Stem Cells for All

With the rise of biomedical research, society is confronted with new ethical dilemma. One of these centers around embryonic stem cells, which on one hand involves the destruction of embryos and on the other hand promises vast medical progress.

Certainly, the current situation, where private companies are given the green light to pursue any stem cell research, while public research is limited to about sixty existing stem cell lines, is absurd. Stem cell research holds such promise for medicine that it should be pursued and publicly funded, but in a tightly regulated environment.

Stem cells are cells that can divide and specialize. They are found in our adult bodies, though in small quantities, since they are essential to replenish our body with cells. For example, blood stem cells can generate red and white blood cells and platelets. They reside in the bone marrow and, at any time, a few of them circulate in the blood to refurnish our supply of blood cells. Some kind of stem cells can divide in culture and specialize into any tissues of the human body. These flexible stem cells are derived mainly from embryos of about four days old. At this stage, the embryo forms a blastocyst, a shell of cells whose outer layer supports its development, and whose inner cell mass contains unspecialized cells that can develop into all the tissues of the human body. The scientists collect these so-called “multipotent” stem cells, but in the process, the embryo is destroyed.

Not everything should be sanctioned in the name of medical progress. Stem cell research reopens the thorny debate on the status of the embryo. For those who believe that the embryo is "the tiniest of human being" (CARE), it is evident that it should be protected from scientific manipulations. For those who believe that the embryo is still merely a lump of cells, it is evident that embryonic stem cell research should be freely pursued.

Some may argue that since the status of the embryo is unsettled, it is more prudent to refrain from manipulating it. This prudence appears unwise in light of the promises of stem cell research. Stem cell research may increase our understanding of human development and may help us gain insight into abnormal development, a frequent cause of cancers and birth defects. It may enhance the efficiency of drug testing by first testing on stem cell lines before considering testing on animals and humans. Stem cell research may provide treatment to diseases like Parkinson’s and Alzheimer’s by allowing tissues and cells of the body to be regenerated through cell therapy. However, much basic research needs to be pursued for these applications, and others, to become a reality. Indeed, according to the Expert Group on Therapeutic Cloning of the UK government, this basic research should assess:

- whether stem cells can be successfully isolated and grown in the laboratory;
- whether stem cells grown in the laboratory can be influenced to turn into specific cell types;
- whether stem cells that have formed particular cell types could be used to treat patients whose tissue was diseased or damaged through injury;

- whether tissue grown in this way would develop normally or whether there might be risks to the patient." (par 3 "The Stem Cell")

Some suggest that embryonic stem cell research is unnecessary because adult stem cells are equally malleable and already used in treatments today. Though adult stem cells may be superior for some applications, particularly those involving rejection issues, it would be hasty to disregard embryonic stem cell for this reason. It is likely that both types of research will have complementary functions and that embryonic stem cell research will provide insights into how to better exploit adult stem cells. John Gearhart of John Hopkins University, one of the first scientist to isolate embryonic stem cells, predicts that "answers to the problems of how you would do things with adult stem cells will probably come from the embryonic cells" (Vogel). In addition, currently, embryonic stem cells are the only one who can divide in culture. This distinct advantage over adult stem cells allows scientists not only to learn about the process of differentiation but also to obtain large amount of stem cells in the laboratory for further research. Furthermore, most embryonic stem cells are derived from "spare" embryos of In Vitro Fertilization (IVF) that would be frozen at best, thrown away at worst: in any case wasted. It seems reasonable to use them.

Scientists sometimes need to derive stem cells from embryos created in the lab, when the embryos from outside sources like IVF are not suited for the purpose of the research, perhaps because the quality of these stem cells is insufficient. Whether scientists should e allowed to create and destroy an embryo solely to collect stem cells depends once more on what status we accord to the embryo. As the embryo develops, as it starts to look and feel human, it becomes more and more untenable to use it for research purpose. In the UK, research is allowed on embryos up to fourteen days, when it starts showing signs of an emerging nervous system. Embryo under fourteen days cannot feel, cannot suffer. In any case, the process of creating and destroying an embryo should not be taken lightly and should be clearly regulated. Scientists should demonstrate why their research has a worthy goal and cannot be accomplished without creating and destroying embryos. In the United Kingdom, where a clear regulation for using embryos exists with "the Human Fertilisation and Embryology Act", 48'000 "spare" embryos from IVF, but only 118 created embryos, were used in research from 1990 to 1998, according to Expert Group on Therapeutic Cloning (par 13 "Legal Restrictions"). So, despite being allowed to create and destroy embryos for research purpose, scientists in the United Kingdom have done so sparingly, only when their research goals could not be achieved otherwise. Therefore, the United States should follow the model set forth by the United Kingdom to regulate the creation and destruction of embryos for research purpose.

One reason scientists want to create embryos in laboratory is to apply Somatic Cell Nuclear Transfer (SCNT) to humans. Without Somatic Cell Nuclear Transfer, the applications of embryonic stem cell research would be limited. Involving the fusion of an egg cell without nucleus and a somatic cell, this technique creates embryos that have the genetic material of an adult. The adult will then not reject tissues differentiated from stem cells derived from these embryos, because their genetic material is his

own. These embryos and their derivatives may also provide insights on how to render adult stem cells more versatile. This technique is also called “therapeutic cloning” because the embryo created has the same genetic material as an adult. For this reason, some argue that this method should be forbidden because it is the first step on the slippery slope of “reproductive cloning”. Yet it is not because we can successfully grow an embryo for a few days that we are ready to create a full human being. It would be cruel to attempt cloning, at least because of the deformation risks involved (Jaenish and Wilmut): these risks and failures will not be overcome by studying a “cloned” embryo for 2 weeks or less.

Stem cell research is too promising and too controversial to be left in the hands of obscure private companies. By allowing federal funding only on some sixty existing stem cell lines, Bush merely widens the gap between public and private research, neither serving the embryos, nor medical progress. As George Daley, Fellow at the Whitehead Institute for Biomedical Research, puts: "there is a ban on federal funding of human embryo research, and the work proceeds largely unchecked in private industry, away from NIH oversight, outside the scrutiny of scientists and the peer review process” (Friedrich). Furthermore, if the public wants to decide who should benefit from stem cells applications tomorrow, it should participate in the stem cells research today.

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