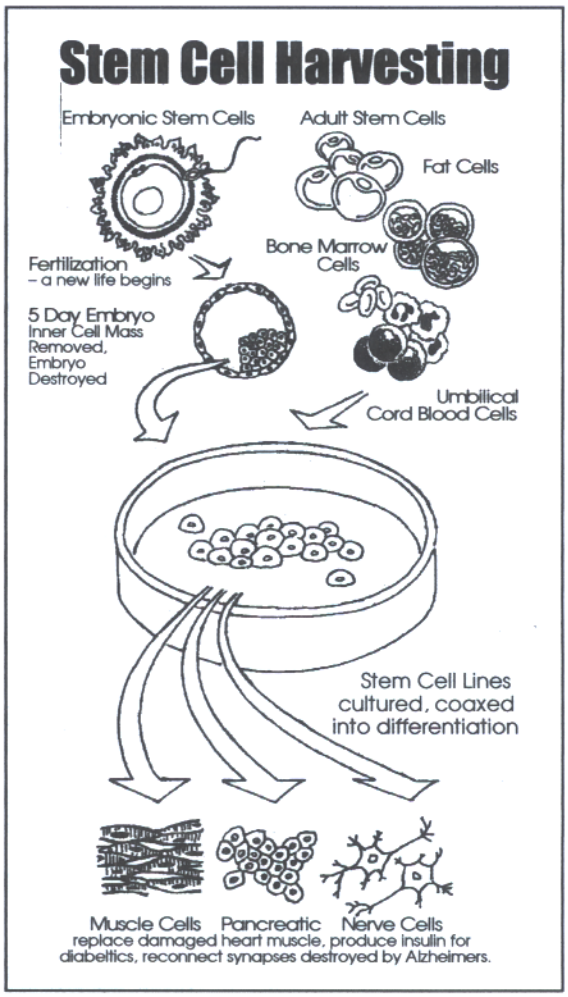
Stem Cell Research: FACTS . . . & FALLACIES

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]

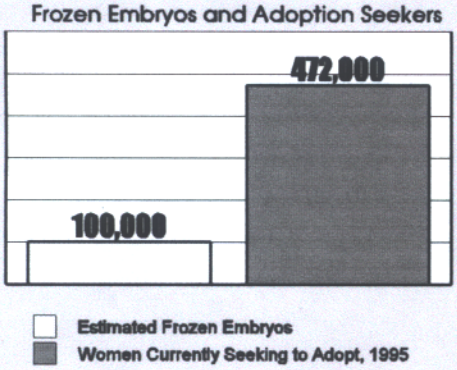
Despite the reported "promise" of embryonic stem cells, stem cells from adults are the ones that have been delivering true therapy. Dr. Donald Orlic of the National Human Genome Research Institute states, "We are currently finding that these adult stem cells can function as well, perhaps even better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

THERE ARE NO "EXCESS" EMBRYOS.

Advocates of ESC research want to use frozen embryos from fertility clinics as their main source of stem cells. Often dubbed "leftover," "surplus," "spare," or "excess," these embryos were conceived during in vitro fertilization but were not implanted in a mother's womb. Fertility clinics typically offer three options to couples for the embryos that are not implanted: destroy them, donate them to another couple, or freeze them and store them in case the first attempt at pregnancy fails or the couple wants to give birth to more of their children later. Overwhelmingly, couples choose to freeze their embryos.[8] Today, an estimated 100,000 embryos wait in cryo-banks.[9]

Proponents of ESC research argue that these embryos will be disposed of anyway, but the destiny of frozen embryos is not necessarily destruction. In one study, 59 percent of parents who originally intended to discard their embryos within three years changed their minds, instead attempting another pregnancy or donating their embryos to another couple.[10] The American Society for Reproductive Medicine tells fertility clinics that they may destroy frozen embryos after five years of attempts to reach parents for a decision. Doctors, however, are reluctant to end the embryos' lives.[8]

Frozen embryos have also been adopted by couples who would like to become parents but have not been able to conceive a child on their own. This alternative is only now rising to public attention. Through the Snowflakes Embryo Adoption Program, for example, eight babies have been born since the program's 1997 founding, and five more are on the way.[11] In 1995, approximately 472,000 ever-married women described themselves as currently seeking to adopt a child. Another five million said they would consider adoption at some time in the future.[12]



Hannah:
An Embryo's Story

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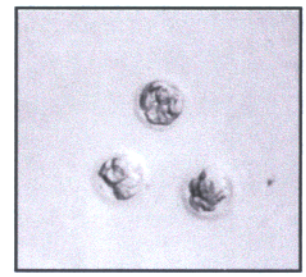
"Millions of times a year, egg genome meets sperm genome, and the result is a human baby, its parts all in place, its brain a universe of love and meaning."

– *New York Times,* June 27, 2000



Hannah Strege was one of these "spare" frozen embryos before Marlene and John Strege adopted her through the Snowflakes Embryo Adoption Program in 1998.

"She required a place to grow, nutrients and love–her same basic needs today–but Hannah did the rest."

– Marlene Strege, House testimony, 7/17/01

Hannah at 2 years old, with happy mom, Marlene.

NOTES: **1.** NIH, *Stem Cells: Scientific Progress and Future Research Directions*, 6/01 **2.** Weiss, *Washington Post*, 4/10/01, 7/6/01 **3.** Nat'l Bioethics Advisory Comm., *Ethical Issues in Stem Cell Research*, 9/99 **4.** Prentice Testimony, stemcellresearch.org **5.** Goodman, *Salt Lake Tribune*, 7/1/01 **6.** Ramiya, *Nature Medicine*, 3/00 **7.** Bazell, MSNBC.com, 3/30/03 **8.** Stolberg, *N Y Times*, 2/25/01 **9.** Friedrich, *JAMA*, 8/9/00 **10.** Klock, *NEJM*, 7/5/01 **11.** Davidson Testimony, 7/17/01 **12.** Chandra, NCHS, 1999 **13.** ABC News/BeliefNet Poll, 6/01 **14.** NBC News/Wall St Jrnl Poll, 6/01 **15.** Harris Poll, 7/01 **16.** Raspberry, *Washington Post*, 7/20/01 **17.** Hunt, *Wall St Jrnl*, 7/12/01 **18.** Rosin, *Washington Post*, 11/6/98

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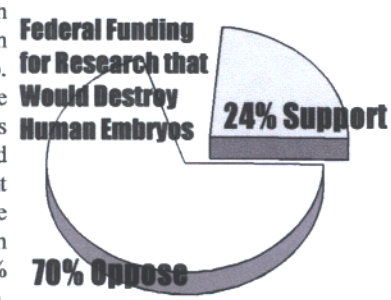
AMERICANS SUPPORT STEM CELL RESEARCH ... BUT NOT IF A HUMAN EMBRYO DIES.

Proponents of research that would require destroying human embryos cite wide public support. Their polls, however, often fail to mention that embryos would be destroyed for their stem cells.[13-15] Consider the results from a poll that shared this fact:

International Communications Research asked "Stem cells are the basic cells from which all of a person's tissues and organs develop. Congress is considering whether to provide federal funding for experiments using stem cells from human embryos. The live embryos would be destroyed in their first week of development to obtain these cells. Do you support or oppose using your federal tax dollars for such experiments?" Given these details, 69.9% opposed government funding of such research. Only 23.9% expressed support.



International Communications Research
June 1-5, 2001