Medicine

Many drugs and vaccines are produced by transformed organism

They use recombinant DNA technology

They can be made quickly, cheaply and in large quantities using this method

There are ethical, moral and social concerns associated with the use of genetic engineering

Agriculture

Farmers might plant only one type of transformed crop

This is known as monoculture

This could make the whole crop vulnerable to disease, as the plants are genetically identical

Some people are concerned about the possibility of superweeds

Super Weeds *are weeds resistant to herbicides*

These could occur if transformed crops interbreed with wild plants

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Industry

Without proper labelling some people think they will not have a choice about whether or not to consume food made using genetically engineered organisms

Some people are worried that the process used to purify proteins from genetically engineered organisms could lead to the introduction of toxins into the food industry

Medicine

Companies who own genetic engineering technologies may limit the use of technologies that could be saving lives

Some people worry this technology could be used unethically

For example, to make designer babies

This is currently illegal

Humanitarians think genetic engineering will benefit people

It has many potential humanitarian benefits

Agricultural crops could be produced that help reduce the risk of famine and malnutrition

For example, drought-resistant crops in drought-prone areas

Transformed crops could be used to produce useful pharmaceutical products

These could make drugs available to more people

For example, in areas where refrigeration is not available

Medicines could be produced more cheaply

This means more people can afford them

Some environmentalists and anti-globalisation activists have concerns

Environmentalists oppose recombinant DNA technology

They think it could potentially damage the environment

For example, transformed crops could encourage farmers to carry out monoculture

This decreases biodiversity

There are fears that if transformed crops breed with wild plants, there'll be uncontrolled spread of recombinant DNA

This would have unknown consequences

Anti-globalisation activists are people who oppose globalisation

***Globalisation** is the growth of multinational companies at the expense of smaller ones*

A few large biotechnology companies control some forms of genetic engineering

As the use of this technology increases, these companies get bigger and more powerful

This may force smaller companies out of business

It would make it harder for them to compete

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Genetic Fingerprinting

Not all of an organism's genome codes for proteins

*A **genome** is all the genetic material in an organism*

Some of the genome consists of repetitive, non-coding base sequences

The are base sequences that do not code for proteins

There are advantages to gene therapy:

It could prolong the lives of people with genetic disorders and cancer

It could give people with genetic disorders and cancer a better quality of life

Carriers of genetic disorders might be able to conceive a baby without that disorder or risk of cancer

This only works in germ line therapy

There are disadvnatges to gene therapy:

The effects of the treantnent may be short-lived

This is only true of somatic therapy

The patient might have to undergo multiple treatent

This is only true of somatic therapy

It might be difficult to get the allele into specific body cells

The body could idenify vectors as foreign bodies and start an immune response against them

An allele could be inserted into the wrong place in the DNA, possibly causing more problems

An inserted allele could get overexpressed, producing too much of the missing protein

Disorders caused by multiple genes would be difficult to treat with this technique

There are also many ethical issues associated with gene therapy

For example, some people are worried that the technology caould be used in ways other than for medical treatment, such as treating the cosmetic effects of aging

Other people worry that there's the potenital to do more harm than food by using the technology

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