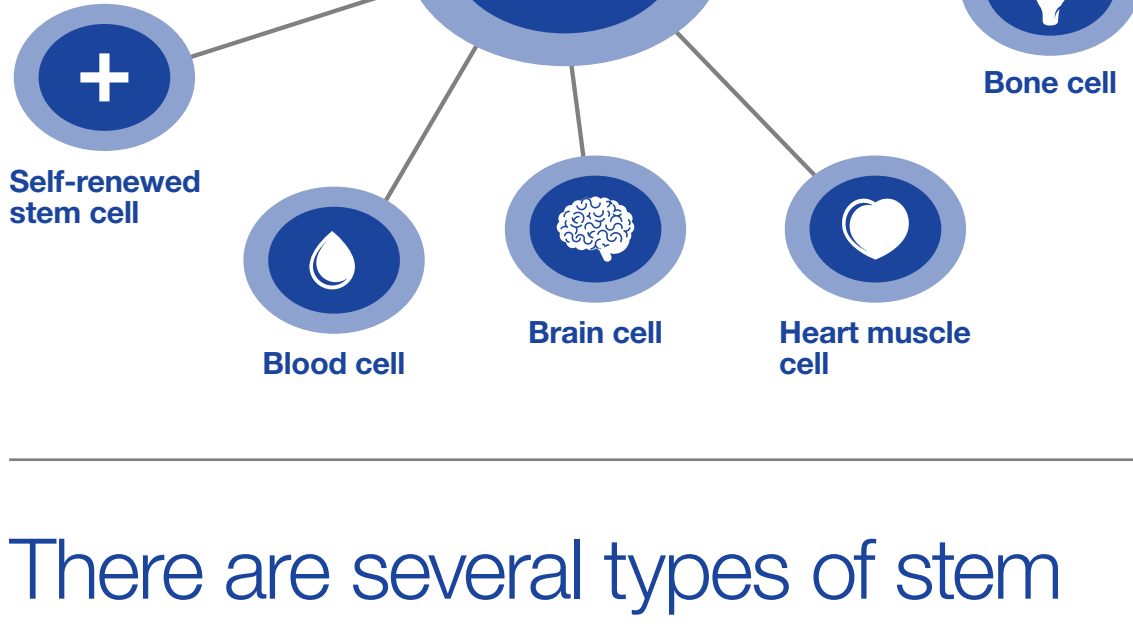


The Amazing Stem Cell

What are they? Where do they come from?
How are they changing medicine?

Stem cells are “master cells”

Stem cells can be “guided” to become many other cell types.

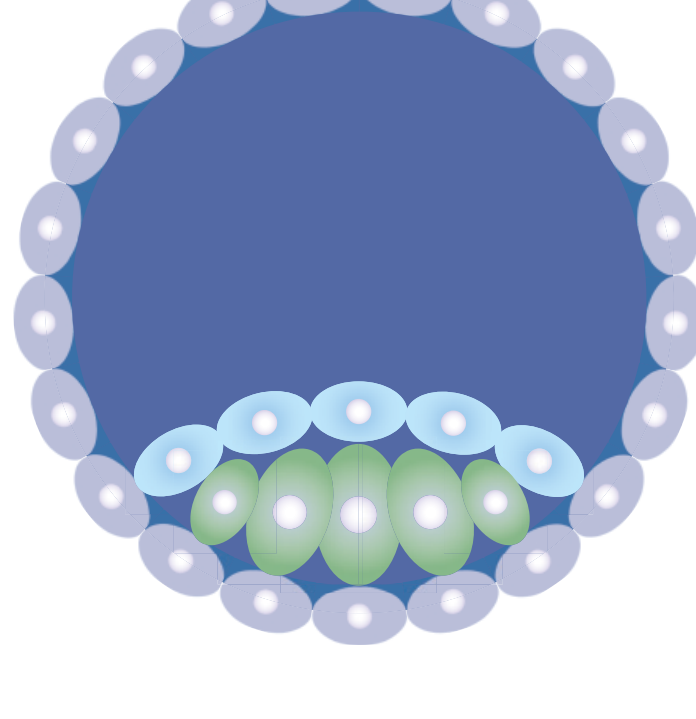


There are several types of stem cells, each from a unique source

Embryonic stem cells*

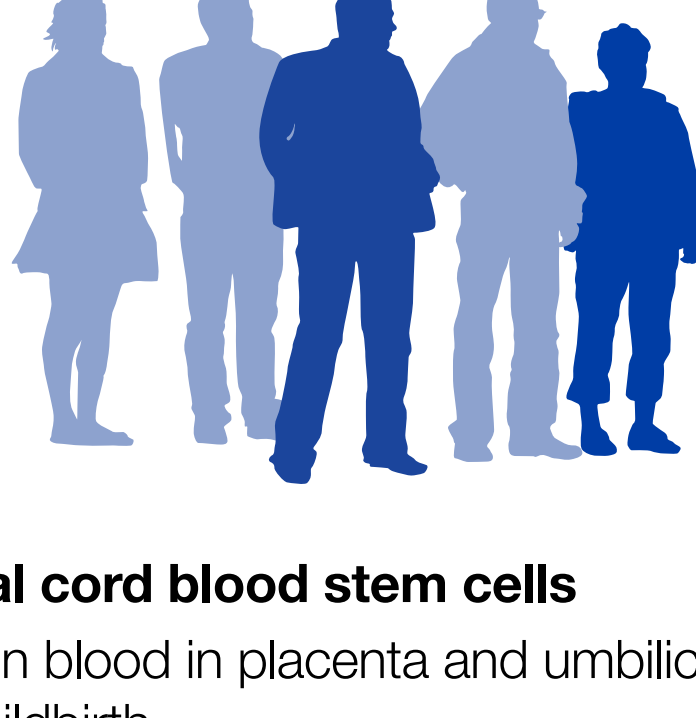
- Removed from embryos created for in vitro fertilization after donation consent is given. (Not sourced from aborted fetuses.)
- Embryos are 3-5 days old (blastocyst) and have about 150 cells.
- Can become any type of cell in the body, also called pluripotent cells.
- Can regenerate or repair diseased tissue and organs.
- Current use limited to eye-related disorders.

* Not used by Mayo Clinic.



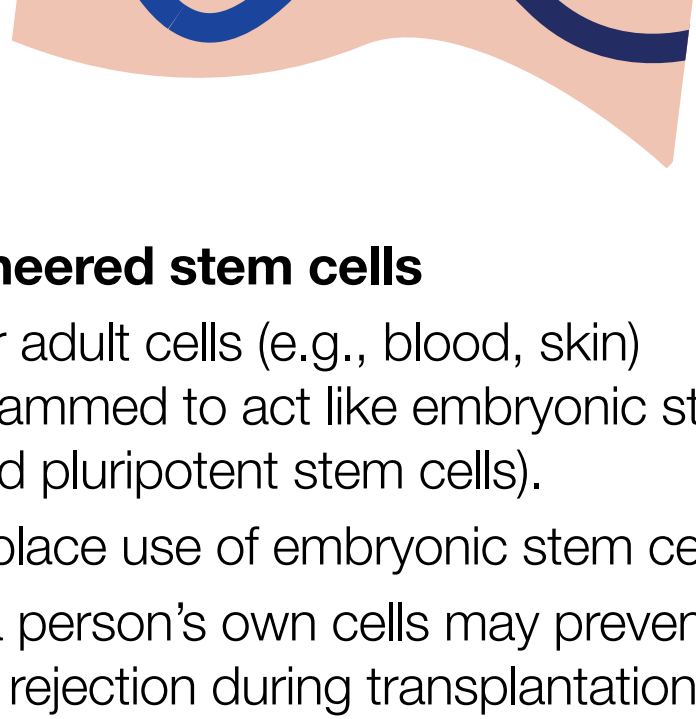
Adult stem cells

- Found in most adult organs and tissues, including bone marrow.
- Often taken from bone marrow in the hip.
- Blood stem cells can be collected through apheresis (separated from blood).
- Can regenerate and repair diseased or damaged tissues (regenerative medicine).
- Can be used as specialized “drugs” to potentially treat degenerative conditions.
- Currently tested in people with neurological and heart disease.



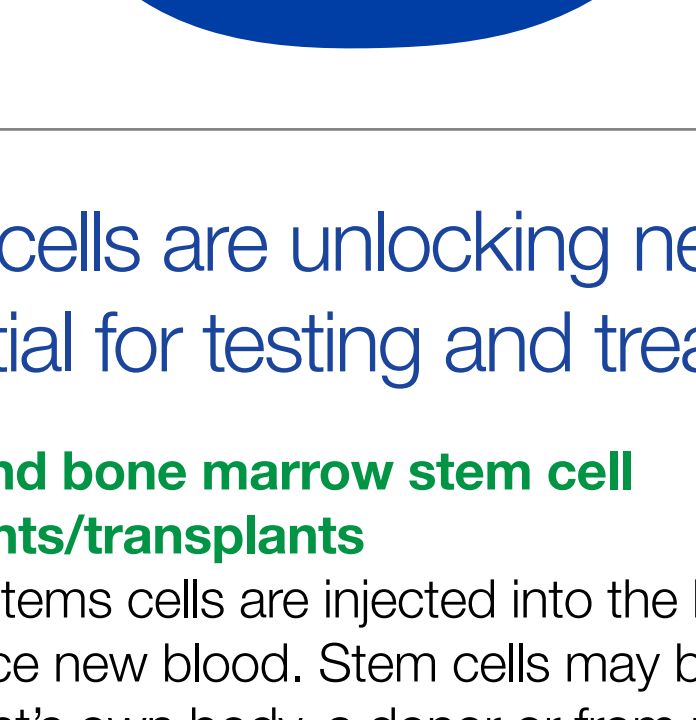
Umbilical cord blood stem cells

- Found in blood in placenta and umbilical cord after childbirth.
- Have the ability to change into specialized cells (like blood cells), also called progenitor cells.
- Parents choose to donate umbilical cord blood for use in research, or have it stored for private or public banks.
- Can be used in place of bone marrow stem cell transplants in some clinical applications.



Bioengineered stem cells

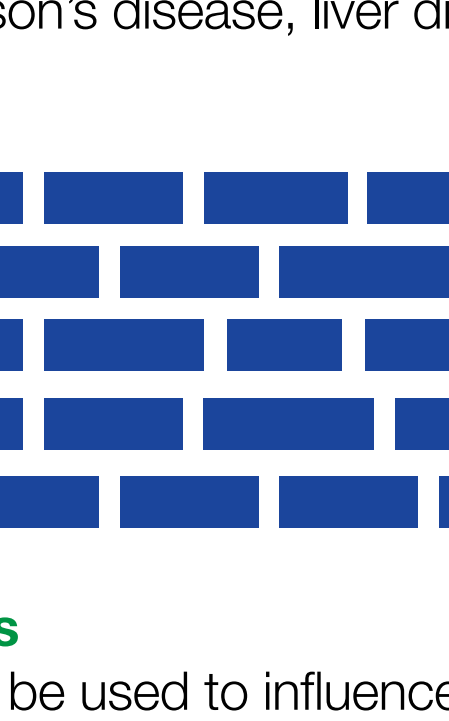
- Regular adult cells (e.g., blood, skin) reprogrammed to act like embryonic stem cells (induced pluripotent stem cells).
- May replace use of embryonic stem cells.
- Using a person’s own cells may prevent immune system rejection during transplantation.
- Testing shows successful reprogramming of cells into functional neurons, heart, liver and lung cells.



Stem cells are unlocking new potential for testing and treatment

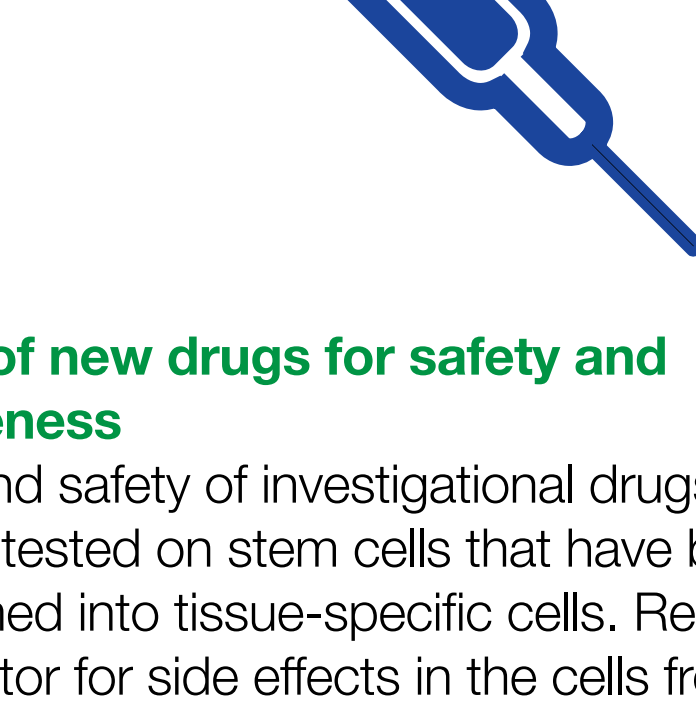
Blood and bone marrow stem cell treatments/transplants

Healthy stem cells are injected into the body to produce new blood. Stem cells may be from the patient’s own body, a donor or from umbilical cord blood.



Regenerative cellular therapies

Stem cells have the potential to rebuild healthy tissues, potentially helping people with heart disease, ALS, diabetes, Alzheimer’s disease, cancer, Parkinson’s disease, liver disease and more.



Cells as drugs

Stem cells can be used to influence other cells. For example, stem cells can be injected into joints to reduce pain and swelling, or in soft tissue to promote healing.



Testing of new drugs for safety and effectiveness

Quality and safety of investigational drugs could be tested on stem cells that have been transformed into tissue-specific cells. Researchers can monitor for side effects in the cells from the drug before exposing a patient to it.

