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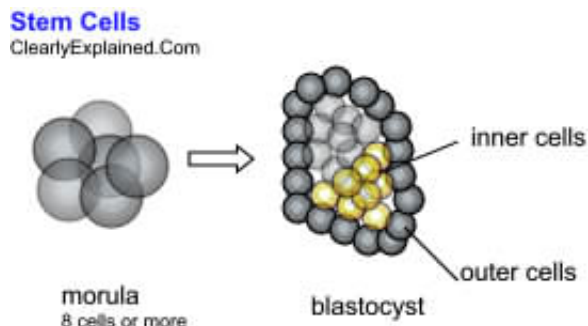


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by Richard Conan-Davies BSc Dip Ed

A straightforward and fast information guide to Stem Cells from [ClearlyExplained.Com](http://ClearlyExplained.Com)

updated: 22 June 2009



An illustration showing the basics of stem cells. A newly fertilised egg produces 8 identical cells that go on to form a 'clump' of cells that can potentially produce other types of cells.

The | [What](#) | [Why](#) | [News](#) | [How](#) | [History](#) | [Future](#) | of stem cells

## What are stem cells?

Stem cells are generally very early stage cells that have the ability to turn into other specialised types of cells.

For example a stem cell can turn into liver cells, skin cells, nerve cells etc. These early stage cells can have differing abilities to turn into more specialised cells.

There are generally 3 types of stem cells that are important:

- embryonic stem cells
- adult stem cells
- umbilical cord stem cells\*

These are often classified further ... [more...](#)

**extra info:** [Why is a stem cell called a stem cell?](#)

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## Why are stem cells important?

Stem cells are significant for a number of reasons. These include things like:



- Potential therapeutic uses such as:
  - cures for diabetes, brain diseases like Parkinson. Treatments for cancer or Multiple sclerosis (MS)
- Ethical concerns
  - Issues of when is a

On a very basic level stem cells are interesting in trying to understand how such cells store information and then turn into other cells with very different properties is quite a fascinating topic.

How a cell goes from type A to type B is part of discovering something about ourselves and the world we live in.

Stem cell research may also be useful for improvement of livestock or other

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human human, misuse.

- Scientific curiosity- simply knowing how cells can change from one function to another.

animals

## News about Stem Cells

- [Yahoo! Full coverage](#) on stem cells
- [Stem Cell Research news](#)
- [Time.com article of stem cells](#)
- [ABC news Stem cell search](#)
- BBC news [stem cells](#)



- [Google news search Stem cells](#)

LATEST: [Stem cell products and services](#)  
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### [Proven Stem Cell Serum](#)

69% Wrinkle Reduction in 8 Weeks!  
Clinically Proven. Guaranteed



Some reliable and quality assured sources of general information about stem cells include:

Australia:

- [Uni NSW Medical School on Stem cells](#)

US:

- US National Institute of Health [Stem Cell Basics](#)
- [Alphamed press Stem cells](#)
- The Why Files on [Stem Cells](#)
- [Stem cell therapy](#) explanations from Uni of Utah

UK/Europe:

- [European Research on stem cells](#)
- German Research Organisation (DFG.de) on [stem cell research](#)
- [Explore Stem Cells](#) (introduction to stem cells)

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### [Cord Blood Stem Cells](#)

Store your child's cord blood stem cells with Cryo-Save

## How are stem cells classified?

Generally there are 2 types of stem cells, embryonic and adult stem cells.

- Embryonic - technically called *totipotent* and produce all types of tissue. This is the very early stage of a recently fertilised egg and has only about 8 cells( morula)
  - Inner cells-*pluripotent* can become almost all types of cells and are taken from an early embryo stage.
- Adult stem cells are typically called *multipotent* cells like bone marrow cells

## How are these types of cells developed?

**Embryonic stem** cells are 'harvested' or collected from the very early stages of a fertilised egg called a blastocyst.

**Adult stem** cells are collected from a limited number of cell types in the body. Typically these are bone marrow cells or from very early stages of tissue development.

**Umbilical cord stem** cells are collected from the cells of the umbilical cord of a recently born baby. Some of these cells are slightly undeveloped and so can turn into

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that can produce a wide range of different blood cells. There are also some cell types in the body that have be

- But there is continuing research into if it is possible to make multipotent cells into pluripotent types.



these cells are considered **totipotent**

other types of cells (multipotent)



these inner cells are now **pluripotent**

*blastocyst*

There are wide range of chemical signals from nearby cells that direct what the cells should become. There are even signals from the uterus where the embryos are normally held.

## What is the history of stem cells?

Stem cells themselves have actually been around for almost as long as life has been on earth. In essence all life evolved from stem cells of some kind.

Many of the earliest forms of life on earth were not much more complex than stem cells.

Stem cell field research developed from studies in the 1960s by Canadian scientists Ernest A. McCulloch and James E. Till .

Stem cell research has been around for almost as long as microscopes. Though it is only within the 1980s that more sophisticated genetchnology developments have allowed for the culturing (growing of cells) in laboratories.

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Fetal nerve cells were one of the first 'stem cells" not real stem cells though were used to treat Parkinson.

source: [Lasker Foundation](#)

Later in 1998 a team from [University of Wisconsin](#) managed to grow human stem cells in culture.

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## The future of stem cells?

Stem cell research is about the future, it is cutting edge technology that brings a headline each day. So stem cell research is likely to continue in various forms.

The main controversy is the use of human embryonic stem cells.



The future of stem cells is a consideration of the benefits and dangers of the technology. It is similar to many other kinds of technology.

EurekaAlert provides a portal to some of the most recent scientific discoveries about [stem cells](#) that points to the future uses of stem cells.

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### About the Author

Richard, has worked explaining science for the past 10 years, including at Questacon, Mount Stromlo, CSIRO, the Maritime Museum in Greenwich, and various schools in South East London. He studied immunology and biochemistry at ANU.

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If there is something important missing please let me know

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