

The use of recombinant technology benefits humans

[Technology](#)



**ASSIGN
BUSTER**

Recombination is a way in which meiosis produces new combinations of genetic information. During synapsis, chromatids may exchange parts with other chromatids, leading to a physical exchange of chromosome parts; thus, genes from both parents may be combined on the same chromosome, creating a new combination. Recombinant DNA technology is a series of techniques in which DNA fragments are linked to self-replicating forms of DNA to create recombinant DNA molecules. These molecules in turn are replicated in a host cell to create clones of the inserted segments.

I think that recombinant technology only benefits humans as it allows us much greater control over genetic manipulation, which we can then use to our advantage. Indge, Rowland and Baker (2000) summarises some of the ways that recombinant technology has been beneficial to humans;

- Genetically engineered micro organisms- large amounts of insulin and human growth hormone can be produced cheaply.
- Genetically modified plants- Desirable plants can be transferred from an organism to a crop plant.
- Genetically modified animals- human proteins such as haemoglobin and blood-clotting factors, are already produced in the milk of transgenic cows, goats and sheep.
- Human gene therapy- gene therapy involves inserting a 'normal' gene into an organism's body to correct a genetic disorder.
- Mapping human chromosomes (the Human Genome Project)- scientists in over 1000 laboratories around the world are contributing to the Human Genome Project. Their aim is to create a map of

all human chromosomes, identifying the precise location of every gene.

This will help to develop new gene therapy treatments.

The ability to clone genes through the use of recombinant technology is a big advantage to humans. The production of human insulin is now done on a very large scale and benefits many thousands of diabetics. Kent (2000) states that human insulin made by recombinant DNA technology produces fewer side effects than insulin prepared from cow or pig pancreatic extracts, previously the main source of insulin. But diabetics are not the only people who are benefiting from recombinant technology. Jones and Jones (1999) show that considerable advances in genetic engineering are making gene therapy possible. Gene therapy is intended to correct inherited disorders, such as cystic fibrosis, which are caused by a defective gene. If the 'correct' gene could be inserted into the affected person's cells, then they should be free of the disease.

Recombinant technology is also beneficial to humans when it comes to crop production. Genetic engineering is used to produce pest resistant varieties of crop, which means that fewer pesticides would have to be used on the crops and they would produce a greater yield. Jones and Jones (1999) say that tomatoes have been produced containing genes that result in them remaining fresh for much longer than usual after picking. This makes it much easier, and therefore cheaper, to transport them from grower to sale point, so they have a much longer shelf life. But genetically modified crops can also cause problems in the environment. If crops are produced containing a gene making them resistant to herbicides and are then sprayed with the herbicide

to kill weeds, this gene might then somehow spread to wild plants and affect the balance of the ecosystem.

Although recombinant technology is of great use to humans when it comes to gene therapy and genetically modified crops it can also be a threat if used in the wrong way. Jones and Jones (1999) state that the techniques of genetic engineering could be used deliberately to create new organisms that could infect and kill humans. There are, of course, already many organisms that can do this, but little use had been made on biological warfare. About half of the nations of the world signed a treaty in 1972 pledging not to produce biological weapons of any kind. However, the concern remains, and it is certainly possible that new, highly dangerous forms of infectious organisms could be used deliberately.