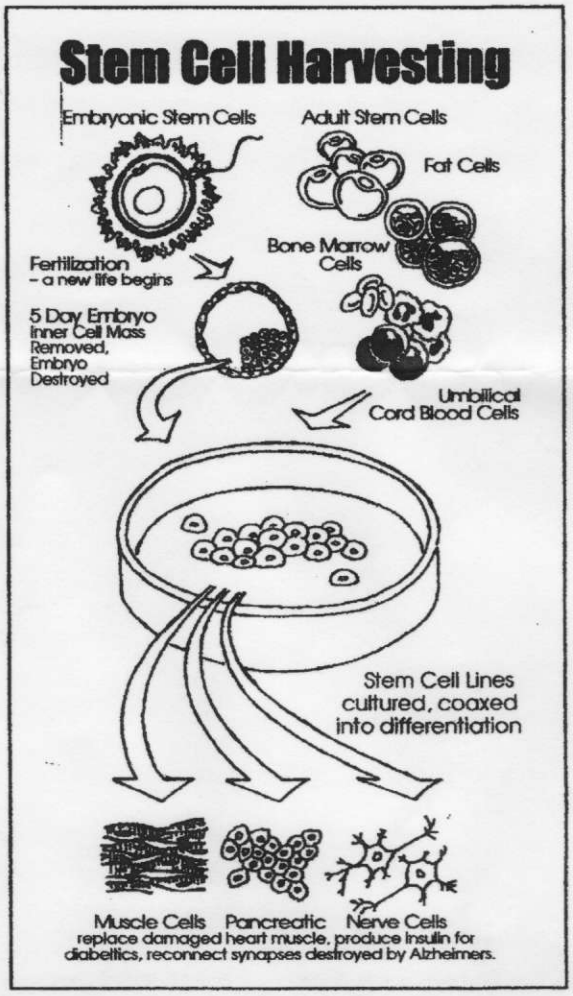
Stem Cell Research: FACTS . . . & FALLACIES

What are stem cells, and why are scientists so interested in them?

"A stem cell is a cell that has the ability to divide (self replicate) for indefinite periods . . . . Under the right conditions, or given the right signals, stem cells can give rise (differentiate) to the many different cell types that make up the organism. That is, stem cells have the potential to develop into mature cells that have characteristic shapes and specialized functions, such as heart cells, skin cells, or nerve cells." Scientists envision drawing from "lines" of stem cells–colonies of similar cells that can replicate for long periods–to create new specialized cells for transplant into patients, to repair or replace tissues that disease and disability have damaged.[1]



Where are stem cells found?

In the adult organism ("adult" referring to humans or animals any point after birth) stem cells are found in the bone marrow, blood stream, brain, spinal cord, dental pulp, skeletal muscle, skin, gastrointestinal tract, cornea, retina, liver, and pancreas. Another rich source of stem cells is the blood within umbilical cords and placentas no longer needed by newborn babies.[1] New research shows human fat contains stem cells.[2]

The stem cells receiving the most public attention are found within human embryos. Researchers harvest these cells by pulling the "inner cell mass," the 30-34 cells that will develop into the baby's tissues and organs, from the center of a five-day-old embryo.[1]

What is the problem with stem cell research?

Adult stem cell research is not controversial; no human being dies when these cells are collected. The moral problem arises because stem cell harvesting from embryos would destroy them.[3]

Is the enthusiasm for embryonic stem cell research justified?

Human embryonic stem cells (ESCs) have not yet successfully treated disease.[4] Currently, the National Institutes of Health says that "any therapies based on the use of human ES cells are still hypothetical and highly experimental." Scientists are still figuring out how to induce the cells to change into particular types of cells. Other problems the researchers have encountered include: the tendency of ESCs to form tumors when they are transplanted into a patient, unstable expression of traits contained in the cells' genes, immune rejection, and the risk of passing animal viruses to humans because formulas of animal cells are used to keep ESC lines growing.[1, 2]

CROSSING A CRITICAL MORAL LINE

Even some who support legal abortion worry that society's sanction of research that would destroy human embryos may set a dangerous moral precedent. We are "crossing a major boundary without any sense of how significant a boundary it is," says Duke theologian Amy Hall.[16] Once we approve killing one human being to save the life of another, where do we stop? Should we create and clone embryos just for "spare parts?" Why stop at embryos? What about near-term fetuses, or even newborn infants? Why not calculate an individual's quality of life or projected social contribution and determine whether or not someone else is entitled to his or her organs? Hastings Center bioethicist Daniel Callahan supports abortion but opposes stem cell research that would destroy human embryos because once started, "there is no logical place to draw the line."[17] The *Washington Post* says, "even moralists without fixed views on abortion are queasy about the idea of scientists mass-producing embryos for a goal other than human reproduction. For them, any amount of scientific progress is cold comfort in a future where human dignity is no longer the first priority."[18]

What is the current state of research on adult stem cells?

Doctors already use adult stem cells to treat a host of human diseases, including cancers, autoimmune diseases, stroke, cartilage and bone damage, and blood and liver diseases. Scientists are continually discovering new capabilities of adult stem cells. For example, using mice and rats, scientists have regrown nerve cells, reversed diabetes, and repaired hearts damaged by heart attack. There is also evidence of a universal adult stem cell that can change into any cell of the body. [1, 4, 5-7]

Despite the reported "promise" of embryonic stem cells, stem cells from adults are the ones that have been delivering true therapy. Dr. Donald Orlic of the National Human Genome Research Institute states, "We are currently finding that these adult stem cells can function as well, perhaps even better than, embryonic stem cells."[7]