ETHICAL ISSUES RAISED BY GENETIC MANIPULATION.

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In the previous article I gave an overview of the huge potential of genetic manipulation, principally in the fields of medicine and of agriculture. Genetic testing can identify carriers of genetic disease and genetic therapy has the potential to cure genetic disease. Genetic engineering can produce new strains of plants and animals to enhance agricultural production. Scientific and technical progress in these areas has been rapid. However, the technical capacity to achieve something is an entirely separate matter from considerations as to whether or not the procedure is permissible on ethical ground. The development of genetic manipulation techniques has raised many questions that remain topics of hot debate.

It would be easy to carry out genetic testing on a widespread screening basis. There are dangers involved here. Should the identity of the carrier of a genetic disease be identified to anyone except the carrier, and, in many such cases, is it even desirable that the carrier knows? For example suppose you have a genetic nerve disease which displays no symptoms until you reach your forties. Then, progressive loss of mental functioning sets in, followed by death in 10 years. If you are informed you have this disease while still young, what effect will it have on your quality of life? On the other hand, how can you make an informed decision about whether or not to have children if you are not aware of your condition?

Insurance companies already seek information about family history of conditions with a hereditable component such as heart disease, and use this information when assessing premium levels. If these companies had access to widespread genetic screening data they would have an unprecedented ability to forecast morbidity and life expectancy. In such cases some people might be unable to obtain any insurance at all. Similar considerations apply to employment prospects for such individuals if genetic screening data were made available to employers.

Then there's the whole question of genetic testing to provide information about potential offspring. On one level this could simply involve genetic counselling, where a known carrier of a genetic disease gets professional advice on the probability that a potential offspring would inherit the genetic defect, and, in that event, what the outlook for the child would be. Based on the advice given, the subject decides whether or not the risks merit going ahead and having a child. To avail of genetic counselling in this manner would be seen as sensible and decent by the vast majority of people.

However, it is now possible to do genetic testing on embryos in the very earliest stages of development. At this stage it is also possible to tell the sex of the developing embryo. Making decisions based on genetic testing of embryos is a highly controversial area. For example, many people would feel that it is reasonable to terminate pregnancy if genetic testing of the embryo shows a defect which makes it certain that the born child would lead a miserable life ending in early death. Many other people would vehemently protest that any artificial termination is absolutely prohibited on moral grounds, despite the undoubted accuracy of the medical prognosis.

And what about terminating matters if the embryo is of the 'wrong' sex? While this might seem to be a fundamentally inhuman act, there are parts of the world where it is common because of the strong social preference for boys over girls. Indeed, such preferences are not unknown in our

own culture. All of which prompts the question - should genetic testing of embryos be allowed except under the most tightly circumscribed circumstances?

When considering gene therapy one must distinguish between therapeutic and non-therapeutic intervention. Gene therapy to cure a disease is therapeutic; gene therapy to improve intelligence (this is presently not possible) or some other characteristic, e.g. height, is non-therapeutic. A procedure might be considered ethical when undertaken for therapeutic purposes and unethical when undertaken for non-therapeutic purposes. For example choosing the sex of a child, for reasons of social pressures, might be considered unethical, whereas deciding not to have boy children because of an inherited fatal genetic defect, expressed only in males, could be considered an ethical decision.

A distinction must also be drawn between genetic manipulation of germ cells and somatic cells. Germ cells (sperm in male, and egg in female) are those involved in procreation and inheritance; somatic cells are the ordinary body tissue cells (muscle, nerve etc). Genetic changes made to a person's somatic cells end with the death of that individual. Genetic changes in a germ cell can be passed on to future generations. If mistakes were made in genetic engineering of germ cells, these mistakes could spread through the population in future generations. Therefore, genetic engineering of germ cells is banned in humans.

Less scrupulous considerations apply where animals are concerned. There are many examples of transgenic animals, where a gene from one species is introduced into another species, in order to facilitate the production of some useful protein product. Animals have also been genetically manipulated to express diseases similar to human conditions. The justification here is to facilitate widespread study of the disease, and in ways that are not possible with human subjects. An oncomouse has been genetically engineered in America and attempts have been made to patent it. This mouse develops cancer within several months of birth. Whatever about producing healthy transgenic animals to make useful protein products, one must have grave reservations about deliberately engineering sick animals.

People are wary about the whole concept of genetic manipulation. This is understandable because what we are talking about is a fundamental manipulation of life. An analogy can be drawn with the developments in nuclear physics earlier this century. Learning the secrets of the atomic nucleus gave physicists the power to manipulate matter in ways that hitherto had been impossible. Some of the possible manipulations of the atom, stemming from discoveries earlier this century, are good for humanity and some are not. On the positive side I will list nuclear power (at least the intention was good) and the production of special forms of radioactive elements that are very useful in medicine and scientific research. On the negative side we had the nightmarish development of nuclear weapons. Similarly the new genetic techniques allow us to manipulate living organisms in ways that were hitherto not possible. We must strive to use this power only for good ends. This will require considerable wisdom and considerable courage.

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