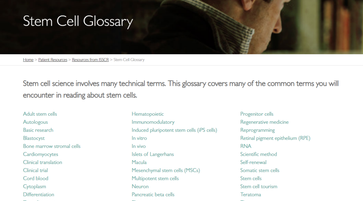

Stem Cell Glossary

Stem cell science involves many technical terms. This glossary covers many of the common terms you will encounter in reading about stem cells.

Adult stem cells
Autologous
Basic research
Blastocyst
Bone marrow stromal cells
Cardiomyocytes
Clinical translation
Clinical trial
Cord blood
Cytoplasm
Differentiation
Drug discovery
Drug screening
Embryo
Embryonic stem cells
Fibroblast
Glucose
Hematopoietic
Immunomodulatory
Induced pluripotent stem cells (iPS cells)
In vitro
In vivo
Islets of Langerhans
Macula
Mesenchymal stem cells (MSCs)
Multipotent stem cells
Neuron
Pancreatic beta cells
Photoreceptors
Placebo
Placebo effect
Pluripotent stem cells
Preclinical research
Precursor cells
Progenitor cells
Regenerative medicine
Reprogramming
Retinal pigment epithelium (RPE)
RNA
Scientific method
Self-renewal
Somatic stem cells
Stem cells
Stem cell tourism
Teratoma
Tissue
Tissue-specific stem cells
Totipotent
Translational research
Zygote

Adult stem cells

A commonly used term for tissue-specific stem cells, cells that can give rise to the specialized cells in specific tissues. Includes all stem cells other than pluripotent stem cells such as embryonic and induced pluripotent stem cells.

BACK TO TOP

Autologous

Cells or tissues from the same individual; an autologous bone marrow transplant involves one individual as both donor and recipient.

BACK TO TOP

Basic research

Research designed to increase knowledge and understanding (as opposed to research designed with the primary goal to solve a problem).

BACK TO TOP

Blastocyst

A transient, hollow ball of 150 to 200 cells formed in early embryonic development that contains the inner cell mass, from which the embryo develops, and an outer layer of cell called the trophoblast, which forms the placenta.

BACK TO TOP

Bone marrow stromal cells

A general term for non-blood cells in the bone marrow, such as fibroblasts, adipocytes (fat cells) and bone- and cartilage-forming cells that provide support for blood cells. Contained within the population of cells are multipotent bone marrow stromal stem cells that can self-renew and give rise to bone, cartilage, adipocytes and fibroblasts.

BACK TO TOP

Cardiomyocytes

The functional muscle cells of the heart that allow it to beat continuously and rhythmically.

BACK TO TOP

Clinical translation

The process of using scientific knowledge to design, develop and apply new ways to diagnose, stop or fix what goes wrong in a particular disease or injury; the process by which basic scientific research becomes medicine.

BACK TO TOP

Clinical trial

Tests on human subjects designed to evaluate the safety and/or effectiveness of new medical treatments.

BACK TO TOP

Cord blood

The blood in the umbilical cord and placenta after child birth. Cord blood contains hematopoietic stem cells, also known as cord blood stem cells, which can regenerate the blood and immune system and can be used to treat some blood disorders such as leukemia or anemia. Cord blood can be stored long-term in blood banks for either public or private use. Also called umbilical cord blood.

BACK TO TOP

Cytoplasm

Fluid inside a cell, but outside the nucleus.

BACK TO TOP

Differentiation

The process by which cells become increasingly specialized to carry out specific functions in tissues and organs.

BACK TO TOP

Drug discovery

The systematic process of discovering new drugs.

BACK TO TOP

Drug screening

The process of testing large numbers of potential drug candidates for activity, function and/or toxicity in defined assays.

BACK TO TOP

Embryo

Generally used to describe the stage of development between fertilization and the fetal stage; the embryonic stage ends 7-8 weeks after fertilization in humans.

BACK TO TOP

Embryonic stem cells (ESCs)

Undifferentiated cells derived from the inner cell mass of the blastocyst; these cells have the potential to give rise to all cell types in the fully formed organism and undergo self-renewal.

BACK TO TOP

Fibroblast

A common connective or support cell found within most tissues of the body.

BACK TO TOP

Glucose

A simple sugar that cells use for energy.

BACK TO TOP

Hematopoietic

Blood-forming: hematopoietic stem cells give rise to all the cell types in the blood.

BACK TO TOP

Immunomodulatory

The ability to modify the immune system or an immune response.

BACK TO TOP

Induced pluripotent stem cells (iPSCs)

Embryonic like stem cells that are derived from reprogrammed, adult cells, such as skin cells. Like ESCs, iPS cells are pluripotent and can self-renew.

BACK TO TOP

In vitro

Latin for "in glass." In biomedical research this refers to experiments that are done outside the body in an artificial environment, such as the study of isolated cells in controlled laboratory conditions (also known as cell culture).

BACK TO TOP

In vivo

Latin for "within the living." In biomedical research this refers to experiments that are done in a living organism. Experiments in model systems such as mice or fruit flies are an example of in vivo research.

BACK TO TOP

Islets of Langerhans

Clusters in the pancreas where insulin-producing beta cells live.

BACK TO TOP

Macula

A small spot at the back of the retina, densely packed with the rods and cones that receive light, which is responsible for high-resolution central vision.

BACK TO TOP

Mesenchymal stem cells (MSCs)

A term used to describe cells isolated from the connective tissue that surrounds other tissues and organs. MSCs were first isolated from the bone marrow and shown to be capable of making bone, cartilage and fat cells. MSCs are now grown from other tissues, such as fat and cord blood. Not all MSCs are the same and their characteristics depend on where in the body they come from and how they are isolated and grown. May also be called mesenchymal stromal cells.

BACK TO TOP

Multipotent stem cells

Stem cells that can give rise to several different types of specialized cells in specific tissues; for example, blood stem cells can produce the different types of cells that make up the blood, but not the cells of other organs such as the liver or the brain.

BACK TO TOP

Neuron

An electrically excitable cell that processes and transmits information through electrical and chemical signals in the central and peripheral nervous systems.

BACK TO TOP

Pancreatic beta cells

Cells responsible for making and releasing insulin, the hormone responsible for regulating blood sugar levels. Type I diabetes occurs when these cells are attacked and destroyed by the body's immune system.

BACK TO TOP

Photoreceptors

Rod or cone cells in the retina that receive light and send signals to the optic nerve, which passes along these signals to the brain.

BACK TO TOP

Placebo

A pill, injection or other treatment that has no therapeutic benefit; often used as a control in clinical trials to see whether new treatments work better than no treatment.

BACK TO TOP

Placebo effect

Perceived or actual improvement in symptoms that cannot be attributed to the placebo itself and therefore must be the result of the patient's (or other interested person's) belief in the treatment's effectiveness.

BACK TO TOP

Pluripotent stem cells

Stem cells that can become all the cell types that are found in an embryo, fetus or adult, such as embryonic stem cells or induced pluripotent (iPS) cells.

BACK TO TOP

Preclinical research

Laboratory research on cells, tissues and/or animals for the purpose of discovering new drugs or therapies.

BACK TO TOP

Precursor cells

An intermediate cell type between stem cells and differentiated cells. Precursor cells have the potential to give rise to a limited number or type of specialized cells. Also called progenitor cells.

BACK TO TOP

Progenitor cells

An intermediate cell type between stem cells and differentiated cells. Progenitor cells have the potential to give rise to a limited number or type of specialized cells and have a reduced capacity for self-renewal. Also called precursor cells.

BACK TO TOP

Regenerative Medicine

An interdisciplinary branch of medicine with the goal of replacing, regenerating or repairing damaged tissue to restore normal function. Regenerative treatments can include cellular therapy, gene therapy and tissue engineering approaches.

BACK TO TOP

Reprogramming

In the context of stem cell biology, this refers to the conversion of differentiated cells, such as fibroblasts, into embryonic like iPS cells by artificially altering the expression of key genes.

BACK TO TOP

Retinal pigment epithelium

A single-cell layer behind the rods and cones in the retina that provide support functions for the rods and cones.

BACK TO TOP

RNA

Ribonucleic acid; it "reads" DNA and acts as a messenger for carrying out genetic instructions.

BACK TO TOP

Scientific method

A systematic process designed to understand a specific observation through the collection of measurable, empirical evidence; emphasis on measurable and repeatable experiments and results that test a specific hypothesis.

BACK TO TOP

Self-renewal

A special type of cell division in stem cells by which they make copies of themselves.

BACK TO TOP

Somatic stem cells

Scientific term for tissue-specific or adult stem cells.

BACK TO TOP

Stem cells

Cells that have both the capacity to self-renew (make more stem cells by cell division) and to differentiate into mature, specialized cells.

BACK TO TOP

Stem cell tourism

The travel to another state, region or country specifically for the purpose of undergoing a stem cell treatment available at that location. This phrase is also used to refer to the pursuit of untested and unregulated stem cell treatments.

BACK TO TOP

Teratoma

A benign tumor that usually consists of several types of tissue cells that are foreign to the tissue in which the tumor is located.

BACK TO TOP

Tissue

A group of cells with a similar function or embryological origin. Tissues organize further to become organs.

BACK TO TOP

Tissue-specific stem cells

Stem cells that can give rise to the specialized cells in specific tissues; blood stem cells, for example, can produce the different types of cells that make up the blood, but not the cells of other organs such as the liver or the brain. Includes all stem cells other than pluripotent stem cells such as embryonic and induced pluripotent cells. Also called adult or somatic stem cells.

BACK TO TOP

Totipotent

The ability to give rise to all the cells of the body and cells that aren't part of the body but support embryonic development, such as the placenta and umbilical cord.

BACK TO TOP

Translational research

Research that focuses on how to use knowledge gleaned from basic research to develop new drugs, treatments or therapies.

BACK TO TOP

Zygote

The single cell formed when a sperm cell fuses with an egg cell.