

Basic Questions & Answers About Stem Cells

Q: What are stem cells?

A: Stem cells are the fundamental building blocks for all the tissues in the body. They can develop into bone, brain, muscle, skin and other organs and tissue.

Q: What kinds of stem cells are there?

A: There are three types _ totipotent, pluripotent and multipotent, each representing a different stage in development.

Q: What are totipotent stem cells?

A: Totipotent stem cells form when a fertilized egg first divides. Totipotent stem cells can develop into a complete individual.

Q: What are pluripotent stem cells?

A: After a few days, totipotent stem cells form a blastocyst, a ball of cells. The inner layer contains pluripotent stem cells which are capable of developing into any tissue in the body. Pluripotent stem cells, however, cannot become a complete individual. Pluripotent stem cells are also called embryonic stem cells.

Q: What are multipotent stem cells?

A: Multipotent stem cells are found in mature tissue and are formed by the body to replace worn out cells in tissues and organs. Stem cells from the bone marrow, for instance, form the various kinds of blood cells. Neural stem cells can form nerve and brain cells. Multipotent stem cells are sometimes called somatic or adult stem cells.

Q: How are stem cells useful in medicine?

A: Researchers believe that stem cells have great promise in the treatment of many illnesses, from brain disease to diabetes to heart failure. Experts believe they can learn to direct the development of stem cells into various types of new cells that can rejuvenate or

even replace ailing organs. For instance, some believe it may be possible to grow insulin-producing cells to cure some forms of diabetes, or nerve cells to restore function for patients paralyzed by spinal injury.

Q: Which type of stem cell is best?

A: That is unknown. Some researchers believe embryonic stem cells are best because they are the most versatile. But research has shown that adult stem cells also are capable of forming many different types of cells. For instance, some mouse experiments have shown that neural stem cells from the brain can be coaxed into growing muscle, liver and heart cells.

Q: Why is embryonic stem cell research controversial?

A: An embryo is killed when the pluripotent stem cells are extracted. Many people are ethically opposed to killing human embryos for any purpose. A 1995 law specifically forbids federal funding of research in which a human embryo would be destroyed, injured or placed at risk.