



# Bioethics Review

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**The Scholl Institute of Bioethics is a nonprofit, Judeo-Christian organization that addresses bioethical issues including euthanasia, physician-assisted-suicide, the withholding or withdrawing of food and water from non-dying patients, brain death, organ transplantation, genetic engineering, and the rights of disabled or mentally ill persons.**

## A NEW YEAR - A NEW WORLD

By Elizabeth Hanink, RN and Betty Odello, RN

Advances in medical science have multiplied dramatically since the beginning of the century. But the developments of 2016 really stand out for their number and the challenges they bring to our society. A few specific examples are of particular concern: CRISPR, mitochondrial transfer and interspecies experimentation-chimera research. Each of these should prompt us to wonder just how far we are prepared to venture in the impossible quest for the perfect human. Are we using the tools God has given us? Or are we playing God?

### CRISPR

The biggest splash this past year came with the general acknowledgement that newly developed gene technology could have major impact on agriculture, human health, and yes, business. CRISPR, which stands for clustered regularly interspaced short palindromic repeats, is a tool for genetic manipulation that is much less expensive, more easily accomplished, and ultimately much harder to regulate than earlier methods. Already it has led to rarely seen cross-disciplinary meetings of concerned scientists, unprecedented business investment, and, of course, the requisite patent fight.

When applied to humans, CRISPR-Cas9 involves the manipulation of genes either in gametes (egg or sperm) or in very small embryos. By using a naturally occurring enzyme derived from common bacteria, scientists are able to pinpoint specific spots within a gene to delete, cut, or repair. The dangers to the embryos are evident and it needs to be asked whether the eradication of any disease justifies this type of risk. And, mention needs to be made of the embryos whose lives are sacrificed in the effort to perfect such disease-destroying skills. Surely this view of humans as products or commodities is not in keeping with a Judeo-Christian ethic.

Even when embryos are not involved, when instead egg or sperm cells are the subject of modification, questions arise. Although CRISPR promises greater specificity, it still will have "off-target" results, unanticipated effects.

Remember the surprise when researcher discovered that the defect that allows for sickle cell disease, at the same time protects from malaria, a disease that continues to inflict huge costs and mortality on the world. Are there other mutations like sickle cell that have developed over time and serve to protect populations against other diseases? We don't know. Additionally, any changes made to ova or sperm cells will continue down through generations, with unknown consequences—a true sword of Damocles.

### Mitochondrial Transfer Techniques

The second area of notable progress is in mitochondrial transfer techniques. Researchers face the reality that a child will be born with the genetic material of three people: two women who each contribute a part and a man whose sperm fertilizes the egg, either before or after the transfer. Here, too, the advancement is not completely new but recent refinements expand the reach of such activity.

Mitochondria are tiny pieces in a cell's cytoplasm that are a source of energy, but also a locus of tiny bits of DNA that can mutate or be defective and cause devastating hereditary diseases for which at present there are no cures. Since most DNA is within the nucleus, scientists have discovered that by transferring a nucleus but leaving behind defective cytoplasm and planting the nucleus into a cell which has had a nucleus removed, the newly reconstructed cell, surrounded by healthy cytoplasm, can then be fertilized in vitro to create an embryo free of defect or mutation.

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In April 2016 ---a healthy son was born to a Jordanian couple who had the procedure done in Mexico by an American team. So we have the genetic material of future generations affected by yet another procedure, not to mention the real jeopardy to each embryo subjected to these processes. Do we really have the right to consider as legitimate methods that weaken the parentage of offspring or the right to alter germlines for future generations? Without their consent? Without understanding all the possible consequences?

### Chimera Research

Last, but certainly not least, chimera research is once again in the news, this time at the National Institutes of Health. This type of research has existed for decades. For example, human tumor cells are routinely grown in mice to study cancer disease processes, and conversely, heart valves from pigs and cows are routinely used in human heart patients. Such research might lead to a readily available source of human organs and body parts for transplantation. But in response to advances in genetic technology and stem cell studies, the agency has had in place a moratorium on funding decisions that recognized the real danger to aspects of human identity.

In September, the extension of this NIH moratorium was opened to public comment. Three issues, at the very least, are troublesome.

1. Are there sufficient safeguards in the transfer of human cells into the brain systems of animals to avoid any transfer of any distinctly human characteristics?
2. Is the source of the cells used legitimate or is it embryonic?
3. And lastly, does the research avoid the production or reproduction of human gametes (egg and sperm), the basic building blocks of human reproduction, in animals?

Here, as in CRISPR and all genetic experimentation, off-target and unintended consequences loom large.

There are other issues. In fact, advances in the life sciences far out-pace the ethical analyses needed to protect vulnerable populations. Furthermore, a lack of public funding does not mean experiments do not occur. Private money such as equity and hedge funds are glad to support research that promises financial profit. And there is no universal governing body that regulates scientists determined to engage in this research. What is illegal in one country may be ignored in another, or even worse, supported by legislation in another.

We at Scholl continue to urge you to read widely about developments and consequences related to

clear about the inherent dignity of all human life, even that which, with our limited vision, we see as needing "correction." Human Life is not a commodity to be experimented with at will. Rather, it is a gift from God to be protected and treasured.

### Biotechnology, specifically genetic studies, is big business.

There are over 6000 or so genetic diseases and 95 percent have no proven therapy according to Katrine Bosley of Editas Medicine. It stands then that biotechnology, specifically genetic studies, is big business.

According to Forbes magazine, investment is flooding into the companies that promise to deliver on basic research, before clinical applications are even considered. The big three are, Editas, Intellia, and Crispr.

Therapeutics, have collectively raised, in the last three years alone, \$660 million in equity funding.

Additionally, the three have, through business development deals, raised over \$500 million in upfront and research and development support.

### A Better Way - Adult Stem Cells

Over 60,000 people a year, around the globe, receive ethically-acceptable adult stem cell transplants for dozens of different conditions because adult stem cells have a proven record at saving lives and improving health.

Adult stem cells can be isolated from many different tissues, including bone marrow, blood, muscle, fat, and umbilical cord blood, and isolating the adult stem cells from tissues of a patient or a healthy donor does not require harming or destroying the adult stem cell donor. That gives adult stem cells a distinct ethical advantage over embryonic stem cells. Yet the facts have been, and continue to be, obscured by proponents of embryonic stem cell research who are so eager to harvest stem cells from tiny humans they are blind to the truth that there are plentiful alternative sources.

For complete article:

December 9, 2016 Adult Stem Cells

<<http://www.nationalrighttolifenews.org/news/category/adult-stem-cells/>> By David Prentice.