

## Genetic Engineering and Cloning

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In May, a team headed by researchers at Emory University School of Medicine in Atlanta, GA., reported the discovery of the gene that causes *fragile X syndrome*, the most common form of inherited mental retardation. The gene – the first that researchers have linked directly to intelligence – affects an estimated 1 in every 1,250 males and 1 in every 2,000 females. Its effects range from mild learning disabilities to severe retardation. French and Australian scientists in December announced the development of a test that can be used for prenatal diagnosis of the disorder – an accomplishment made possible by the gene's discovery. (*The 1992 World Book Yearbook* 93)

When touting the benefits of genetic engineering, scientists talk about how much good can be done for mankind. The paragraph above helps indicate what research is able to do in identifying genes that can be somewhat detrimental to people. It also introduces us to the dangers of genetic engineering!

For most of us, the field of genetic engineering is about as foreign as any area can be. Terms we hear that give us at least a little insight to genetic engineering are DNA, stem cell research, and cloning. In the past, we have been subjected to the idea in such books as *Frankenstein* (written in 1818 by Mary Shelley) and *The Strange Case of Dr. Jekyll & Mr. Hyde* (published in 1886 by Robert Louis Stevenson). And a Star Wars movie brought us into touch with genetic engineering, at least from a science fiction standpoint – *Star Wars Episode 2: Attack of the Clones*. As I was studying for this topic, I noticed at least two shows on television that dealt with clones. Genetic engineering is everywhere around us, but still we do not know that much about it.

Genetic engineering is probably best known in the agriculture field. The producing of particular kinds of crops has been manipulated by science, so that we get more protein or more fiber or more vitamins or whatever trait we desire. Experiments are now being done that would help pork producers raise pigs that will give better chops and slabs of bacon (*Cloning* 1). Scientists are also considering the possibility of genetic engineering helping endangered species to increase their population (*Why We Should Use Cloning* 1). Arguments have been made on both sides of the issue as to whether these things are right or wrong. Many are concerned, especially in agriculture, as to the dangers of genetic engineering.

The greatest fear many have is the making of a human being. Although many attempts have been made to produce life, man is still incapable of doing so. However, scientists are continuing to work on producing a better human being, not necessarily producing a human, but manipulating birth to produce only certain kinds of humans. Genetic research is continuing to look for the genes that cause everything from alcoholism to homosexuality to Lou Gehrig's disease (ALS). It is believed by many that if these can be isolated, then we can do something about removing these genes at, or before, conception and thus produce only certain kinds of babies. The research by scientists also extends to producing an exact duplicate of a particular human being. A little bizarre, but given as a possibility through genetic research, is the idea of producing a cloned child that would be able to provide a needed organ for a child now living. This organ would have the same genetic makeup and thus not be rejected by the original child.

Cloning also provides better research capabilities for finding cures to many diseases. There are also possibilities that nuclear transfer could provide benefits to those who would like children. For instance, couples who are infertile, or have genetic disorders, could use cloning to produce a child. Equally important, women who are single could have a child using cloning instead of in-vitro fertilization or artificial insemination. Nuclear transfer could also provide children who need organ transplants to have a clone born to donate organs. Cloning could also provide a copy of a child for a couple whose child had died. (*Why We Should Use Cloning* 1)

The debate over genetic engineering has heated up in the last few years, with most of the dispute centered on stem cell research. Stem cells are the master cells that turn into all the cells found in the body. These stem cells generally come from embryos. Stem cells can be cloned and used for research. Singapore has given the go ahead on human embryo cloning (Olesen 1). Norway is introducing legislation to ban therapeutic cloning (*Norwegian government* . . . 1). And, in the United States, President Bush has made it clear that he opposes cloning in all forms (Fox 1).

The history of genetic engineering/cloning goes back to the late 1800's. Yet, no major advances were made until the 1950's. In November 1951, a frog embryo was cloned in Philadelphia. In the 1970's and 1980's, some advances were made with a German scientist claiming to have cloned three mice from embryos; a team in England that cloned a sheep's embryo; and, a team in America that cloned a cow's embryo. But, the biggest boost for genetic engineering came on July 5, 1996, when a cloned sheep by the name of Dolly was born. Dolly was cloned from a six year old sheep and reportedly had the same genetic makeup as this original sheep (*History of Cloning* 1-3).

On December 8, 1998, researchers at the Infertility Clinic at Kyeonghee University in Korea announced they had successfully cloned a human. They were not trying to clone humans, but "to clone specific, genetically identical organs for human transplant". On March 14, 2000, it was announced that five piglets had been cloned. These pigs were cloned for the purpose of organ transplants (*Human Cloning* 1-4). Researchers at Texas A&M University are at work to clone a family's dog that passed away recently. Millions of dollars have been put forth to provide this family with an exact copy of their favorite pet. In 2001, researchers at Texas A&M cloned the first cat using a private grant of \$3.7 million dollars (Rumbelow).

Those involved with genetic engineering try to persuade us that this research is good for us, because it will help us rid the world of life threatening diseases, genetic disorders, retardation, etc. They, by their work, will provide us with better food and medicine. In their minds, genetic engineering is the greatest thing on the face of the Earth. In my research, I could not help but notice that many believe that genetic engineering is giving a helping hand to the evolutionary process (Quotations related to genetics 2; *Why genetic engineering...* 2). Now, that we have a little background to genetic engineering, what should be the Christian's position on this field? Is genetic engineering, especially among humans, that which Christians can support? From here, we want to look at how genetic engineering works, and then make some observations concerning genetic research in light of God's word.

A distinction must be made at this point between genetic engineering and cloning. Although both are closely related (and cloning is a part of genetic engineering), the difference lies in the scope of each area. Genetic engineering is primarily used to describe that area where certain genes are isolated and then removed in order to produce a "better" person or thing. For instance, genes that cause retardation would be removed before implanting into an egg in order that the offspring would not have these genes that cause retardation. Thus, only babies with "good" mental faculties would be born. Genetic engineering also applies to manipulating genes in order to cause something to produce only certain traits – corn could be manipulated to give more vitamins; humans could be manipulated to have blue eyes or blond hair or, perhaps, tall stature.

Cloning, on the other hand, involves itself in producing something with the same gene makeup as its "parent" (or "donor" as scientists seem to like to call it). The idea of cloning is to produce offspring that are identical to their "parents". A clone only uses one set of genes in its production rather than the two sets of genes in normal reproduction. In cloning, there is no need for a male and female to produce offspring. There is only the need of an egg and a cell from the one scientists wish to clone.

*Sexual reproduction* involves a male and female and the reproductive systems of both. The male and female both offer a set of genes in this process. Their offspring would have half its genes from its mother and half its genes from its father. Thus the offspring would not be identical to either of its parents, but would have resemblances to both. The offspring's gene make up would be different than either of its parents. The only case in which the genes of the offspring would be the same is in the case of identical twins. These two would have the same gene makeup as each other, although different from either parent. (See Attachment 1 concerning sexual reproduction)

*Asexual reproduction (cloning)* uses the egg of the female. The nucleus of the egg is removed and a body cell from the one to be cloned is introduced into this egg. Thus, the egg now has only one set of genes, rather than the two it would normally have through sexual reproduction. The egg is then implanted into the mother's womb and brought to term. The offspring would be an identical copy of the one being cloned. While this may sound simple, it should be noted that this is a very difficult process full of failures. Dolly, the sheep that was cloned in 1996, had 277 failures before Dolly was produced. (See Attachment 2 concerning asexual reproduction).

*Therapeutic cloning* uses much of the same process as asexual reproduction. However, once the body cell has been implanted into the egg, the embryo is not implanted into a mother's womb. The embryos are used to generate stem cells that can be "harvested". From these stem cells, the scientists can produce such things as bone tissue, muscle tissue, or nerve tissues. These tissues can then be used in the clonal donor without fear of rejection. From therapeutic cloning comes the possibility of producing organs for transplant that will not be rejected by the clonal donor because these organs will have the same genetic makeup of the donor. (See Attachment 3 concerning therapeutic cloning).

*Germline engineering combine* is that which can be used to produce a "designer baby". In this area, normal sexual reproduction takes place. However, the embryos produced by this process are used to "harvest" stem cells. These stem cells are implanted with new genes (genes that carry the traits we wish to have in our "designer baby"), and then tested to see which have successfully incorporated the new genes. A stem cell that has successfully incorporated the new genes is then implanted into another egg (this egg has had its nucleus removed). The egg is then placed in a mother's womb and the baby that will be born will have the traits that we have desired for it to have (such as blond hair, blue eyes, etc.). (See Attachment 4 concerning germline engineering).

Another potential of genetic engineering is what is known as *pre-implantation diagnosis and selection*. This process involves testing fertilized eggs for the presence of disease-causing genes. Those with disease-causing or other detrimental genes would be discarded and only those with "good" genes would then be implanted in a mother's womb. This process would supposedly prevent us from bringing to term those babies that would be Mongoloid, handicapped in any way, or have any potential for life-threatening diseases down the line. (See Attachment 5 concerning pre-implantation diagnosis and selection) (*ARHP presents . . .*).

All of the processes mentioned above concerning genetic engineering and cloning are still in the experimental stage, with some success stories. While many may view genetic engineering as the key to the future success of the human race and that which will give us more quality of life, there are many ethical concerns with this work. Many have viewed genetic engineering as man "playing God". Certainly, the field of genetic engineering is centered upon the idea that man believes he knows what is best for the human race. Yet, man's attempts to provide what they believe to be best for the human race have always met with disaster. One has only to recall Adolf Hitler's attempt to produce a "master race" in Germany during the late 1930's and early 1940's to see how dangerous men can be to one another.

What then should be the Christian's perspective to genetic engineering and cloning? Please consider carefully the following:

- 1) Genetic engineering is a field that forgets that man is a three part being – body, breath, and soul. God gave the breath of life to man and man became a living soul (Genesis 2:7). Man was created in the image of God (Genesis 1:27). Man is not an animal, but one who will live, die, and face God in judgment (Hebrews 9:27). While the genetic engineer may attempt to produce life, man can not create a soul.

- 2) Genetic engineering is a field that requires the death of many children in order to produce the “good” that it claims it can do. As we noticed in our discussion of genetic engineering, embryos (which are fertilized cells and thus conception has taken place) are destroyed in order to harvest what is needed or discarded because they do not meet the requirements at the time. This destruction is the taking of the life of human beings. In such passages as Job 3:3 and Jeremiah 1:5, God teaches us that life begins at conception.
- 3) Genetic engineering assumes that man is in control, i.e., we know what is best for us. Jeremiah 10:23 shows us clearly that man is not capable of directing his own steps. And, Proverbs 14:12 helps us to understand that the end of man’s devices are the ways of death.
- 4) Genetic engineering is a very selfish and prejudiced field. It is concerned with making everything “better” and producing only the “best”. Who among man has decided that man does not need some adversity in life (cf. James 1:1-5)? Who among man knows what are the “best” traits for mankind? Have we forgotten that God has made all men of one blood (Acts 17:26)? Will man through his “wisdom” decide that certain races should not exist? We should always remember that the wisdom of the world is foolishness with God (1 Corinthians 1:20).
- 5) Genetic engineering involves the worship of the creature more than the creator. God is left out of the thinking involved in genetic engineering. Man is his own god. He seeks his pleasure and his own glory. This attitude is greatly condemned by God (Romans 1:25; 10:3; 2 Timothy 3:1-7).
- 6) Genetic engineering assumes we are without guidelines. The basis of genetic engineering is the evolutionary process (Man is nothing more than a superior animal. Therefore, we are doing no more to man than we would to a dog, cat, or pig). There are no limits to where man will go when he forgets that he must face God in judgment one day (2 Corinthians 5:10; Ecclesiastes 12:14).
- 7) Genetic engineering forgets that the end does not justify the means. While it is important to do good, it is also important as to the means we use to accomplish this good. Everything we do must be in keeping with what God has authorized (Colossians 3:17), and must be that which brings glory to God (1 Corinthians 10:31). Saul, king of Israel, kept part of the spoils from the battle with Amalek so they could be offered to God (1 Samuel 15:21). While his intentions were good, his method was wrong. The end never justifies the means. Saul lost his kingdom because of his actions (1 Samuel 15:22ff). Men must be careful never to “measure themselves by themselves” (2 Corinthians 10:12). Consider also Romans 3:8.

While we would never want to discourage man from seeking to help himself upon the Earth, we must remember that all that we do must be that which enables us to one day dwell eternally with God. Genetic engineering may seem like such a good thing, but when it comes to humanity, it uses the

death of many to accomplish its goals. It centers itself on self-gratification and places man in the position of thinking he is something when he is nothing. The Christian's perspective towards genetic engineering and human cloning must be to reject this field of study.

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