Name_____ Class_____ Date _____

Issues and Decisions 11

Should Genetics Be Used to Improve Humans?

In 1978, the first successful in vitro fertilization procedure was performed on a human. The purpose of this procedure was to enable women with certain reproductive disorders to bear children. While this goal was achieved, the procedure also gave rise to a number of ethical, legal, and moral issues.

As research provides more and more information about the human genome, it may become possible for scientists to manipulate human genetic material on an unprecedented scale. The potential development and use of such techniques will raise very difficult questions. Many of these questions will center on the use of technology to "improve" the human species.

Clones and Genetic Engineering Not too many years ago, cloning was the stuff of science fiction. In cloning, an exact duplicate of an individual is developed from a few cells of that individual.

Today, techniques have been developed that produce genetic duplicates of a cell. Cloning is no longer science fiction. In 1996, scientists in Scotland created a clone using genetic material taken from the udder of an adult sheep. The birth of the lamb marked the first time scientists have successfully created a genetic duplicate from the DNA of an adult mammal. It is possible that the techniques used might one day enable scientists to clone humans.

Techniques such as cloning, and other genetic manipulations, are generally called genetic engineering. Genetic engineering can be thought of as the "redesigning" of organisms by changing their genes. The most important technique used in genetic engineering is the combination of DNA from two different cells. This technique is called recombinant DNA technology. Genetic engineering has successfully developed methods of producing large quantities of certain vaccines, and drugs such as insulin and interferon.

Genetic engineering has raised concerns that the techniques used to "redesign" organisms might be applied to humans. Genetic engineering could make possible a modern-day eugenic movement to alter the genetic makeup of people deemed to be "undesirable."

Trait Selection At present, the fears that genetic engineering might lead to extreme alterations of humans seem unfounded. However, the mapping of the human genome does present the possibility of parents being able to "select" certain traits for yet-to-be-conceived offspring. It is already possible to detect the sex of in vitro embryos and to screen the embryos for certain genetic disorders, such as Down syndrome.

When the human genome map has been completed, it will be possible to screen embryos for a broad spectrum of genetic disorders and inherited traits. Thus, future generations of prospective parents may be able to select, to a limited degree, some of the physical traits they will pass on to their children. It may even be possible for parents to make decisions regarding certain mental and personality traits.

REVIEW *On a separate piece of paper, answer the following questions.*

1. What is recombinant DNA technology?
2. What is a benefit of genetic engineering to the field of medicine?

CONSIDER THIS *On a separate piece of paper, answer the following questions.*

1. Under what circumstances should doctors be allowed to change the genes of patients? Support your opinion with facts.
2. Should genetic engineering be used to improve the human species? Support your answer.