Christian Principles for Genetic Interventions

Introduction

Most of the new developments in genetics are the result of increased knowledge concerning the fundamental structure of genes, not only in humans but throughout all the realms of life on earth. Among these developments are genetic mapping, new means for genetic testing, new possibilities for genetic engineering, and a variety of eugenic strategies that would have been unimaginable only a few years ago. In short, new genetic knowledge has produced unprecedented power. With that power has come the potential for immense good or harm. And with such great power also comes great responsibility. From the standpoint of the Christian faith, we are accountable for the use of this power not only to global humanity, but also to every realm of created life that God has entrusted to our stewardship. Ultimately we are accountable to the Maker of the universe who holds us responsible for the care of each other and of the earth.

When creation came forth from the Creator's hand it was "very good." (Gen. 1:31) The genetic endowment which Adam and Eve received from their Creator was without defects. The genetic diseases from which humans now suffer are not the result of normal variation. They have developed through harmful mutation. In restoring the human genome to a healthier condition, modern sciences may attempt to recover more of creation's original condition. To the extent that helpful genetic interventions can be conducted in harmony with Christian principles, they are to be welcomed as cooperation with the divine intention of alleviating the painful results of sin.

Any attempt to state comprehensive principles of ethics for genetic interventions must confront the complexities of a rapidly changing field of science. Since the discovery of the molecular structure of DNA (deoxyribonucleic acid), knowledge of genetics across an ever wider range of life forms has burgeoned.

Many of the increases in information and technological ability have been accompanied by significant ethical concerns. We can only begin to imagine future questions that will arise as genetic science progresses. The complexity of the issues and the pace of change make it likely that statements of relevant Christian principles will require expansion and modification as time passes.

One example of an area of rapid change is genetic mapping. An international, scientific effort known as the Human Genome Project is attempting to construct a detailed genetic chart, or "map," of all the human chromosomes. The goal is to provide a comprehensive description of the sequence of the millions of DNA base pairs which human chromosomes contain. Researchers plan to use this information to facilitate the identification and isolation of human genes, thereby providing a helpful aid in understanding human development and in treating human diseases. New details about the identity, role, and function of human genes are continually emerging.

Increased knowledge about the identity of human genes has given rise to a variety of new possibilities for genetic testing. In the past, genetic information about an

individual was largely inferred from the person's family history or clinical observations of the person's phenotype, or physical expressions of a person's genes. Today, a growing number of sophisticated genetic analyses make it possible to identify defective genes that cause genetic diseases such as cystic fibrosis, Huntington's Chorea, and some types of cancer. Many of these tests can now be performed prenatally. The potential exists for identifying hundreds of genetic characteristics, including a wide range of genetic disorders.

A further result of basic genetic knowledge is the capacity to alter genes intentionally, or genetic engineering. Through the use of enzymes which are able to excise specific segments of genes, it is possible to change the genetic makeup of cells by deliberately inserting, removing, or changing specific genes. Genetic engineering presents astonishing new possibilities, including the transfer of genes across biological boundaries, such as from animals to plants. The potential for improving life forms seems endless. Genetically engineered plants, for example, can be made more productive, more resistant to diseases, or less susceptible to internal processes of decay.

Genetic engineering has directly benefited human medicine. It has made possible, for example, the production of human insulin and human growth factor, neither of which was previously obtainable in sufficient quantities. Genetic engineering also makes it possible to treat diseases through genetic alteration. With this type of treatment, a patient whose cells have missing or defective genes receives needed genetic material. No one knows how many genetic diseases may eventually be treated in this way, but initial successes with diseases such as cystic fibrosis give hope that other genetic disorders may be treatable.

Increased genetic knowledge also produces new possibilities for eugenics, or endeavours to improve the gene pool of various species, including human beings. In broad terms, such attempts fall into two categories. Negative eugenics uses strategies whose goal is to prevent harmful genes from being inherited. Positive eugenics uses strategies whose goal is to promote the transmission of desirable genes. An example of negative eugenics, common in the past, is the sterilization of individuals considered to have defective genes capable of being inherited. An example of positive eugenics is artificial insemination by donors who have been selected for traits, such as high intelligence, that are deemed desirable.

Ethical Concerns

In order to provide focus, it is helpful to consider a sampling of current ethical concerns for which we seek to state Christian principles. These concerns can be placed in four basic categories: the sanctity of human life, the protection of human dignity, the acceptance of social responsibilities, and the safekeeping of God's creation.

Sanctity of human life. If genetic determinism reduces the meaning of humanhood to the mechanistic outworkings of molecular biology, there is serious potential for devaluing human life. For example, new capacities for prenatal genetic testing, including the examination of human pre-embryos prior to implantation, generate questions about the value of human life when it is genetically defective. How

serious must a genetic defect, prenatally diagnosed, be before it is an ethically legitimate reason for discarding a pre-embryo or for inducing an abortion? Some conditions, such as trisomy 18, are generally deemed incompatible with life. But the relative seriousness of most genetic defects is a matter of judgment.

Protection of human dignity. The protection of personal privacy and confidentiality is one of the major concerns associated with the new possibilities for genetic testing. Knowledge about a person's genetic profile could be of significant value to potential employers, insurance companies, and to those related to the person. Whether genetic testing should be voluntary or mandatory, when and by whom the testing should be done, how much and with whom the resulting information should be shared are matters of significant ethical concern. Difficult decisions must be made about whether there are exceptions to the usual expectation of confidentiality and privacy when persons may suffer considerable harm because of a lack of information. At stake is the protection of persons from stigma and unfair discrimination on the basis of their genetic makeup.

Another cluster of concerns related to human dignity stems from the possibility of intentionally altering the human gene pool. Medical interventions for genetic diseases may be aimed either at the treatment of bodily cells that are genetically defective or at the alteration of reproductive cells. Changes in human reproductive cells could become a permanent part of the human gene pool. Interventions may also extend beyond the treatment of disease and include attempts to enhance what have formerly been considered normal human characteristics. What are the implications for the meaning of being human, for example, if interventions aimed at enhancing human intelligence or physique become available?

Acceptance of social responsibilities. The power that results from new genetic knowledge also raises concerns about the ethics of social policies and the boundaries between individual liberties and social responsibilities. For example, should society develop policies designed to encourage either positive or negative eugenics? Should individuals with serious genetic disorders be given full procreative liberty? Another area of social concern has to do with the use of society's resources. Questions can be raised about the amount of social resources that should be spent for interventions in human genetics when more basic health care is not fully available. Other questions arise concerning the distribution of the benefits and burdens of genetic interventions and how they will be shared by rich and poor within society.

Stewardship of God's creation. As the powers of genetic engineering are further developed, many changes could be made in various species that inhabit the earth. These changes have the potential for being both permanent and, to some degree, unpredictable. What limits to genetic change, if any, should be accepted? Are there boundaries that should not be crossed in transferring genes from one life form to another? We may hope that genetic changes are intended to enhance life on our planet.

But there are reasons for concern. For example, consideration has already been given to genetic alterations for the purpose of developing new biological weapons.

The exploitation of other life forms for purposes of military security or economic gain should call forth careful, moral scrutiny.
It is with ethical concerns like these in mind that we state the following Christian principles for genetic interventions.

Principles

1. Confidentiality. Christian love requires that trust be maintained in human relationships. The protection of confidentiality is essential to such trust. In order to safeguard personal privacy and protect against unfair discrimination, information about a person's genetic constitution should be kept confidential unless the person elects to share the knowledge with others. In cases where others may suffer serious and avoidable harm without genetic information about another person, there is a moral obligation to share the needed information (Matt. 7:12, Phil. 2:4).

2. Truthfulness. The Christian obligation to be truthful requires that the results of genetic testing be honestly reported to the person tested or to responsible family members if the person is incapable of understanding the information (Eph. 4:25).

3. Honouring God's image. In all of God's creation, only human beings were created in the image of God (Gen. 1:26, 27). The Christian acknowledgment of God's wisdom and power in creation should lead to caution in attempts to alter permanently the human gene pool (Gen. 1:31). Given current knowledge, genetic interventions in humans should be limited to treatment of individuals with genetic disorders (somatic cell therapies) and should not include attempts to change human reproductive cells (germ cell alterations) that could affect the image of God in future generations. All interventions in human beings for genetic reasons should be taken with great moral caution and with appropriate protection of human life at all stages of its development (with reference to selective abortion, refer to the principles stated in "Seventh-day Adventist Guidelines on Abortion").

4. Prevention of suffering. It is a Christian responsibility to prevent or relieve suffering whenever possible (Acts 10:38, Luke 9:2). For this reason the primary purpose of human genetic intervention should be the treatment or prevention of disease and the alleviation of pain and suffering. Because of the tendencies of sinful human nature, the possibility of abuse, and unknown biological risks, attempts to modify physical or mental characteristics with genetic interventions for healthy persons who are free of genetic disorders should be approached with great caution.

5. Freedom of choice. God values human freedom and rejects the way of coercion. People who are capable of making their own decisions should be free to decide whether or not to be tested genetically. They should also be free to decide how to act on information that results from testing, except when others may suffer serious and avoidable harm. It may be the morally responsible choice to avoid known risks of serious congenital defects by forgoing procreation. While such decisions about procreation and genetic testing are deeply personal, they should be made by the individual with due consideration for the common good.

6. Stewardship of creation. Safeguarding God's creation includes esteem for the diversity and ecological balance of the natural world with its countless species of living creatures (Gen. 1). Genetic interventions with plants and animals should show respect for the rich variety of life forms. Exploitations and manipulations that would destroy natural balance or degrade God's created world should be prohibited.

7. Nonviolence. Using genetic manipulation to develop means of warfare is a direct affront to Christian values of peace and life. It is morally unacceptable to abuse God's creation by changing life forms into weapons of destruction (Rev. 11:18).

8. Fairness. God loves all human beings, regardless of their perceived social status (Acts 10:34). The benefits of genetic research should be accessible to people in need without unfair discrimination.

9. Human dignity. Created in God's image, human beings are more than the sum of their genes (Gen. 1:27, Acts 17:28). Human dignity should not be reduced to genetic mechanisms. People should be treated with dignity and respect for their individual qualities, and not be stereotyped on the basis of their genetic heritage.

10. Healthfulness. Christians have a responsibility to maintain the health of their bodies, including their genetic health (1 Cor. 10:31). This means that Christians should avoid that which is likely to be genetically destructive to themselves or to their children, such as drug abuse and excessive radiation.

Glossary

Base pairs. Pairs of complementary bases forming the DNA structure; the units used to measure the length of DNA. Base pairs consist of adenine (A), which must always pair with thymine (T), and guanine (G), which must always pair with cytosine (C).

Chromosome. The condensed rod made up of a linear thread of DNA interwoven with protein that is the gene-bearing structure of living cells. Human beings have twenty-three pairs of chromosomes.

DNA (deoxyribonucleic acid). The double helix molecule that encodes genetic information and is the primary hereditary molecule in most species.
Enzyme. A protein that facilitates a specific chemical reaction without changing its direction or nature.

Eugenics. Strategies for attempting to improve the gene pool of a species either by halting the transmission of unwanted characteristics or increasing the transmission of desired characteristics.
Gene. The basic unity of heredity; a section of DNA that contains information for the production of specific protein molecules.
Gene mapping. The process of ascertaining the genetic sequence of a species.

Gene therapy. The medical replacement or repair of defective genes in living cells.

Genetic engineering. The process of altering the genetic makeup of cells or individual organisms by deliberately inserting, removing, or changing specific genes.

Genetic testing. The examination of individuals' genetic makeup for the purpose of identifying possible hereditary traits, including defects or abnormalities.

Germ cell. Reproductive cell.

Genome. All of the genetic material in the chromosomes of a particular organism or individual.

Genotype. An individual's genetic makeup.

Human Genome Project. The international, scientific effort to construct a detailed map of human genes, identifying their structure and function.

Implantation. The attachment of an embryo to the wall of the uterus.

Mutation. A permanent alteration of DNA that can be inherited.

Negative eugenics. Strategies for preventing the transmission of genetic traits which are deemed undesirable.

Phenotype. The observable characteristics resulting from a particular genotype as influenced by environmental factors.

Positive eugenics. Strategies for promoting the transmission of genetic traits which are deemed desirable.

Pre-embryo. A fertilized ovum (or conceptus) prior to implantation and the beginning of pregnancy.

Recombinant DNA. A novel sequence of DNA that is artificially produced by joining segments of DNA.
Somatic cell. Any cell of a body other than reproductive cells.

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