

The Discovery History of Stem Cell

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Abstract: The definition of stem cell is “an unspecialized cell that gives rise to a specific specialized cell, such as a blood cell”. Embryonic stem cells are derived from the inner cell mass of blastocyst stage embryos. Somatic stem cells differentiate into only the cells the specific tissue wherein they reside. Stem Cell is the original of life. All cells come from stem cells. This article describes a brief history of the discovery of stem cells.

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Brief Stem Cell Research History:

- 1908: Alexander Alexandrowitsch Maximow (Russian) firstly proposed the term "Stem Cell" and the existence of haematopoietic stem cells.
- 1924: Alexander Alexandrowitsch Maximow identified the precursor cell within the mesenchyme that develops into mesenchymal stem cells.
- 1960s: Joseph Altman and Gopal Das showed the existence of neural stem cells.
- 1963: James Edgar Till and Ernest McCulloch discovered the hematopoietic stem cells in mouse bone marrow that are self-renewing cells.
- 1968: A bone marrow transplant was successfully used.
- 1978: Haematopoietic stem cells were discovered in human cord blood.
- 1981: Martin Evans and Matthew Kaufman extracted mice embryonic stem cells from mice blastocysts.
- 1989: Sally Temple discovered the existence of multipotent, self-renewing progenitor and stem cells in the subventricular zone of the mouse brain.
- 1992: Brent A. Reynolds and Samuel Weiss isolated neural stem cells from the adult striatal tissue.
- 1997: John E. Dick discovered the existence of cancer stem cells.
- 1998: James Thomson discovered the human embryonic stem cells.
- 1998: John Gearhart obtained the germ cells from fetal gonadal tissue before developing pluripotent stem cell lines.
- 2001: Advanced Cell Technology cloned early staged human embryos (at the stage of 4 to 6 cells)
- 2003: Songtao Shi discovered that the primary teeth of children can be used as a new source for extracting adult stem cells.
- 2004: Hwang Woo-Suk showed the creation of human embryonic stem cell lines from unfertilised human oocytes, but it was later shown that his work was fake.
- 2005: UC Irvine's Reeve-Irvine Research Centre partially restored mobility in paralysed rats with induced spine damage by using neural stem cells.
- 2006: University of Illinois at Chicago of USA identified cord blood-derived multipotent stem cells with pluripotent capacities.
- 2006: Shinya Yamanaka derived induced pluripotent stem cells from mice.
- 2006: Newcastle University in England differentiated umbilical cord blood stem cells into liver cells
- 2007: Anthony Atala discovered a amniotic fluid stem cells that are pluripotent in nature.
- 2007: Mario Capecchi, Martin Evans and Oliver Smithies got the Nobel prize for Physiology or Medicine with their work on mouse embryonic stem cells.
- 2007: Shinya Yamanaka created human induced pluripotent stem cells, and James Thomson obtained same achievement.
- 2008: Robert Lanza got the production of human embryonic stem cells that didn't require the destruction of an embryo.
- 2008: Human knee cartilage stem cell obtained, which was involved the use of autologous mesenchymal adult stem cells.

- 2008: Sabine Conrad created human pluripotent stem cells from spermatogonial cells of adult testis.
- 2008: Paolo Macchiarini transplanted the first human organ, fully grown from stem cells. It was a trachea which was transplanted on a Colombian female who had her own collapsed due to tuberculosis.
- 2010: The first human clinical trial involving embryonic stem cells started.
- 2011: Inbar Friedrich Ben-Nun produced stem cells from an endangered species, which has the potential to save the species that are in danger of extinction.
- 2012: Advance Cell Technology started.

Alexander Alexandrowitsch Maximow was the first person to show that all blood cells are developed from a common precursor cell. This is commonly known as the unitarian theory of hematopoiesis. He proposed the existence of hematopoietic stem cells. He was the first person to use the term "stem cells" for scientific and medical purposes. After Alexander Maximow died in 1928, other physicians and medical researchers such as Joseph Altman, Gopal Das, Andre Gernez, McCulloch and Till discovered various characteristics of stem cells. Alexander A. Maximow was a Russian-American physician, biologist and scientist. He was born on January 22nd, 1874 in Russia. He studied in Germany (at Freiburg and Berlin) and America and achieved an M.D. from the Imperial Military Academy in Saint Petersburg in Russia. He was a histology and embryology professor from 1903 to 1922. He also served at the University of Chicago as professor of anatomy from 1922 to 1928. He died on December 4, 1928 in Chicago after of a long-standing history of severe coronary arteriosclerosis. In his early life, he was mostly interested in histological and related fields. Most of his papers that were published from 1896 until 1902 were based on these subjects. Later, he became actively involved in research on blood and its connective tissues. The modern idea of origin and differentiation of blood cells are primarily based on the unitarian theory.

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