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Guidance in relation to genetic engineering

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Church of the Brethren Annual Conference Official Documents

GUIDANCE IN RELATION TO GENETIC ENGINEERING 1987 Annual Conference Statement

WHEREAS: The miracle of new life is a gift from God.

WHEREAS: The innate characteristics, such as sex and genetic makeup, of new life are also considered intimate to God's plan;

WHEREAS: Scientific research, in regard to genetic engineering and recombination, including gene insertions, deletions, and mutations, is progressing steadily in areas of amphibian and mammalian gene manipulation;

WHEREAS: Restrictions toward some aspects of genetic engineering are being eased, or lifted altogether;

It is felt that a thorough, comprehensive study is in order to allow the Annual Conference to learn of the mounting evidence in scientific progress toward ultimate future manipulation of human genes, and also to encourage the General Board and Annual Conference to provide guidance and direction to the local churches.

Therefore, we, the people of the Bear Creek Church of the Brethren, in council on May 30, 1982, voted to petition the 1983 Annual Conference meeting in Baltimore, Maryland, on June 28 to July 3, 1983, through the West Marva District Conference meeting in Westernport, Maryland, on September 17-18, 1982 to appoint a committee to investigate the current direction of scientific research in regard to genetic engineering and recombination, as it relates to experimentation on human life.

Ernest Spoerlein, Moderator
Mrs. Judy Rush, Clerk

Action of the West Marva District Conference meeting at the Westernport Church of the Brethren, September 17-18, 1982: Passed to Annual Conference.

Lester Boleyn, Moderator
Linda Everett, Writing Clerk

Action of 1983 Annual Conference: The Annual Conference approved the Standing Committee recommendation to "a) adopt the concern of the query from the West Marva District and b) take the following actions:

1. to endorse the concept of persons using their ability and reason to experiment for the enrichment of life and existence.
2. to instruct the General Board to:
 - a. seek out wherever possible Church of the Brethren participation in the development of guidelines for ethical research;
 - b. encourage and assist continued evaluation and discussion by the Brethren Health and

Welfare Association and other interested groups within the church;

- c. report to the membership within two years in the form of a study paper or by other means in the areas of concern, controversy and change. We also request the General Board to monitor these areas and to keep the membership appraised."

Action of the General Board: The General Board assigned to the World Ministries Commission responsibility for implementing the Annual Conference action. Leland Wilson, director of the Washington Office, was given staff responsibility.

The following actions were taken:

- Through *Messenger* and *Agenda*, Church of the Brethren members were encouraged to study the issue of genetic engineering and to share ideas and guidelines for genetic engineering that would be a part of this study. Referrals were also made to the Brethren colleges and to Bethany Theological Seminary.
- A referral was made to the Brethren Health and Welfare Association, and the issue has been a part of its agenda.
- Paul W. Hoffman, president of McPherson College and 1983 Annual Conference moderator, was asked to prepare the query answer, assisted by an Advisory Committee. The committee provided initial perspectives and resource materials. They then reviewed and made suggestions on the preparatory draft of this paper. Members of the Advisory Committee were:
 - Murvel Annan, Professor of Biology and Genetics, retired, Bridgewater, VA;
 - John W. Cooper, Assistant Professor of Philosophy and Religion Bridgewater College, Bridgewater, VA,
 - David Deeter, graduate student, Claremont Graduate School, Claremont CA;
 - Thomas A. Fogle, Assistant Professor of Biology, Saint Mary's College, Notre Dame, IN;
 - Harvey Good, Professor of Biology, University of LaVerne, LaVerne, CA,
 - Robert Heckman, Professor of Biology, Elizabethtown College, Elizabethtown, PA;
 - Leon Hironimus, Pastor, First Church of the Brethren, Ligonier, PA;
 - G. Martin Keeney, Synthetic Chemist, Monsanto Corporation, St. Louis, MO;
 - Debra A. Kirchhof-Glazier, Assistant Professor of Biology, Juniata College, Huntingdon, PA,
 - David G. Metzler, Professor of Religion, Bridgewater College, Bridgewater, VA;
 - Romelle S. Million, Medicine and Science Verbatim Reporter, Alexandria, VA;
 - Dale L. Oxender, Director, Center for Molecular Genetics, University of Michigan, Ann Arbor, MI;
 - William Puffenberger, Professor of Religion and Philosophy, Elizabethtown College, Elizabethtown, PA,
 - Gerald W. Roller, Physician of Internal Medicine, Roanoke, VA,
 - A. Robert Shank, Director, Western Research Station, Illinois Foundation Seeds, Inc., Seward, NE;
 - Graydon F. Snyder, Dean, Chicago Theological Seminary, Chicago, IL.;
 - Marla Ullom, premedical student, McPherson College, McPherson, KS;
 - Ben F. Wade, Vice-President and Dean, Florida Southern College, Lakeland, FL;
 - LeRoy Walters, Director, Center for Bioethics, Georgetown University, Washington, DC;
 - W. Steve Watson, Associate Professor of Philosophy and Religion, Bridgewater College, Bridgewater, VA,

1987 ANNUAL CONFERENCE STATEMENT ON GENETIC ENGINEERING

Definitions

The term "genetic engineering," first coined in 1965, describes the various techniques used to isolate specific genes, form combinations of genes, or move genes from one species to another species without regard to genetic barriers. Genetic engineering is the common name for more scientific descriptive words such as "gene splicing," *in vitro* recombination, or DNA cloning. The most common type of genetic engineering is gene splicing, in which some DNA (deoxyribonucleic acid-the building blocks of life) is excised from one species and inserted into the DNA of another species, thus forming "recombinant DNA." "Germ cells" are the sex cells, sperm and egg, which fuse during fertilization. "Somatic cells" constitute all cells of the body other than germ cells. They contain twice the number of chromosomes as germ cells since they have their ultimate origin in the union of sperm and egg at fertilization. Genetic engineering of an individual's somatic cells affects only the individual involved, whereas genetic engineering of an individual's germ cells affects the individual's offspring rather than the individual. The changing of germ cells is called germline intervention."

The understanding of DNA in terms of its impact on genetic characteristics began about 1953. In the early 1970s, scientists learned how to isolate specific DNA materials and remove them from one species and attach them to another. More recently, biomedical research and genetic engineering technologies have been greatly expanded and refined. This causes excitement in some persons and concern in others.

Accomplishments

The application of genetic engineering to agriculture and human medicines has been nearly universally accepted for many years.

In the area of agriculture, human beings have deliberately and systematically been bringing about genetic changes in plants and animals for at least ten thousand years. Through the use of selective breeding and the planting of certain seeds, predictable results have followed. The overall goals have been to improve health, yields, adaptations, resistance to diseases, and the length of growing seasons.

The existence of genes was postulated in 1865 by Gregor Mendel, a Moravian monk (abbot) who studied pea plants. Though not taken seriously until this century, Mendel was certain that the traits of inheritance were real and predictable.

More recently, vaccines have been developed using the products of recombinant DNA which are helpful in preventing diarrhea and other animal diseases. Growth hormones are being examined for their ability to increase milk production. New crop varieties that are resistant to herbicides, grow under difficult conditions or are resistant to plant diseases are being developed. Certain cereals with increased protein content and nutritional value are now present. Some agricultural experts predict that by the year 2000, the value of genetically- altered products will reach 6.8 billion.

Plant geneticists are now able to make hybrids of two different plants using a process called protoplast fusion. Products combining carrots and celery, tomatoes and potatoes, have been developed although not yet at a high quality level. Future crops will likely be more resistant to diseases, produce significantly higher yields, and adapt to environments better than their predecessors. It is exciting to those concerned about feeding everyone to speculate about the positive impact that genetic engineering can have in the area of agriculture.

Recent developments in medicine are being received with great enthusiasm. Genetically engineered bacteria that can produce insulin, interferon, or human growth hormone are seen as beneficial and medically helpful to millions. New molecular approaches have greatly improved our understanding of such complex diseases as cancer and diabetes.

Many antibodies, used for diagnoses, are the result of engineering, and the new possibilities are promising, as attempts continue to reduce diseases.

Sickle-cell anemia and Duchenne muscular dystrophy are examples of diseases caused by defects in a single gene. In the future, these defects may be corrected by a surgical replacement with the proper gene. Even now, through sophisticated genetic screening, physicians can sometimes be alerted to a greater

likelihood of cancer.

Using very recent recombinant DNA technologies, scientists have now identified certain genes in normal cells that are responsible for causing malignancy. Two of these specific cells closely resemble certain viruses that can infect cells and transform them into cancer cells. Researchers are confident that they will be able to determine the biochemical events involved in malignancy given the power of the new techniques.

Immunotherapy, the name given for a new treatment for cancer, is receiving much attention by scientists and physicians. Through the use of anticancer agents which are genetically engineered, human cells develop proteins which become a part of the defense mechanism of the body. Whereas chemotherapy uses toxic chemicals, these new biological agents regulate the body's own immune system to cause it to eliminate the cancer cells. Also monoclonal antibodies are being used on tumor cell surfaces to destroy the tumor cells. The development of monoclonal antibodies is a parallel technology to that of recombinant DNA.

Physicians who treat patients dying of Huntington's chorea are obligated to bank a sample of the patient's DNA so that prenatal diagnoses can be performed on the relatives of the patient during the fetal stage. Such testing through amniocentesis allows families to better prepare for a defective fetus. In the instances of negative hereditary patterns, some persons now decide against having children.

Genetic engineering has the possibility of producing more food from less land on a planet where many are starving and where the population could soon be higher than the planet can comfortably accommodate. Genetic engineering may be able to greatly limit the hereditary transference of diseases, correct genetic mutations and even eliminate many of the currently dreaded diseases of humankind. Thus, through genetic changes, the quality of life could be greatly enhanced for many persons.

Affirmations

1. The church affirms that God is the creator of life, that life is a divine gift, and that life has a divine purpose.
2. The church affirms that the search for truth is a continuing process involving biblical study, scientific research and prayer, as these contribute to the decision-making of the faith community.
3. The church affirms that redemption is not only helpful but required, considering that persons are often trapped in economic and health situations which require assistance.
4. The church affirms its stance against the abuses of knowledge.
5. The church affirms that in the incarnation of Jesus Christ, God has shown the importance and meaning of human existence and the value of human decisions.
6. The church affirms that God continues to create all humans in God's image so that all of life may be understood as a divine gift to be lived in faithfulness to God and with God's children.
7. The church affirms the concept of community and life within community for the sharing of inspiration and love and for the wholeness that comes from participation within the faith community.
8. The church affirms the unity within a human life, the oneness and interrelationships of the organism, which has a body, a mind, and a spirit.
9. The church affirms its vigorous opposition to war and killing and to the development of weapons whose sole purpose is to kill, maim subject, or manipulate others and, recognizes that any research can be used for such purposes.
10. The church affirms that the human mind is a gift of God and that the search for knowledge is to be encouraged.
11. The church affirms that Christians follow the truth as they have perceived it even though that truth may conflict with the majority opinion.
12. The church affirms an everpresent readiness to listen to the ideas and opinions of all others and its openness to new knowledge in all areas.

Concerns

1. *Theological Concerns.* Advances in genetic engineering pose significant theological questions. How does the engineering of genetic change relate to our understanding of God as Creator of life? Does changing the genetic structures of life, overstep the boundaries God has set for humankind or contradict the biblical concept of the fear of the Lord?

Are humans playing God? Or is genetic engineering a legitimate way for humanity to serve as partners with God to fulfill God's intentions? If so, what is the proper way for the religious community to work with the scientific community in raising the pertinent theological questions and in making scientific decisions that are moral and appropriate? And, given the power to shape or alter life, what are the moral limits beyond which it would be hazardous or sinful to go?

2. *Ethical Concerns.* Genetic engineering presents new and continuing ethical issues which have not been adequately addressed or resolved. What are the ideal credentials for persons serving on committees or agencies who make decisions about genetics? What agencies should be empowered to ultimately supervise and control genetic experimentation and research? Who should own the patents which come from products which result from government funded research?

Will the powerful genetic technologies be used to relieve human suffering in areas such as the Third World when the financial rewards are limited? Will governments and corporations consider the diseases and needs of the poor when research priorities are established? Currently, some genetically engineered medicines and foods cost much less than their predecessors. What incentives and protections could be enacted to encourage corporations to specifically develop products for the benefit of the millions of poor, hungry, and sick persons worldwide? Will only the rich benefit from the new multi-billion dollar biological technologies?

Are there responsible safeguards to prevent the misuse of poor or uneducated persons as being the initial subjects for genetic research? Are the parameters for safety the same for the rich and the poor when considering reasonable risk levels as genetic technologies are implemented?

Is it appropriate for academic institutions to promote or accept lucrative military contracts when the sole purpose of the contracts for research is to produce weapons for military defense? Since military information is often classified and secret, how can the public know whether biological weapons are being produced, developed or refined? What are the legitimate rights of citizens in a democracy to be informed about biological weapons, especially when the potential for destruction through genetically engineered bacteria is so great?

3. *Social Impact.* The impact of genetic engineering on the social well-being of persons is not at all clear. Who decides the legal, social, and ethical issues that are involved? Genetic changes that assist persons of one sex or in one culture or geographic area may be a liability to persons of the other sex or another culture or geographic area. Who determines what changes are good and permissible?

It may be possible to radically change the nature of humankind through selective genetic manipulation in order to develop persons with stronger bodies, higher intelligence, and greater memory. Will the development of such persons be for those who have the financial resources to pay for the costs? Will this development be available to all and at whose expense? And what are the societal hazards of inadvertent mistakes made by well-meaning researchers, as the side effects of recombinant DNA or germline intervention become known?

4. *Long-term Effects.* The long-term effects of genetic engineering are unknown. Should there be minor harmful effects in the process of producing major helpful effects, what ratios of minor and major are acceptable? What impact will numerous genetic changes have on an ecological system that has evolved over many generations into a system of delicate balance?

Natural selection, a process of genetic change over thousands of years, has moved at a very slow pace. Genetic engineering produces changes at a comparatively rapid pace. What impact will the

swift changes have on ecology and the process of nature? What procedures will be used to control biological pollution, the uncontrollable multiplication of altered life forms that cannot be recalled? What is the responsibility of one generation related to the health of those persons of future generations? What are the acceptable parameters for defining human health both now and in the future?

5. *Genetic Counseling.* As gene-splicing techniques become more sophisticated, there are numerous questions presented related to human health and reproduction which will require counseling as persons make decisions related to very complicated issues. At present genetic counseling services are considered to be somewhat successful in providing medical information. But addressing the emotional, economic, and moral issues involved has been less than satisfactory. What is the appropriate role of the Christian church in providing appropriately trained counselors who can give spiritual as well as medical assistance in compassionate ways? What is the role of the church in confronting prospective parents with the realities of their genetic histories as decisions are made about whether or not to have children. What is the appropriate balance of individual freedom in making decisions related to genetic changes or reproduction as compared to social responsibilities where decisions are made for the good of society. If diseases such as Huntington's chorea, hemophilia, or cystic fibrosis are pre- or ante-nataly diagnosed what are the ethical and moral responsibilities involved in the decision-making processes.

Since abortion is the only current way of dealing with a defective fetus, is abortion permissible or even appropriate in certain instances involving improper fetal development? Should Christians have different concepts about abortion when the fetus is obviously unhealthy as compared to when the fetus is considered to be normal or healthy? If a fetus is diagnosed beyond doubt as being defective, are there different levels of defectiveness which would lead to different decisions? How does the Christian church prepare counselors with an understanding of all of the intricacies involved to assist those who are faced with making such decisions?

6. *Gene Therapy.* Although research has not as yet been authorized using human subjects, knowledge is rapidly accruing about the impact of gene therapy through research with animals. Through gene therapy, unhealthy genes will be replaced by healthy ones. Who is to determine what are unhealthy and healthy genes? Can an individual patient request gene therapy or can others, such as relatives, request it for a particular patient? Should gene therapy be limited only to genetic changes on somatic cells or is it permissible also to change sex cells?

At what point in the state of the art of gene therapy is it permissible and acceptable to attempt therapy with human subjects? What are appropriate precautions that must be met and who is assigned the penalties in the event that irrevocable errors are made which might impact future generations? How far can one go with the unknown related to the controllable or uncontrollable risks involved? How should society cope with persons who have energetic philosophical concepts which insist on genetic changes in order to produce a "healthy" or "perfect" human being?

7. *Human Reproduction.* The technical advances in genetic engineering have presented new concepts and rapid changes related to human reproduction. These changes are often called "technological reproduction" or "non-coital procreation." What impact will the new methods of procreation have on the traditional Christian concepts of sexuality, the family, or sexual roles? If it becomes possible to modify human family characteristics such as height, weight, or intelligence, who will determine the parameters or the appropriatenesses of these modifications?

What are the ethical issues involved in *in vitro* fertilization? Given the possibilities of embryo freezing, embryo changing, and surrogate mothering, what is the appropriate stance of the Christian church toward these issues? Are Christians free to consider any other process for conception when the "natural" mode does not produce a pregnancy? In the event of health problems, are there hesitations presented by the Christian faith that should prevent the use of a surrogate mother as a couple develops its own family?. Are single persons outside of the boundaries of the Christian faith when they have children without the process of coitus?

Recommendations

In response to recent developments in genetic engineering, the Church of the Brethren recommends the following:

1. We recommend the continuing use of scientific research for the alleviation of human suffering.
2. We recommend that members of the church take an active interest in monitoring and influencing the actions of the Recombinant Advisory Committee of the National Institute of Health, the Biotechnology Science Coordinating Committee, the Environmental Protection Agency, and other similar committees, and use appropriate procedures to influence these agencies in keeping with the spirit and intent of this statement.
3. We recommend the greater utilization and broader involvement of the Subcommittee on Bioethics of the Recombinant Advisory Committee in the development of guidelines for the application of genetic engineering.
4. We recommend that legislation be enacted which would prohibit both research on and development of genetic engineering for military purposes.
5. We recommend the careful monitoring of genetic engineering by the General Board of the Church of the Brethren and the development of future papers as is felt to be appropriate.
6. We recommend that members of the church become knowledgeable about genetic engineering through readings, classes, college courses, church seminars, special lectures, and articles from professional journals.
7. We recommend that members of the church become involved in discussions about genetic engineering and especially encourage members of the scientific community to be in dialogue with nonscientists.
8. We recommend that select persons with appropriate credentials, skills, or potential be encouraged to become knowledgeable for the purpose of being genetic counselors to persons who are trapped in a conflict of values.
9. We recommend that congregations as a part of their ministry encourage persons contemplating parenthood to research their genetic histories and to especially seek counseling if there is a history of genetic diseases.
10. We recommend that institutions of the church, especially our colleges and seminary consider including professional courses or discussions within appropriate courses to disseminate information about genetic engineering.
11. We recommend a continuing emphasis on the rights of all persons to dignity, freedom, justice, love, and respect.

Hope

The advancements of genetic engineering have begun to provide us with choices in areas where previously no choices were possible. Existing moral and ethical systems give no clear guidelines for making these new choices. As concerned Christians we commit ourselves to the development of moral guidelines and regulations recognizing that guidelines and regulations are never sufficient alone, but at best are undergirded by the scriptures, education, information, justice, concern and love. If we proceed deliberately, insist on guidelines which are subservient to the norm of love, encourage scientific literacy, and tolerate very minimal risk, we can have the kind of future we desire, a future in which we are free to make careful choices and still be able to place our faith in God to shape our ultimate destiny.

Action of the General Board: At its March, 1987 meeting, the board approved the final draft of the "Guidance in Relation to Genetic Engineering" paper with the addition of the section, Ethical Concerns and directed that it be sent to the 1987 Annual Conference.

Phillip C. Stone, Chairman
Donald E. Miller, General Secretary

Action of the 1987 Annual Conference: The 1987 ANNUAL CONFERENCE STATEMENT ON GENETIC ENGINEERING was presented to the delegate assembly from the General Board by Leland Wilson, General Board staff member, and Paul W. Hoffman, General Board appointee to prepare, with an advisory committee, the paper in completion of an Annual Conference assignment to the General Board. Several amendments were proposed and were defeated. *The 1987 ANNUAL CONFERENCE STATEMENT ON GENETIC ENGINEERING was adopted as received.*

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