these treatments. DES is teratogenic and, along with Ovral, abortifacient by its effect of preventing implantation of the newly conceived individual. State and federal conscience clauses protect Catholic health facilities from legal liability for not cooperating in the procuring of an abortion. Clearly there is much Catholic health facilities can and should do for the survivors of rape, but this does not include terminating any human life that may be the result of rape by preventing its implantation in the uterus or directly cooperating in such abortions through referral.

The statistically slight probability of pregnancies resulting from rape, the presently available alternative prescriptions to prevent ovulation, and the future directions for research in this area will be discussed in the concluding part of this series.

Lloyd W. Hess, Ph.D.

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**Genetic Engineering to the Rescue . . . Synthetic Growth Hormone**

When in doubt call the culprit a virus. More diseases and disorders plague the human race than there are distinct names for them. Even less clear are the sources and causes of many diseases. In centuries past, blame was often placed at the devil's door. Today we are more likely to attribute an unknown disease to a virus. Among these poorly understood disorders are Crohn's disease (a chronic, inflammatory intestinal malady), Guillain-Barré syndrome (a neurological condition which results in an often totally or partially reversible paralysis, but fatal if not reversible) and Creutzfeld-Jakob disease (a rare brain condition for which at present there is no known cure).

**Virus Contaminated Growth Hormone**

The trigger for setting off a medical alarm was the death of three individuals who had been treated as children or adolescents for dwarfism with human growth hormone. The growth hormone had been extracted from the pituitary glands of human cadavers. Apparently, some of these tissues had been infected with the virus which causes the fatal brain condition, Creutzfeld-Jakob disease. The National Institutes of Health (NIH) annually processes about 50,000 human pituitaries. The growth hormone extracted from these glands is used to treat at no cost to the patient about 2,300 persons. An additional 1,200 affected individuals are being treated with commercially produced human growth hormone which costs about $5,000.00 to $10,000.00 per person for a year's treatment. The federal program is being stopped and the two companies commercially producing the human growth hormone are being urged to cease distributing the substance (See, *Science*, 7 June 1985, Colin Norman, "Virus Scare Halts Hormone Research" p. 1176-7).

Not only are those patients who are being treated with growth hormone being deprived of that necessary substance, but also researchers. In particular the termination of a reliable supply of these glands affects those researchers who were depending on these sources for other pituitary hormones such as prolactin (stimulates the production of milk in lactating women), and the sex hormones (such as luteinizing hormone [LH] and follicle stimulating hormone [FSH]) among several others. Without an adequate supply of these hormones, elucidation of their chemical structure, physiological function or clinical utility is severely compromised.

**Growth Hormone by Recombinant DNA Techniques**

There is a possible solution to the growth hormone problem: the production of synthetic growth hormone by the technique of genetic engineering (specifically, recombinant DNA techniques). These procedures use bacteria genetically modified by the engineered insertion of the human gene which in the human body governs the synthesis of human growth hormone. This synthetic growth hormone presumably will be identical with that which had been extracted from human pituitary glands except that it would not be contaminated by the virus responsible for Creutzfeld-Jakob disease. One of the U.S. firms who has synthesized the hormone and tested it clinically, is expecting soon to receive permission from the Food and Drug Administration (FDA) to market its synthetic growth hormone in the U.S.A.

**Recombinant DNA and Ethics**

If recombinant DNA techniques provide a solution for a true human need, this fact is another argument in favor of promoting the development of genetic engineering. Indeed, we may even have an obligation to promote the field of genetic engineering (See, *Genetic Medicine and Engineering*, Moraczewski, editor, St. Louis, The Pope John Center, 1983, pp. 101-120). Certainly, Pope John Paul II a few years ago had already encouraged the developing of genetic medicine and engineering.

It is also to be hoped, with reference to your activities, that the new techniques of modification of the genetic code, in particular cases of genetic or chromosomal diseases, will be a motive of hope for the great number of people affected by those maladies.

It can also be thought that, through the transfer of genes, certain specific diseases can be cured, such as sickle-cell
anemia, which in many countries affects individuals of the same ethnic origin. It should likewise be recalled that some hereditary diseases can be avoided through progress in biological experimentation. The research of modern biology gives hope that the transfer and mutations of genes can ameliorate the condition of those who are affected by chromosomal diseases . . . .


To balance the stance he took, the Pope also reminded his listeners (and readers) that these researches must all be subject to moral principles and values which respect and realize in its fullness the dignity of man (Ibid, p. 343).

Human Dignity

To respect human dignity is to protect and promote the "image of God" in which all humans were created. It is to promote a person's ability to know, to love, to make responsible free choices and to be self-determinative. It is to protect human life and its source. To respect human dignity is to enhance each person's ability to realize the unique potentialities of each in order to attain more surely the divine destiny to which all are called by God's gracious gift. Medical procedures directed to restoring, or bringing about, normal bodily structure or function for a person are to be considered as promoting human dignity.

Thus, in the case of those individuals who have an abnormally short stature because of a lack of active growth hormone, to supply what is absent or lacking by means of synthetic growth hormone made by genetic engineering, is indeed to respect and serve human dignity.

The Rev. Albert S. Moraczewski, O.P., Ph.D. Editor

CHRISTMAS GREETINGS

Advent is a holy time, a season filled with great expectation. In today's world, expectations range from a desperate hope for peace to the highest hopes that the birth of the Prince of Peace might bring new life to old dreams and visions. To those whose apostolate is a ministry of healing for a broken world, may this Christmastide renew your Advent expectations.

On behalf of the Board of Directors and the President, Father William M. Gallagher, all of us at the Pope John Center join in wishing you a blessed Christmas and a New Year of peace and joy.

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