

CLASSROOM ACTIVITY

Stem Cells: Developing New Cures

Although stem cells hold promise as direct therapy for human diseases, many researchers are even more enthusiastic about the opportunity to use stem cells to study disease fundamentals. Learn how clinicians and researchers are involving diabetes patients in the search for a cure by developing new stem cell lines from their DNA.

CLASS DISCUSSION

Establish Prior Knowledge

Before watching the video discuss with students what they know about stem cell research. Discuss that stem cells are special cells in the human body that can develop into virtually any type of body tissue. Scientific research may show that stem cells can be used to create healthy tissues to replace dysfunctional ones in people with diseases.

Exploration

Have students view the Feature and read the synopsis. Use the following to guide a class discussion. (You may want to have students watch the video a second time.):

- What is an embryonic stem cell?
(Answer: A stem cell derived from the inner cell mass of a very early human embryo)
- What is so unique about the cells in the inner cell mass?
(Answer: They can renew indefinitely and have the ability to give rise to any one of the different cell types in our body—nerve cell, liver cell, pancreatic cell, muscle cell, etc.)
- Describe the somatic cell nuclear transfer procedure.
(Answer: Researchers use a microscopic glass pipette to extract the 46 chromosomes of DNA from the nuclei of a skin cell. Then 23 chromosomes are removed from a donated human unfertilized egg. The 46 chromosomes are inserted into the donor egg's empty cytoplasm. The egg begins to divide as an embryo. After 4 days, stem cells are removed from the interior lining of the egg (called a blastocyst) and a placed in a Petri dish with a growth medium. The blastocyst is discarded, but the stem line continues.)
- What could studying the development of these cells tell scientists?
(Answer: By studying the development of these cells they can discover the processes that lead to the malfunction of that cell, which could lead to disease, such as diabetes. This would allow them to intervene using other kinds of approaches.)
- How is studying cells with a genetic marker for a disease different than studying a patient with that disease?
(Answer: Scientists can create the cell type that has the genetic marker for the disease they are studying. They can watch the cell develop and see what the steps in the development are that have malfunctioned in that individual. They could not do that with a patient with that disease.)

Wrap-Up

Use the following question to wrap up your discussion:

- What ethical issues surround the use of embryonic stem cells?
(Answers may include: Embryonic stem cells involve fertilized human embryos which are used solely to extract stem cells. Many people feel the destruction of a human embryo is unethical.)
- Do you think stem cell research has the potential to eliminate disease? Why or why not?
(Answers will vary.)