

The great stem cell debate: Where are we now? Cloning, chimeras, and cash

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If the amount of newspaper space devoted to an issue reflected its importance, then the most important issue facing America right now is whether or not there should be an asterisk after Barry Bonds' name in the baseball record books.

It wasn't always that way. Prior to September 11, 2001, the press was consumed with the question of whether President Bush would or should allow federal funds to be used for research using human embryonic stem cells. At the time, the overriding moral issue seemed to be a debate about the moral status of the embryo.

As a practical matter, that debate is over. Stem cells obtained from residual human embryos, created for in vitro fertilization but no longer wanted or needed by the couple who created them, are now routinely used in research labs throughout the United States and the world. A solid majority of the American people, including the US Senate and House of Representatives, support such research, including expanded federal funding.

What then is holding up federal funding, and why is the Wisconsin

legislature threatening Wisconsin researchers with prison terms if they conduct certain kinds of stem cell research? Three issues are now dominating the debate: cloning, chimeras, and cash.

Cloning

At the present time, nearly everyone opposes *reproductive cloning*, the creation of a live born human being who is a genetic replica of a previous living person. The main reason for the current consensus is concern about physical harms, since cloning in other mammals has been associated with an array of complications. Whether or not there would continue to be moral objections if the medical problems were resolved is less clear. Public opposition to other new reproductive technologies has typically receded as the safety became established.

The debate is about two other activities—*research* and *therapeutic cloning*. *Research cloning* involves the creation of stem cells for laboratory study that contain the genetic material from patients with serious incurable disorders, such as diabetes or cystic fibrosis. The goal is to learn more about the basic mechanisms of how these diseases develop, and to try out drugs or other therapies in the cell cultures. To get the stem cell lines, the genetic material has to be transferred into an egg from which the nucleus has been removed; the egg is then allowed to grow for

several days into a collection of cells called a blastocyst, from which the stem cells are then removed. The new cells are genetically identical to the patient they came from; thus, it is a kind of cloning.

Therapeutic cloning involves the creation of stem cells that could someday be used for treatment of patients with serious diseases. Suppose, for example, I had sickle cell disease and scientists had created a stem cell line that produced red blood cells with normal hemoglobin. If the stem cells came from another person, I'd be worried that my body would reject them. So I would want stem cells created using my genetic material, using the same technique described for research cloning.

Critics worry that if these techniques are perfected, they could then be used for reproductive cloning. That's possible, though there is widespread support for a moratorium on reproductive cloning, and no serious scientist is interested in doing it. The demand and funding for more work on research cloning is sufficiently great that the only issue now is where the research will occur. The state legislature, with a like-minded governor, can't stop research cloning, but they could ensure that Wisconsin does not play a role in such research.

Chimeras

Less frequently discussed has been a new set of questions raised by the laboratory research that is a prerequisite

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site to human studies. Stem cell lines, like most other new biomedical technologies, will have to be tested in animals. When the organs involved are hearts or livers or kidneys, the ethical questions are familiar ones about animal welfare and avoiding spread of infectious diseases. The new issue involves studies in which human brain cells could be implanted into a laboratory animal. In the worst case—and at this point imaginary—scenario, creative thinkers wonder whether a fully functioning human brain could develop inside, say, a goat, and if that did happen, should we think of it as a really smart goat, or as a human trapped in a goat's body: the so-called "Help, let me out of here" fear.

Most scientists believe this is, and will remain, science fiction. They feel it is biologically highly implausible that human brain cells could organize themselves inside a goat's head and function in a sufficiently organized way to raise concerns. National and

local committees have developed guidelines to reduce the risk of such experiments. For example, one recommendation is that these studies not be allowed to use non-human primates, where the likelihood for a functioning brain might be higher. And ethicists are increasingly directing their attention to the legitimacy of such concerns, and whether further restrictions are needed.

Cash

As noted above, numerous states, countries, and, to a smaller degree, private investors are committing large amounts of funds to stem cell research. California leads the way with a \$3 billion commitment. The current debate, therefore, is not whether such research will occur: it already is. The debate is now about where it will occur.

These are legitimate decisions for democratic (and autocratic) governments: how to spend the public's

money. Some argue that the laboratory of democracy is working well, that there are sufficient funds to allow reasonable progress, and it is not essential that every state participate in the new technology. Others believe that progress has already been unduly delayed, that more money will increase the likelihood of safe and effective therapies for common severe diseases that affect millions of people, and that the legislatures are not representing the wishes of the majority.

In summary, stem cell research is proceeding, slower than it could, but faster than some predicted when President Bush promulgated restrictions on federal funding. This new frontier began in Wisconsin, following James Thomson's landmark discovery in 1998. Whether or not Wisconsin continues to be part of this story, and to what degree, will be heavily influenced by the upcoming state elections.

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