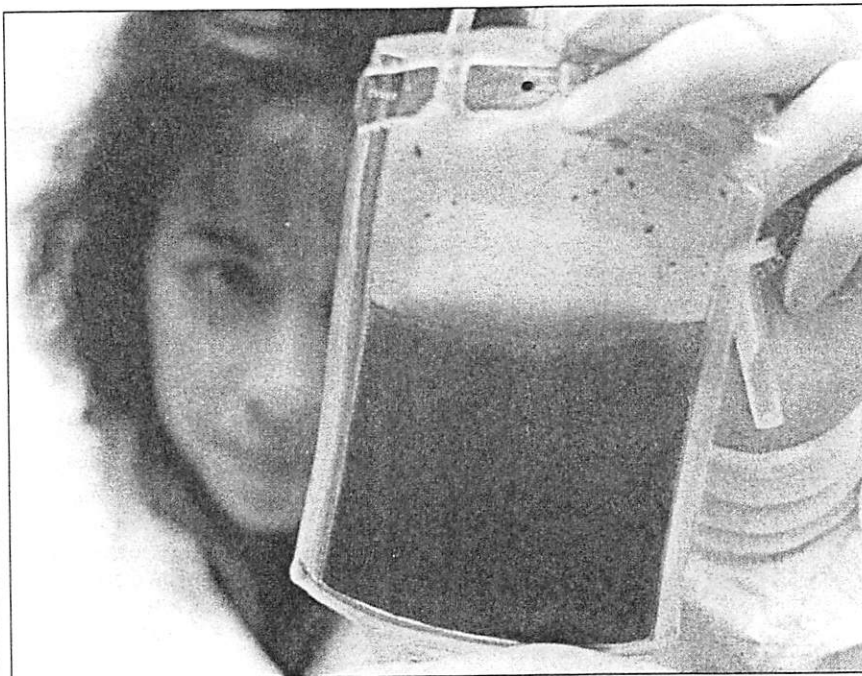


Embryo Research: A Life for a Life?

By Catherine Edwards

Federal agencies, Capitol Hill and pro-lifers are debating the alleged necessity of using human embryos in research, weighing ethics along with the possible medical benefits.



The debate about the ethics of human-embryo stem-cell research is heating up in the nation's capital. This research burst on the medical scene in late 1998 and prompted the National Institutes of Health, or NIH, to issue draft guidelines in December 1999 to regulate how such research should proceed. The public is invited to voice comments and concerns before the regulations become administrative law.

While patient-advocacy groups, scientists and some legislators tout the benefits of embryo stem-cell research, others are concerned that amid the hype the NIH is misinterpreting the

Good or bad science? *A container of stem cells could hold the answer to diseases such as juvenile diabetes.*

law limiting the use of human embryos for experiments while failing to so much as acknowledge that breakthroughs in adult stem-cell research may make the destruction of living embryos unnecessary. As *Insight* reported last summer, stem cells have the remarkable capacity to develop into most of the tissues and organs in the body (see "Give a Life, Take a Life," Aug. 16, 1999). The possible medical benefits for patients with chronic illness are staggering, as scientists search for new ways to ease suffering,

prolong life and defy the aging process.

The problem comes when some scientists insist that the research be conducted using materials cut from living human embryos — an activity Congress banned in 1995. Last year the Department of Health and Human Services, or HHS, the federal agency that oversees NIH, decided to reinterpret the congressional ban. HHS concluded that because isolated stem cells from human embryos do not have the capacity to develop into a human being, they are not subject to the ban. The HHS general counsel determined that as long as someone else was responsible for destroying the embryo and extracting the cells, federally funded researchers who used the stem cells were not violating the law.

Pro-lifers are furious. "Congress outlawed federal funding for harmful embryo research in 1996 and has maintained that prohibition ever since," says Republican Sen. Sam Brownback of Kansas. "The intent of Congress is clear: If a research project requires the destruction of [living] human embryos, no federal funds should be used for that project." And Brownback is just one of many lawmakers concerned that the guidelines do not regulate stem-cell research but instead regulate the means by which researchers may obtain and destroy frozen human embryos while continuing to receive federal funds.

In early February, Brownback and a group of 20 other senators signed a letter calling on NIH to withdraw the new guidelines. The senators urged NIH to refocus on adult stem-cell research, which does not require destroying human embryos. Although the senators warned NIH that the guidelines violate congressional intent and will not be tolerated, NIH has not moved to withdraw them. NIH has not responded to numerous letters from Brownback's office. Republican Sen. Arlen Specter of Pennsylvania disagrees with this group of senators and offered a bill at the end of January to legitimize embryo stem-cell research, thus endorsing NIH's position.

David Prentice is a professor of life sciences at Indiana State University and an adjunct professor of medical and molecular genetics at Indiana University School of Medicine. He cautions against the use of embryo stem cells for tissue regeneration and advocates the use of adult stem cells instead. "Within the last two years, a tremendous variety of adult stem cells has been reported," Prentice says.

Adult stem cells have been found in skin, bone marrow and the blood-

stream. Scientists recently uncovered neural stem cells in the brain. The discovery of stem cells in the cornea is good news for those who need corneal transplants. Corneal stem cells have been used to treat patients in whom traditional corneal transplants were unsuccessful.

"The distinct advantage of these adult stem cells is that you can use your own cells to regenerate tissue, totally circumventing the problem of immune rejection of embryo stem cells," says Prentice.

The December issue of *Science* magazine hailed adult stem-cell research as an astonishing breakthrough. Yet NIH tells *Insight* it is undecided whether to publish guidelines regarding adult stem-cell research. This apparent inconsistency has alarmed members of the pro-life movement, who say they fear that embryo stem-cell research is being used to justify abortion and erode respect for human life.

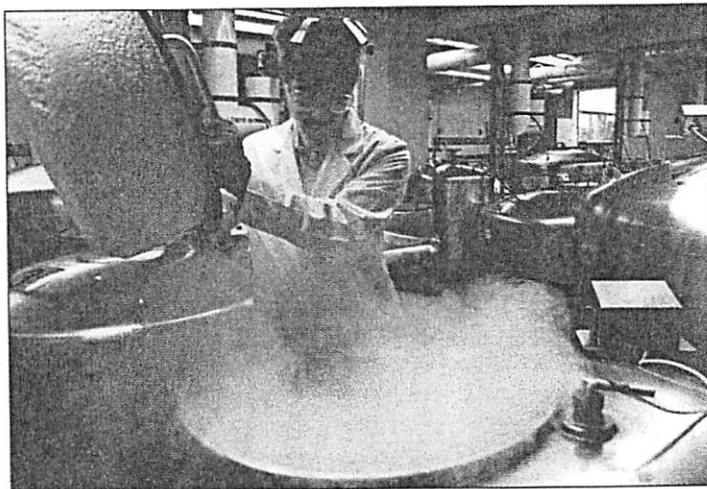
The National Conference of Catholic Bishops criticized the guidelines as well, saying this is the first time in U.S. history that Americans have authorized the federal government to approve and regulate the destruction of human life for research purposes. "Members of the human species who cannot give informed consent for research should not be the subjects of an experiment unless they personally benefit from it or the experiment carries no significant risk of harming them," argues Monsignor Dennis Schnurr, the group's general secretary, in his public comments directed to NIH about the stem-cell guidelines.

The private companies that fund embryo stem-cell research are Geron Corp. in Menlo Park, Calif., and Advanced Cell Technology, or ACT, in Worcester, Mass. Along with NIH, they advocate using stem cells of frozen embryos left over "in excess of clinical need" as long as they have gained the consent of the couples who produced the embryos. No federal laws regulate private research.

So what about those who suffer from diseases that might be eliminated by such research? One group that stands to benefit greatly from stem-cell research is diabetics. Type 1 diabetes (otherwise known as juvenile

diabetes) is caused by the body's autoimmune destruction of its own insulin-producing islet cells. One of the more promising cures for this is to restore the function of the islet cells. According to the Juvenile Diabetes Foundation, or JDF, the use of stem cells would greatly speed the research

'I hope I never have to choose a treatment that has been developed at the expense of a human embryo.'



Frozen in time: Pro-lifers say cryogenically stored embryos are viable human beings and should not be misused or destroyed.

process in this area. The JDF recognizes that Congress bans embryo stem-cell research and calls for the ban to be lifted in light of promising research, although the foundation does call for appropriate ethical safeguards to accompany such a lift.

Like Prentice, however, the JDF recognizes the potential for the body to reject the islet-cell transplants, making one's own stem cells a better choice. But ACT chief executive officer Michael West told the *New York Times* in early February that "a lot of the problems we have in trying to develop these new technologies for medicine is people's knee-jerk reaction to words like 'fetal' and 'embryo.'"

But not all patients with Type 1 diabetes support embryo stem-cell research. Christopher Currie has been insulin-dependent for 25 years; his diagnosis came at age 11. He wears an insulin pump and is well-aware of the fact that as a diabetic he can expect to

lose a third or more of his normal life span. This frightens him, he explains, as he has a young wife and family. He desperately wants a cure for his illness but opposes embryo stem-cell research. "Treatments that depend on the destruction of human embryos will not help thousands of patients like me who will not accept such treatments in good conscience," he says. "I hope that I may never be faced to choose a treatment that has been developed at the expense of a human embryo."

Micheline Matthews-Roth is a researcher at Harvard University Medical School, where she has been working to find a cure to a rare genetic disease called erythropoietic protoporphyria, or EPP. Sufferers are highly sensitive to most of the visible-light spectrum from the sun to indoor fluo-

rescent light, which makes ordinary living very difficult. Matthews-Roth and her colleagues have been able to cure EPP in mice by extracting stem cells from their bone marrow and replacing the defective cells with normal ones. The mice have suffered no immunological rejection of these replacement cells. Matthews-Roth holds out great hope that a cure for EPP in humans might be found with more funding of adult stem-cell research.

So why are scientists insisting on fetal and embryo stem-cell re-

search? "Because it's there," says Matthews-Roth, "and they ignore the ethics of destroying a life apart from the dangers of the body rejecting the embryonic stem cells that might force patients to go on potentially lethal anti-rejection medication the rest of their lives."

Meanwhile, alternatives exist to save those embryos deemed by NIH to be "in excess of clinical need." In the world of test-tube babies, no one denies that these embryos have a chance to live as normal human beings if implanted in a womb. Several U.S. organizations are dedicated to helping infertile couples create families of their own by offering such embryos for implantation into women who are unable to produce ova. "Embryonic stem-cell research is currently unnecessary," says Prentice. "Why don't we just explore adult stem-cell research, which appears much more promising?"