

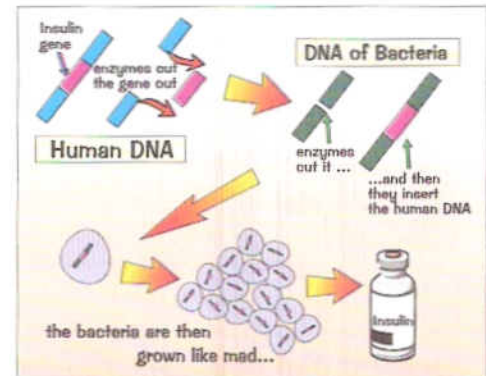
Genetic Engineering

Genetic engineering is cool — hopefully

This is a new science with exciting possibilities, but dangers too. The basic idea is to move sections of DNA (genes) from one organism to another so that it produces useful biological products. We presently use bacteria to produce human insulin for diabetes sufferers, and also to produce human growth hormone for children who aren't growing properly.

Genetic engineering involves these important stages:

- 1) The useful gene is "cut" from the DNA of, say, a human.
- 2) This is done using "enzymes." Particular enzymes will cut out particular bits of DNA.
- 3) Enzymes are then used to cut the DNA of a bacterium, and the human gene is then inserted.
- 4) Again this "splicing" of a gene is controlled by certain specific enzymes.
- 5) The bacterium is now cultivated and soon there are millions of similar bacteria all producing, say, human insulin.
- 6) This can be done on an industrial scale and the useful product can be separated out.



So, we've turned nasty old bacteria into a useful biological factory. Phew, that's modern science for you.

Using animals as chemists



- 1) The same approach can also be used to transfer useful genes into animal embryos. Sheep, for example, can be genetically engineered to produce useful substances (for example, medicinal drugs) in their milk! This is a very easy way to produce drugs...

- 2) Insects also have their uses. Mosquitos may, in the near future, be used to combat diseases such as "malaria." The mosquitos that normally spread malaria are being genetically engineered to produce the malaria vaccine. Therefore instead of giving the disease to people, they will soon hopefully be immunizing them instead.



Nothing's been done to stop the itching though.

Mosquitoes that stop you getting Malaria — now that's clever...

They could ask you about any of the details on this page. The only way to be sure you know it: cover the page and write mini-essays on both topics. Then see what you missed, and try again...