

Pennsylvanians for Human Life - PHL - is an educational organization dedicated to the protection of human life from conception until natural death. Our mission is to provide clear and accurate information to persons of all ages on the process of human development before and after birth, especially as this process is threatened by the practices of abortion, assisted suicide, and new human cell technologies.

We perceive some progress in the small but steady reduction of the number of abortions and even better progress in the increasing moral awareness of our younger people. However we also see two trends which are operating to dehumanize our American culture.

-The Slippery Slope of Disrespect for Human Life

-The Brave New World of Biotechnology

The growing disrespect for human life is the fallout from the continuing acceptance of the practice of aborting over one million unborn children each year. The impact of this easy acceptance of abortion is a coarsening of our respect for human life in all forms. The slippery slope from accepting abortion is seen in the growing acceptance of assisted suicide at one end of the cycle of life and in the enthusiastic promotion of the use of human embryos for research purposes at the other end of that cycle.

The other trend, and the subject which I would like to address here in more detail, is the development of Brave New World technologies for the biological processes involved in the beginning of human life. I am referring here to stem cell research, cloning, and in-vitro fertilization. I use the term Brave New World because, in a science fiction novel of that name written by Aldous Huxley in the year 1932, - seventy years ago - he envisioned almost precisely those technologies and the grossly dehumanized world which such technologies could produce.

Advances in biotechnology have produced enormous benefits for mankind and will continue to do so. New drugs and medical procedures have essentially eliminated diseases such as small pox and polio and have extended human life spans by many years. The future of biotechnology shows even greater promise. As a Pro-Life organization we at PHL are enthusiastic supporters of advanced biotechnology, including stem cell research, as I will point out shortly.

There are, however, ethical guidelines which must be followed as we reach for that future. Just as we have guidelines for the treatment of laboratory animals we must have even more rigorous guidelines as we experiment with human life. Much work in biotech is being conducted and discussed with a bright focus on the value of the results. Little attention is being paid to the ethical issues involved in the means to those ends.

The technology of stem cell research and related subjects is highly complex and is conducted by teams of exquisitely trained scientists. Nevertheless the basics of these processes are not that obscure or difficult to understand and their ethical implications

need to be appreciated by all of us before we find, like the proverbial frog in the slowly heating pot, that we are already in that dehumanized Brave New World. You have probably heard that if you drop a frog into hot water it will jump out before it gets hurt. If you put that same frog into cold water and start heating it the frog will not recognize the danger until it is too late.

Let me start with a biological process that most of us know reasonably well, the normal creation of a human life.

A female egg cell is met by a male sperm cell and fertilization begins. Each of these cells contributes 23 chromosomes, or half of the required 46 chromosomes that make up a complete human string of DNA, the language of life. While this meeting of cells is referred to as the moment of conception it actually takes about 30 hours for these two cells to integrate into a single cell.

At the end of that period we have a human life. There is no honest disagreement that, from a biological point of view this is the beginning of a new human life. There is disagreement, some of it honest, much of it dishonest, that this human life has not yet gained sufficient respect that its right to life should prevail over competing rights such as those of the mother or of research priorities. As Pro-Lifers we, of course, believe that a human being gains a right to life as soon as it becomes a human being and that time is conception.

After conception that new, single cell, life starts to divide, slightly faster than once every 24 hours. After about 5 days that life consists of between 100 and 200 cells. It is now called an embryo. It had been termed a zygote initially.

This new embryo is at a very critical point for a variety of reasons. First of all it is now looking to implant itself in the wall of the mother's uterus and continue its development. From a biotech point of view it is now made up of two clearly different types of cells. Remember that word "different". That is the key word for stem cells. The outer cells, perhaps 100 in number, form an outer shell which will develop into the supporting structures such as the placenta, the amniotic sac, and the umbilical cord. The inner cells, perhaps 25 in number, will continue to develop as the human life.

The human body is made up of 210 different types of cells. Those 25 cells in the inner cell mass of the new embryo will continue to divide and differentiate themselves into those 210 different types. This ability to differentiate is the definition of stem cells. These 25 inner cells have already partially differentiated in ways that scientists do not yet understand. They are termed multipotent cells, that is each cell is potentially able to differentiate into many but not all possible cells. These 25 or so inner cells are stem cells - multipotent embryonic stem cells. The original fertilized egg after conception is, by contrast, a totipotent cell, that is it is able to differentiate into all 210 types of cells.

These embryonic stem cells are one type of stem cells used in stem cell research. Another type of stem cells are adult stem cells. This important type will be discussed later.

Before looking at stem cell research we need to look at in-vitro fertilization – IVF. The main reason is that IVF-generated embryos are proposed as an important source of embryonic stem cells.

The IVF process starts by removing female eggs from a woman's ovaries, placing them in a Petri dish with sperm cells and allowing them to fertilize. They are then grown in that Petri dish to the embryo stage when they are then mechanically implanted in the woman's uterus.

The Catholic Church position on IVF is that it is banned because it eliminates the unitive or family uniting function of the marriage act. However beyond this Catholic view there are a number of additional ethical problems with IVF, some existing and some potential.

The first such additional important ethical problem is that in order to have a high probability of at least one live birth the procedure requires that multiple eggs be extracted from the woman and be fertilized – usually 6 to 12 eggs. Typically only 2 or 3 of the resulting embryos are selected for implantation and the rest are frozen for possible future use. The disposition of those so-called “spare” embryos presents an ethical problem. Researchers believe that the stem cells included in those embryos should be used for research. That is a significant ethical problem with IVF because such use requires killing the embryos in order to obtain the stem cells they contain.

A third ethical problem derives from the fact that the usual reason for the use of IVF is that the prospective parents have a fertility problem. The sometime solution here is the use of sperm cells or/and egg cells from third parties. With the availability of surrogate motherhood technology yet another additional party could be involved in a rent-a-womb kind of function. It is conceivable (no pun intended) and increasingly probable that there might be 5 different people each with a legitimate claim to being the parent of that child. The ethical problems here are mind boggling in addition to the legal problems.

Yet another ethical problem with IVF is the recent availability of technology which will allow a more sophisticated selection of embryos for implantation. The ability to examine the DNA of the embryos in the Petri dish, a process called Pre-implantation Genetic Diagnosis or PGD, allows for the detection of genetic defects and the discarding of such embryos. This discarding is essentially abortion. In addition PGD allows the parents to select boys or girls for implantation. (The politically correct Choice-like term for this is “family balancing”)

Recently scientists at the University of Wisconsin have developed ways to not only diagnose but also correct defects in DNA. We are likely not far from a point where skin color, hair color, height, intelligence, and other desirable traits can be “corrected for” in

the test tube. We may soon be able to get just what we want and, like King Midas, we may not like it.

The IVF industry – and it is an industry – operates with fewer controls than the abortion industry. There is no governmental or professional monitoring of such issues as the uses of PGD, the duration of the in vitro development stage, or the follow up of potential birth defects or of defects found later in life.

Moving to stem cell research itself scientists can obtain stem cells, put them into a Petri dish, and, with the appropriate electrical or chemical stimulation, grow those multipotent stem cells into specific desired types of cells. Nerve cells to heal Christopher Reeves spinal cord. Skin cells for burn victims. Kidney cells for dialysis patients. Perhaps some day complete organs such as kidneys, hearts, muscles, and so on.

Stem cell research focuses on understanding how cells differentiate and on developing methods to control that differentiation process.

The potential benefits from stem cell research are numerous, valuable, and highly probable, and as I said previously, we Pro-Lifers, contrary to what you have probably heard, support stem cell research enthusiastically.

There is a major problem. Where do we get stem cells? The source most discussed involves the use of those “spare embryos” from IVF. In order to extract the embryonic stem cells (ESCs) – those 25 or so cells which are the inner cell mass – scientists have to crack the outer shell thereby killing the embryo.

That is unethical and unacceptable. While the ends are extremely valuable the means make them ethically unreachable. But there are other ethical sources of stem cells which I will get to in a minute.

Before getting to that I want to touch on a related technology, that of cloning. Human cloning is basically the same human development process as that of in vivo or in vitro fertilization. It starts with a female egg and gets to the same key point of a human embryo. The difference is in the fertilization step.

In the cloning process the nucleus of the egg, which contains its 23 chromosomes, is removed and discarded. A cell is removed from a donor adult. It could be skin, muscle, nerve, or almost any type of cell. The nucleus of that adult cell, with its full 46 chromosome DNA, is removed and inserted into the egg. This is now a fertilized egg. A new human life. A clone of the donor adult.

This new life grows as in the other processes discussed and becomes an embryo. The current avowed purpose of this cloning process is to produce stem cells just like the spare embryos from IVF except these will have the DNA of the adult donor. After further growth and differentiation in a Petri dish the resulting cells will, because of the matching DNA, presumably be less subject to rejection when inserted back into that donor.

This sounds ideal except that we face the same ethical problem of killing the embryo in order to get the stem cells.

In addition that cloned embryo could be implanted in a woman's uterus and be brought to term. Dolly the sheep was created using that technology. The Raelians said in December 2002 that they had a live human female clone named Eve who was conceived using that technology. While Raelians are almost certainly a hoax there are qualified scientists working in precisely that direction and such an event is almost inevitable without some constraints.

Finally there are other, ethical, sources of stem cells.

In the adult human body while the vast majority of cells have already reached their final differentiated cell type there continue to be stem cells capable of differentiating into various types of cells. They are found in small but usable quantities in many, possibly even all, organs of the body.

The most common source of adult stem cells is in bone marrow where new blood cells are being continually created to replace the normal loss of blood cells as they get damaged in their travels. Other sources of adult stem cells have been found in muscles, brain, fat, kidneys, and other organs. Most recently baby teeth have been found to have a high concentration of adult stem cells. The tooth fairy is even more valuable than children have known!

All of these adult stem cells can be manipulated in Petri dishes in the same way as that of embryonic stem cells. More importantly many of these types of adult stem cells are already in use in curing patients. Leukemia patients have been successfully treated with bone marrow derived stem cells for almost 20 years. Recent progress has been reported in the treatment of humans with other types of adult stem cells. There is a growing number of reports of successful treatments of heart injuries, Parkinson's disease, myeloma, and others. No successful treatments using embryonic stem cells have ever been reported.

Christopher Reeves, Michael J. Fox, and the other embryonic stem cell flag wavers are fighting the thing most likely to save their lives. The potential for any ESC-based cures is far distant. The potential for some adult SC-based cures is already here.

Another ethical source of stem cells is in the blood remaining in the umbilical cord and placenta after a child is born. Children, because of their rapid rate of growth, the ultimate source of which is stem cells, have a high percentage of stem cells. At birth their cord blood has a much higher percentage of stem cells than would be found later in life.

Why is there such attention paid to embryonic stem cells and so little attention paid to adult and umbilical stem cells?

One reason is that adult stem cells are a small fraction of cells in adult organs and are therefore more difficult to obtain.

A second reason is that adult stem cells are farther down the differentiation path – they are less potent than embryonic stem cells and more differentiated toward a few of the 210 cell types. This is a two edged sword with advantages and disadvantages. Much research needs to be done on understanding and controlling the differentiation processes. This can and should be done on animals and even lower species first.

More recent research has shown that adult stem cells can, in fact, be manipulated to form all of the cells in the human body just as embryonic stem cells.

A third reason is more sinister. Pro-abortion forces have been very active in denigrating the very real success of adult stem cell progress. The reason for this is that if it is established that the life of human embryos deserve protection a major pro-abortion stance would be in jeopardy.

In conclusion it is important to recognize that technical progress is essentially indifferent to ethical issues. That is too often also true of the technicians. Most technical progress has negative as well as positive implications. Biotechnology is no different. While we proceed forward in these areas, and we should, we also need to be sure that there are societal guidelines along the path to protect our human dignity. It is up to all of us, scientists as well as lay people, to consider how brave a new world we really want.