

ISSUES IN PERSPECTIVE

Dr. James P. Eckman, President Emeritus
Grace University, Omaha, Nebraska
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Should We Grow Transplantable Organs for People in Animals?

For the first time, biologists have succeeded in growing human stem cells in pig embryos, increasing the possibility that one day soon we may develop human organs in animals for later transplant. Nicholas Wade summarizes this controversial procedure: “The approach involves generating stem cells from a patient’s skin, growing the desired new organ in a large animal like a pig, and then harvesting it for transplant into the patient’s body. Since the organ would be made of a patient’s own cells, there would be little risk of immune rejection.” This means that the human-organ-growing pigs would be examples of chimeras—animals composed of two different genomes—a human and a pig. When the human stem cells are implanted into an early pig embryo, the result is an animal composed of mixed pig and human cells. Two separate scientific teams are working on this:

- A team of biologists led by Jun Wu and Juan Carlos Izpisua Belmonte of the Salk Institute.
- A team led by Tomoyuki Yamaguchi and Hideyuki Sato of the University of Tokyo and Hiromitsu Nakauchi of Stanford University.

The reports published by these two teams of scientists “establish the feasibility of trying to grow replacement organs in animals.” Such research is being driven, among other things, by the acute need for organs. Some 76,000 people in the United States alone are awaiting organ transplants. But creating chimeras to meet this need is controversial, provocative and potentially dangerous. For example, if human cells should be incorporated into a pig’s brain, it would be endowed with human qualities. “Almost no one wants a talking pig.” Another example: What if human cells should come to compose the pig’s reproductive tissues. “Few people want to see what might result from the union between a pig with human sperm and a sow with human eggs.”

The legal and ethical questions associated with chimeras caused the National Institutes of Health in 2015 to issue a moratorium on using public funds to insert human cells into animal embryos. Wade adds that “insertion of human stem cells into early embryos of monkeys was prohibited in 2009, and remains so because monkeys, given their evolutionary closeness to humans, might easily have their brains altered by human cells.” The bottom line remains that science has a long way to go before human organs can be successfully grown in animals like pigs. But with techniques like the Crispr-Cas gene editing system, a level of precision in channeling human stem cells in a pig embryo into organs of interest, means that this possibility is no longer science fiction.

Jeffrey P. Kahn of the Johns Hopkins Berman Institute of Bioethics raises two important ethical concerns:

1. Most people now accept the practice of adding DNA to various species. This produces genetically modified food for example, which is generally accepted. But are genetically modified organisms acceptable? Are we willing to accept an animal-human chimera?
2. Kolata writes: “Where to draw the human boundary is another issue. If it is OK to put human cells into an animal, why does it seem clearly wrong to put animal cells into a human? As more and more human cells are added to an animal, at what point is the result different from adding more and more animal cells to a human embryo?” Kahn asks, “What are we doing when we are missing the traits of two species? What makes us human? Is it having 51% human cells?”

Obviously, the entire issue of placing human stem cells into animal embryos is provocative, controversial and ethically suspect. It raises profound questions about the nature of humanity, for, as Dr. Jeffrey Kahn has asked, “What makes us human?” Only God’s revelation in Scripture can help us here. The review of a few transcultural principles sourced in God’s Word will give us God’s perspective on such things:

1. Human beings are created in God’s image—the fundamental basis for human value and worth. We can then stipulate that humans are always more valuable (intrinsically so) than all other created things. There is an essential, Creation-order distinction between humans and other created things (both living and non-living)—see Genesis 1 and 2. Such a creation-order distinction is central to remembering that God’s creative work is species-specific (also see Genesis 1). Hence, technology must always seek to preserve the worth, dignity and value of all human beings (as distinctly different from all other life), regardless of age or stage of development.
2. Issues and practices associated with reproductive and genetic technologies fall under the stewardship responsibility of humanity to God. In Genesis 1:26ff, God created humans—male and female—in His image and then gave them the responsibility to “be fruitful and multiply, and fill the earth and subdue it; and rule over the fish of the sea and over the birds of the sky, and over every living thing that moves on the earth (1:28).” Verse 29 extends this dominion to plants, trees and seeds. God affirms this dominion status, although affected by human sin and rebellion, to Noah in Genesis 9:1-2. Because God is sovereign and humans have dominion status, human accountability is a necessary corollary. This matter of accountability has powerful implications when it comes to reproductive and genetic technologies. These technologies give humans power never realized before in history. But because of human depravity, it is difficult to be optimistic about the ultimate use of some of these technologies. In His common grace, God has permitted the human race to develop these technologies—but we must always remember that we are accountable to Him as to how we use them. With human stem cells in animals (and vice versa?), we simply do not know the long term effects of its widespread use. The sobering fact of human depravity looms over its use.

3. Human life itself is of higher value than the **quality** of human life. With the eternal perspective that Scripture gives, the quality of life ethic is faulty but seems to drive the current use of many of these technologies. Ethicist Michael Sandel writes that “In a world without givens, a world controlled by bioengineering, we would dictate our nature as well as our practices and norms. We would gain unprecedented power to redefine the good. . . The more successfully we engineered IQ and muscle-to-fat ratio, the more central these measures would become to our idea of perfection. . . But it w[ill] never be a perfect world.” [*The Case Against Perfection: Ethics in the Age of Genetic Engineering*, p. 5.] Because of sin, we live in an imperfect world, and, until the new heaven and new earth, our fallen world will be characterized by disease, tragedies, accidents and old age. The quality of life ethic, therefore, must never trump the infinite value of life ethic detailed in the Bible.
4. From God’s perspective, concern for the improvement of the “inner man” is always more important than concern for improvement of the “outer man.” No procedure or practice will prevent the inevitability of death. Perhaps that is why the Scripture gives focus to such issues as the fruit of the Spirit (Galatians 5:22-23) and the eight quality traits called the Beatitudes (Matthew 5:1-16). From God’s perspective, these character traits are more paramount than using certain technologies to strive toward the goal of human perfectibility.
5. Carl Henry, years ago in his book, *Christian Personal Ethics (1957)*, provided an important guideline for wise decision-making when it comes to reproductive and genetic technologies: “Whatever tends to overcome what would be a deterioration in the created order and seeks to restore what God purposed in Creation is on far safer grounds than all kinds of novel and experimental enterprise.” In other words, he argued that there is clear biblical warrant for technologies that restore; there is no clear biblical warrant for manipulation toward perfection—an insightful guideline in approaching technologies such as planting human stem cells into animal embryos.
6. Finally, human civilization must critically examine the scientific (technological) imperative. Simply because society can pursue a particular medical, reproductive or genetic procedure does not mandate that it must! Especially in the area of genetics, “can” does not mandate “ought.” The potential for power and control and its obvious abuse mandates an examination of this imperative. Perhaps with some of these procedures, such as placing human stem cells in animal embryos, it would be wise to not do them at all. As a civilization, are we that arrogant or (perhaps a kinder way to say it) are we that confident in our own wise judgment and righteousness to be certain this technique will never be used for nefarious ends? History does not give me much confidence in the ability of the human race to make such wise and righteous decisions.

See Gina Kolata’s helpful article on human stem cells in animals in the *New York Times* (5 August 2016), Nicholas Wade in the *New York Times* (27 January 2017), Alice Park, “Life the Remix,” in *Time* (4 July 2016), pp. 42-48, and James P. Eckman, *Biblical Ethics*, pp. 40-46.