



How can education influence stem cell issues?

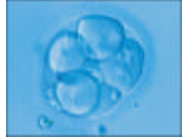
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What are stem cells?



Stem cells (SC) are unspecialized cells in humans or animals that can self-renew through mitosis and can give rise to specialized daughter cells. One way of classifying human stem cells is by their source as we have done below.

•Embryonic SC

Pluripotent stem cells derived from blastocysts (early embryos that can potentially have many clinical applications including treating neurodegenerative diseases and type 1 diabetes.

•Somatic SC

Multipotent or unipotent stem cells derived from adult tissues. Hematopoietic stem cells (from bone marrow) have long been used to treat leukemia. Other medical applications are possible such as growing in-vitro tissues for transplantation. However, somatic SC are rare, hard to identify, and don't have the plasticity of embryonic SC.

•Cord Blood SC

Multipotent stem cells are derived from umbilical cords with similar potential for medical applications as somatic SC.

•Placental SC

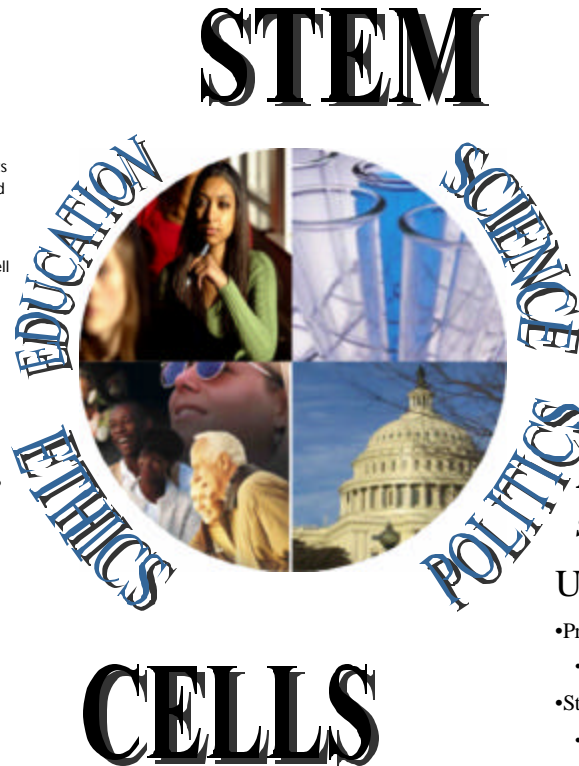
Similar to Cord Blood SC

•Amniotic SC

Similar to Cord Blood SC

•Induced Pluripotent SC

New technique for turning a specialized cell back into a pluripotent stem cell



How has politics influenced stem cell research?



US Legislation

•President Bush's 2001 NIH policies

•*Restricted federal funding to a few stem cell lines*

•Stem Cell Research Enhancement Act of 2005/ 2007

•*Unsuccessful attempts by Congress to expand the list of federally funded stem cell lines*

•State Legislation

ex. California passed Proposition 71 to fund

stem cell research within the state

International Legislation

•Singapore, Sweden, United Kingdom (*permissive*)

•Australia (*moderately permissive*)

•Austria and Germany (*restrictive*)

Our Project

•Description

Recognizing the need for stem cell publications for the general audience that can provide a quick overview of the central issues, our project was to synthesize a multifaceted review article of stem cells covering the areas of science, ethics, and politics.

Two main principles underlie our decision to write the article.

- *Science educators have the responsibility to ensure that today's students will become tomorrow's scientifically informed and socially engaged citizens.*
- *An interdisciplinary approach should be taken in teaching students about stem cells, because stem cells are no longer a purely scientific matter.*

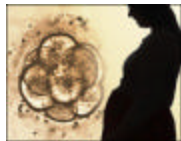
In order to help our science majors be more socially conscientious citizens, we have been using our article as a way to not only introduce our students to the scientific side of stem cells but also to their equally relevant ethical and political issues. This approach has been successful in encouraging students to share their views on stem cells, which we believe to be an essential part of being a socially engaged citizen.

•Goal

We hope to provide educators, students, and the general public a brief, convenient primer to stem cell developments and debates in science, ethics, and politics.

•Accomplishment

Our review article was published in SECEIJ Fall 2007 issue.



What ethical concerns surround human embryonic stem cells?

•Is a pre-implantation embryo a human life?

•The negative social ramifications of human embryonic stem cells

ex. Exploitation of women,
commercialization of human tissues

•Ethically questionable solutions

ex. Altered nuclear transfer (ANT)

•Ethically acceptable solutions

ex. Human induced pluripotent stem cells (hiPSC)
(the technique is new, however, and there remain scientific reservations)