**Ethics regarding genetic engineering**

**By Gerard Feller**

**Summary**

In this article I would like to briefly describe some developments and techniques in genetic engineering. It focuses on the applications to human genes and the possibilities of genetics in the near future.

On the basis of a few fragments of an article by Jim Leffel (13) I want to show the harmful influence of postmodern thinking in relation to the ethics regarding genetic engineering. Leffel approaches the developments mainly from the point of view of American society, but this is usually a harbinger of the developments in the West. It is high time for Christians to sound the alarm bell and look for biblical solutions and standpoints in this complex problem. Many Christians are insidiously infected by pragmatic postmodern thinking and are transformed into unbiblical thinking and assertion on this issue. Christian scientists, theologians, ethicists, apologists, social workers need to wake up and defend the biblical realism. This applies to many scientific and sociological developments, but certainly also to the ethics of genetic theology.  This article tries to make a modest contribution to this.

**Definition**

Genetic technology or genetic engineering is a modern form of biotechnology in which the D.N.A. of an organism is directly adapted.

This is in contrast to classical biotechnology where the D.N.A. of an organism is adapted *in*directly, for example by crossbreeding (1). Genetic manipulation is the insertion of a piece of D.N.A. from one organism into another. This technique is called a recombinant - D.N.A. technique. The basic principle of all techniques is based on a fixed number of steps.

1. Isolation of the gene you want to modify (removing D.N.A. from the cells).
2. The possible modification of the isolated gene.
3. Transferring the gene into a suitable vector (for example a virus, a piece of bacterial D.N.A., liposome or a gold bullet stuck with D.N.A.).
4. Transformation of the cell or organism you want to modify. For example, the 'shooting in' of the D.N.A. or via bacteria.
5. Selection of the modified cells or organisms.

The D.N.A. must be included in the so-called genome. The genome is the total of the total hereditary information of a cell. The techniques of transferring genes are still far from always successful. Scientists need to know which cells have absorbed the D.N.A.  They attach a so-called 'marker gene' to the new gene before it is transferred. Such a marker gene codes resistance to an antibiotic or a pesticide, for example. The genetic cells are then grown in a feeding ground that contains the antibiotic or pesticide. After that only the plants that have absorbed the new D.N.A. with the new gene and additional marker survive.

The cells are grown further and develop as adult plants. It is often impossible to regulate the introduction of a new gene properly and this randomness can disrupt the highly regulated network of D.N.A. in an organism. Genetic manipulation is a collective term for many things. It has already taken off in the plant and food industry, but in this article we will mainly focus on the ethics surrounding genetic manipulation in humans.

**The genome or gene pool**

The genome or gene pool of an organism is the whole of hereditary information in a cell. A research into genomes in humans has led to the Human Genome Project (2). The Human Genome Project, in which the U.S. Department of Energy and NIH Human Genome Programs participate, is an effort coordinated in America to map all human genetic material by determining the complete sequence of the D.N.A. in the human genome. The ultimate goal of the Human Genome Project is to discover, map, and make all of the estimated 35,000 human genes accessible for further biological studies. To enable future interpretation of the function of a human gene, the Human Genome Project also conducts parallel research into the genetic composition of other organisms.

**The Human Genome Project - The DNA - sequence has been revealed**

In 2000, after years of research costing many billions of dollars, the Human Genome Project, together with Celera Genomics (a private bio-technological company) announced rough representations of the human genome order. By mid-2001, scientists associated with these companies had presented to the outside world the true nature and complexity of the digital code inherent in DNA. We now understand that in a human DNA molecule there are about 35,000 genes, consisting of about 3 billion chemical bases arranged in exact sequences. Even the DNA molecule of the *single-celled E. coli*bacteria contains enough information to fill all books in any large world library. We now realize that the discovery (in 1953 by James Watson and Francis Crick) of the DNA structure in its basic form was one of the greatest scientific discoveries of all time.

**Human Genome Project - What does this mean for the 21st century?**

As a result of the work of the Human Genome Project and other genetic scientists, we now realize that the possibilities of genetic manipulation are far-reaching and profound. Think of the recent cloning of Dolly the sheep, which has received a lot of media attention. This tremendous technological discovery has dramatic potential for significant abuse. In this respect, we must keep a close eye on 'science' and constantly remind the popular culture that technology is not the supreme authority. No matter what one's DNA looks like, every human being is a special individual created by God. Genetic manipulation seems to accept the idea that DNA contains everything we are. The Bible teaches that man has a soul and a mind. Therefore, contrary to what the general scientific principles tell us, we are more than a combination of a genetic code and 17 natural organic elements. The director of the Human Genome Project, Francis Collins, is a Christian who illuminates the positive aspect of genetic research: "We have had a first look at our user’s manual, which was previously only familiar to God”.

While this is an exciting statement, no matter how 'smart' we become as a society, we should never lose sight of the fact that we are not God and should not put ourselves in a position to play God. Because we live in a post-modern society that is more influenced by humanistic materialism and moral relativism than by Judeo-Christian values, we must keep a watchful eye on the potential use and abuse of human genetic manipulation (end of quote 2).

**From theism to modern and postmodern anthropology**

In the past, western culture was mainly determined by a biblical image of man. People were rational, aware of their limited knowledge, the consequences of the Fall and their finiteness. Although we as Christians can rationalize, we are aware that revelation from God to our mind and from our mind to reason often leads to the ultimate truth. We are created in the image of God and have a tremendous intrinsic value as individuals. The reason and evidence is that Jesus gave His life for us. In the late seventeenth century a new vision of human nature emerged, and modernism was born. The founder of modern philosophy, René Descartes, looked for truth without revelation: "I think, so I am". The concept of humanity became so rational that it became the trademark of 'The Illumination'. A second claim was that man is autonomous, meaning that the individual self (the "I", that "thinks") transcends the environment and biology. For more than two hundred years the belief in independent mind/body dualism and confidence in rational objectivity remained. The autonomous, rational-self became the basis for Illumination, humanism and liberal political theory, the free market economy and radical individualism. Until postmodernism came, denying the rational possibility of objectivity of the individual. Postmodernists see people as an extension of culture and deny the total self. Kenneth Gergen (3), an American philosopher, notes that the spread of postmodern consciousness has caused a deterioration of every form of transcendence, a denial of the individual self, and of the rational ability. No claim can be made to reality because there is no neutral context from which to think. All thoughts are contextual, the individual can never escape from subjectivity. Every intrinsic quality of the human being is lost, together with moral dignity and personal commitment. People derive an illusionary sense of identity and value as persons from the random environment of their culture, according to the thinking of postmodernism. Evangelicals are now increasingly influenced by postmodern conceptions of truth and knowledge. Some claim that it is a welcome escape from the anti-natural stranglehold of modernism on Western culture.  However, the price is too high, because one becomes unfaithful to the biblical claim of truth, resulting in the denial of objective human dignity. Postmodern views inevitably lead to serious erosion of human rights. Materialistic naturalism is advancing among secular scientists, as evidenced by the words of Robert Museum Haynes, chairman of the 16th International Congress on Genetics. "For three thousand years, the majority of humanity was convinced that man was something magical. That is a Judeo-Christian view. The possibilities of manipulating man's genes make it much clearer that we are largely biological machines. Traditional thinking, built on the idea that man is something special, unique or even sacred, is outdated" (4).

**The consequences of postmodern thinking in genetics**

In earlier times, human behavior was attributed to environmental or moral choices, nowadays behavior is mainly attributed to our genetic origin.  Leading scientists 'discovered' the genetic basis of a range of behaviors and traits, including alcoholism, homosexuality, I.Q., and violence. Serious doubts from other scientists receive little attention, giving the public the impression that science is about to solve some of the greatest problems in society (5).

**Genetic screening**

Genetic screening of prenatal children is increasingly becoming an option for parents. This can cause more and more erosion in human dignity. Dr. Harvey Lodish of the Whitehead Institute for Biomedical Research in Cambridge Massachusetts states: "By means of techniques involving the use of vitro fertilization, it is already possible to modify a cell of the developing embryo in the desired region of the D.N.A..

Genetic screening of embryos for implantation can quickly become routine (6). In an interview of the Christian Magazine called ‘Visie’, Prof. Dr. Henk Jochemsen, former director of the Prof. G.A. Lindeboom Institute, draws the line there. "Genetic manipulation in humans can be done in two ways. It can be done on body cells and on the germ line. Genetic modification on the germ line means that in the very earliest stage of human development, the embryo, the change takes place and that the organism that develops from it, will have that new D.N.A. in all cells. This cannot be done in a safe way anyway. In my opinion it cannot be done without destroying human embryos: if it succeeds, the change is found in the gender line. That is much more drastic and far-reaching than genetic modification on body cells. With genetic modification on body cells, you take several cells from a certain patient that you are genetically going to change. Then you put the cells back into the patient, hoping that they will function better. I have no fundamental objections to this form of gene therapy on body cells" (7). Jochemsen admits that there are many border cases. He indicates that from the point of view of medicine and politics one should define the boundaries more clearly of what is still medicine and what is more in the desirable sphere  outside the field of medicine. Increasing developments in genetic manipulation are opening the door to a situation in which parents can indicate a wide range of undesirable characteristics. There is a clear need for such procedures. Social and economic pressure is being used. An example: If we can prevent or reduce alcoholism (by eliminating the so-called alcohol gene), this would save society a lot of misery and costs. Or, as some say: "Who doesn't want to prevent the trauma of having a homosexual child (by manipulation of the so-called homosexual gene)? The Lindeblad (magazine) of November 2014 (8) also discusses the dangers of increasing genetic screening. Further unravelling of the human D.N.A. profile has been made possible by so-called Next Generation Sequencing (N.G.S.). The possibilities with regard to predicting the contraction of diseases have increased enormously compared to the 'old D.N.A. screening method'. Many more base pairs (hereditary material) can be read at the same time than before. Moreover, a diagnosis and prognosis can be established much faster than before by means of N.G.S. This new method of screening emphasizes legal and ethical objections against gene screening".

**New 'sick people'**

Critical thinkers like Ivan Illich already pointed out in the last century that the development of medical science would make more people 'ill'. Doctors set standards, and those who do not meet them suddenly become 'sick'. Even if the 'new sick people' have never considered themselves sick. When geneticists improve the species, many healthy people suddenly become ill. Although at the moment the D.N.A. is too complicated to control, many scientists believe that computer simulations make the effects of gene technology interventions increasingly predictable. An example of gene screening: At the age of thirty you have a gene screening done that shows that at the age of 55 you have a 65% chance of ovarian cancer and a 20 - 55% chance of diabetes mellitus type 2. Is that a reason for you to remove the healthy ovaries now, so that you will not have the dreaded disease in 20 years' time? And if the N.G.S. shows that this form of cancer has a strong family component, should the rest of the (unborn?) family members also be burdened with it? Does everyone want to know whether it is in 'the family'?Often it is also necessary for the research to genetically examine others. People unintentionally face difficult choices. Would you like an abortion for this (possible) science? This is already an item and in the near future also for Parkinson's disease and forms of Alzheimer's disease. The Lindeblad rightly notes that man is not worthy of protection because of his health or talents, but because God created and loves him! For its intrinsic value.

**Market forces in reproductive consumerism**

Fortunes are made through the commercial marketing of genetic material. In 1987, AFTAKAS granted U.S. patent rights to all forms of life, including animals. People were exempted under the law on the prohibition of slavery.

The Dutch embryo law (2002) prohibits the cloning of humans, as is currently the case in most countries. "It is forbidden to carry out actions with germ cells or embryos with a view to the birth of genetically identical human individuals", according to this embryo law. In the US, embryos (9) and fetuses, genetically manipulated human tissues, cells and genes are patentable. Corporate America has acquired the right to own, use and sell multi-celled tissues. The AFTAKAS patent office is flooded with applications for patents on hundreds of human genes and lines. How should we deal with bone marrow donors? Is it also permitted to breed 'spare parts'? An embryo created in a laboratory is still protected by law. But once implanted in the mother, that protection is over, and can even be aborted. Researchers at Harvard and Stanford Medical School have already recorded hundreds of cases of genetic discrimination. On the basis of existing conditions, health insurance companies have refused to provide coverage on the basis of possible genetic transmissible diseases. Kimbrell warns that the legal distinction between life and machine, between life and product, is beginning to disappear. If ultimately human beings are cloned, are they then persons with constitutional rights? We are witnessing a depersonalization of human life, if all parts of humans and genetic materials are sold and patented, processed and developed. We also get an unprecedented change in traditionally social and legal definitions. Traditional concepts of life, birth, illness, death, mother, father, and person will start to falter and then disappear (10).

With depersonalization, important moral differences are obscured by scientific and legal jargon. As a result, genetic research and technology are becoming less and less ethically and humanly anchored. Scientists make less and less distinction between what they can and should do. David Hirsch says that postmodernists must realize that it is impossible to fragment a human being into parts without causing the individual to become worthless in the real world (10).

**Genetics and the open door to facism and eugenics**

One of the major shortcomings of postmodernism is denying objective values. Kenneth Green (3) says: "Postmodernism is generally regarded as moral bankruptcy, because it does not profess fundamental values and principles.

Even more striking, postmodernism is not even an argument against Nazism or any other form of cultural tyranny. During the Second World War there was the Aryan 'item' of racial purity. It only really became dangerous when the Darwinian philosophers tried to formulate a scientific application as the basis for the Nazis' eugenic program”. Ernst Haecel (11) stated much earlier: "Hundreds of thousands of incurable madmen, people with cancer are kept artificially alive, without the slightest profit for themselves or for the common good!”. The one who did not fit in the Aryan picture was considered genetically inferior. When economic and social pressure are combined with various prejudices, postmodern constructivism offers an attractive basis for eradicating "undesirable characteristics" from the gene pool. Not so long ago, two prominent researchers, including a Harvard scholar, published a book called 'The Bell Curve'. The book argues that black people on average have a lower IQ and are therefore unworthy of receiving education and government programmes to help them out of poverty (12). Of course, this book has caused a lot of indignation, but it has also given much fuel to the underflow of racism in society, of which unfortunately many incidents are still visible in the US to this day, think of all police violence incidents against black people. Genetics and crime, incidentally, are another form of genetic determinism. Millions of dollars are spent on research into the genetic basis of our behavior. People are looking for the 'violence gene'. Criminal behavior is also medicalized. In various states in the US, chemical or surgical castration is an option for certain sex offenders. These kinds of 'solutions' put people on a slippery slope, namely the idea that human behavior is reduced to biology and environment, without any room for character formed by moral choices or changes in faith and spiritual changes. The medicalization of criminal behavior seems attractive because it connects the powerlessness over much violence and the rising costs of imprisoning criminals with the idea that the criminals are the victims of 'bad genes'. In a postmodern culture, one should unfortunately not expect an objective basis for social ethics or individual dignity.  Only an arbitrary social consensus determines the limits of the possibilities.

**A challenge for the church**

We enter a new era in the struggle for human rights. The increasingly developing secular worldview, rooted in genetic determinism and postmodern constructivism, leaves little room for the dignity of human life (13). Perhaps faith in God and man as His image bearer is the only basis on which to limit present developments. Christians should take a considered position on genetic manipulation and cloning. This applies to both the use of genetic technology and the possible dangers (13). According to Professor A. Houtepen, a Roman Catholic theologian, "genetics should also be seen in the perspective of the finiteness of man and the vulnerability of the universe. In stewardship, neither an anthropocentric exploitation drive nor a cosmic equation of man with animal and plant is appropriate. To suffice with technical solutions under the continuation of the current lifestyle is not desirable". Or as Frits Lange states in a Protestant view on the cloning of humans and animals: "What matters is not only the question of how God created the world, but above all what for! Genetic technology, like every therapeutic means, must be a means that can be blessed by God, and for this a comprehensive test in every form and application by the Holy Spirit and God's Word is indispensable.

**Gerard Feller**

translated by Ursula Moestapa

January 2015

**Frame work**

**Objections to genetic engineering**

No genetic engineering on the germ line

No genetic engineering without embryo protection

No genetic engineering for non-medical purposes

No genetic engineering for super breed

No gene screening with statistically dubious prediction value

No genetic engineering just for the elite.

No genetic engineering that reduces biodiversity

No cloning of people

No genetic engineering that leads to a further increase of the generation gap

No genetic engineering that promotes discrimination of race and disabled persons.

No genetic engineering that stretches the concept of disease.

No commercial exploration and unfair profit from patents.

No excessive role of gene technology in the treatment of the whole human being according to spirit-soul and body.

Genetic engineering, like any therapeutic means, must be a means that can be blessed by God, and for this, extensive testing by the Holy Spirit and God's Word is indispensable.

**Benefits of genetic engineering**

Hereditary abnormalities cured by means of gene therapy

More efficient antibiotics, enzyme production by fermentation.

Resistance and prophylaxis against some diseases.

Medicines via recombinant D.N.A. techniques.

Outside the scope of this article:

Making many crops healthier, more available to more people.

To have medicines and vaccines produced by plants instead of animals.

Mining less agricultural land in developing countries through greater returns in the fight against hunger in the world.

**Healthier food.**

Growing crops more efficiently through accelerated and targeted breeding improvement.

**Notes:**

1. [**http://nl.wikipedia.org/wiki/Genetische\_technologie**](http://nl.wikipedia.org/wiki/Genetische_technologie)
2. [**http://www.allaboutpopularissues.org/dutch/menselijk-genoom-project.htm#sthash.7UYzxkti.B5TkdQkB.dpuf**](http://www.allaboutpopularissues.org/dutch/menselijk-genoom-project.htm#sthash.7UYzxkti.B5TkdQkB.dpuf)
3. Kenneth Green, The Saturated Self (New York Basic Books 1991)
4. Andrew Kimbell, The Human body shop. The engineering and marketing of Life (San Francisco Harper, 1993)
5. Jim Leffel, Genetische technologie, artikel ID: DE311
6. Harvey Lodish, Viewpoint: The Future in: Sciencefiction 267:1609
7. Visie 28 dec. 2002. Ook gepubliceerd op [**www.christenunie.nl**](http://www.christenunie.nl/)
8. Contractbasis van het prof. G.A. Lindeboominstituut te Amersfoort, november 2014
9. Andrew Kimbrell, De menselijke body shop. De ontwikkeling en marketing van leven. Harper, San Francisco 223.19
10. David Hirsch, De zielige literatuur. Kritiek na Auschwitz, Hannover; Brown University Press, 1991
11. Ernst Haeckel, The wonders of Life Harper 1905 cited by Stern: Biological Science and the Roots of Nazism, American Scientist, 1988 76
12. Charles Murray and Richard Herrnstein, The Bell Curve, Intelligence and Class Structure in American Life (New York Free Press 1994)

Jim Leffel, Genetic engineering, Article ID: DE311. Jim Leffel teaches philosophy at Ohio Dominican College and leads the Crossroads Project, a team of researchers and pastoral leaders who equip Christians to communicate effectively in our contemporary culture. Crossroads is part of Xenos Christian Fellowship in Columbus,Ohio [**www.crossrds.org**](http://www.crossrds.org/)