particulate substances.

Pharmacogenetics: The science of how a person\’s genes affect his or her response to drugs.

Pharmacogenomics: The science of how a person\’s genome affects his or her response to drugs, in either a positive or negative way. The word is used interchangeably with pharmacogenetics.

Pharmacokinetic studies: Studies which how a drug is absorbed, distributed, metabolized, and eliminated by the body.

Pharmacologic: The characteristics or properties of a drug, especially those that make it medically effective

Pharming: The process of farming GM plants or animals to be used as living pharmaceutical factories. Cows, sheep, pigs, goats, rabbits and mice can be used to produce large amounts of human proteins in their milk. Plants are being used to produce vaccines and diagnostic reagents.

Pharynx: An area in the vertebrate throat where air and food passages cross; in flatworms, the muscular tube that protrudes from the ventral side of the worm and ends in the mouth.

Phase I Clinical Trial: A preliminary evaluation in a relatively small group of subjects to evaluate safety, determine side effects, and establish safe dosing.

Phase II Clinical Trial: A study in which a treatment is given to a larger group of subjects to determine if it is effective and further evaluate safety.

Phenetics: An approach to taxonomy based entirely on measurable similarities and differences in phenotypic characters, without consideration of homology, analogy, or phylogeny.

Phenomics: The study of an overall organism and how the characteristics or traits of an organism that we can see (its phenotype) fits with the information we know about its genes (genomics) and proteins (proteomics).

Phenotype: A set of observable physical characteristics of an individual organism. A single characteristic can be referred to as a \"trait,\" although a single trait is sometimes also called a phenotype. For example, blond hair could be called a trait or a phenotype, as could obesity. A phenotype can be the result of many factors, including an individual\’s genotype, environment, and lifestyle, and the interactions among these factors. The observed manifestation of a genotype, a phenotype may be expressed physically, biochemically, or physiologically.

Phenotypic characteristics: The genetically and environmentally determined physical characteristics of an organism.

Phentolamine: given by injection causes blood vessels to expand, thereby increasing blood flow; when injected into the penis, it increases blood flow to the penis, which results in an erection. see also papaverine, \"bimix\", \"trimix\".

Phenylketonuria (PKU): A hereditary disorder that results in reduced production of the liver enzyme phenylalanine hydroxylase. This substance is involved in the breakdown of phenylalanine in food to tyrosine. Without a modified diet, affected infants will develop severe, irreversible brain damage.

Pheochromocytoma: A tumor that is derived from chromaffin cells and is usually associated with paroxysmal or sustained hypertension.

Pheromone: A small, volatile chemical signal that functions in communication between animals and acts much like a hormone in influencing physiology and behavior.

Philadelphia chromosome: Characteristic chromosomal abnormality in which a portion of chromosome 22 is translocated to chromosome 9. This abnormality is found in nearly all cases of chronic myeloid leukaemia and some cases of acute lymphoblastic leukaemia.

Phlebotomy: Withdrawing blood from a vein (usually a vein in the arm) usually for testing purposes.

Phloem: The portion of the vascular system in plants consisting of living cells arranged into elongated tubes that transport sugar and other organic nutrients throughout the plant.

Phosphatase group: A functional group important in energy transfer.

Phosphodiesterase (PPD) inhibitors: Drugs which may help a man achieve an erection.
2876 phospholipids: Molecules that constitute the inner bilayer of biological membranes, having a polar, hydrophilic head and a nonpolar, hydrophobic tail.

2877 Phosphorylation: Addition of a phosphate group or groups to a molecule.

2878 phosphorylation: the addition of phosphate to an organic compound through the action of a phosphorylase or kinase.

2879 photic zone: The narrow top slice of the ocean, where light permeates sufficiently for photosynthesis to occur.

2880 photoautotroph: An organism that harnesses light energy to drive the synthesis of organic compounds from carbon dioxide.

2881 photon: A unit of energy of a light ray or other form of radiant energy. Most conventional radiation uses photons to deliver ionizing radiation.

2882 photoperiodism: A physiological response to day length, such as flowering in plants.

2883 photophosphorylation: The process of generating ATP from ADP and phosphate by means of a proton-motive force generated by the thylakoid membrane of the chloroplast during the light reactions of photosynthesis.

2884 Photoreceptor: A cell or organ capable of detecting light.

2885 photospiration: A metabolic pathway that consumes oxygen, releases carbon dioxide, generates no ATP, and decreases photosynthetic output; generally occurs on hot, dry, bright days, when stomata close and the oxygen concentration in the leaf exceeds that of carbon dioxide.

2886 photosynthesis: The conversion of light energy to chemical energy that is stored in glucose or other organic compounds; occurs in plants, algae, and certain prokaryotes.

2887 photosystem: The light-harvesting unit in photosynthesis, located on the thylakoid membrane of the chloroplast and consisting of the antenna complex, the reaction-center chlorophyll a, and the primary electron acceptor. There are two types of photosystems, I and II; they absorb light best at different wavelengths.

2888 phototropism: Growth of a plant shoot toward or away from light.

2889 phrenic nerve pacing: Provides respiratory assistance for individuals with higher-level, respiration-compromising injuries by electrically stimulating diaphragmatic contractions.

2890 phyletic change: The changes taking place in a single lineage of organisms over a long period of time; one of the principal patterns of evolutionary change.

2891 phylogeny: The evolutionary history of a species or group of related species.

2892 phylum pl. phyla: A taxonomic category; phyla are divided into classes.

2893 physiatrist: Physiatrists are rehabilitation physicians. They are nerve, muscle, and bone experts who treat injuries or illnesses that affect how you move. Rehabilitation physicians have completed training in the medical specialty physical medicine and rehabilitation (PM&R).

2894 physical examination: A general evaluation of a person's physical condition performed by a physician or nurse.

2895 physical therapist: A specialist trained in the treatment of diseases and injury through exercise and physical activities; may be involved in addressing some LSD symptoms.

2896 physical therapy: A type of treatment or therapy designed to help an individual who has difficulty with physical movement. Physical therapists may use exercise, water, and other treatments to help improve muscle strength, range of motion, and motor skills.

2897 physiologic: Of or consistent with a living organism's normal functioning.

2898 physiology: The study of function in cells, organs, or entire organisms; the processes of life.

2899 phytoalexin: An antibiotic, produced by plants, that destroys microorganisms or inhibits their growth.

2900 phytochrome: A pigment involved in many responses of plants to light.

2901 phytoplankton: Aquatic, free-floating, microscopic, photosynthetic organisms.

2902 PI3 kinase: An enzyme which influences a wide variety of cellular functions, including cell growth, differentiation and survival, glucose metabolism and cytoskeletal organization.

2903 pia mater: The innermost layer of the meninges, the membrane system surrounding the spinal cord.

2904 PICP: carboxy-terminal propeptide of type 1 procollagen; a bone formation marker.

2905 pigment: A colored substance that absorbs light over a narrow band of wavelengths.

2906 pigments: Chemicals that are coloured. For example, the pigment melanin determines skin colouration.

2907 pill burden: Refers to the total number of pills that need to be taken.

2908 pilus: A surface appendage in certain bacteria that functions in adherence and the transfer of DNA during conjugation.

2909 pineal gland: A small endocrine gland on the dorsal surface of the vertebrate forebrain; secretes
the hormone melatonin, which regulates body functions related to seasonal day length.

pinocytosis: A type of endocytosis in which the cell ingests extracellular fluid and its dissolved solutes.

pipette: A handheld instrument with a narrow plastic or glass tube that is marked for measuring (graduated) and is used to transfer small amounts of liquids sometimes containing cells.

d: The core of the central vascular cylinder of monocot roots, consisting of parenchyma cells, which are ringed by vascular tissue; ground tissue interior to vascular bundles in dicot stems.

pituitary gland: An endocrine gland at the base of the hypothalamus; consists of a posterior lobe (neurohypophysis), which stores and releases two hormones produced by the hypothalamus, and an anterior lobe (adenohypophysis), which produces and secretes many hormones that regulate diverse body functions.

placenta: A temporary organ joining the mother and fetus, the placenta transfers oxygen and nutrients from the mother to the fetus, and permits the release of carbon dioxide and waste products from the fetus. It is roughly disk-shaped, and at full term measures about seven inches in diameter and a bit less than two inches thick. The upper surface of the placenta is smooth, while the under surface is rough. The placenta is rich in blood vessels.

placental mammal: A member of a group of mammals, including humans, whose young complete their embryonic development in the uterus, joined to the mother by a placenta.

placoderm: A member of an extinct class of fishlike vertebrates that had jaws and were encased in a tough, outer armor.

plankton: Mostly microscopic organisms that drift passively or swim weakly near the surface of oceans, ponds, and lakes.

planning target volume (PTV): Equivalent to the clinical target volume plus a margin to account for uncertainty in immobilization and localization of the patient anatomy during treatment.

plana: The ciliated, free-swimming type of larva formed by many cnidarians.

plasma cell: A derivative of B cells that secretes antibodies.

plasmacytoma: Any discrete, presumably solitary, mass of neoplastic plasma cells either in bone marrow or various extramedullary sites.

plasmid: A small ring of DNA that carries accessory genes separate from those of a bacterial chromosome. Also found in some eukaryotes, such as yeast.

plasmodesma: An open channel in the cell wall of plants through which strands of cytosol connect from adjacent cells.

plasmogamy: The fusion of the cytoplasm of cells from two individuals; occurs as one stage of syngamy.

plasmolysis: A phenomenon in walled cells in which the cytoplasm shrivels and the plasma membrane pulls away from the cell wall when the cell loses water to a hypertonic environment.

plasticity: The ability of stem cells from one adult tissue to generate the differentiated cell types of another tissue.

plastid: Any of several pigmented cytoplasmic organelles found in plant cells and other organisms, having various physiological functions, such as the synthesis and storage of food.

platelet: A particle found in the bloodstream that binds at the site of a wound to begin the blood clotting process. Platelets are formed in bone marrow.

pleated sheet: One form of the secondary structure of proteins in which the polypeptide chain folds back and forth, or where two regions of the chain lie parallel to each other and are held together by hydrogen bonds.

pleiotropic: When a single gene influences multiple traits.

pleiotropy: The ability of a single gene to have multiple effects.

pleomorphism: A hardening within the nervous system, especially of the brain and spinal cord, resulting from degeneration of nervous elements such as the myelin sheath.

plesiomorphic character: A primitive phenotypic character possessed by a remote ancestor.
pleura: The delicate serous membrane that lines each half of the thorax of mammals and is folded back over the surface of the lung of the same side.

pleural effusion: A collection of fluid (or blood) in the pleural space (in one side of the chest cavity around the lung). May be secondary to trauma, cancer, nephrotic syndrome, kidney disease, pancreatitis, congestive heart failure and cirrhosis.

pleuripotential stem cells: These have the information and capacity to become any cell in the body if managed properly. The question remains as to how best manage these valuable cells.

pleuripotent: Ability of a stem cell to differentiate into cell types of the three germ layers, adjective: pleuripotent.

plexus: A structure in the form of a network, especially of nerves, blood vessels, or lymphatics.

plicae circulares: Plicae circulares are macroscopically visible, crescent-shaped folds of the mucosa and submucosa. Plicae circulares extend around one-half to two-thirds of the circumference of the lumen of the small intestine.

ploidy: The number of homologous sets of chromosomes in a biological cell. In humans, most cells are diploid; that is they contain one set of chromosomes from each parent.

pluralism: The belief that there are multiple opinions about an issue, each of which contains part of the truth, but none that contain the whole truth.

pluripotent cell: A self-renewing cell that has the capability to commit toward different cell lineages along one germ layer, e.g., hematopoietic stem cells can make immune and red blood cells. Thus, a pluripotent cell is a stem cell.

pluripotent stem cell: Pluripotent stem cell has the ability to give rise to various types of the cells that develop from the three germ layers viz. mesoderm, endoderm and ectoderm from which all the cells of the body arise. The only known sources of human pluripotent stem cells are those isolated and cultured from early human embryos and from fetal tissues.

pluripotent: Ability of a single stem cell to give rise to all of the various cell types that make up the body. Pluripotent cells cannot make so-called "extra-embryonic" tissues such as the amnion, chorion, and other components of the placenta. Scientists demonstrate pluripotency by providing evidence of stable developmental potential, even after prolonged culture, to form derivatives of all three embryonic germ layers from the progeny of a single cell and to generate a teratoma after injection into an immunosuppressed mouse.

pluripotental: Able to form all the body’s cell lineages, including germ cells, and some or even all extraembryonic cell types. Example: embryonic stem cells.

pmbryonic germline (EG) cells: EG cells are pluripotent stem cell lines derived from the primitive germline cells that exist between the blastocyst stage of development until their conversion within gonads to egg or sperm stem cells. Their properties are similar to those of ES cells.

pneumonia: An inflammatory infection that occurs in the lung.

point mutation: A change in a gene at a single nucleotide pair.

polar body: A polar body is a structure produced when an early egg cell, or oogonium, undergoes meiosis. In the first meiosis, the oogonium divides its chromosomes evenly between the two cells but divides its cytoplasm unequally. One cell retains most of the cytoplasm, while the other gets almost none, leaving it very small. This smaller cell is called the first polar body. The first polar body usually degenerates. The ovum, or larger cell, then divides again, producing a second polar body with half the amount of chromosomes but almost no cytoplasm. The second polar body splits off and remains adjacent to the large cell, or oocyte, until it (the second polar body) degenerates. Only one large functional oocyte, or egg, is produced at the end of meiosis.

polar covalent bond: A type of covalent bond between atoms that differ in electronegativity. The shared electrons are pulled closer to the more electronegative atom, making it slightly negative and the other atom slightly positive.

polar molecule: A molecule (such as water) with opposite charges on opposite sides.

polar nuclei: In angiosperms, the two nuclei of the central cell of the female gametophyte; they fuse with a sperm nucleus to form the triploid (3n) endosperm nucleus.

polar: Having parts or areas with opposed or contrasting properties, such as positive and negative charges, head and tail.

polarity: The property of having two opposite poles, sides or ends (for example, humans have left-right polarity, also front-back polarity and head-tailward polarity).

pollen: An immature male gametophyte that develops within the anthers in a flower.
pollination: The placement of pollen onto the stigma of a carpel by wind or animal carriers, a prerequisite to fertilization.

polyamine: Any of a group of organic compounds, such as spermine and spermidine, composed of only carbon, nitrogen, and hydrogen and containing two or more amino groups.

polyandry: A polygamous mating system involving one female and many males.

polygenic inheritance: An additive effect of two or more gene loci on a single phenotypic character.

polygyny: A polygamous mating system involving one male and many females.

polymer: A large molecule consisting of many identical or similar monomers linked together.

polymerase chain reaction (PCR): A laboratory process in which a segment of DNA is copied multiple times using DNA polymerase.

polymerase chain reaction (PCR): System for in vitro amplification of DNA that involves separating the DNA into its two complementary strands and using DNA enzymes to synthesize two-stranded DNA from each single strand, and repeating the process.

polymerase: An enzyme, such as DNA polymerase or RNA polymerase, that catalyzes the synthesis of a polymer from its subunits.

polymorphic: Referring to a population in which two or more physical forms are present in readily noticeable frequencies.

polymorphism: The coexistence of two or more distinct forms of individuals (polymorphic characters) in the same population.

cellular polynucleotide: A polymer made up of many nucleotides covalently bonded together.

polyp: The sessile variant of the cnidarian body plan. The alternate form is the medusa.

polypectomy: Excision of a polyp.

polypeptide: A peptide containing anywhere between 10 and 100 molecules of amino acids. Peptides can either be small proteins or part of a protein. A polypeptide is the ultimate expression product of a gene, and is folded into a functional protein after it has been assembled.

polysaccharide: A polymer of up to over a thousand monosaccharides, formed by condensation synthesis.

to two- or more amino groups.

polyunsaturated fat: A fat that has more than one double bond in the molecule.

Polyvinylchloride: A carcinogenic polymer used in plastics and is commonly known as PVC.

population bottleneck: Type of genetic drift that occurs as the result of a population being drastically reduced in numbers by an event having little to do with the usual forces of natural selection.

population density: The number of individuals of a population per unit area or volume of living space.

population doublings: The number of times cells growing in vitro have increased the total number of cells by a factor of 2 compared to the initial number of cells. Primitive streak: A band of cells appearing in the embryo at the start of the third week of development, that marks the axis along which the spinal chord develops.

population viability analysis (PVA): A method of predicting whether or not a species will persist in a particular environment.

positional information: Signals, to which genes regulating development respond, indicating a cell's location relative to other cells in an embryonic structure.

positive feedback: A physiological control mechanism in which a change in some variable triggers mechanisms that amplify the change.

growth in vitro have increased the total number of cells by a factor of 2 compared to the initial number of cells. Primitive streak: A band of cells appearing in the embryo at the start of the third week of development, that marks the axis along which the spinal chord develops.

post: implantation embryo: Implanted embryos in all early stages of development until the establishment of the body plan of a developed organism with identifiable tissues and organs.

posterior: The rear; for example, the posterior of the prostate is the part of the prostate that faces a man's back.
posterior lateral: Behind and to one side.

postsynaptic membrane: The surface of the cell on the opposite side of the synapse from the synaptic terminal of the stimulating neuron that contains receptor proteins and degradative enzymes for the neurotransmitter.

postsynaptic: Situated after a synapse. A postsynaptic cell (e.g., another neuron or a muscle cell) contains receptors that bind to neurotransmitters released by presynaptic neurons.

postzygotic barrier: Any of several species-isolating mechanisms that prevent hybrids produced by two different species from developing into viable, fertile adults.

potency: A general term that describes the capability of a cell (stem cell or progenitor) to differentiate into another more committed cell type.

potential energy: The energy stored by matter as a result of its location or spatial arrangement.

power: The term power has quite a few different meanings. For Biotechnology Online, we are referring to an organisation or individual's ability to act effectively according to their intentions, needs, or values.

prana: Under ancient Hindu Ayurvedic and yoga philosophy, life-force energy prana is circulated throughout the body.

preclinical testing: Laboratory tests of a new drug or a new medical device to determine the toxicity and pharmacokinetics in order to gather evidence to support a clinical trial in humans.

preclinical: Before a disease becomes recognizable based on direct observation.

precursor cells: In fetal or adult tissues, partly differentiated cells that divide and give rise to differentiated cells. Also known as progenitor cells.

precursor cells: In fetal or adult tissues, these are partly differentiated cells that divide and give rise to differentiated cells. Also known as progenitor cells.

precursor: A cell capable of differentiating into another cell type. For example, a hepatic/pancreatic cell precursor is capable of differentiating into liver cells of several types, pancreatic cells that secrete digestive juices, and pancreatic cells that produce insulin. A stem cell is a precursor to other cell types.

predation: An interaction between species in which one species, the predator, eats the other, the prey.

predator: An organism that eats other living organisms.

prednisone (Orasone® or Deltasone® or Liquid Pred® or Meticorten®): A glucocorticoid steroid used to treat anorexia and cachexia and some cancers. It is similar to a steroid hormone made by the adrenal glands in the body.

preferred provider organization: An insurance plan which allows choice of any provider in the network.

pre-implantation embryo: Fertilized eggs (zygotes) and all of the developmental stages up to, but not beyond, the blastocyst stage. A pre-implantation embryo has not yet implanted in the wall of the uterus. Human embryonic stem cells are derived from pre-implantation-stage embryos fertilized outside a woman's body (in vitro).

pre-implantation genetic diagnosis (PGD): Tests early-stage embryos produced through in vitro fertilization (IVF) for the presence of a variety of genetic conditions. One cell is extracted from the embryo in its eight-cell stage and analyzed. Embryos free of conditions that would cause serious disease can be implanted in a woman's uterus and allowed to develop into a child.

preimplantation: With regard to an embryo, preimplantation means that the embryo has not yet implanted in the wall of the uterus. Human embryonic stem cells are derived from pre-implantation stage embryos fertilized outside a woman's body (in vitro).

preliminary Search: The process by which a patient's HLA type is sent to the NMDP and entered into the computer where it is compared to the HLA types of all volunteers listed in the Registry at that time. The patient's demographic information and basic disease status are also submitted at preliminary search. The preliminary search becomes formal when specific donors are requested for further testing on behalf of the patient.

prenatal analysis: Refers to a variety of tests to determine the health of the fetus. In some cases of known carrier couples of genetic disease prenatal analysis can show if the fetus is affected by the disease.

preparative regimen: Chemotherapy or radiation that is administered prior to transplant to kill any remaining cancer cells and to make a space for your new stem cells.

President's Council on Bioethics (PCB): A committee of experts during the Bush administration that was formed in 2001 (after the NBAC was disbanded) to provide the President with advice on bioethical issues that may emerge as a result of biomedical science and technology.

pressure-flow hypothesis: A hypothesis accounting for sap flow through the phloem.
system. According to this hypothesis, the solution containing nutrient sugars moves through the sieve tubes by bulk flow, moving into and out of the sieve tubes by active transport and diffusion.

presynaptic: Situated in front of or occurring before a synapse. A presynaptic neuron releases neurotransmitters that bind with the receptors of a postsynaptic cell (e.g., another neuron or a muscle cell).

pre-transplant Conditioning: A regimen of chemotherapy with or without radiation therapy that destroys a patient's marrow. The marrow is then restored by transplanting stem cells.

prey: An organism eaten by another organism.

prezygotic barrier: A reproductive barrier that impedes mating between species or hinders fertilization of ova if interspecific mating is attempted.

priapism: A prolonged, often painful erection, in which the penis does not return to its flaccid state within about four hours due to blood retention.

priapism: an abnormal, painful erection where the penis remains erect for an extended period of time that is usually not accompanied with sexual desire

primary consumer: An herbivore; an organism in the trophic level of an ecosystem that eats plants or algae.

primary germ layers: The three initial embryonic germ layers—endoderm, mesoderm, and ectoderm—from which all other somatic tissue-types develop.

primary growth: Growth initiated by the apical meristems of a plant root or shoot.

primary immune response: The initial immune response to an antigen, which appears after a lag of several days.

primary producer: An autotroph, which collectively make up the trophic level of an ecosystem that ultimately supports all other levels; usually a photosynthetic organism.

primary productivity: The rate at which light energy or inorganic chemical energy is converted to the chemical energy of organic compounds by autotrophs in an ecosystem.

primary site: The anatomic site where the original tumor is located. Primary cancer is usually named after the organ in which it starts. For example, cancer that starts in the breast is always breast cancer even if it spreads (metastasizes) to other organs such as bones or lungs.

primary structure: The level of protein structure referring to the specific sequence of amino acids.

primary succession: A type of ecological succession that occurs in an area where there were originally no organisms.

primate: A member of the order of mammals that includes anthropoids and prosimians.

primer: An already existing short RNA chain bound to template DNA to which DNA nucleotides are added during DNA synthesis.

primitive LHSC: Cells cannot home to the bone marrow and repopulate a host. Needs to undergo maturation on stromal cells and cytokines.

primitive streak: The initial band of cells from which the embryo begins to develop. The primitive streak establishes and reveals the embryo’s head-tail and left-right orientations.

primitive: A term describing a cell that is less specialized, and more capable of differentiation into other cell types.

primordial germ cell: The precursors of reproductive cells within the embryo. They are detectable in an embryo after four weeks of development and will develop into either sperm or eggs.

primordium (pl. primordial): A cell or organ in its earliest stage of differentiation.

principle of allocation: The concept that each organism has an energy budget, or a limited amount of total energy available for all of its maintenance and reproductive needs.

prion: An infectious form of protein that may impede mating between species or hinders fertilization of ova if interspecific mating is attempted.

probiotic: A live microbial feed supplement which improves the host animal's intestinal microbial balance. Although referring to the supplementation of animal feeds for farm animals, the definition is easily applied to humans. The major consumption of probiotics by humans is in the form of dairy-based foods containing intestinal species of lactobacilli and bifidobacteria. It is implicit in the definition that consumption of the probiotic affects the composition of the intestinal microflora. Potential benefits of probiotics include increased resistance to infectious diseases, decreased duration of diarrhea, reduction in blood pressure, reduction in serum cholesterol concentration, reduction in allergy, and reduction in carcinogen production.

procambium: A primary meristem of roots and shoots that forms the vascular tissue.

procambium: the soluble precursor of collagen.
3051 Procrit®: a recombinant human erythropoietin used to treat anemia.
3052 proctitis: inflammation of the rectum; in PC therapy may be associated with radiation therapy.
3053 producer, in ecological systems: An autotrophic organism, usually a photosynthesizer, that contributes to the net primary productivity of a community.
3054 profilin: A form of protein present in pollen.
3055 progenitor cell: A cell type that can differentiate, but cannot self-renew. As a stem cell begins to differentiate into a progenitor cell, potency and self renewal begin to lessen and cellular senescence increases. When a stem cell can no longer self-renew, but can still differentiate into multiple cell types, the stem cell has now transitioned into a progenitor cell. For example, a hematopoietic stem cell will first differentiate into a hematopoietic progenitor cell that maintains the same differentiation potential, but loses the ability to self-renew. The hematopoietic progenitor cell will then differentiate into one of two more specialized progenitor cell types: 1) lymphoid progenitor cells that will further differentiate into cells of the lymphoid lineage (b-cells, t-cells, NK cells) or 2) myloid progenitor cells that will further differentiate into cells of the myloid lineage (erythrocytes, platelets, macrophages, neutrophils, eosinophil, basophil).
3056 progesterone receptor: The docking site on a cell that interacts with progestins.
3057 progesterone: A female steroid sex hormone C21H30O2 that is secreted by the corpus luteum to prepare the endometrium for implantation and later by the placenta during pregnancy to prevent rejection of the developing embryo or fetus.
3058 prognosis: The patient's potential clinical outlook based on the status and probable course of his disease; chance of recovery.
3059 prognosis: The patient's potential clinical outlook based on the status and probable course of his disease.
3060 programming: The term which encompasses both reprogramming, differentiation and transdifferentiation.
3061 progression: Continuing growth or regrowth of the cancer.
3062 prokaryotic cell: A type of cell lacking a membrane-enclosed nucleus and membrane-enclosed organelles; found only in the domains Bacteria and Archaea.
3063 prokaryotic: Literally “before the nucleus”, the term applies to all bacteria and archaea. Prokaryotic cells have no internal membranes or cytoskeleton. Their DNA is circular, not linear.
3064 prolactin (PRL): A tropic hormone produced by the pituitary that increases androgen receptors, increases sensitivity to androgen & regulates production & secretion of citrate.
3065 proliferation: Expansion of a population of cells by the continuous division of single cells into two identical daughter cells.
3066 proliferative inflammatory atrophy (PIA): Chronic inflammatory prostate lesions that may result in prostate cancer.
3067 prometaphase: The phase of mitosis in which the nuclear envelope breaks into fragments. Some of the spindle fibers reach the chromosomes and attach to protein structures at the centromeres, called kinetochores, while others make contact with microtubules coming from the opposite pole. The opposing spindle fibers move the chromosomes toward the metaphase plate, an imaginary plane equidistant from the poles.
3068 promoter: A specific nucleotide sequence in DNA that binds transcriptional machinery in the proper position to initiate transcription or the production of mRNA.
3069 prone: referring to the position of the body when lying face downward.
3070 Prophage: A phage genome that has been inserted into a specific site on the bacterial chromosome.
3071 prophase: The first stage of mitosis, during which duplicated chromosomes condense from chromatin, and the mitotic spindle forms and begins moving the chromosomes toward the center of the cell.
3072 prophylactic, prophylaxis: a drug, procedure or piece of equipment used to prevent disease.
3073 proptosis: Forward displacement (bulging) of an organ, typically the eyeball(s).
3074 Proscar®: brand name of finasteride; a 5 AR inhibitor.
3075 prosimian: A lower primate; includes lemurs, lorises, tarsiers, and bush babies, as well as many fossil forms.
3076 prospective HLA-DR typing: A National Marrow Donor Program typing program that selects stored samples from donors who have been HLA-A, B typed, but not HLA-DR typed, and submits them for HLA-DR typing in advance of the donor being identified as a potential match for a specific patient. The goal of this program is to increase the number and diversity of fully HLA typed volunteer stem cell donors on the NMDP Registry, thus reducing search times and costs for patients.
3077 prospective: relating to or being a study (as of the incidence of disease) that starts with the present condition of a population of individuals and follows them into the future.
prostaglandin (PG): One of a group of modified fatty acids secreted by virtually all tissues and performing a wide variety of functions as messengers.

prostaglandin: Hormone like substances that stimulate target cells into action; they differ from hormones in that they act locally, near their site of synthesis, and they are metabolized very rapidly; any of various oxygenated unsaturated cyclic fatty acids of animals that have a variety of hormone like actions (as in controlling blood pressure or smooth muscle contraction).

ProstaScint®: A monoclonal antibody test directed against the prostate specific membrane antigen (PSMA); seems to focus on androgen independent tumor tissue which may contain a greater amount of PSMA.

prostate gland: A gland in human males that secretes an acid-neutralizing component of semen.

prostate specific antigen (PSA): a protein secreted by the epithelial cells of the prostate gland including cancer cells; an elevated level in the blood indicates an abnormal condition of the prostate gland, either benign or malignant; it is used to detect potential problems in the prostate gland and to follow the progress of PC therapy.

prostate: The gland surrounding the urethra and immediately below the bladder in males which provides fluid to nourish and transport sperm during intercourse.

prostatectomy: Surgical removal of part or all of the prostate gland.

prostate-specific membrane antigen (PSMA): A biomarker of prostate epithelial cell activity that is expressed in the membrane of prostate epithelial cells. PSMA is composed of a short 19 amino acid intra-cellular domain, a 24 amino acid transmembrane domain and a 707 amino acid extra-cellular domain. PSMA antigen is radiologically identified (imaged) using a monoclonal antibody attached to a radioactive Indium 111 isotope (ProstaScint scan) to allow visualization of PSMA antigen-containing tissue found within lymph nodes and/or prostate gland.

prostatic acid phosphatase (PAP): An enzyme or biomarker secreted by prostate cells associated with a higher probability of disease outside the prostate when levels are 3.0 or higher; PAP elevations suggest that the disease is not OCD (organ confined disease).

prostatic acid phosphatase: An enzyme or biomarker secreted by prostate cells associated with a higher probability of disease outside the prostate when levels are 3.0 or higher; PAP elevations suggest that the disease is not OCD.

prostatic pedicle: A stalk at the base of the prostate through which the prostate receives its nourishment.

prostatism: A symptom resulting from compression or obstruction of the urethra, due most commonly to hyperplasia of the prostate; results in urinary difficulties and, occasionally, urinary retention.

prostatitis: Infection or inflammation of the prostate gland treatable by medication and/or manipulation; (BPH is a more permanent laying down of fibrous and connective tissue caused when the prostate tries to contain a relatively silent chronic lower-grade infection, often requiring a TURP to relieve the symptoms).

prostatovesical junction: The area in which the prostate connects to the bladder.

prosthesis: A manufactured device used to replace a normal body part or function.

protease inhibitor: A substance that inhibits the action of a protease.

protease: Any enzyme that catalyzes the splitting of proteins into smaller peptide fractions and amino acids by a process known as proteolysis.

proteasome inhibitors: A drug that blocks the action of proteasomes. A proteasome is a large protein complex that helps destroy other cellular proteins when they are no longer needed. Proteasome inhibitors are being studied in the treatment of cancer.

proteasome: An enzyme complex found in all cells, responsible for breaking down proteins involved in cell cycle regulation. Proteasome inhibition disrupts this process, leading to apoptosis or cell death.

protein kinase: An enzyme that transfers phosphate groups from ATP to a protein.

protein marker: Stem cells, like most cells, display a characteristic set of protein molecules on their cell surface called markers, which can be used to make a preliminary identification. Using fluorescently tagged antibodies that attach to these markers, an instrument called a fluorescence activated cell sorter (FACS) can separate and isolate the rare stem cell among a population of thousands of differentiated cells.

protein phosphatase: An enzyme that removes phosphate groups from proteins, often functioning to reverse the effect of a protein kinase.

protein: A large, complex molecule made up of amino acids in chains. The structures of proteins are encoded by DNA, and the proteins are manufactured, according to the DNA blueprint, by apparatus in the cell. Surface proteins on the cell identify the cells as self or non-self, and also
allow researchers to identify different cell types, by identifying the proteins expressed on their surface. Antibodies are used to identify various types of proteins.

**proteoglycans**: A glycoprotein in the extracellular matrix of animal cells, rich in carbohydrate.

**proteome**: A collection of proteins. The human proteome is the collection of proteins found in the human body. A proteome can also refer to the set of proteins in a particular cell.

**Proteomics**: The use of large scale protein separation and identification techniques to study the complete set of proteins in the body.

**protocol**: A precise set of methods by which a treatment or research study is to be carried out.

**protoderm**: The outermost primary meristem, which gives rise to the epidermis of roots and shoots.

**proton beam radiation therapy**: A form of RT that uses the proton, a positively charged nuclear particle, to deliver ionizing radiation. The proton can be programmed to stop at a particular depth within tissue for the delivery of its radiation payload.

**proton pump inhibitors (PPI)**: drugs that reduce gastric acidity by inhibiting the proton pump within the gastric lining cells; examples of PPI include Prilosec® and Nexium®.

**proton pump**: An active transport mechanism in cell membranes that consumes ATP to force hydrogen ions out of a cell and, in the process, generates a membrane potential.

**proton**: A subatomic particle with a single positive electrical charge, found in the nucleus of the atom.

**protonphridium**: An excretory system, such as the flame-cell system of flatworms, consisting of a network of closed tubules having external openings called nephridiopores and lacking internal openings.

**proton-motive force**: The potential energy stored in the form of an electrochemical gradient, generated by the pumping of hydrogen ions across biological membranes during chemiosmosis.

**Proto-oncogene**: A normal cellular gene that has the potential to become an oncogene. c-Myc, one of the four reprogramming factors originally used by the Yamanaka group to reprogram somatic cells into pluripotent stem cells, is a well known proto-oncogene. The c-Myc gene codes for a transcription factor that regulates the expression of many genes involved in the control of cell proliferation, growth, differentiation and apoptosis. Abberant expression of c-Myc, on the other hand, is associated with tumor formation and cancer.

**protoplasm**: All the contents of a cell, including the nucleus.

**protoplasm**: The contents of a plant cell exclusive of the cell wall.

**protostome**: A member of one of two distinct evolutionary lines of coelomates, consisting of the annelids, mollusks, and arthropods, and characterized by spiral, determinate cleavage, schizocoealous formation of the coelom, and development of the mouth from the blastopore.

**protozoa**: Any of a large group of single-celled, usually microscopic, organisms such as amoeba.

**protozoan pl. protozoa**: A protist that lives primarily by ingesting food, an animal-like mode of nutrition.

**provirus**: Viral DNA that inserts into a host genome.

**proximal**: Points near the center of the body. Proximal muscles are the trunk muscles and help maintain balance, opposite of distal.

**proximate causation**: The hypothesis about why natural selection favored a particular animal behavior.

**PSA density (PSAD)**: The amount of PSA per unit volume of the prostate gland; the quotient of PSA divided by gland volume; a reflection of tumor density within the prostate.

**PSA doubling time (PSADT)**: The calculation of the time it takes for the PSA value to double based on at least three values separated by at least three months each; before diagnosis, a PSADT of less than 10 years may be an indication of the presence of PC.

**PSA failure**: The ASTRO definition of PSA failure as being three consecutive increases in PSA level following treatment.

**PSA mRNA**: Messenger RNA which replicates the DNA code of the PSA protein.

**PSA nadir (PSAN)**: the lowest value the PSA reaches during or after a particular treatment; a progressive rise after a PSA nadir has been reached usually indicates biologic activity of PC.

**PSA relapse-free survival**: Survival of the PC patient that relates to no evidence of biochemical relapse based on a rising PSA as seen in 3 consecutive determinations; also called biochemical relapse-free survival (bRFS).

**PSA response**: Normally referred to as a decline in PSA of > 50%.

**PSA slope**: The rate of rise in the PSA level normally expressed as ng/mL per month.

**PSA velocity (PSAV)**: The calculation of the rate of increase in PSA levels in succeeding PSA tests; before diagnosis, a PSAV of 0.75
ng/ml/year (or higher) may be an indication of the presence of PC

pseudocoelem: A body cavity consisting of a fluid-filled space between the endoderm and the mesoderm; characteristic of the nematodes.

pseudocoelomate: An animal, such as a rotifer or roundworm, whose body cavity is not completely lined by mesoderm.

pseudogenes: A sequence of DNA that resembles a gene but is non functional and cannot be transcribed. It could be the remnant of a once-functional gene that has accumulated mutations.

pseudopodia: Fingerlike extensions from an amoeboid cell; literally “false feet”.

pseudopodium: A cellular extension of amoeboid cells used in moving and feeding.

pseudopregnant: Refers to a female primed with hormones to accept a blastocyst for implantation.

PSM: prostate specific membrane; a membrane that surrounds the protoplasm (cytoplasm) of prostate cells.

psoriasis: Psoriasis is a condition characterized by severe scaling and flakiness. Recent evidence indicates that the skin is rapidly reproducing cells creating an excess build-up because the skin cannot exfoliate normally.

psychogenic: produced or caused by psychological or mental factors rather than organic factors; compare to neurogenic.

psychosis: Mental state involving hallucinations (disturbances of perception) and/or delusions (false yet strongly held personal beliefs that result from an inability to separate real from unreal experiences).

psychotic symptom: Symptoms of psychosis or the mental state involving hallucinations (disturbances of perception) and/or delusions (false yet strongly held personal beliefs that result from an inability to separate real from unreal experiences).

psychotic: Psychosis is a loss of contact with reality, typically including delusions (false ideas about what is taking place or who one is) and hallucinations (seeing or hearing things which aren't there).

PTEN: A gene acts as a tumor suppressor gene by deactivating Akt and rendering prostate cancer cells more susceptible to suicide.

PTHrP: Parathyroid hormone-related protein; a protein involved in osteoblast stimulation; a product also of the PC cell elaborated by neuroendocrine cells that make CGA (chromogranin A).

Pub Med: a Web site which allows access to thousands of published medical studies. It is a service of the National Institute of Health and can be found at www.pubmed.com.

pubertal delay: A lack of the signs of puberty in either sex by age 14. Delayed puberty and other growth-related problems or delay can be symptoms with many LSDs.

puberty: The condition of being or the period of becoming first capable of reproducing sexually marked by maturing of the genital organs, development of secondary sex characteristics, and in the human and in higher primates by the first occurrence of menstruation in the female.

pubic arch: the arch formed by the inferior rami of the pubic bones.

pubo-prostatic: Relating to the structures/supports which connects the capsule of the prostate gland to symphysis pubis.

puerperium: The period between childbirth and the return of the uterus to its normal size.

pulmonary artery: In birds and mammals, an artery that carries deoxygenated blood from the right ventricle of the heart to the lungs, where it is oxygenated.

pulmonary embolism: a blood clot in a lungs, causing a severe impairment of respiratory function.

pulmonary vein: In birds and mammals, a vein that carries oxygenated blood from the lungs to the left atrium of the heart, from which blood is pumped into the left ventricle and from there to the body tissues.

pulmonary artery: In birds and mammals, an artery that carries deoxygenated blood from the right ventricle of the heart to the lungs, where it is oxygenated.

pulmonary: Pertaining to the lungs.

cellular plating: The checkerboard diagram used for analysis of allele segregation.

pupa: A developmental stage of some insects, in which the organism is nonfeeding, immotile, and sometimes encapsulated or in a cocoon; the pupal stage occurs between the larval and adult phases.

pumping: The process of removing certain types of cells from the stem cell product before transplanting it to a patient. In autologous transplants, marrow may be purged of lingering cancer cells.
purine analog: An anticancer drug that interferes with cancer cell division and causes their death. The enzyme that is responsible for DNA replication tries to use the analog rather than the proper purine, and thus does not function correctly.
purine: A nitrogenous base, such as adenine or guanine, with a characteristic two-ring structure; one of the components of nucleic acids.
purpura: Hemorrhage under a surface that is about 1.0 cm. in diameter.
pyelogram: X-ray study of the kidney especially showing the pelvis (urine-collecting basin) of the kidney and the ureter.
pyramid of energy: A diagram of the energy flow between the trophic levels of an ecosystem; plants or other autotrophs (at the base of the pyramid) represent the greatest amount of energy, herbivores next, then primary carnivores, secondary carnivores, etc.
pyrilinks-D (Dpd): a urine test that quantitates bone resorption; the second voided urine specimen is ideal to use; other markers of bone resorption are ICTP and N-telopeptide.
pyrimidine: A nitrogenous base, such as cytosine, thymine, or uracil, with a characteristic single-ring structure; one of the components of nucleic acids.
pyrophosphate: A salt or ester of pyrophosphoric acid.
qCT: quantitative CT bone densitometry; an alternate way to evaluate bone density besides the DEXA scan; qCT is not falsely elevated due to calcium deposits in blood vessels or due to degenerative joint disease
Qi: Under Traditional Chinese Medicine, the life-force energy that permeates all living things.
qigong: A system of self healing encompassing gentle movements, breathing, and meditative practices.
quadriplegia: An injury in the cervical area, affecting all four limbs.
quality of life (QOL): An evaluation of health status relative to the patient's age, expectations and physical and mental capabilities.
quantitative character: A heritable feature in a population that varies continuously as a result of environmental influences and the additive effect of two or more genes.
quaternary structure: The particular shape of a complex, aggregate protein, defined by the characteristic three-dimensional arrangement of its constituent subunits, each a polypeptide.
queen: In social insects (ants, termites, and some species of bees and wasps), the fertile, or fully developed, female whose function is to lay eggs.
quercetin: A commonly available, antioxidant nutritional supplement found in many many foods. Inhibits damage-mediating, post-injury lipid peroxidation.
quiescence: The G0, or resting phase of the cell cycle, the state of a cell when it is not dividing.
quiescent center: A region located within the zone of cell division in plant roots, containing meristematic cells that divide very slowly.
quiescent: A cell that does not divide or replicate.
R plasmid: A bacterial plasmid carrying genes that confer resistance to certain antibiotics.
rabies: A viral disease of wild animals that can be transmitted to humans through the bite of an infected animal. The disease has not yet been detected in Australia.
RAD: A unit of absorbed radiation dose, 100 rads = 1 joule/kg = 1 Gray.
radiative: Members of the radially symmetrical animal phyla, including cnidarians.
radiation cystitis: Inflammation of the bladder lining due to the ionizing effects of radiation therapy.
radiation oncologist: A physician who has received special training regarding the treatment of cancers with different types of radiation.
radiation proctitis: Inflammation of the rectal mucosa lining due to the ionizing effects of radiation therapy.
radiation therapy: The use of high-energy rays to damage cancer cells, stopping them from growing and dividing. Like surgery, radiation therapy is a local treatment that affects cancer cells only in the treated area.
radiation therapy: Treatment aimed at eliminating cancer cells, shrinking tumors or suppressing the immune system by using high-energy radiation from X-ray machines or other sources.
radiation: (1) Rays of energy. Gamma rays and X-rays are two of the types of energy waves often used in medicine. (2) The use of energy waves to diagnose or treat disease.
radical prostatectomy (RP): An operation to remove the entire prostate gland and seminal vesicles.
radical: Directed at the cause of a disease; thus, radical prostatectomy is the surgical removal of the prostate with the intent to cure the problem believed to be caused by or within the prostate.

radio sensitivity: The degree to which a type of cancer responds to radiation therapy.

radioactive dating: A method of determining the age of fossils and rocks using half-lives of radioactive isotopes.

radioactive isotope: An isotope, an atomic form of a chemical element, that is unstable; the nucleus decays spontaneously, giving off detectable particles and energy.

radioactive isotope: Isotope refers to one of two or more atoms of the same element that have the same number of protons in their nucleus but different numbers of neutrons. A radioactive isotope is a natural or artificially created isotope of a chemical element having an unstable nucleus that decays, emitting alpha, beta, or gamma rays until stability is reached.

radiobiology (adj. radiobiological): The study of the effects of radiation on living organisms.

radiography: Producing an image by radiation other than visible light, e.g., x-rays of one's teeth is done by radiography.

radioimmunoassay: A sensitive method of determining the concentration of a substance, particularly a protein-bound hormone, in blood plasma.

radioimmunometric: A measurement using radioimmunology, a system for testing antigen antibody reactions using radioactive labelling of antigen or antibody to detect the extent of the reaction.

radioisotope: A type of atom (or a chemical which is made with a type of atom) that emits radioactivity.

radiolabeled: An antibody that has been joined with a radioactive substance.

radiolabel: An antibody that has been joined with a radioactive substance.

radiology: The branch of medicine that deals with radioactive substances for diagnosing and treating disease.

radiometric dating: A method paleontologists use for determining the ages of rocks and fossils on a scale of absolute time, based on the half-life of radioactive isotopes.

radionuclide: An unstable form of a chemical element that radioactively decays, resulting in the emission of nuclear radiation.

radiopharmaceutical: A drug containing a radioactive substance that is used in the diagnosis and treatment of cancer and in pain management of bone metastases.

radiotherapy: The use of radiation to kill cancer cells. X-rays and gamma-rays are the most commonly used forms.

Rai: A staging system for lymphoma.

ramus (pl. rami): The arch formed by the inferior rami of the pubic bones.

determined: The process of assigning patients to different forms of treatment in a research study in a random manner.

rapamycin: An antibiotic that blocks a protein involved in cell division and inhibits the growth and function of certain T cells of the immune system.

rapeseed: The seed of the rape plant, which is a source of edible oil. The rape plant is a bright yellow flowering variety of the Brassicaceae (mustard) family known as canola. It is generally grown and cultivated for animal feed, vegetable oil and biodiesel.

rb: A protein which plays an important role in sensing whether appropriate growth factors and nutrients are present to allow for cell growth and division; loss of Rb fosters the evolution of hormone-resistant disease and may impair the response to radiation therapy.

dNA: Recombinant DNA.

Reactant: A starting material in a chemical reaction.

receptor activator of nuclear factor Kappa-B ligand: A molecule important in bone metabolism which activates osteoclasts, cells involved in bone resorption.

receptor potential: An initial response of a receptor cell to a stimulus, consisting of a change in voltage across the receptor membrane proportional to the stimulus strength. The intensity of the receptor potential determines the frequency of action potentials traveling to the nervous system.

receptor: A docking site which interacts with a ligand; receptors may be on the cell membrane or within the cell cytoplasm or nucleus; estrogen receptors and androgen receptors are examples; all cells have multiple receptors.

receptor-mediated endocytosis: The movement of specific molecules into a cell by the inward budding of membranous vesicles containing proteins with receptor sites specific to the molecules being taken in; enables a cell to acquire bulk quantities of specific substances.

receptors: Specialized structures, often on the surface of cells, that recognize molecules for signaling or for transporting into the cell.

recessive allele: In a heterozygote, the allele that is completely masked in the phenotype.
recessive inheritance or trait: Pattern of inheritance whereby disease results only when an individual inherits two gene mutations for the particular disease. The parents of a child who is affected are said to be “carriers” of the disease, because they have one mutation and do not manifest symptoms. If both members of a couple are carriers, there is a 1 in 4 or 25% chance in each pregnancy for a child to be affected. Also referred to as autosomal recessive inheritance if the gene is not located on the X or Y chromosomes.

recessive: A genetic trait that is only expressed if both genes in the pair code for it; it can be “overridden”

recessive: One of a pair of alleles that fails to be expressed in the phenotype of the organism when the dominant allele is present. Also refers to the phenotype, when an individual has only the recessive allele.

recipient: In medicine, a recipient is someone who receives something like a blood transfusion or an organ transplant. The recipient is beholden to the donor.

reciprocal altruism: Altruistic behavior between unrelated individuals; believed to produce some benefit to the altruistic individual in the future when the current beneficiary reciprocates.

recognition sequence: A specific sequence of nucleotides at which a restriction enzyme cleaves a DNA molecule.

recognition species concept: The idea that specific mating adaptations become fixed in a population and form the basis of species identification.

recombinant DNA technology: A procedure for manufacturing proteins by manipulation of DNA segments. Used to produce large quantities of enzymes for use in enzyme replacement therapy.

recombinant DNA: DNA formed by combining segments of DNA from different genes or different types of organisms.

recombination: The formation of new gene combinations; in eukaryotes, may be accomplished by new associations of chromosomes produced during sexual reproduction or crossing over; in prokaryotes, may be accomplished through transformation, conjugation, or transduction.

recruitment group: An organization affiliated with the National Marrow Donor Program that recruits donors.

rectoprostatic: The area between the prostate and its neighboring rectal wall.

rectum (adj. rectal): The final part of the intestines that ends at the anus.

receptor: A structure on the surface of a cell that recognizes a chemical signal from another cell.

repetitive DNA: DNA that is repeated many times within a genome.

repetitive element: A DNA sequence that is repeated within a genome.

repetitive gene: A gene that is repeated within a genome.

red blood cell: The blood cells that carry oxygen. Red cells contain hemoglobin and it is the hemoglobin which permits them to transport oxygen (and carbon dioxide). Hemoglobin, aside from being a transport molecule, is a pigment. It gives the cells their red color (and their name).

redox reaction: A chemical reaction involving the transfer of one or more electrons from one reactant to another; also called oxidation-reduction reaction.

reducing agent: The electron donor in a redox reaction.

reduction: The gaining of electrons by a substance involved in a redox reaction.

reflex erection: A penile erection produced by touch.

reflex: An automatic reaction to a stimulus, mediated by the spinal cord or lower brain.

refractory period: The short time immediately after an action potential in which the neuron cannot respond to another stimulus, owing to an increase in potassium permeability.

refractory: Resistant to therapy; e.g., hormone refractory prostate cancer is resistant to forms of treatment involving hormone manipulation.

regeneration (vs. transplantation): Another potential application of stem cells is making cells and tissues for medical therapies. Today, donated organs and tissues are often used to replace those that are diseased or destroyed. Unfortunately, the number of people needing a transplant far exceeds the number of organs available for transplantation. Pluripotent stem cells offer the possibility of a renewable source of replacement cells and tissues to treat a myriad of diseases, conditions, and disabilities including heart disease, eye disease, liver disease, kidney disease, Parkinson’s and Alzheimer’s diseases, spinal cord injury, stroke, burns, diabetes, osteoarthritis and rheumatoid arthritis.

regenerative medicine: A field of medicine devoted to treatments in which stem cells are induced to differentiate into the specific cell type required to repair damaged or destroyed cell populations or tissues. Regenerative medicine aims to repair damaged organs to replace cells and tissues damaged by aging and by disease.

regional anesthesia: Includes both epidural and spinal.

registry: A confidential national database of potential volunteer stem cell donors established
remission, all signs and symptoms of cancer that have disappeared. In complete remission, some, but not all, signs and symptoms of cancer. In partial remission: A decrease in or disappearance of secretion of hormones by the anterior pituitary.

releasing hormone: A hormone produced by neurosecretory cells in the hypothalamus of the vertebrate brain that stimulates or inhibits the secretion of hormones by the anterior pituitary.

remobilization: The process of mobilization following failure of an earlier procedure.

renal: A term that means having something to do with the kidneys. Renal failure is kidney failure.

reparative medicine: The field of medicine that deals with the repair or replacement of lost or damaged tissue. An example of this is stem cell therapy. Reparative medicine is also referred to as regenerative medicine.

repeat sequences: The length of a nucleotide sequence that is repeated in a tandem cluster.

repetitive DNA: Nucleotide sequences, usually noncoding, that are present in many copies in a eukaryotic genome. The repeated units may be short and arranged tandemly (in series) or long and dispersed in the genome.

regurgitation: Return of stomach content eg food into the mouth.

reimbursement: Refund, being paid back for monies used out of pocket.

reinfusion: The return of healthy stem cells into the transplant recipient’s body.

rejection phenomena: Where ever an organ or tissue (i.e. blood transfusion) is given to a patient via transplantation, the patient’s immune system detects that an invasion by a foreign object has occurred. The immune system then reacts by forming antibodies and killer T-cells (thymic derived lymphocytes) to destroy the “invader.”

rejection: The response of the immune system to a transplant of foreign tissue, or tissue from another person or animal as donor. Adult stem cells are much more likely to trigger rejection than fetal, embryonic or umbilical cord stem cells.

relapse: The reappearance of a disease after a period of improvement.

relative fitness: The contribution of one genotype to the next generation compared to that of alternative genotypes for the same locus.

relay neuron: Neuron that transmits signals between different regions of the central nervous system.

releaser: A signal stimulus that functions as a communication signal between individuals of the same species.

releasing hormone: A hormone produced by neurosecretory cells in the hypothalamus of the vertebrate brain that stimulates or inhibits the secretion of hormones by the anterior pituitary.

remission: A decrease in or disappearance of signs and symptoms of cancer. In partial remission, some, but not all, signs and symptoms of cancer have disappeared. In complete remission, all signs and symptoms of cancer that can be detected with modern technology have disappeared, although cancer still may be in the body.

regulative development: A pattern of development, such as that of a mammal, in which the early blastomeres retain the potential to form the entire animal.

regulatory DNA: DNA that controls the activity of genes. In the human genome, regulatory DNA sequences tend to be short and located near the genes they control.

regulatory viral protein (Rev) A lentiviral packaging element that binds to Rev Response Element (RRE) sequences, allowing the cytoplasmic export of viral RNAs.

regurgitation: Return of stomach content eg food into the mouth.

reportable list: A list that identifies all diagnoses and types of cases to be included in the cancer registry data base. For most registries in the world, the "reportable list" is everything listed in ICD-O-3 with a /2 or a /3 in the behavior code.

reportable malignancies: Tumors required to be reported. Typically, in most cancer registries, the reportable tumors are those that are listed in the International Classification of Diseases for Oncology, Third Edition which have a behavior defined as in situ (behavior code = /2) or invasive (behavior code = /3).

represibl enzyme: An enzyme whose synthesis is inhibited by a specific metabolite.

repressor: A DNA-binding protein that inhibits gene transcription by binding to the operator and blocking the attachment of RNA polymerase to the promoter region of the gene.

repessor: A protein that suppresses the transcription of a gene.

reproductive cloning: The goal of reproductive cloning is to create an animal being identical to the animal that donated the somatic cell nucleus. The embryo is implanted in a uterus and develops into a live being. The first animal to be created by reproductive cloning was Dolly the sheep, born at the Roslin Institute in Scotland in 1996.
reproductive isolation: Two populations of organisms are isolated if their members are unable to interbreed and produce fertile offspring. Various structural, behavioral, and biochemical features can prevent interbreeding and thus reproductively isolate populations as distinct species.

reprogramming factors: In 2006, the Yamanaka lab identified four factors that, when co-transfected and expressed in mouse adult fibroblast cells, caused those fibroblasts to revert back to a pluripotent like state. One year later, the same four factors were used to successfully reprogram human adult fibroblast cells into induced pluripotent stem cells. These four factors are Oct-4, SOX2, c-Myc and Klf-4.

reprogramming: The process of converting a differentiated cell to an embryonic stem cell-like state by the forced expression of proteins important for maintaining the "stemness" of embryonic stem cells. Used, for example, to generate induced pluripotent stem (iPS) cells. Alternatively, reprogramming can be described as a switch in gene expression from one kind of cell to another unrelated cell type. For example, switching of adult pancreatic exocrine (non-insulin producing) cells to pancreatic β-cells that secrete insulin. Reprogramming occurs naturally in regenerative organisms, such as planaria (flatworms), starfish, and salamanders, and is termed dedifferentiation.

reproperitoneal: Having to do with the area outside or behind the peritoneum (the tissue that lines the abdominal wall and covers most of the organs in the abdomen).

reptilia: The vertebrate class of reptiles, represented by lizards, snakes, turtles, and crocodilians.

rescue process: Another term for a stem cell transplant. The re-infusion of healthy stem cells following high doses of chemotherapy or radiation.

research sample: A sample of a donor's or recipient's blood that is used in research studies. Typically, blood samples are collected for research studies but sometimes a marrow sample is requested at the time of donation.

resection: Surgical removal.

resectoscope: Instrument inserted through the urethra and used by a urologist to cut out tissue (usually from the prostate) while the physician can actually see precisely where he is cutting.

residual Disease: The disease has not been eradicated.

resistance: In cancer, the ability of a tumour or cancer cells to withstand the effects of treatment that should normally kill them.

resolving power: A measure of the clarity of an image; the minimum distance that two points can be separated and still be distinguished as two separate points.

resorption: Loss of bone through increased breakdown via osteoclasts or other mechanism causing a reduction in bone mass.

resource partitioning: The division of environmental resources by coexisting species populations such that the niche of each species differs by one or more significant factors from the niches of all coexisting species populations.

respiration: (1) In aerobic organisms, the intake of oxygen and the liberation of carbon dioxide. (2) In cells, the oxygen-requiring stage in the breakdown and release of energy from fuel molecules.

respite care: A service provided to the families of children who require extraordinary forms of care, so that the family can take vacations, handle business affairs, and have some relief from the duties of caring for the child.

response rate: The proportion of patients in which a treatment has an effect on cancer. Responses can be partial or complete.

response: The disappearance of all signs of cancer in response to treatment. In the case of MM, a CR means that the M-protein has been completely eliminated. This does not always mean the cancer has been cured.

resting potential: The membrane potential characteristic of a nonconducting, excitable cell, with the inside of the cell more negative than the outside.

restriction enzyme: An enzyme (normally derived from bacteria) that cuts strands of DNA at particular points along its length into shorter fragments.

restriction fragment length polymorphisms (RFLPs): Differences in DNA sequence on homologous chromosomes that result in different patterns of restriction fragment lengths (DNA segments resulting from treatment with restriction enzymes); useful as genetic markers for making linkage maps.

restriction site: A specific sequence on a DNA strand that is recognized as a "cut site" by a restriction enzyme.

retention: Refers to the length of time volunteer stem cell donors remain on the Registry and are able to be located, are in good health and are still willing to donate.
reticular cell: Non-descript cells in the bone marrow that have not been characterized. Sometimes fibroblasts and mesenchymal stem cells are referred as reticular cells.

reticular formation: A brain circuit involved with alertness and direction of attention to selected events; consists of a loose network of interneurons running through the brainstem, plus certain neurons in the thalamus that function as an extension of this network.

reticuloendothelial system: A group of cells having the ability to take up and sequester inert particles and vital dyes, including macrophages or macrophage precursors, specialized endothelial cells lining the sinusoids of the liver, spleen, and bone marrow, and reticular cells of lymphatic tissue (macrophages) and of bone marrow (fibroblasts).

reticuloendothelial: The widely diffused bodily system constituting all phagocytic cells except certain white blood cells.

reticulopodia: Long thread-like pseudopodia that branch apart and rejoin, forming a fine network. They are characteristic of forams.

reticum: A fine network (e.g., endoplasmic reticum).

retina: The innermost layer of the vertebrate eye, containing photoreceptor cells (rods and cones) and neurons; transmits images formed by the lens to the brain via the optic nerve.

retinal: The light-absorbing pigment in rods and cones of the vertebrate eye.

retinoblastoma: An ocular malignant neoplasm of the retina, usually arise in the first 2 years of life, it is the most form of intraocular malignancy in children.

retinoic acid: A metabolite of vitamin A.

retinoid: Derivatives of vitamin A used clinically in the treatment of severe acne and psoriasis; under investigation for treating cancer.

retropubic prostatectomy: Surgical removal of the prostate through an incision in the abdomen above the pubic bones.

retrospective: Relating to a study that starts with the present condition of a population of individuals and collects data about their past history to explain their present condition – compare to prospective.

retrovirus: Any virus belonging to the viral family Retroviridae. They are enveloped viruses possessing an RNA genome, and replicate via a DNA intermediate. Retroviruses rely on the enzyme reverse transcriptase to perform the reverse transcription of its genome from RNA into DNA, which can then be integrated into the host's genome with an integrase enzyme. The virus then replicates as part of the cell's DNA.

reverse transcriptase: A DNA polymerase enzyme that transcribes single-stranded RNA into double-stranded DNA which is then integrated into the host genome by integrase proteins. This process is the reverse of normal transcription. The retroviral vectors (retroviruses) are genetically engineered by scientists to encapsulate and deliver reverse transcriptase, integrase and the four reprogramming factors, Oct-4, SOX2, c-Myc, Klf-4 into the fibroblasts to reprogram them into induced pluripotent stem cells. These transgenes are then reverse transcribed from RNA into DNA by the enzyme reverse transcriptase and finally integrated into the host's genome by integrase proteins.

Rh protein: A cell recognition protein found on the outside of red blood cells. This protein was first identified in Rhesus monkeys, and thus its name. Along with the "A" and "B" blood type proteins, these constitute the major blood type markers.

rhabdomyosarcoma: Rhabdomyosarcoma tumors arise from a cell called a "rhabdomyoblast", which is a primitive muscle cell. Instead of differentiating into striated muscle cells, the rhabdomyoblasts grow out of control. Since this type of muscle is located throughout the body, the tumors can appear at numerous locations.

rhizoid: Rootlike anchoring structure in fungi and nonvascular plants.

rhizome: In vascular plants, a horizontal stem growing along or below the surface of the soil; may be enlarged for storage or may function in vegetative reproduction.

rhizotomy: A neurosurgical procedure that selectively severs spinal nerve roots.

rhodopsin: A visual pigment consisting of retinal and opsin. When rhodopsin absorbs light, the retinal changes shape and dissociates from the opsin, after which it is converted back to its original form.

ribonucleic acid (RNA): A type of nucleic acid consisting of nucleotide monomers with a ribose sugar and the nitrogenous bases adenine (A), cytosine (C), guanine (G), and uracil (U); usually single-stranded; functions in protein synthesis and as the genome of some viruses.

ribose: The sugar component of RNA.

ribosomal RNA (rRNA): The most abundant type of RNA. Together with proteins, it forms the structure of ribosomes that coordinate the sequential coupling of tRNA molecules to the series of mRNA codons.
3326 ribosome: A cell organelle constructed in the nucleolus, functioning as the site of protein synthesis in the cytoplasm. Consists of rRNA and protein molecules, which make up two subunits.

3327 ribozyme: An enzymatic RNA molecule that catalyzes reactions during RNA splicing.

3328 rights: Entitlements. Some rights (human rights) belong to everyone by virtue of being human; some rights (legal rights) belong to people by virtue of their belonging to a particular political state.

3329 risk factor: that which causes an individual or group of individuals to have an increased risk of a condition or disease.

3330 risk: Used as a term for a danger that arises unpredictably, such as being struck by a car.

3331 RNA (ribonucleic acid): A type of nucleic acid consisting of nucleotide monomers with a ribose sugar and the nitrogenous base adenine (A), cytosine (C), guanine (G), or uracil (U). RNA is usually single-stranded and functions in protein synthesis, gene regulation, and often makes up the genetic material of viruses.

3332 RNA (ribonucleic acid): Found mostly in the cytoplasm of cells is important in the synthesis of proteins. It is a chain made up of subunits called nucleotides. Messenger RNA (mRNA) replicates the DNA code for a protein and moves to organelles (specialized cell structures) called ribosomes, which are themselves composed of protein and a type of RNA called ribosomal RNA (rRNA). At the ribosomes, transfer RNA (tRNA) assembles amino acids to form the protein specified by the messenger RNA.

3333 RNA interference, or RNAi: A system in cells for “turning off,” or silencing, genes. Some plants use RNAi to silence the genes of invading pathogens, and some animals may as well. In the laboratory, scientists mimic RNAi to test the functions of individual genes. The system has potential as a therapy if scientists can figure out how to trigger the silencing of “overactive” genes in people, such as those involved in cancer.

3334 RNA polymerase: An enzyme involved in the synthesis of messenger RNA during gene transcription. RNA polymerase moves along a gene in the 5' to 3' direction and uses the genetic information encoded by the DNA to add the complementary ribonucleotides to synthesize messenger RNA.

3335 RNA processing: Modification of RNA before it leaves the nucleus, a process unique to eukaryotes.

3336 RNA splicing: The removal of noncoding portions (introns) of the RNA molecule after initial synthesis.

3337 RNA: Short for ribonucleic acid, a nucleic acid molecule similar to DNA but containing ribose rather than deoxyribose. RNA is formed upon a DNA template. There are several classes of RNA molecules. They play crucial roles in protein synthesis and other cell activities: Messenger RNA (mRNA) is a type of RNA that reflects the exact nucleoside sequence of the genetically active DNA. mRNA carries the “message” of the DNA to the cytoplasm of cells where protein is made in amino acid sequences specified by the mRNA. Transfer RNA (tRNA) is a short-chain type of RNA present in cells. There are 20 varieties of tRNA. Each variety combines with a specific amino acid and carries it along (transfers it), leading to the formation of protein with a specific amino acid arrangement dictated by DNA. Ribosomal RNA (rRNA) is a component of ribosomes. Ribosomal RNA functions as a nonspecific site for making polypeptides.

3338 robotic prostatectomy: A new minimally invasive type of surgery that features telemanipulation devices allowing the performance of complex surgical tasks with dexterity and minimal fatigue due to their ergonomic design. They also provide expanded degree of movements, tremor filtering, and 3-D stereoscopic visualization.

3339 ROC curve: Relative (or receiver) Operating Characteristic, or simply ROC curve, is a graphical plot of sensitivity vs. 1 minus specificity.

3340 rod cell: One of two kinds of photoreceptors in the vertebrate retina; sensitive to black and white and enables night vision.

3341 Roentgen: The international unit of x- or gamma-radiation, abbreviated r or R; named after the German physicist, Wilhelm Roentgen, who discovered roentgen ray in 1895.

3342 root cap: A cone of cells at the tip of a plant root that protects the apical meristem.

3343 root hair: A tiny projection growing just behind the root tips of plants, increasing surface area for the absorption of water and minerals.

3344 root pressure: The upward push of water within the stele of vascular plants, caused by active pumping of minerals into the xylem by root cells.

3345 root: The descending axis of a plant, normally below ground and serving both to anchor the plant and to take up and conduct water and dissolved minerals.

3346 rostral: An anatomical adjective indicating toward the head (opposite of caudal).

3347 rough ER: That portion of the endoplasmic reticulum studded with ribosomes.
transmission of a nerve impulse along an axon

saltatory conduction(sahl-tuh-tor-ee): Rapid transmission of a nerve impulse along an axon resulting from the action potential jumping from one node of Ranvier to another, skipping the myelin-sheathed regions of membrane.

salvage: A procedure intended to "rescue" a patient following the failure of a prior treatment; for example, a salvage prostatectomy would be the surgical removal of the prostate after the failure of prior radiation therapy or cryosurgery.

sample repositories: Laboratories under contract with the NMDP to store blood and cell samples from NMDP volunteer donors for later DNA-based HLA typing.

Sanger sequencing: A widely used method of determining the order of bases in DNA.

saprobe: An organism that acts as a decomposer by absorbing nutrients from dead organic matter.

sarcolemma: The specialized plasma membrane surrounding a muscle cell (muscle fiber); capable of propagating action potentials.

sarcoma: A malignant neoplasm arising in tissue of mesodermal origin (as connective tissue, bone, cartilage, or striated muscle).

sarcomere: The fundamental, repeating unit of striated muscle, delimited by the Z lines.

sarcoplasmic reticulum: A modified form of endoplasmic reticulum in striated muscle cells that stores calcium used to trigger contraction during stimulation.

satellite cells: Small mononuclear progenitor cells with virtually no cytoplasm found in mature muscle.

satellite: A chromosomal segment that branches off from the rest of the chromosome but is still connected by a thin filament or stalk.

saturated fat: A fat that has only single bonds in the molecule.

saturated fatty acid: A fatty acid in which all carbons in the hydrocarbon tail are connected by single bonds, thus maximizing the number of hydrogen atoms that can attach to the carbon skeleton.

saturation biopsy: A systematic biopsy using 3-D mapping to obtain thorough coverage of a half or the full prostate involving as many as 30-80 samples, depending on gland volume.

duplex: A chromosome; a small chromosome that branches off from the rest of the chromosome but is still connected by a thin filament or stalk.

savanna: A tropical grassland biome with scattered individual trees, large herbivores, and three distinct seasons based primarily on rainfall, maintained by occasional fires and drought.

saw palmetto: The dwarf palm plant indigenous to Florida that is the source of Serenoa repens and its lipid extract.

scaffold: A material that spans a healing wound and provides structure for young cells as they grow into mature tissue.
scale-up: The process of transferring a biological procedure that works in a laboratory up to a scale suitable for wider-scale therapeutic use.

scar tissue: A type of connective tissue that results from the normal healing process. Scar tissue is not as elastic or as strong as normal, uninjured tissue.

Schwann cell: In the embryo, Schwann cells grow around the nerve fiber, forming concentric layers of cell membrane (the myelin sheath).

Schwann cells: A chain of supporting cells enclosing the axons of many neurons and forming an insulating layer called the myelin sheath.

scleroid: A short, irregular sclerenchyma cell in nutshells and seed coats and scattered through the parenchyma of some plants.

tsclerenchyma cell: A rigid, supportive plant cell type usually lacking protoplasts and possessing thick secondary walls strengthened by lignin at maturity.

Sclerosis: A hardening within the nervous system, especially of the brain and spinal cord, resulting from degeneration of nervous elements such as the myelin sheath.

sclerotic: Tissue hardened by causes like inflammation, mineral accumulation, etc.

SCNT: A technique whereby the nucleus of a somatic cell (any cell of the body except sperm and egg) is injected into an egg that has had its nucleus removed.

screening: Evaluating populations of people to diagnose disease early.

scrotum: The pouch of skin containing a man's testicles.

search process: The process of comparing a patient's HLA antigens to those of the volunteer donors on the Registry (preliminary search) and testing potentially matched donors to identify the best donor for the patient (formal search). The search process may take from several weeks to more than a year.

sebaceous: Relating to or being fatty material.

seborrhoeic dermatitis: A skin disorder affecting the scalp, face and trunk causing scaly, flaky, itchy, red skin. It particularly affects the sebume gland rich areas of skin. It is thought to be caused by a fungal infection caused by the yeast, Pityosporum ovale in individuals with decreased immunity and increased sebum production.

second filial generation (F2): Offspring resulting from interbreeding of the hybrid F1 generation.

second law of thermodynamics: The principle whereby every energy transfer or transformation increases the entropy of the universe. Ordered forms of energy are at least partly converted to heat, and in spontaneous reactions, the free energy of the system also decreases.

second messenger: A small, nonprotein, water-soluble molecule or ion, such as calcium ion or cyclic AMP, that relays a signal to a cell's interior in response to a signal received by a signal receptor protein.

secondary compound: A chemical compound synthesized through the diversion of products of major metabolic pathways for use in defense by prey species.

secondary consumer: A member of the trophic level of an ecosystem consisting of carnivores that eat herbivores.

secondary growth: The increase in girth of the stems and roots of many plants, especially woody, perennial dicots.

secondary immune response: The immune response elicited when an animal encounters the same antigen at some later time. The secondary immune response is more rapid, of greater magnitude, and of longer duration than the primary immune response.

secondary injury: The physiological and biochemical changes that occur after the initial mechanical injury that further damage the spinal cord.

secondary productivity: The rate at which all the heterotrophs in an ecosystem incorporate organic material into new biomass, which can be equated to chemical energy.

secondary sex characteristics: Characteristics of animals that distinguish between the two sexes but that do not produce or convey gametes; includes facial hair of the human male and enlarged hips and breasts of the female.

secondary structure: The localized, repetitive coiling or folding of the polypeptide backbone of a protein due to hydrogen bond formation between peptide linkages.

secondary succession: A type of succession that occurs where an existing community has been severely cleared by some disturbance.

secretagogue: A substance that causes another substance to be secreted.

secretation: 1. The process of secreting (releasing) a substance, especially one that is not a waste, from the blood or cells; 2. a substance, such as saliva, mucus, tears, bile, or a hormone, that is secreted.

sedimentary rock: Rock formed from sand and mud that once settled in layers on the bottom of seas, lakes, and marshes. Sedimentary rocks are often rich in fossils.
seed implantation: Insertion of radioactive seeds, usually iodine 125 or palladium 103 into the prostate tissue to destroy prostate cancer (PC).

seed: An adaptation for terrestrial plants consisting of an embryo packaged along with a store of food within a resistant coat.

segregation: The normal biological process whereby the two pieces of a chromosome pair are separated during meiosis and randomly distributed to the germ cells.

seizure: A sudden change in behavior due to an excessive electrical activity in the brain. There are a wide variety of possible symptoms of seizures, depending on what parts of the brain are affected. Many types of seizures cause loss of consciousness with twitching or shaking of the body. However, some seizures consist of staring spells that can easily go unnoticed. Occasionally, seizures can cause temporary abnormal sensations or visual disturbances.

seizure: Abnormal electrical discharge of brain tissue, often resulting in abnormal body movements or behaviours.

selection coefficient: The difference between two fitness values, representing a relative measure of selection against an inferior genotype.

selection: The process by which the forms of organisms in a population that are better adapted to the environmental conditions increase in frequency relative to less well-adapted forms over a number of generations.

selective androgen receptor modulator: A drug that selectively inhibits androgen receptors of a specific tissue(s) while allowing the normal interaction of the androgen with androgen receptors at other sites.

selective breeding: A process in which new or improved strains of plants or animals are developed, mainly through controlled mating or crossing and selection of progeny for desired traits.

selective permeability: A property of biological membranes that allows some substances to cross more easily than others.

selective pressure: An environmental factor that favors the survival and reproduction of those genetic variants within a population that are better adapted to the environment.

selenium: A relatively rare nonmetallic element found in food in small quantities that has some effect in prevention of prostate cancer.

self pollination: The transfer of pollen from anther to stigma in the same flower or to another flower of the same plant, leading to self-fertilization.

self regeneration: For cells, ability to divide and produce more copy of itself.

self: Belonging to or part of the body, as opposed to foreign material or foreign proteins present in the body.

self-fertilization: The union of egg and sperm produced by a single hermaphroditic organism.

Self-inactivating (SIN) long terminal repeat: The basal/enhancer control elements from wild-type lentiviral promoters were replaced in the long terminal repeat by transcriptional control elements from heterologous viral or cellular promoters. This replacement renders the virus replication incompetent.

self-incompatibility: The capability of certain flowers to block fertilization by pollen from the same or a closely related plant.

self-renewal: Self-renewal describes the process where a stem cell undergoes mitotic cell division that yields at least one daughter cell with equivalent developmental potential as the mother cell - i.e. creating another stem cell. The capacity of stem cells to self-renew varies based on the type of stem cell. Induced pluripotent stem cells and embryonic stem cells maintain the ability to self-renew indefinitely under proper culture conditions. Adult stem cells have limited capacity to self-renew and proliferate. Self-renewal is a necessary cellular function that allows the body to maintain a sufficient number of stem cells within its different tissues and organs for the maintenance/repair of lost or damaged cells/tissues.

semen: The fluid that is ejaculated by the male during orgasm; contains sperm and secretions from several glands of the male reproductive tract.

seminal vesicles: Glandular structures located above and behind the prostate that secrete and store seminal fluid; the seminal vesicles connect with the ejaculatory ducts; the seminal fluid contains nutrients for the sperm that improves their viability and mobility.

seminal: Related to the semen; for example, the seminal vesicles are structures at the base of the
bladder and connected to the prostate that provide nutrients for the semen. Seminiferous tubules: Highly coiled tubes in the testes in which sperm are produced. Senescence: The phenomenon in which a normal diploid cell loses the ability to divide after about 50 cell divisions. Sensation: An impulse sent to the brain from activated receptors and sensory neurons. Sensitivity: The probability that a diagnostic test can correctly identify the presence of a particular disease assuming the proper conduct of the test; specifically, the number of true positive results divided by the sum of the true positive results and the false negative results. Sensory neuron: A nerve cell that receives information from the internal and external environments and transmits the signals to the central nervous system. Sensory receptor: A specialized structure that responds to specific stimuli from an animal's external or internal environment; transmits the information of an environmental stimulus to the animal's nervous system by converting stimulus energy to the electrochemical energy of action potentials. Sepal: A whorl of modified leaves in angiosperms that encloses and protects the flower bud before it opens. Sepsis: Systemic response to infection with fever and elevated white blood cell count. Septicemia: A bodywide infection due to virulent bacteria entering the bloodstream from a local infection, i.e., blood poisoning. Septum: A partition, or cross wall, that divides a structure, such as a fungal hypha, into compartments. Sequence (v.): To determine the sequence of genetic “letters” in a piece of DNA or an entire human genome. Sequence assembly: A process whereby the order of multiple sequenced DNA fragments is determined. Sequence tagged site (STS): Short (200 to 500 base pairs) DNA sequence that has a single occurrence in the human genome and whose location and base sequence are known. Detectable by polymerase chain reaction, STSs are useful for localizing and orienting the mapping and sequence data reported from many different laboratories and serve as landmarks on the developing physical map of the human genome. Expressed sequence tags (ESTs) are STSs derived from cDNAs. 3460 Sensory receptor: A specialized structure that responds to specific stimuli from an animal's external or internal environment; transmits the information of an environmental stimulus to the animal's nervous system by converting stimulus energy to the electrochemical energy of action potentials. 3461 Sequence (v.): To determine the sequence of genetic “letters” in a piece of DNA or an entire human genome. 3462 Sequence assembly: A process whereby the order of multiple sequenced DNA fragments is determined. 3463 Sequence tagged site (STS): Short (200 to 500 base pairs) DNA sequence that has a single occurrence in the human genome and whose location and base sequence are known. Detectable by polymerase chain reaction, STSs are useful for localizing and orienting the mapping and sequence data reported from many different laboratories and serve as landmarks on the developing physical map of the human genome. Expressed sequence tags (ESTs) are STSs derived from cDNAs. 3464 Senescence: The phenomenon in which a normal diploid cell loses the ability to divide after about 50 cell divisions. 3465 Sensation: An impulse sent to the brain from activated receptors and sensory neurons. 3466 Sensitivity: The probability that a diagnostic test can correctly identify the presence of a particular disease assuming the proper conduct of the test; specifically, the number of true positive results divided by the sum of the true positive results and the false negative results. 3467 Sensory neuron: A nerve cell that receives information from the internal and external environments and transmits the signals to the central nervous system. 3468 Sensory receptor: A specialized structure that responds to specific stimuli from an animal's external or internal environment; transmits the information of an environmental stimulus to the animal's nervous system by converting stimulus energy to the electrochemical energy of action potentials. 3469 Sequence (v.): To determine the sequence of genetic “letters” in a piece of DNA or an entire human genome. 3470 Sequence assembly: A process whereby the order of multiple sequenced DNA fragments is determined. 3471 Sequence tagged site (STS): Short (200 to 500 base pairs) DNA sequence that has a single occurrence in the human genome and whose location and base sequence are known. Detectable by polymerase chain reaction, STSs are useful for localizing and orienting the mapping and sequence data reported from many different laboratories and serve as landmarks on the developing physical map of the human genome. Expressed sequence tags (ESTs) are STSs derived from cDNAs.
syndrome includes fever and coughing or difficulty breathing, and can be fatal. It is thought to have originated in mainland China in 2003 and has spread to other countries.

3461 severe combined immuno-deficiency disease (SCID): An inherited disease in which the immune system does not work well. It is often treated with a marrow or blood stem cell transplant.

3462 sex chromosomes: These determine our gender. Some congenital diseases are X-linked and only manifest in males. That is because a normal second X makes the expression recessive while the Y sex chromosome in males does not cancel out the expression which is thus dominant. Hemophilia is an example of an X-linked congenital disease.

3463 sex hormone binding globulin (SHBG): A protein that binds testosterone to make it unavailable for function; SHBG production is increased by estrogens such as DES. SHBG binds to DHT four times more avidly than to testosterone.

3464 sex-linked genes: Genes located on one sex chromosome but not the other.

3465 sex-linked trait: An inherited trait, such as color discrimination, determined by a gene located on a sex chromosome and that therefore shows a different pattern of inheritance in males and females.

3466 sex-linked: Traits or diseases associated with the X or Y chromosome; generally seen in males.

3467 sextant: Having six parts; thus, a sextant biopsy is a biopsy that takes six samples.

3468 sexual dimorphism: A special case of polymorphism based on the distinction between the secondary sex characteristics of males and females.

3469 sexual health inventory for men score: A score which quantifies sexual function based on five specific questions.

3470 sexual reproduction: A type of reproduction in which two parents give rise to offspring that have unique combinations of genes inherited from the gametes of the two parents.

3471 sexual selection: Selection based on variation in secondary sex characteristics, leading to the enhancement of sexual dimorphism.

3472 Sezary Disease: This is a variant of a cutaneous T-cell lymphoma. It likely represents the leukemic phase of mycosis fungoides.

3473 SH-2, -3, -4: Markers developed by Osiris Biotechnology to detect mesenchymal stem cells. SH-2 has the specificity as for CD105 (endoglin) and SH-4 for stro-1.

3474 shared follow-up: Shared follow-up is the act or process of sharing information or contacting the patient at least once per year to ascertain vital status, cancer status, and other information.

3475 shoot system: The aerial portion of a plant body, consisting of stems, leaves, and flowers.

3476 short tandem repeats: Short DNA sequences that are repeated in a head-to-tail manner. They are useful in DNA profiling.

3477 short-day plant: A plant that flowers, usually in late summer, fall, or winter, only when the light period is shorter than a critical length.

3478 shotgun method: Sequencing method that involves randomly sequenced cloned pieces of the genome, with no foreknowledge of where the piece originally came from. This can be contrasted with "directed" strategies, in which pieces of DNA from known chromosomal locations are sequenced. Because there are advantages to both strategies, researchers use both random (or shotgun) and directed strategies in combination to sequence the human genome.

3479 shotgun sequencing: A method of determining the DNA sequence of a genome. The first step in shotgun sequencing is to copy a genome many times, then shred the copies into fragments of DNA that can be “read” by machines. Next, computers identify the fragments that belong next to each other in the genome and assemble them into a complete genome sequence.

3480 sickle cell anemia: An inherited type of anemia which occurs most often in Africans and African Americans. The disease gets its name from the sickle shape (a C-shape) of the red blood cells. These cells cannot move oxygen very well. The disease is sometimes treated with a marrow or blood stem cell transplant.

3481 sickle cell trait: A person who has one gene for sickle cell anemia is said to have sickle cell trait. Sickle cell trait cannot change to become sickle cell anemia. A person will develop sickle cell anemia only if both parents pass on the trait (gene) to him or her.

3482 side effect: A reaction to a medication or treatment (most commonly used to mean an unnecessary or undesirable effect).

3483 side population (SP) stem cell: Two examples of multipotent stem cell populations found in bone marrow and skeletal muscle. SPs are not yet fully characterized. Their significance is their unexpected ability to differentiate into cell types that are distinct from their tissue of origin.

3484 sideroblast: An erythroblast having granules of ferritin.

3485 sieve tube member: A chain of living cells that form sieve tubes in phloem.

3486 sign stimulus: An external sensory stimulus that triggers a fixed action pattern.
sign: Physical changes which can be observed as a consequence of an illness or disease.
signal excitation: The excitation of signals using a strong magnetic field and radio frequency (RF) pulses to produce resonances or peaks due to water or other chemicals (metabolites) within tissue.
signal peptide: A stretch of amino acids on polypeptides that targets proteins to specific destinations in eukaryotic cells.
signal transduction pathways: Relay of a signal by the conversion from one physical or chemical form to another. In cell biology, signal transduction is the process in which a cell converts an extracellular signal into a response.
signals: Internal and external factors that control changes in cell structure and function. They can be chemical or physical in nature.
signal-transduction pathway: A mechanism linking a mechanical or chemical stimulus to a cellular response.
signet ring: The early stage of trophozoite development of the malaria parasite in the red blood cell; the parasite cytoplasm stains blue around its circular margin, and the nucleus stains red in Romanowsky stains, while the central vacuole is clear, giving the ringlike appearance.
sildenafil: The active ingredient of Viagra®, which may help to produce erections.
silencing: A technique to stop or interrupt the expression of a particular gene, most commonly by the insertion of a reverse copy of all or part of that gene.
single nucleotide polymorphism (SNP): A single “letter” of DNA that may vary from one person to the next. At a particular location in the genome, one person may have an “A” while another has a “T.” In the human genome, a SNP occurs on average about once every thousand DNA “letters.”
single photon emission computed tomography: Tomography using emissions from radionuclides and a computer algorithm to reconstruct the image. SPECT allows visualization of the body in slices from recalculated planar views of the patient.
single-cell cloned: A procedure pertaining to cells in vitro in which the descendants of a single cell are physically isolated from other cells growing in a dish, and then expanded into a larger population.
single-gene disorder: A disease caused by a single gene that is inherited in a straightforward manner from parent or parents to child. Huntington’s disease and cystic fibrosis are examples. The term "Mendelian" refers to Gregor Mendel, the Austrian who did pioneering work on genes and traits in ordinary garden peas by showing that a single trait, such as color, can be determined by a single gene. Compared to “complex diseases,” Mendelian disorders are relatively rare.
sink habitat: A habitat where mortality exceeds reproduction.
sinoatrial node: Area of the vertebrate heart that initiates the heartbeat; located where the superior vena cava enters the right atrium; the pacemaker.
sinus marrow sinus: Area of the blood vessels where the arterial and venous blood mix. Mature hematopoietic cells and other bone marrow cells exist through the sinus into the peripheral circulation.
sinusoidal: Any of the venous cavities through which blood passes in various glands and organs, such as the adrenal gland and the liver.
sister chromatids: Replicated forms of a chromosome joined together by the centromere and eventually separated during mitosis or meiosis II.
sister Mary Joseph node: A malignant intra-abdominal neoplasm metastatic to the umbilicus.
skeletal muscle: Striated muscle generally responsible for the voluntary movements of the body.
skeletal: Related events - include bone fracture, spinal cord compression or the need for radiation or surgery for the treatment of bone metastasis.
skin biopsy: A skin biopsy is a procedure where a piece of skin is removed to diagnose an illness. It may also be called punch biopsy. A skin biopsy can be performed in an outpatient medical setting with some local anesthetic to numb the area. Physicians who specialize in genetics or dermatologists usually perform the skin biopsy. During a skin or punch biopsy, the doctor removes a small round piece of skin using a hollow instrument. Stitches are only required if a large sample is taken. To prepare for the test, tell your doctor about all the medications you are currently taking including over the counter medications. You will feel a stinging sensation when the anesthetic is injected. You may feel a little sore in that area for several days thereafter.
sliding-filament model: The theory explaining how muscle contracts, based on change within a sarcomere, the basic unit of muscle organization, stating that thin (actin) filaments slide across thick (myosin) filaments, shortening the sarcomere; the shortening of all sarcomeres in a myofibril shortens the entire myofibril.
small cell PC: An aggressive variant of prostate cancer with a tendency to metastasize early due to rapidly dividing cells.
small intestinal submucosa: A scaffold used to help heal chronic wounds, repair hernias, or form a sling for the bladder as a treatment for urinary incontinence. SIS is constructed from naturally-occurring material and is harmlessly absorbed by the body as healthy new tissue grows in to replace it.

Small molecule drugs: Form of LSD treatment that attempts to use small molecules to administer therapies to stabilize faulty enzymes or minimize the amount of waste material that accumulates.

small nuclear ribonucleoprotein (snRNP): One of a variety of small particles in the cell nucleus, composed of RNA and protein molecules; functions are not fully understood, but some form parts of spliceosomes, active in RNA splicing.

smooth ER: That portion of the endoplasmic reticulum that is free of ribosomes.

smooth muscle: A type of muscle lacking the striations of skeletal and cardiac muscle because of the uniform distribution of myosin filaments in the cell.

smooth muscle: Also known as “involuntary muscle,” these muscles perform automatic tasks such as peristalsis and blood vessel constriction. Named smooth muscle because of smooth, rather than striated, appearance under a microscope.

social dominance: A hierarchical pattern of social organization involving domination of some members of a group by other members in a relatively orderly and long-lasting pattern.

social hierarchy: An arrangement within a group of animals, such as rabbits, where some individuals are dominant over others. The more dominant an animal, the more likely it is to have preferred access to mates and sources of food.

society: An organization of individuals of the same species in which there are divisions of resources, divisions of labor, and mutual dependence; a society is held together by stimuli exchanged among members of the group.

Sociobiology: The study of social behavior based on evolutionary theory.

sodium-potassium pump: A special transport protein in the plasma membrane of animal cells that transports sodium out of and potassium into the cell against their concentration gradients.

solute: Substance that is dissolved in a solution.

solution: A homogeneous, liquid mixture of two or more substances. solvent The dissolving agent of a solution. Water is the most versatile solvent known.

somatic (adult) stem cells: A relatively rare undifferentiated cell found in many organs and differentiated tissues with a limited capacity for both self renewal (in the laboratory) and differentiation. Such cells vary in their differentiation capacity, but it is usually limited to cell types in the organ of origin. This is an active area of investigation.

somatic (or adult) stem cell: An undifferentiated cell found in a differentiated tissue that can renew itself and differentiate (with certain limitations) to give rise to all the specialized cell types of the tissue from which it originated. It is important to note that scientists do not agree about whether or not adult stem cells may give rise to cell types other than those of the tissue from which they originate.

somatic cell genetic mutation: A change in the genetic structure that is neither inherited nor passed to offspring. Also called acquired mutations.

somatic cell nuclear transfer (SCNT): A laboratory technique for creating an ovum with a donor nucleus. In SCNT the nucleus, which contains the organism's DNA, of a somatic cell is removed and the rest of the cell discarded. At the same time, the nucleus of an egg cell is removed. The nucleus of the somatic cell is then inserted into the enucleated egg cell. After being inserted into the egg, the somatic cell nucleus is reprogrammed by the host cell. The egg, now containing the nucleus of a somatic cell, is stimulated with a shock and will begin to divide. After many mitotic divisions in culture, this single cell forms a blastocyst with almost identical DNA to the original organism.

somatic cell nuclear transplant: A technique in which the nucleus of a somatic cell (any cell of the body except sperm cells and egg cells) is injected, or transplanted, into an egg, that has had its nucleus removed. If the new egg is then implanted into the womb of an animal, an individual will be born that is a clone. The clone has the identical genetic material as the somatic cell, which supplied the nucleus that carries the genetic material. This procedure is very inefficient and was first developed for agricultural purposes. However, in human medicine, this technique can be used to isolate embryonic stem cells from eggs that undergo nuclear transplant. When the somatic cell is supplied from the cells of a person, the stem cells isolated from the developing eggs can be used to make a tissue that will not be rejected by that person, because they have the same genetic material. In this way, 'customized' embryonic stem cells could be made for everyone who needed them.

somatic stem cells: Somatic stem cells are another way of referring to adult stem cells. These cells...
are undifferentiated, meaning they can develop into more than one type of cell belonging to the organ from which they were taken. They can self-renew indefinitely.

3530 somatic: Pertaining to the body, as opposed to the brain or the spirit.

3531 somatosensory evoked potential: An electrophysiological measurement of spinal cord function. Recorded by stimulating peripheral nerves and measuring the response from the patient's scalp.

3532 somatosensory: Refers to sensory signals from all tissues of the body including skin, viscera, muscles and joints.

3533 somatostatin: A hormone that inhibits the secretion of insulin and gastrin.

3534 somatomedotropin: A hormone, produced by the pituitary gland, that stimulates protein synthesis and promotes the growth of bone; also known as growth hormone.

3535 somite: One of the longitudinal series of segments into which the body of many animals (including vertebrates) is divided.

3536 sonogram: An image of a structure that is produced by ultrasonography.

3537 source habitat: A habitat where reproduction exceeds mortality and from which excess individuals disperse.

3538 Southern blotting: A hybridization technique that enables researchers to determine the presence of certain nucleotide sequences in a sample of DNA.

3539 SOX 2 SRY (sex determining region Y): box 2, is a transcription factor that is essential to maintain self-renewal of undifferentiated embryonic stem cells. This intronless gene encodes a member of the SRY-related HMG-box (SOX) family of transcription factors involved in the regulation of embryonic development and in the determination of cell fate.

3540 SOX2: SOX2 is a transcription factor critical for the maintenance of pluripotency in embryonic stem cells. SOX2 and Oct-4 work in parallel to co-regulate expression of target genes involved in the maintenance of pluripotency. In 2006, the Yamanaka lab identified Oct-4 as one of the four factors that, when co-transfected and expressed in mouse adult fibroblasts, caused fibroblasts to revert to an "embryonic-like" state. One year later, the same four factors where used to successfully reprogram human adult fibroblast cells into induced pluripotent stem cells. These four factors are Oct-4, SOX2, c-Myc, Klf-4.

3541 spasticity: Spasticity is a condition in which certain muscles are continuously contracted. This contraction causes stiffness or tightness of the muscles and may interfere with movement, speech, and manner of walking. Spasticity is usually caused by damage to the portion of the brain or spinal cord that controls voluntary movement. Symptoms may include hypertonicity (increased muscle tone), clonus (a series of rapid muscle contractions), exaggerated deep tendon reflexes, muscle spasms, scissoring (involuntary crossing of the legs), and fixed joints. The degree of spasticity varies from mild muscle stiffness to severe, painful, and uncontrollable muscle spasms. Spasticity can interfere with rehabilitation in patients with certain disorders, and often interferes with daily activities.

3542 spatial-resolution: A term that refers to the number of pixels utilized in construction of a digital image - images having higher spatial resolution have a greater number of pixels.

3543 specialized cells: Also known as differentiated, mature or adult cells. Cells.

3544 specialized: (1) Of cells, having particular functions in a multicellular organism. (2) Of organisms, having special adaptations to a particular habitat or mode of life.

3545 speciation: The origin of new species in evolution.

3546 species (pl. species): A particular kind of organism; members possess similar anatomical characteristics and have the ability to interbreed.

3547 species diversity: The number and relative abundance of species in a biological community.

3548 species richness: The number of species in a biological community.

3549 species selection: A theory maintaining that species living the longest and generating the greatest number of species determine the direction of major evolutionary trends.

3550 species-specific: Pertaining to individuals of only one species. For example, a pesticide that is species-specific affects only one species.

3551 specific heat: The amount of heat that must be absorbed or lost for 1 g of a substance to change its temperature 1°C.

3552 specific: Unique; for example, the proteins in a given organism, the enzyme catalyzing a given reaction, or the antibody to a given antigen.

3553 specificity: The probability that a diagnostic test can correctly identify the absence of a particular disease assuming the proper conduct of the test; specifically, the number of true negative results divided by the sum of the true negative results and the false positive results; a method that detects 95% of true PC cases is highly sensitive, but if it also falsely indicates that 40% of those who do not have PC do have PC then its specificity is only 60%.
spectral karyotype (SKY): A graphic of all an organism's chromosomes, each labeled with a different color. Useful for identifying chromosomal abnormalities.

spectrophotometer: An instrument that measures the proportions of light of different wavelengths absorbed and transmitted by a pigment solution.

spectroscopy: The science of measuring the emission and absorption of different wavelengths (spectra) of visible and non-visible light

sperm: A sperm is the male "gamete" or sex cell. It combines with the female "gamete," called an ovum, to form a zygote. The formation process is called fertilization.

spermatid: Each of four haploid (n) cells resulting from the meiotic divisions of a spermatocyte; each spermatid becomes differentiated into a sperm cell.

spermatocytes: The diploid (2n) cells formed by the enlargement and differentiation of the spermatogonia; they give rise by meiotic division to the spermatids.

spermatogenesis: The continuous and prolific production of mature sperm cells in the testis.

spermatogonia: The unspecialized diploid (2n) cells on the walls of the seminiferous tubules that, by enlargement, differentiation, and meiotic division, become spermatocytes, then spermatids, then sperm cells.

spermatocid: A substance that acts to kill or immobilize sperm.

spermidine: A polyamine compound, C7H19N3, found in ribosomes and living tissues and having various metabolic functions. It was originally isolated from semen.

spermine: A crystalline polyamine compound, C10H26N4, present in ribosomes and found widely in living tissues along with spermidine. It is originally isolated from semen.

sphincter: A ringlike valve, consisting of modified muscles in a muscular tube, such as a digestive tract; closes off the tube like a drawstring.

sphingomyelin: A lipid or fat that is critical for the normal structure and function of cells and tissues. It is normally degraded into ceramide by sphingomyelinase. Niemann-Pick Types A and B are characterized by its absence and resultant accumulation of sphingomyelin.

spina bifida: A birth defect in which the spinal cord is malformed and lacks its usual protective skeletal and tissue coverings.

spinal Anesthesia: A form of anesthesia in which medication is inserted into the spinal column to block any painful sensations that might be felt from the point of insertion down to the lower extremities. The donor is conscious under this form of anesthesia. Nearly five percent of NMDP donors receive spinal anesthesia.

spinal cord injury: Trauma or damage to the spinal cord, the major column of nerve tissue that is connected to the brain and lies within the vertebral canal and from which the spinal nerves emerge. The spinal cord and the brain constitute the central nervous system. The spinal cord consists of nerve fibers that transmit impulses to and from the brain. Like the brain, the spinal cord is covered by three connective-tissue envelopes called the meninges. The space between the outer and middle envelopes is filled with cerebrospinal fluid (CSF), a clear colorless fluid that cushions the spinal cord against jarring shock.

spinal cord: The major column of nerve tissue that is connected to the brain and lies within the vertebral canal and from which the spinal nerves emerge. Thirty-one pairs of spinal nerves originate in the spinal cord: 8 cervical, 12 thoracic, 5 lumbar, 5 sacral, and 1 coccygeal. The spinal cord and the brain constitute the central nervous system (CNS). The spinal cord consists of nerve fibers that transmit impulses to and from the brain. Like the brain, the spinal cord is covered by three connective-tissue envelopes called the meninges. The space between the outer and middle envelopes is filled with cerebrospinal fluid (CSF), a clear colorless fluid that cushions the spinal cord against jarring shock. Also known simply as the cord.

spindle: An assemblage of microtubules that orchestrates chromosome movement during eukaryotic cell division.

spinosus Process: A vertebral rearward projection that provides an attachment point for muscles and ligaments.

spiracle: One of the external openings of the respiratory system in terrestrial arthropods.

spiral cleavage: A type of embryonic development in protostomes, in which the planes of cell division that transform the zygote into a ball of cells occur obliquely to the polar axis, resulting in cells of each tier sitting in the grooves between cells of adjacent tiers.
Spleen: An oblong-shaped organ situated between the heart and stomach that plays a role in the final destruction of red blood cells, filtration and storage of blood, and production of lymphocytes.

Splenomegaly: Enlargement of the spleen; may be a symptom with several LSDs.

splice site: Location in the DNA sequence where RNA removes the noncoding areas to form a continuous gene transcript for translation into a protein.

spliceosome: Complex assembly that interacts with the ends of an RNA intron in splicing RNA; releases an intron and joins two adjacent exons.

spongy parenchyma: In plant leaves, a tissue composed of loosely arranged chloroplast-containing parenchyma cells.

sporadic cancer: Cancer that occurs randomly and is not inherited from parents. Caused by DNA changes in one cell that grows and divides, spreading throughout the body.

sporangiphore: A specialized hypha or a branch bearing one or more sporangia.

sporangium (pl. sporangia): A capsule in fungi and plants in which meiosis occurs and haploid spores develop.

spore: In the life cycle of a plant or alga undergoing alternation of generations, a meiotically produced haploid cell that divides mitotically, generating a multicellular individual, the gametophyte, without fusing with another cell.

sporophyte: The multicellular diploid form in organisms undergoing alternation of generations that results from a union of gametes and that meiotically produces haploid spores that grow into the gametophyte generation.

sporopollenin: A secondary product, a polymer synthesized by a side branch of a major metabolic pathway of plants that is resistant to almost all kinds of environmental damage; especially important in the evolutionary move of plants onto land.

squamous cell carcinoma: A malignant neoplasm of squamous cells. In the white population, squamous cell carcinoma of the skin is associated with prolonged exposure to ultraviolet light and these neoplasms are slow to metastasis even after becoming invasive.

ß-cell: A cell in the pancreas which is responsible responsible for the production and regulation of insulin.

sspartocylas: An enzyme that breaks down a N-acetylaspartate acid into parts thought to be necessary for proper myelin production and maintenance, Canavan disease is characterized by its absence.

spergillus: A family of fungi commonly found in soil - certain types may cause disease, especially in people who have suppressed immune systems.

stabilizing selection: Natural selection that favors intermediate variants by acting against extreme phenotypes.

Stage: As regards cancer, the extent of a cancer, especially whether the disease has spread from the original site to other parts of the body.

staging: The process of determining extent of disease in a specific patient in light of all available information; it is used to help determine appropriate therapy; there are two staging methods: the Whitmore-Jewett staging classification (1956) and the more detailed TNM (tumor, (lymph) nodes, metastases) classification (1992) of the American Joint Committee on Cancer and the International Union Against Cancer. Staging should be subcategorized as clinical staging and pathologic staging. Clinical stage is based on the digital rectal exam findings. Pathologic stage usually relates to what is found at the time of surgery. The TNM system is now most commonly used.

stamen: The pollen-producing male reproductive organ of a flower, consisting of an anther and filament.

stander: A piece of equipment which allows a person who is unable to stand on his/her own (or has great difficulty standing) to stand upright. Standers have a variety of components providing support to necessary areas (knees, chest, hips, head, etc.) depending on each person’s needs. Standing is medically beneficial for many reasons, including: bone density, stretching feet/ankles, improving digestion and improving joints.

staple length: The length of the individual fibres of cotton. Affects the quality of the fabric that is made from it.

starch: A storage polysaccharide in plants consisting entirely of glucose.

startle response or Moro reflex: The startle response or reflex is a normal reflex for an infant when he or she is startled or feels like they are falling. The infant will have a "startled" look and the arms will fling out sideways with the palms up and the thumbs flexed. Presence of the startle response in babies older than a few months is abnormal and associated with neurological damage.

stat 3: Signal transducers and activators of transcription 3.

statocyst: A type of mechanoreceptor that functions in equilibrium in invertebrates through
the use of statoliths, which stimulate hair cells in relation to gravity.

**3601** stele: The central vascular cylinder in roots where xylem and phloem are located.

**3602** Stem cell antigen 1 (Sca-1): Cell-surface protein on bone marrow cell, indicative of hematopoietic stem cells and mesenchymal stem cells.

**3603** stem cell biologist: A scientist that works with stem cells.

**3604** stem cell factor (SCF): Relatively undifferentiated cell that can continue dividing indefinitely, throwing off daughter cells that can undergo terminal differentiation into particular cell types.

**3605** stem cell homing: The migration of stem cells through the blood or tissue to an ultimate destination where it differentiates and replaces or builds tissue. Stem cell homing is triggered by interactions between the cell surface adhesion molecules (such as selectins, integrins and ICAMs) and the cell's surrounding environment.

**3606** stem cell line: A group of stem cells that have the following two traits: (1) They divide and make exact copies of themselves. (2) This is called self-renewal. They can change into distinct precursors of all sorts of different cells. This is called differentiation.

**3607** stem cell niche: The microenvironment in which a stem cell is situated. During development, the niche may contain various factors and elements that alter gene expression within the stem cell, causing the cell to differentiate and proliferate into various tissues of the fetus. In developed tissue, the niche may help maintain stem cells in a quiescent state, until injury or disease signals them to self-renew and differentiate to replace the damaged tissue. Niche elements may include interactions with other cells, adhesion molecules, growth factors, cytokines and parameters such as pH, ionic strength and gas composition. Scientists study niche characteristics in order to replicate them in vitro, to control and direct the differentiation of stem cells in the laboratory.

**3608** stem cell retrieval: The process of collecting stem cells from the circulating blood stream following administration of growth factors to increase their numbers.

**3609** stem cell therapy: Use of stem cells to treat a disorder. Over 70 different disorders have been identified as amenable to stem cell therapy.

**3610** stem cell transplant: The process of infusing healthy stem cells into persons who have undergone high-dose chemotherapy for one of many forms of leukemia, immunodeficiency, lymphoma, anemias, or metabolic disorders. There are three types of stem cell transplants: autologous, allogeneic and syngeneic. Healthy stem cells are collected from bone marrow, peripheral blood, and umbilical cord blood. Once the healthy stem cells are infused into the patient's blood stream, the cells move from the blood vessels to the center of the bones, where they begin making new blood cells.

**3611** stem cell transplantation: A transfusion of bone marrow stem cells which are used to rescue marrow after very high doses of chemotherapy. Stem cells are circulating and can be mobilized so as not to require bone marrow harvesting (involves collecting stem cells with a needle placed into the soft center of the bone, the marrow).

**3612** stem cells: A stem cell is a cell whose job in the body is not yet determined. Every single cell in the body "stems" from this type of cell, hence, the name stem cell. Stem cells are the body's "master" cells. Stem cells are formed at conception and specialize to become the various tissues of the growing embryo. They can duplicate themselves indefinitely and become or "differentiate" into many different cell types, such as blood, nerve, organ, bone, muscle, etc. These two key characteristics make stem cells different from the body's other cells, which are permanently the type of cell they have become - for example, a liver cell can only divide and generate new liver cells. The ability of stem cells to become other types of cells - their ability to "differentiate" - makes them absolutely essential for repairing and renewing body tissues throughout our lives.

**3613** stem-cell homeostasis persistence of tissue stem: Cell pool throughout life. Requires balancing symmetric self-renewal with differentiative divisions at the population level, or sustained asymmetric self-renewal.

**3614** stem-cell homeostasis: Persistence of tissue adult stem: cell pool throughout life. Requires balancing symmetric self-renewal with differentiative divisions at the population level or sustained asymmetric self-renewal.

**3615** stemness: Unproven notion that different stem cells are regulated by common genes and mechanisms.

**3616** stenosis: A narrowing, as in aortic stenosis (narrowing of the aortic valve in the heart), pulmonary stenosis (narrowing of the pulmonary valve in the heart), pyloric stenosis (narrowing of the outlet of the stomach), spinal stenosis (narrowing of the vertebral canal, often with impingement upon the spinal cord). From the Greek "stenos" meaning narrow.

**3617** stent: A tube used by a surgeon to drain fluids.
sterile: Incapable of reproduction. Not able to germinate or bear fruit.

steroid: Any hormone affecting the development and growth of sex organs. Testosterone and estrogen are steroids. Synthetic steroids are useful cancer treatments, but they might have undesirable side-effects.

stigma: In plants, the region of a carpel serving as a receptive surface for pollen grains, which germinate on it.

stimulant medication: A drug that increases the activity of the sympathetic nervous system and produces a sense of euphoria or awakening. Stimulants can be used as recreational drugs or therapeutically to increase alertness. They are also used and sometimes abused to boost endurance and productivity as well as to suppress appetite. Examples of stimulants are caffeine, nicotine, amphetamines and cocaine.

stimulus: Any internal or external change or signal that influences the activity of an organism or of part of an organism.

stochastic: Random.

stomata (pl. stomata): A microscopic pore surrounded by guard cells in the epidermis of leaves and stems that allows gas exchange between the environment and the interior of the plant.

stool impaction: Severe constipation.

strategy: A group of related traits, evolved under the influence of natural selection, that solve particular problems encountered by living organisms; often includes anatomical, physiological, and behavioral characteristics.

stratified: In an analysis of data, a particular clinical or pathologic feature(s) is used as the basis for comparison, e.g. clinical stage, pathologic stage, PSA, Gleason score.

stress incontinence: passing a small amount of urine when coughing, lifting, etc.

striated muscle: Skeletal voluntary muscle and cardiac muscle. The name derives from the striped appearance, which reflects the arrangement of contractile elements.

strict aerobe: An organism that can survive only in an atmosphere of oxygen, which is used in aerobic respiration.

strict anaerobe: An organism that cannot survive in an atmosphere of oxygen. Other substances, such as sulfate or nitrate, are the terminal electron acceptors in the electron transport chains that generate their ATP.

structure: Scarring as a result of a procedure or an injury that constricts the flow of a fluid; for example, a urethral stricture would restrict the flow of urine through the urethra.

stroma: The fluid of the chloroplast surrounding the thylakoid membrane; involved in the synthesis of organic molecules from carbon dioxide and water.

stromal BPH: A non-cancerous cause of prostate enlargement within the connective tissue framework of the prostate.

stromal cell: A non-blood cell that is derived from blood organs, such as bone marrow or fetal liver, which is capable of supporting growth of blood cells in vitro. Stromal cells that make this matrix within the bone marrow are also derived from mesenchymal stem cells.

stromal: Relating to the stroma of an organ or other structure, that is, its framework, usually of connective tissue, rather than its specific substance.

stromatolite: Rock made of banded domes of sediment in which are found the most ancient forms of life: prokaryotes dating back as far as 3.5 billion years.

strontium-89: An injectable radioactive product that is used to relieve bone pain in some patients with prostate cancer that no longer responds to hormones or appropriate forms of chemotherapy.

structural formula: A type of molecular notation in which the constituent atoms are joined by lines representing covalent bonds.

structural gene: A gene that codes for a polypeptide.

Structural genomics: The effort to determine the 3D structures of large numbers of proteins using both experimental techniques and computer simulation.
suppressor T cell (TS): A type of T cell that causes B cells as well as other cells to ignore antigens.

suprapubic: Above the pubic bone; a suprapubic tube is placed into the bladder by puncturing the skin and soft tissue above the pubic bone.

supraspinale: Above the spinal cord or vertebral column.

surface antigen: Proteins on the surface of cells that are capable of detection by antibodies or other means. These may stimulate an immune response.

surface markers: Proteins on the outside surface of a cell that are unique to certain cell types, which are visualized using antibodies or other detection methods.

suture: Hemostatic agent.

surrogate: A person or animal that functions as a substitute for another. In the case of a surrogate mother, a woman or female animal carries an embryo and ultimately gives birth to a baby that was formed from the egg of another female.

survivorship curve: A plot of the number of members of a cohort that are still alive at each age; one way to represent age-specific mortality.

suspension-feeder: Aquatic animal, such as a clam or a baleen whale, that sifts small food particles from the water.

sustainable agriculture: Long-term productive farming methods that are environmentally safe.

sustainable development: An approach to development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It seeks to ensure that current development does not alter the environment's ability to recover from any damage sustained, and also makes use of renewable resources.

sustainable development: The long-term prosperity of human societies and the ecosystems that support them.

style: In angiosperms, the stalk of a carpel, down which the pollen tube grows.

subarachnoid space: A space, filled with cerebrospinal fluid, between the spinal-cord’s arachnoid membrane and inner most pia mater membrane.

subcapsular: Under the capsule; for example, a subcapsular orchietomy is a form of castration in which the contents of each testicle is removed but the testicular capsules are then closed and remain in the scrotum.

Subculturating: Transferring cultured cells, with or without dilution, from one culture vessel to another.

subcutaneous: Located, found, or placed just beneath the skin.

subcutis: Subcutis the deepest layer of skin and is also known as the subcutaneous layer.

substitution: In genetics, a type of mutation due to replacement of one nucleotide in a DNA sequence by another nucleotide or replacement of one amino acid in a protein by another amino acid.

substrate: (1) The substance on which an enzyme works. (2) The foundation to which an organism is attached.

substrate: Waste material that may accumulate in cell lysosomes when it is not broken down by enzymes.

substrate-level phosphorylation: The formation of ATP by directly transferring a phosphate group to ADP from an intermediate substrate in catabolism.

sucrose: Cane sugar; a common disaccharide found in many plants; a molecule of glucose linked to a molecule of fructose.

sugar: Any monosaccharide or disaccharide.

sulcus: A groove or furrow, as one of the grooves on the surface of the cerebrum in mammals.

sulfated proteoglycan: Molecules found primarily in connective tissues and joint fluids and that provide lubrication.

summation: A phenomenon of neural integration in which the membrane potential of the postsynaptic cell in a chemical synapse is determined by the total activity of all excitatory and inhibitory presynaptic impulses acting on it at any one time.

superficial: Pertaining to or situated near the surface, especially relating to the skin.

superolateral: Situated above and toward the side (of the prostate).

superoovulation: The stimulation of the ovary to release more than the normal number of egg cells.

suppressor gene: A gene that can suppress the action of another gene.
suture: Surgical stitching used in the closure of a cut or incision.
swim bladder: An adaptation, derived from a lung, that enables bony fishes to adjust their density and thereby control their buoyancy.
symbiont: The smaller participant in a symbiotic relationship, living in or on the host.
symbiosis: An ecological relationship between organisms of two different species that live together in direct contact.
Symmetric cell division: The process by which a stem cell undergoes mitotic cell division, yielding two identical daughter cells with the same developmental potential as the mother cell (e.g. self-renewal). During embryonic development and/or in response to an injury, certain stem cells will undergo symmetric cell division instead of asymmetric cell division. On the other hand, asymmetric cell division is the process whereby a stem cell undergoes mitotic cell division, yielding one daughter cell with equivalent developmental potential as the mother cell - i.e. another stem cell - and one daughter cell with less developmental potential than the mother cell - i.e. a progenitor cell. Symmetric and asymmetric cell division (self-renewal) are necessary cellular functions that allow the body to maintain a sufficient number of stem cells within its different tissues and organs. The stem cells are important for the maintenance/repair of lost or damaged cells/tissue. Without self-renewal, through asymmetric and symmetric cell division, the body would exhaust its population of stem cells.
sympathetic division: One of two divisions of the autonomic nervous system of vertebrates; generally increases energy expenditure and prepares the body for action.
sympathetic nervous system: A part of the autonomic nervous system that mobilizes energy and resources during times of stress and arousal.
sympatric speciation: A mode of speciation occurring as a result of a radical change in the genome that produces a reproductively isolated subpopulation in the midst of its parent population.
symphysis pubis: The rather rigid articulation of the two pubic bones in the midline of the lower anterior part of the abdomen.
symphlast: In plants, the continuum of cytoplasm connected by plasmodesmata between cells.
symptom management: Care for LSD patients that tries to alleviate and manage their symptoms with a variety of methods (surgery, drugs, dialysis, transplantation, etc.), but does not affect the underlying cause of the disease.
symptom: A feeling, sensation or experience associated with or resulting from a physical or mental disorder and noticeable by the patient.
sympathetic nervous system: A part of the autonomic nervous system of vertebrates; generally increases energy expenditure and prepares the body for action.
sympathetic division: One of two divisions of the autonomic nervous system of vertebrates; generally increases energy expenditure and prepares the body for action.
synapsis: The pairing of replicated homologous chromosomes during prophase I of meiosis.
synapomorphies: Shared derived characters; homologies that evolved in an ancestor common to all species on one branch of a fork in a cladogram, but not common to species on the other branch.
synapse: The locus where one neuron communicates with another neuron in a neural pathway; a narrow gap between a synaptic terminal of an axon and a signal-receiving portion (dendrite or cell body) of another neuron or effector cell. Neurotransmitter molecules released by synaptic terminals diffuse across the synapse, relaying messages to the dendrite or effector.
synapses: The junction between a neuron and another neuron or muscle or gland cells. At the synapse, the axon releases a neurotransmitter that diffuse across a tiny gap to a target-cell receptor, triggering a response.
synapsis: The pairing of replicated homologous chromosomes during prophase I of meiosis.
synaptic cleft: A narrow gap separating the synaptic knob of a transmitting neuron from an receiving neuron to an effector.
synaptic knob: The relay point at the tip of a transmitting neuron's axon, where signals are sent to another neuron or to an effector.
synaptic terminal: A bulb at the end of an axon in which neurotransmitter molecules are stored and released.
syncope: Fainting or a loss of consciousness.
syncytiotrophoblast: A multinucleated cell formed from the cells of the trophoblast. Only a small area of the syncytiotrophoblast is evident at the start of the formation of the embryo, but this cell tissue is highly invasive, quickly expands and soon surrounds the entire embryo.
synctium: A mass of cytoplasm containing many nuclei that are enclosed by a single plasma membrane. This is usually the result of either cell fusion or a series of incomplete division cycles in which the nuclei divide but the cell does not.
syndrome: The group or recognizable pattern of symptoms or abnormalities that indicate a particular trait or disease.
synergistic: Assists or adds to the activity of another substance, such as a drug.
syngamy: The coming together of the egg and sperm at fertilization.
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synaptic terminal: A bulb at the end of an axon in which neurotransmitter molecules are stored and released.
syngeneic transplant: The person donating the bone marrow or stem cells is an identical twin.

syngeneic: Genetically identical members of the same species.

synteny: Genes occurring in the same order on chromosomes of different species.

synthesis phase: In the cell cycle, the phase in which the DNA of the chromosomes is replicated and DNA-associated proteins, such as histones, are synthesized.

synthesis: The formation of a more complex substance from simpler ones.

syringe: An instrument consisting of a hollow barrel and a plunger used to administer injections or to hold the liquid resulting from an aspiration.

syringomyelia: The formation of a fluid-filled cavity or syrinx in the area of the spinal cord injury.

systematic biopsy: Sampling of various sectors of the prostate under ultrasound guidance.

systematics: The branch of biology that studies the diversity of life; encompasses taxonomy and is involved in reconstructing phylogenetic history.

systemic acquired resistance (SAR): A defensive response in infected plants that helps protect healthy tissue from pathogenic invasion.

systemic: Throughout the whole body; affecting the entire body.

systole: The stage of the heart cycle in which the heart muscle contracts and the chambers pump blood.

systolic pressure: The pressure in an artery during the ventricular contraction phase of the heart cycle.

T cell: A type of white blood cell that is of crucial importance to the immune system. Immature T cells (termed T-stem cells) migrate to the thymus gland in the neck, where they differentiate into various types of mature T cells and become active in the immune system. T cells that are potentially activated against the body’s own tissues are normally killed or changed (“down-regulated”) during this maturation process.

T helper cells: A type of white blood cell that is part of the body’s immune response. It recognizes foreign antigens and stimulates the production of other cells to control them. Also called inducer T cell or CD4+ T cell.

T3: Triiodothyronine. A thyroid hormone important for hematopoietic cells.

taiga: The coniferous or boreal forest biome, characterized by considerable snow, harsh winters, short summers, and evergreen trees.

tamoxifen: The generic name for Nolvadex®; an anti-estrogen that works by blocking the estrogen receptor (ER) on the cell.

target capture: A process that isolates the target nucleic acid from clinical specimens and purifies the nucleic acid for amplification.

TAT: A lentiviral packaging element required for the efficient elongation of nascent viral transcripts.

taxane: Anticancer drugs that inhibit cancer cell growth by stopping cell division. Includes paclitaxel and docetaxel.

taxi: A movement toward or away from a stimulus.

taxon (pl. taxa): The named taxonomic unit at any given level.

taxonomy: The branch of biology concerned with naming and classifying the diverse forms of life.

Tay-Sachs disease: A lethal hereditary disease. The progressive accumulation of a substance called ganglioside in the brain causes paralysis, mental deterioration and blindness. Death usually occurs before the age of four.

T-Cell: A type of lymphocyte responsible for attacking and destroying virus-infected cells, foreign tissue and tumor cells. Cytotoxic T- cells target a particular antigen and secrete toxic chemicals to kill the foreign cell or tissue. Other T-cells, called Helper T-cells, activate lymphocytes like B- cells and NK cells to help the body fight off invading viruses, micro-organisms and malignant cells.

T-cells: T-cells are thymus-derived lymphocytes. T-cells are the major component of cell-mediated immunity. There are several types of T Cells: Cytotoxic T-cells destroy cancer cells and foreign invaders; helper T-cells that work in conjunction with white blood cells; and suppressor T cells that play a role in controlling white blood cell function.

Technetium: A silvery-grey metallic element, artificially produced by bombardment of molybdenum by deuterons: used to inhibit corrosion in steel. The radioisotope technetium (Tc99m), with a half-life of six hours, is used in radiotherapy.

telemanipulation: The direct human control of a robotic manipulator, where the operator and the manipulator are at different locations.

telomerase: An enzyme that catalyzes the lengthening of telomeres in eukaryotic germ cells. Embryonic stem cells have been shown to express high levels of telomerase activity, allowing embryonic stem cells to divide indefinitely or be "immortal" under proper culture conditions.
Telomere: The end of a chromosome, associated with a characteristic DNA sequence that is replicated in a special way. A telomere counteracts the tendency of the chromosome to shorten with each round of replication.

telophase: The fourth and final stage of mitosis, during which daughter nuclei form at the two poles of a cell. Telophase usually occurs together with cytokinesis.

temperate bacteriophage: A bacterial virus that may become incorporated into the host-cell chromosome.

temperate deciduous forest: A biome located throughout midlatitude regions where there is sufficient moisture to support the growth of large, broad-leaf deciduous trees.

temperate virus: A virus that can reproduce without killing the host.

temperature: A measure of the intensity of heat in degrees, reflecting the average kinetic energy of the molecules.

template: A pattern or mold guiding the formation of a negative or complementary copy.

tendon: A type of fibrous connective tissue that attaches muscle to bone.

tenocyte: Tendon-producing cell.

tentacles: Long, flexible protrusions located about the mouth of many invertebrates; usually prehensile or tactile.

TERATOCARCINOMA: An old name for a germ cell tumor that is a mixture of teratoma and embryonal carcinoma. In more modern usage, this kind of mixed germ cell tumor may be known as a teratoma with elements of embryonal carcinoma, or simply as an embryonal carcinoma.

TERATOGEN: A drug or other agent that raises the incidence of congenital malformations.

TERATOMA: Scientists verify that they have established a human embryonic stem cell (hESC) line by injecting putative stem cells into mice with a dysfunctional immune system. Since the injected cells cannot be destroyed by the mouse's immune system, they survive and form a multi-layered benign tumor called a teratoma. Even though tumors are not usually a desirable outcome, in this test, the teratomas serve to establish the ability of a stem cell to give rise to all cell types in the body. This is because the teratomas contain cells derived from each of the three embryonic germ layers.

TERMINAL CELL: Differentiated and specialized cell with limited or no capacity to divide, also called terminally-differentiated cell.

TERMINATOR: A special sequence of nucleotides in DNA that marks the end of a gene; it signals RNA polymerase to release the newly made RNA molecule, which then departs from the gene.

territory: An area or space occupied and defended by an individual or a group; trespassers are attacked (and usually defeated); may be the site of breeding, nesting, food gathering, or any combination thereof.

tertiary consumer: A member of a trophic level of an ecosystem consisting of carnivores that eat mainly other carnivores.

tertiary structure: Irregular contortions of a protein molecule due to interactions of side chains involved in hydrophobic interactions, ionic bonds, hydrogen bonds, and disulfide bridges.

tesla: Unit of measurement to describe magnetic field strength.

testcross: Breeding of an organism of unknown genotype with a homozygous recessive individual to determine the unknown genotype. The ratio of phenotypes in the offspring determines the unknown genotype.

testis (pl. testes): The male reproductive organ, or gonad, in which sperm and reproductive hormones are produced.

tests, (pl. testes): One of two male reproductive glands located inside the scrotum that are the primary sources of the male hormone testosterone.

testosterone (T): The male hormone or androgen which comprises most of the androgens in a man's body; chiefly produced by the testicles but also is derived from adrenal androgen precursors such as DHEA and androstenedione. T is highly important to a man’s sexual interest or libido and his ability to achieve erection. T plays a key role in virtually every tissue in the human body e.g. brain, bone, blood formation, skin, nails, muscle.

testosterone: A hormone that is produced especially by the testes or made synthetically and that is responsible for inducing and maintaining male secondary sex characters.

tetanus: The maximal, sustained contraction of a skeletal muscle, caused by a very fast frequency of action potentials elicited by continual stimulation.

tetrad: In genetics, a pair of homologous chromosomes that have replicated and come together in prophase I of meiosis; consists of four chromatids.

tetraploid complementation assay: An assay that can be used to test a stem cell's potency. Scientists studying mouse chimeras (mixing cells of two different animals) noted that fusing two 8-cell embryos produces cells with 4 sets of chromosomes (tetraploid cells) that are biased toward developing into extra-embryonic tissues.
such as the placenta. The tetraploid cells do not generate the embryo itself; the embryo proper develops from injected diploid stem cells. This tendency has been exploited to test the potency of a stem cell. Scientists begin with a tetraploid embryo. Next, they inject the stem cells to be tested. If the injected cells are pluripotent, then an embryo develops. If no embryo develops, or if the resultant embryo cannot survive until birth, the scientists conclude that the cells were not truly pluripotent.

3765 tetraploid: Individual or cell having four times the haploid number of chromosomes in the cell nucleus.

3766 tetrapod: A vertebrate possessing two pairs of limbs, such as amphibians, reptiles, birds, and mammals.

3767 TGF-β (transforming growth factor beta): A bone-derived growth factor that stimulates the PC cell and osteoblast, among many other functions.

3768 thalamus: One of two integrating centers of the vertebrate forebrain. Neurons with cell bodies in the thalamus relay neural input to specific areas in the cerebral cortex and regulate what information goes to the cerebral cortex.

3769 thalassaemia: A hereditary anaemia resulting from reduced production of either alpha or beta haemoglobin. Depending on the type, the condition can be fatal before or just after birth, or can result in varying levels of anaemia and development difficulties.

3770 thalidomide: A drug that belongs to the family of drugs called angiogenesis inhibitors. It prevents the growth of new blood vessels into a solid tumor.

3771 thallus: A simple plant or algal body without true roots, leaves, or stems.

3772 theca: General term for any stiff outer covering of a unicellular protist, and usually made up of interlocking plates. Dinoflagellates and diatoms are examples of protists with thecae.

3773 thallus: A simple plant or algal body without true roots, leaves, or stems.

3774 therapeutic cloning: The goal of therapeutic cloning is to create cells that exactly match a patient. By combining a patient's somatic cell nucleus and an enucleated egg, a scientist may harvest embryonic stem cells from the resulting nuclear transfer product that can be used to generate tissues that match a patient's body. This means the tissues created are unlikely to be rejected by the patient's immune system.

3775 therapeutic index: An index based on the ratio of tumor control probability (TCP) to normal tissue complication probability (NTCP) used in radiation therapy to assess the likelihood of effective treatment vs. the likelihood damage to surrounding tissues.

3776 therapeutic: The treatment of disease or disability.

3777 therapy: The treatment of disease or disability.

3778 thermistor or thermocouple: A thermoelectric device used to measure temperatures accurately.

3779 thermoablation: A procedure using heat to remove tissue or a part of the body, or destroy its function.

3780 thermodynamics: The study of transformations of energy. The first law of thermodynamics states that, in all processes, the total energy of a system plus its surroundings remains constant. The second law states that all natural processes tend to proceed in such a direction that the disorder or randomness of the system increases.

3781 thermoluminescent dosimeter: A device that registers the radiation dose (energy per unit mass) indicated by changes in color induced by temperature change. A device that directly measures absorbed dose.

3782 thermoregulation: The maintenance of internal temperature within a tolerable range.

3783 thiazolidinediones: A class of antidiabetes drugs that enhances the activity of insulin.

3784 thick filament: A filament composed of staggered arrays of myosin molecules; a component of myofibrils in muscle fibers.

3785 thigmomorphogenesis: A response in plants to chronic mechanical stimulation, resulting from increased ethylene production; an example is thickening stems in response to strong winds.

3786 thigmotropism: The directional growth of a plant in relation to touch.

3787 thinking disorder: Disorder that affects people's ability to think normally. This can often be an associated symptom in other mental disorders such as: schizophrenia or bipolar disorder.

3788 thoracentesis: Removal of fluid in the pleura through a needle.

3789 thoracic region: The 12 thoracic vertebrae are located in the chest/trunk region below the cervical vertebrae and above the lumbar vertebrae.

3790 thoracic: Pertaining to or affecting the chest.

3791 thorax: (1) In vertebrates, that portion of the trunk containing the heart and lungs. (2) In crustaceans and insects, the fused, leg-bearing segments between head and abdomen.

3792 threatened species: Species that are likely to become endangered in the foreseeable future throughout all or a significant portion of their range.
threshold potential: The potential an excitable cell membrane must reach for an action potential to be initiated.

thrombocyte (platelet): A tiny, disc-shaped blood cell responsible for controlling abnormal or excessive bleeding.

thrombocytopenia: A condition where there are not enough platelets in the blood. Thrombocytopenia is likely to occur following a stem cell transplant and increases your chance of bleeding.

thromboembolism, thromboembolic: The blocking of a blood vessel by a blood clot dislodged from its site of origin.

thrombopoietin: Growth factor for the proliferation and differentiation of platelet forming cells called megakaryocytes.

thrombosis: The formation or presence of a thrombus (a clot of coagulated blood attached at the site of its formation) in a blood vessel.

thylakoid: A flattened membrane sac inside the chloroplast, used to convert light energy to chemical energy.

thymocytes: These are precursor T Cells which develop in the Thymus (located in upper part of chest cavity, produces hormones that stimulate production of infection-fighting cells). The Thymocytes develop into a pool of T Cells able to respond to foreign pathogens.

thymus: An endocrine gland in the neck region of mammals that is active in establishing the immune system; secretes several messengers, including thymosin, that stimulate T cells.

thyroid gland: An endocrine gland that secretes iodine-containing hormones (T3 and T4), which stimulate metabolism and influence development and maturation in vertebrates, and calcitonin, which lowers blood calcium levels in mammals.

thyroid: A gland located beneath the voice box (larynx) that produces the thyroid hormone. The thyroid helps regulate growth and metabolism.

thyroid-stimulating hormone (TSH): A hormone produced by the anterior pituitary that regulates the release of thyroid hormones.

thyroxine: An iodine-containing hormone C15H11I4NO4 that is an amino acid produced by the thyroid gland as a product of the cleavage of thyroglobulin, increases metabolic rate, and is used to treat thyroid disorders.

Ti plasmid: A plasmid of a tumor-inducing bacterium that integrates a segment of its DNA into the host chromosome of a plant; frequently used as a carrier for genetic engineering in plants.

tibial: Pertaining to a tibia (the larger bone of the lower leg).

titer: The number of transducing units per ml.

TLR4 (toll like receptors 4): A transmembrane lipopolysaccharide receptor. Activation causes the release of antimicrobial peptides, inflammatory cytokines and chemokines, and costimulator molecules that initiate the innate immune response to common gram-negative bacteria.
T-lymphocyte: A cell type of the immune system that matures in the thymus and is responsible for cell-mediated immunity.

TNF-alpha: Tumor necrosis factor alpha; a protein produced by macrophages in the presence of an endotoxin and shown experimentally to be capable of attacking and destroying cancerous tumors.

tolerance induction: The "education" process that T cells undergo to discriminate between self and foreign proteins. This process takes place primarily in the thymus. In addition to inactivating or deleting self-reactive T cells, those T cells that can recognize the body's MHC proteins, but not be activated solely by this recognition, are also selected to leave the thymus (circulate through the body).

tolerance: A state of specific immunologic unresponsiveness. Individuals are normally tolerant to their own cells and tissues. Autoimmune diseases occur when tolerance fails.

toll like receptors 4 (TLR4): One in a family of receptors that provide critical links between immune stimulants produced by microorganisms and the initiation of host defenses.

toluene: A solvent used in manufacturing perfumes, detergents, gasoline, other chemicals, and medicines. Acute exposure can irritate the nose, throat, and eyes, and cause headaches, loss of consciousness, and death. Chronic exposure can cause mutations, damage developing fetuses, and damage the liver, kidneys, brain, and bone marrow.

tomography: A procedure where internal body images at a predetermined plane are recorded by means of the tomograph, a computer-driven device that builds the image from multiple X-ray measurements; tomography is used in CAT scan and PET scan.

tonic-clonic seizures: In a tonic-clonic seizure, the person loses consciousness, the body stiffens, and then they fall to the ground. This is followed by jerking movements. After a minute or two, the jerking movements usually stop and consciousness slowly returns.

tonoplast: A membrane that encloses the central vacuole in a plant cell, separating the cytosol from the cell sap.

torpid: In animals, a physiological state that conserves energy by slowing down the heart and respiratory systems.

total body irradiation (TBI): Radiation given to the entire body.

totipotent: Sufficient to form entire organism. Totipotency is seen in zygote and plant meristem cells; not demonstrated for any vertebrate stem cell.

totipotential: Ability of a stem cell to differentiate into all cell types of the organism (totipotent is the adjective).

toxic: Poisonous.

toxicity: The degree to which something is poisonous.

toxicogenomics: The science of how a person's genome affects his or her response to potentially toxic substances in the environment, such as pollutants. A goal of research in toxicogenomics is to identify the genes that predispose some people to become sick when they encounter toxins in their daily lives.

trace element: An element indispensable for life but required in extremely minute amounts.

trachea pl. tracheae: Tiny air tubes that branch throughout the insect body for gas exchange.

trachea: The windpipe; that portion of the respiratory tube that has C-shaped cartilagenous rings and passes from the larynx to two bronchi.

tracheal system: A gas exchange system of branched, chitin-lined tubes that infiltrate the body and carry oxygen directly to cells in insects.

tracheid: A water-conducting and supportive element of xylem composed of long, thin cells with tapered ends and walls hardened with lignin.

tract: A group or bundle of nerve fibers with accompanying connective tissue, located within the central nervous system.

traffic: Trafficking or circulation of cells refer to the movement of cells out of the bone marrow and through the periphery. The cells might return to the bone marrow.

trait: A feature that is genetically controlled. A physical characteristic, such as red hair, that has a genetic component.

transaction: To cut across.
transaminase: An enzyme that catalyzes chemical reactions in the body in which an amino group is transferred from a donor molecule to a recipient molecule.

transcription factor: A regulatory protein that binds to DNA and affects the transcription of specific genes. The four reprogramming factors, Oct-4, SOX2, Klf-4 and c-Myc function as transcription factors- they are capable of binding to the DNA to control the transcription of a unique set of genes. Together, Oct-4, SOX2, Klf-4 and c-Myc induce the expression of genes that are not normally expressed in the fibroblast, but are expressed in pluripotent stem cells. The four transcription factors continue to drive transcription of their downstream genes leading to the activation of other transcriptional networks, inducing a cascade of transcriptional activity.

transcription mediated amplification (TMA): A process that uses two enzymes, Reverse Transcriptase and RNA Polymerase, to produce billions of copies of RNA amplified target from the purified target nucleic acid.

transcription: The synthesis of RNA using a DNA template. During transcription, a DNA sequence is read by RNA polymerase and then transcribed into a complementary, antiparallel strand of mRNA. Transcription occurs in the nucleus of eukaryotic cells.

transcriptomics: The study of the RNA transcripts produced from DNA.

transdifferentiation 1: Cells in one lineage forming cells of another lineage, e.g., lymphoid cells forming myeloid type cells.

transdifferentiation: The ability of a particular cell of one tissue, organ or system, including stem or progenitor cells, to differentiate into a cell type characteristic of another tissue, organ, or system; e.g., blood stem cells changing to liver cells.

transducer: A substance or device that converts input energy of one form into another.

transduction: The integration of exogenous genetic sequences into a host genome through viral particles.

transfection: Describes the introduction of foreign material into eukaryotic cells using a virus vector or other means of transfer.

transfer RNA (tRNA): An RNA molecule that functions as an interpreter between nucleic acid and protein language by picking up specific amino acids and recognizing the appropriate codons in the mRNA.

transformation: (1) The conversion of a normal animal cell to a cancerous cell. (2) A phenomenon in which external DNA is assimilated by a cell.

transfusion: The transferring of blood or blood products directly into a vein or artery.

transgene: A gene that has been artificially introduced into a cell through genetic engineering strategies. In 2006, Shinya Yamanaka and his team determined that expression of only four genes (Oct-4, SOX2, Klf-4 and c-Myc) were necessary to reprogram mouse fibroblasts into pluripotent stem cells—otherwise known as induced pluripotent stem cells. However, these genes are highly down-regulated in fully differentiated somatic cells. To increase the expression of Oct-4, SOX2, c-Myc, and Klf-4, the team engineered Oct-4, SOX2, c-Myc, and Klf-4 transgenes and delivered them into the cell nuclei using retroviral vectors.

transgenesis: The stable introduction of modified genes or genes from another animal or species into an animal’s genome.

transgenic animal cloning: The cloning or copying of a genetically modified animal such as a cow modified to produce pharmaceutical proteins in its milk, or a mouse modified to model a human disease.

transgenic: Having artificially altered genetic material. A transgenic organism is one that has had its genotype altered by the introduction of a gene or DNA sequence into its genome by genetic manipulation; the introduced gene or DNA segment is called a transgene.

transit-amplifying: Cell Proliferative stem-cell progeny fated for differentiation. Initially, it may not be committed and may retain self-renewal.

transition zone: Area of the prostate closest to the urethra which has features that distinguish it from the much larger peripheral zone.

translation: Process in cells in which genetic information encoded in messenger RNA is translated into a sequence of amino acids in a polypeptide chain during protein synthesis. Translation takes place outside of the nucleus.

translational medicine: The area of focus or effort to transition basic research discoveries into clinical applications that benefit patients.

translational research: A sharing of information between laboratory research and patient care, often referred to as “from bench to bedside”.

translocation: (1) An aberration in chromosome structure resulting from an error in meiosis or from mutagens; attachment of a chromosomal fragment to a nonhomologous chromosome. (2) During protein synthesis, the third stage in the elongation cycle when the RNA carrying the growing polypeptide moves from the A site to the P site on the ribosome. (3) The transport via phloem of food in a plant.
transperineal: Through the perineum.

transpiration: The evaporative loss of water from a plant.

transplant center-NMDP: Accredited, hospital based programs with experience, staff and facilities to perform allogeneic stem cell transplantation.

transplant: The grafting of a tissue from one place to another, just as in botany a bud from one plant might be grafted onto the stem of another. The transplanting of tissue can be from one part of the patient to another (autologous transplantation), as in the case of a skin graft using the patient's own skin; or from one patient to another (allogenic transplantation), as in the case of transplanting a donor kidney into a recipient.

transplantation biology: The science that studies the transplantation of organs and cells. Transplantation biologists investigate scientific questions to understand why foreign tissues and organs are rejected, the way transplanted organs function in the recipient, how this function can be maintained or improved, and how the organ to be transplanted should be handled to obtain optimal results.

transplantation: Moving an organ, tissue or cell from one person—the donor—into another, the recipient. Transplants of organs generally involve surgery, but stem cell transplantation can be done by injecting the cells into a specific area, or by infusing them into the bloodstream and allowing them to find their way to the damaged tissues.

transposon: A transposable genetic element; a mobile segment of DNA that serves as an agent of genetic change.

transrectal: Through the rectum.

transurethral resection of the prostate: A surgical procedure to remove tissue obstructing the urethra; the technique involves the insertion of an instrument called a resectoscope into the penile urethra, and is intended to relieve obstruction of urine flow due to enlargement of the prostate

transurethral: Through the urethra.

transverse: Acting, lying, or being across - set crosswise.

trastuzumab (Herceptin®): A type of monoclonal antibody which blocks the effects of the growth factor protein HER2, which transmits growth signals to cancer cells.

TREAT NMD: TREAT-NMD is a network that brings together people with neuromuscular diseases and specialists (scientists, healthcare professionals and pharmaceutical companies) working on treatments for these conditions.

treatment (Tx): Administration of remedies to a patient for a disease

trichocyst: Organelle in ciliates and dinoflagellates which releases long filamentous proteins when the cell is disturbed. Used as a defense against would-be predators.

trigeminal nerve: The main sensory nerve of the face and motor nerve for the muscles of mastication.

triiodothyronine: An iodine-containing hormone C15H12 I 3 NO 4 that is an amino acid derived from thyroxine.

trimix: A mixture of papaverine, phentolamine and prostaglandin E-1 that is injected into the penis to cause an erection.

triplet code: A set of three-nucleotide-long words that specify the amino acids for polypeptide chains.

triphasic: Possessing three germ layers: the endoderm, mesoderm, and ectoderm. Most eumetazoan are triploblastic.

trisomy: Having three copies of a particular chromosome in each somatic (body) cell instead of the normal two copies. This leads to certain conditions, for example Down syndrome (trisomy 21) or Edwards syndrome (trisomy 18).

trophectoderm: The outer epithelium of a mammalian blastocyst that is made up of trophoblast cells. The trophectoderm forms the fetal part of the placenta, supporting embryonic development but not forming part of the embryo proper. Stem cells that give rise to all cell types of the body, including the embryonic components of the trophoblast and placenta, are totipotent stem cells. These stem cells are derived from the pre-implantation embryo at the morula stage of embryonic development.

trophic level: The division of species in an ecosystem on the basis of their main nutritional source. The trophic level that ultimately supports all others consists of autotrophs, or primary producers.

trophic structure: The different feeding relationships in an ecosystem that determine the route of energy flow and the pattern of chemical cycling.

trophic: The starting of cell reproduction and enlargement by nurturing and causing growth.

trophoblast: The outer cell layer of the blastocyst. It is responsible for implantation and develops into the extraembryonic tissues, including the placenta, and controls the exchange of oxygen and metabolites between mother and embryo.
tropic hormone: A hormone that has another endocrine gland as a target.

3900 tropic: Pertaining to behavior or action brought about by specific stimuli, for example, phototropic ("light-oriented") motion, gonadotropic ("stimulating the gonads") hormone.

3901 tropical rain forest: The most complex of all communities, located near the equator where rainfall is abundant; harbors more species of plants and animals than all other terrestrial biomes combined.

3902 tropism: A growth response that results in the curvatures of whole plant organs toward or away from stimuli due to differential rates of cell elongation.

3903 true pelvis: The lower more contracted part of the pelvic cavity.

3904 TRUS (transrectal ultrasound): A method that uses echoes of ultrasound waves (far beyond the hearing range) to image the prostate by inserting an ultrasound probe into the rectum; commonly used to visualize and guide prostate biopsy procedures.

3905 trypsin: An enzyme that digests proteins. Often used to separate cells.

3906 T-score: A comparison of an individual’s bone mass with the average bone mass of a young adult; a negative indicates a loss of bone density.

3907 Transdifferentiation 2: Stem cells in one organ forming differentiated cells of another organ, e.g., bone marrow stem cells forming hepatocytes.

3908 tuber: A much-enlarged, short, fleshy underground stem, such as that of the potato.

3909 tuberculosis: A bacterial infection that most commonly affects the lungs.

3910 tumor markers: Tumor markers are measurable biochemicals that are associated with a malignancy. They are either produced by tumor cells (tumor-derived) or by the body in response to tumor cells (tumor-associated). They are typically substances that are released into the circulation and thus measured in the blood. There are a few exceptions to this, such as tissue-bound receptors that must be measured in a biopsy from the solid tumor or proteins that are secreted into the urine.

3911 tumor suppressor gene: A gene whose protein products inhibit cell division, thereby preventing uncontrolled cell growth (cancer).

3912 tumor: Swelling. An abnormal mass of tissue. Tumors may be cancerous, or non-cancerous (benign). The tumors caused by embryonic stem cells are called teratomas.

3913 tundra: A biome at the extreme limits of plant growth; at the northernmost limits, it is called arctic tundra, and at high altitudes, where plant forms are limited to low shrubby or matlike vegetation, it is called alpine tundra.

3914 turgid: Firm, walled cells become turgid as a result of the entry of water from a hypotonic environment.

3915 turgor pressure: The force directed against a cell wall after the influx of water and the swelling of a walled cell due to osmosis.

3916 tutipotent Stem Cells: Stem cells that can give rise to all cell types that are found in an embryo, fetus, or developed organism, including the embryonic components of the trophoblast and placenta required to support development and birth. The zygote and the cells at the very early stages following fertilization (i.e., the 2-cell stage) are considered tutipotent.

3917 twinning: Development of monozygotic twins, that is, when a very early embryo separates into two pieces, each of which continues development, so that two embryos actually come from one zygote.

3918 type-1A diabetes: A form of insulin dependent diabetes, usually becoming evident in childhood, resulting from an autoimmune reaction that destroys the pancreatic beta cells, so that the body cannot produce its own insulin. In those cases where the condition is not apparent until adulthood, it is called latent autoimmune diabetes of adulthood.

3919 typing laboratory: A testing facility that performs HLA typing.

3920 tyrosine kinase receptor: A receptor protein in the plasma membrane that responds to the binding of a signal molecule by catalyzing the transfer of phosphate groups from ATP to tyrosines on the cytoplasmic side of the receptor. The phosphorylated tyrosines activate other signal-transduction proteins within the cell.

3921 tyrosine kinase: An enzyme that catalyzes the transfer of phosphate groups from ATP to the amino acid tyrosine in a substrate protein.

3922 ulcer: An open sore of the skin or mucus membrane characterized by sloughing of inflamed dead tissue.

3923 ultimate causation: The hypothetical evolutionary explanation for the existence of a certain pattern of animal behavior.

3924 ultrasound: A set of sound waves at a particular frequency which can be used to image internal organs, for example, a baby in the womb.

3925 ultrastructure: The detailed structure of a specimen, such as a cell, tissue, or organ, that can be observed only by electron microscopy. Also called fine structure. In eggshell, ultrastructure refers to the three-dimensional arrangement of
mineral crystals and organic matter. It is described in terms of calcite or aragonite mineralogy and the transition between different zones of organization within the shell. Distinct zones of organization are called ultrastructure zones.

umbilical cord blood stem cells: Stem cells collected from the umbilical cord at birth that can produce all of the blood cells in the body (hematopoietic). Hematopoietic stem cells are present in the blood of the umbilical cord during and shortly after delivery. These stem cells are in the blood at the time of delivery, because they move from the liver, where blood-formation takes place during fetal life, to the bone marrow, where blood is made after birth. Umbilical cord stem cells are similar to stem cells that reside in bone marrow, and can be used for the treatment of leukemia, and other diseases of the blood. Efforts are now being undertaken to collect these cells and store them in freezers for later use. Cord blood is currently used to treat patients who have undergone chemotherapy to destroy their bone marrow due to cancer or other blood-related disorders. However, one problem is that there may not be enough umbilical cord stem cells in any one sample to transplant into an adult.

umbilical cord: At birth, an infant is connected via the umbilical cord to the placenta. Once the cord has been cut, the blood remaining in the cord is termed the cord blood. This blood is of interest because it contains stem cells. The gelatinous substance found inside the umbilical cord. The jelly has recently been shown to be a source of potentially pluripotent stem cells.

umbilical stem cells: Isolated from umbilical cord blood and possessing less rejection potential than most other allogeneic donor tissue.

understanding: The assignment of an overly low clinical stage at initial diagnosis because of the difficulty of assessing the available information with accuracy (e.g., stage T2b as opposed to stage T3b).

undetectable PSA (UDPSA): Defined in the research as a PSA of <0.05 using a hypersensitive assay.

undifferentiated cell: A primitive cell that does not have any tissue-specific structures that allows it to perform specialized functions. It has not changed to become a specialized cell.

undulipodium: Another term for a eukaryotic flagellum.

unipotent stem cells: Stem cells that self-renew as well as give rise to a single mature cell type; e.g., spermatogenic stem cells. It has now been determined that these cells can also differentiate into other types of cells.

unipotent: Cells that can self-renew but only produce one cell type. It's self-renewal that distinguishes them from non-stem cells.

unipotent stem cells: Stem cells that self-renew as well as give rise to a single mature cell type; e.g., spermatogenic stem cells.

unrelated bone marrow or blood stem cell transplant: A marrow or blood stem cell transplant where the donor is not related to the patient.

unsaturated fatty acid: A fatty acid possessing one or more double bonds between the carbons in the hydrocarbon tail. Such bonding reduces the number of hydrogen atoms attached to the carbon skeleton.

unspecialised: Having no specific function.

uPA: A protease or digestive enzyme that is made by the PC cell, stimulates PC cell and osteoblast growth, and is involved with invasion and metastasis.

uPM3 urine test: A new molecular test for detecting prostate cancer cells based on PCA3, a specific gene that is profusely expressed in prostate cancer tissue. Patients who receive the uPM3(TM) undergo a thorough digital rectal prostate examination by a urologist which causes cells from the patient's prostate to be shed into the urine.

upper motor neurons: Nerves within the spinal cord that are involved in controlling movement.

up-regulation: The process of increasing the response to a stimulus.

uptake: The absorption by a tissue of a substance, such as a nutrient, and its permanent or temporary retention.

urea: A soluble form of nitrogenous waste excreted by mammals and most adult amphibians. The main nitrogen part of urine made from protein breakdown.

uremia: The presence of excessive amounts of urea and other waste products in the blood, as occurs in kidney.

ureter: An anatomical tube that drains urine from one of the two kidneys to the bladder.

urethra: A tube that releases urine from the body near the vagina in females or through the penis in males; also serves in males as the exit tube for the reproductive system.

urge incontinence: The need to urinate which is sudden and uncontrollable.

uric acid: An insoluble precipitate of nitrogenous waste excreted by land snails, insects, birds, and some reptiles.
urinary system: The group of organs and their interconnections that permits excess, filtered fluids to exit the body, including (in the male) the kidneys, the ureters, the bladder, the urethra and the penis.

urinary tract infection: An infection identifiable by the presence of bacteria (or theoretically viruses) in the urine; may be associated with fever or a burning sensation on urination.

urinate: To discharge urine, a fluid produced by the kidneys.

urine: The liquid waste filtered from the blood by the kidney and stored in the bladder pending elimination through the urethra.

urochordate: A chordate without a backbone, commonly called a tunicate, a sessile marine animal.

urodynamic Studies: Diagnostic tests used to evaluate urinary-flow.

urodynamics: The mechanical laws of fluid dynamics as they apply to urine transport

urogynaecologists: A doctor who specialises in women's bladder and urine problems and other conditions of the urinary and reproductive systems.

urologist: A doctor trained first as a surgeon who specializes in disorders of the genitourinary system.

uropathy: A disorder involving the urinary tract.

uterine: Pertaining to the uterus.

uterus: Female reproductive organ where eggs are fertilized and/or development of the young occurs.

vaccine: A preparation that contains either whole disease-causing organisms such as viruses which have been killed or weakened, or parts of such organisms, used to confer immunity against the disease that the organisms cause. Vaccine preparations can be natural, synthetic or derived by recombinant DNA technology.

vacuole: Membrane-bound fluid-filled space within a cell. In most plant cells, there is a single large vacuole filling most of the cell’s volume. Some bacterial cells contain gas vacuoles.

vacuum erection device (VED): A device that creates an erection with vacuum; it is usually a hard, plastic device placed over the penis; a vacuum is then created by a pump, bringing blood into the penis.

vagina: Part of the female reproductive system between the uterus and the outside opening; the birth canal in mammals; also accommodates the male’s penis and receives sperm during copulation.

vagus Nerve: Either of the 10th pair of cranial nerves that arise from the medulla and supply chiefly the viscera especially with autonomic sensory and motor fibers -- called also vagus.

valence shell: The outermost energy shell of an atom, containing the valence electrons involved in the chemical reactions of that atom.

value-added traits: Modified crops produced with traits such as improved taste, nutritional value, or utility to provide value for the consumer.

valve: Fold in the lining of an organ that prevents fluid from flowing backward.

Van der Waals interactions: Weak attractions between molecules or parts of molecules that are brought about by localized charge fluctuations.

vaporization: The change from a liquid to a gas; evaporation.

variation: Diversity among the members of a population. Variation among individuals can exist at many levels, including genetic, physiologic and behavioral.

vas deferens (pl. vasa deferentia): The tube in the male reproductive system in which sperm travel from the epididymis to the urethra.

vas deferens: Tube through which sperm travel from the testes to the prostate prior to ejaculation.

vascular bundle: In plants, a group of longitudinal supporting and conducting tissues (xylem and phloem).

vascular cambium: A continuous cylinder of meristematic cells surrounding the xylem and pith that produces secondary xylem and phloem.

vascular endothelial growth factor (VEGF): A substance known to stimulate blood vessel growth or angiogenesis and hence stimulate tumor growth.

vascular pedicle: A stalk through which the prostate receives and drains blood.

vascular plants: Plants with vascular tissue, consisting of all modern species except the mosses and their relatives.

vascular tissue system: A system formed by xylem and phloem throughout the plant, serving as a transport system for water and nutrients, respectively.

vascular tissue: Plant tissue consisting of cells joined into tubes that transport water and nutrients throughout the plant body.

vascular: Composed of, or having to do with, blood vessels.

vascularity: Containing vessels that carry or circulate fluids, i.e. blood, lymph.

vasculature: The arrangement or the distribution of blood vessels in an organ.

vasculogenesis: Formation of primitive vascular networks from endothelial progenitors.
vasectomy: Operation to make a man sterile by cutting the vas deferens, thus preventing passage of sperm from the testes to the prostate.

vasoconstrictor: Relating to a process, condition or substance that causes a narrowing of an opening of a blood vessel.

vasodilator: A drug which cause blood vessels to expand, thereby increasing blood flow; vasodilators are used in Viagra® and other drugs (e.g., trimix) to cause erections.

vasomotor: Causing or regulating dilation or constriction of the blood vessels.

vector: An organism that transmits pathogens from one host to another. Cell biologists use vectors as genetic delivery tools that transfer genetic material into a target cell. In 2006, the Yamanaka team modified viruses called retroviruses to serve as vectors that delivered the four transgenes, Oct-4, SOX2, c-Myc and Klf-4, into the fibroblast cells. The transgenes are then integrated into the host’s genome, thereby permitting its long term gene expression. If all four transgenes successfully integrate into the fibroblast’s genome, they will they begin to express the transgenes as functional proteins and induce pluripotency.

vegetative reproduction: Cloning of plants by asexual means.

VEGF (vascular endothelial growth factor): A substance known to stimulate blood vessel growth or angiogenesis and hence stimulate tumor growth.

veil of aphrodite: A superficial membrane on the surface of the prostate critical for preservation of neurovascular bundle.

vein: A vessel that returns blood to the heart.

vena cava: A large vein that brings blood from the tissues to the right atrium of the four-chambered mammalian heart. The superior vena cava collects blood from the forelimbs, head, and anterior or upper trunk; the inferior vena cava collects blood from the posterior body region.

venous: Venous refers to the system or veins by which blood is returned to the lungs for oxygenation.

ventilation: Any method of increasing contact between the respiratory medium and the respiratory surface.

ventilator: A mechanical device that promotes breathing in individuals with impaired diaphragm function.

ventral Root: A collection of efferent, motor nerves that exit the spinal cord.

ventral: Pertaining to the undersurface of an animal that holds its body in a horizontal position; to the front surface of an animal that holds its body erect.

ventricle: A muscular chamber of the heart that receives blood from an atrium and pumps blood out of the heart, either to the lungs or to the body tissues.

ventricular assist device: A small pump that takes over some of the heart’s job of pumping blood.

venule: A very small vein.

vertebra: The individual bones that make up the vertebral column or spine.

vertebral column: The backbone; in nearly all vertebrates, it forms the supporting axis of the body and protects the spinal cord.

vertebrate: A chordate animal with a backbone: the mammals, birds, reptiles, amphibians, and various classes of fishes.

vertigo: Dizziness or a sensation of whirling or irregular motion that arises from problems within the vestibular portion of the inner ear. Objective vertigo is the name given the sensation that the world is spinning about the patient. Subjective vertigo indicates the patient feels he is moving in space.

very small embryonic like: Adult bone marrow derived pluripotent stem cells (VSELs), which can differentiate in vitro into several lineages, including cardiac and vascular lineages.

vesicle: A small, intracellular membrane-bound sac.

vessel element: A specialized short, wide cell in angiosperms; arranged end to end, they form continuous tubes for water transport.

vessel: A tube in which a body fluid circulates.

vestigial organ: A type of homologous structure that is rudimentary and of marginal or no use to the organism.

viable: Alive. The ability to reproduce. A viable stem cell sample is one that has the ability to be used in transplant.

villi: Projections from the surface, especially of a mucous membrane. If the projection is minute, as in a cell surface, it is called a microvillus.

villus (pl. villi): One of the minute finger-shaped processes of the mucous membrane of the small intestine that serve in the absorption of nutrient.

vimentin: The major polypeptide that joins with other subunits to form the intermediate filament cytoskeleton of mesenchymal cells. Vimentin may also have a role in maintaining the internal organization of certain cells.

vinblastine (trade name Velban®): Periwinkle plant derivative used as an antineoplastic drug that disrupts cell division.
viral infectivity factor (VIF): A lentiviral packaging element that blocks a cellular inhibitor of viral replication.

viral protein R (VPR): A lentiviral packaging element that participates in the viral RNA into the nucleus for chromosomal integration.

viral protein U (VPU): A lentiviral packaging element that is localized at the cell membrane, facilitating the viral release.

vitamin: Any of various organic substances that are essential in minute quantities to the nutrition of most animals and some plants, act especially as coenzymes and precursors of coenzymes in the regulation of metabolic processes but do not provide energy or serve as building units, and are present in natural foodstuffs or sometimes produced within the body.

vitamin E: A lipid soluble antioxidant that protects cell membranes from the free radicals generated through lipid-peroxidation, a process that spreads damage after the initial spinal cord injury. Also called alpha-tocopherol.

visible light: That portion of the electromagnetic spectrum detected as various colors by the human eye, ranging in wavelength from about 400 nm to about 700 nm.

vitalism: The belief that natural phenomena are governed by a life force outside the realm of physical and chemical laws.

viviparous: Referring to a type of development in which the young are born alive after having been nourished in the uterus by blood from the placenta.

voltage-gated channel: Ion channel in a membrane that opens and closes in response to changes in membrane potential (voltage); the sodium and potassium channels of neurons are examples.

volunteer donor: A person who has agreed to donate marrow or stem cells for transplant. Volunteer donors are listed in the NMDP Registry.

Von Recklinghausen disease: Neurofibromatosis is an inherited disorder of the nervous system.

voxels: three-dimensional pixels (volumes) which display spectral data that consist of a series of peaks at distinct frequencies for different chemicals (metabolites) within tissue.

Waldenstrom's Macroglobulinemia: Waldenstrom's macroglobulinemia is a cancer of white blood cells known as B lymphocytes.

Waldenstrom's macroglobulinemia: A disease characterized by the presence of an abnormal protein called macroglobulin which causes various symptoms.

waldeyer ring: The lymphoid ring of the nasopharynx. A ring of lymphoid tissue that encircles the nasopharynx and oropharynx. It is formed by the lymphatic tissue of the pharynx, the palate tonsil, and the lingual tonsil, as well as other collections of lymph tissue in the area.

walking index for spinal cord injury: A measurement which assesses the amount of assistance required for ambulation.

watchful waiting (WW): Active observation and regular monitoring of a patient without actual treatment; also called active objectified surveillance.

water cycle: Worldwide circulation of water molecules, powered by the sun. Water evaporates from oceans, lakes, rivers, and, in smaller amounts, soil surfaces and bodies of organisms; water returns to the Earth in the form of rain and snow. Of the water falling on land, some flows into rivers that pour water back into the oceans and some percolates down through the soil until it reaches a zone where all pores and cracks in the rock are filled with water (groundwater); the deep groundwater eventually reaches the oceans, completing the cycle.

water potential: The physical property predicting the direction in which water will flow, governed by solute concentration and applied pressure.
extensions called tube feet, which function in locomotion, feeding, and gas exchange.

wavelength: The distance between crests of waves, such as those of the electromagnetic spectrum.

WBC/HPF: White blood cells counted per high powered field during a microscopic evaluation.

wheezing: A whistling noise in the chest which occurs during breathing when the airways are compressed.

white blood cell (WBC): Also known as a leukocyte. These cells normally protect against infection by, for example, ingesting bacteria or secreting antibodies. White blood cells are formed from the undifferentiated stem cell that can give rise to all blood cells. Those in the spleen and lymph nodes may become lymphocytes, or monocytes, and those in the thymus can become lymphocytes (T-lymphocytes). WBCs are formed from the undifferentiated stem cell that can give rise to all blood cells. Also known as a leukocyte.

white matter: The portion of the spinal cord that contains myelinated axons.

WHO: The World Health Organization (WHO) is an agency of the United Nations to coordinate international health activities and to help governments improve health services.

wild type: An individual with the normal phenotype.

wilms tumor: Wilms' tumor is a solid tumor that originates in the kidney. It usually occurs in children under age 15 and is very different from adult kidney cancer.

wiskott-aldrich syndrome: An inherited disease of the immune system that only occurs in boys. The white blood cells cannot fight infection. The number of platelets are low and of small size. Because of the low number of platelets, patients have many infections, bleed easily and often have a skin rash. A bone marrow transplant is the best known treatment for this disease.

wobble: A violation of the base-pairing rules in that third nucleotide (5' end) of a tRNA anticodon can form hydrogen bonds with more than one kind of base in the third position (3' end) of a codon.

worker: A member of the nonreproductive laboring caste of social insects.

workup: The process that a closely matched potential donor undergoes to determine whether he or she is healthy and prepared to donate marrow or blood cells. Workup includes a detailed information session with a donor center coordinator and/or medical director, a thorough physical examination, a donation of blood samples for testing and research and usually a donation of autologous blood. er’ T-cells that seek and destroy developing cancer.

wortmannin: A lipid-modifying enzyme that inhibits PI3 kinase.

X inactivation: The normal inactivation of one of the two X chromosomes in females.

Xenogeneic transplantation: Donor cells obtained from different species.

xenograft or xenotransplant: A graft or transplant of cells, tissues, or organs taken from a donor of one species and grafted into a recipient of another species.

xenograft: A graft of tissue taken from a donor of one species and grafted into a recipient of another species.

xenotransplantation: The term used to describe any procedure that involves the transplantation of live cells, tissues, or organs from one species to another, including animal-to-human transplantation.

xenotransplantation: A transplant of tissue from an animal of one species to an animal of another species.

xeroderma pigmentosum: Xeroderma Pigmentosum is a rare genetic condition characterized by an eruption of exposed skin occurring in childhood and photosensitivity with severe sunburn; inherited as a recessive autosomal trait in which DNA repair processes are defective so they are more likely to chromosome breaks and cancers when exposed to ultraviolet light.

XIST: X-inactive specific transcript. Uncertain function.

X-linked recessive disorder: A genetic disease caused by a gene mutation on an X chromosome (one of the chromosome that determines a person’s gender), caused when a male inherits the mutated gene from his father or (more rarely) when a woman inherits it from both parents.

X-ray: A type of high energy radiation that can be used at low levels to make images of the internal structures of the body and at high levels for radiation therapy.

xylem: The tube-shaped, nonliving portion of the vascular system in plants that carries water and minerals from the roots to the rest of the plant.

Y chromosome: The chromosome which determines male gender.

yeast: A unicellular fungus that lives in liquid or moist habitats, primarily reproducing asexually by simple cell division or by budding of a parent cell.
yoga: A system of exercises for attaining bodily or mental control and well-being. Derived from a Sanskrit word which means yoke or union.

yolk sac: Vital to the embryo for the formation of primordial and other cells that form the embryo. In mammals, it is small and devoid of a yolk.

yolk: The stored food in egg cells that nourishes the embryo.

Zoladex®: Trade or brand name for goserelin acetate, an LHRH agonist.

zona pellucida: Glycoprotein membrane which surrounds the plasma membrane of an oocyte.

zone: Part or area of an organ.

zoned reserve systems: Habitat areas that are protected from human alteration and surrounded by lands that are used and more extensively altered by human activity.

zoology: The study of animals.

zooplankton: A collective term for the nonphotosynthetic organisms present in plankton.

zygote: The fertilized egg, the result of sperm/egg interactions leading to the fusion of sperm and egg nuclei. The zygote usually begins cell division to give rise to the stages of the pre-implantation embryo, from the 2 cell stage to the blastocyst; but only the fertilized egg is the zygote.

α-galactosidase: An enzyme that breaks down a particular type of fatty substances, Fabry disease is characterized by its absence.

References