

**GENETIC ENGINEERING**

**EXERCISE 1**

Enter the following webpage and answer the following:

<https://repstein.faculty.drbu.edu/GEessays/engineerhumans.html>

1. What kind of genes have been used for this technology?
2. What has been worked on using human cells?
3. What is cloning?
4. What is the best example for the cloning?
5. Explain what gene therapy is and if it has worked.
6. Why are scientists studying these techniques?

**EXERCISE 2**

Carefully read the next page and briefly write about what the *GREENPEACE* organization believes about this topic.

<https://history.greenpeace.org/aotearoa/genetic-engineering/>

**EXERCISE 3**

Choose a profession:

* Doctor
* Activist
* Scientist

Now write a summary from the point of view you chose, based on what you read before.

**Suggested answers**

1. What kind of genes have been used for this technology?

Genetic "engineers" are now moving genes around among plants,

animals, and bacteria on a regular basis, but with very little

understanding of the possible consequences, and almost no safety

testing. Now genetic engineers are starting to modify the genes

of humans, using three approaches: 1) cloning, 2) somatic cell

manipulation, and 3) human germline manipulation.

1. What has been worked on using human cells?

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**Cloning**

Cloning uses the DNA of an existing individual to create  
a new individual. A human has not yet been cloned, but a team of researchers including an American and an Italian recently announced they are going to attempt it.

**Somatic cell manipulation**

Somatic cells are all the cells of the  
body that do not pass DNA on to the next generation. Somatic cell  
manipulation is currently practiced in some medical research  
centers under the name "gene therapy." For example, researchers  
are experimenting with ways to introduce genes into the blood  
cells of patients with hemophilia (a blood disorder), and into  
cells of the immune system in patients with Severe Combined  
Immune Deficiency (SCID), a rare inherited disorder of the immune  
system. The idea is to "correct" the genetic component of the  
disease instead of, or in addition to, treating the disease with  
drugs. Hundreds of trials have been carried out, but in most  
cases the patients have not been cured.

**Germline manipulation**

Germ cells (sperm and eggs) do pass DNA  
from one generation to the next. Germline manipulation refers to  
changes in the germ cells changes which will be inherited by  
successive generations. Designing future generations through  
germline manipulation is still in the realm of science fiction,  
but just barely: some influential scientists are arguing that it  
should be attempted.

1. What is cloning?

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Cloning uses the DNA of an existing individual to create  
a new individual.

1. What is the best example for this?

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The best-known example is Dolly, a sheep that  
was cloned using DNA from a sheep that had been dead for six  
years.

1. Explain what gene therapy is and if it has worked.

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Somatic cell manipulation, also known as "gene therapy," consists of inserting genes into human cells. Add genes to cells in some part of the human body, such as the lungs or blood.

The manipulation of somatic cells only affects the DNA of the person who undergoes the treatment, in theory, it does not produce changes that can be transmitted to the children and grandchildren of that person.

Somatic cell manipulation was first attempted in humans in 1990. The mechanisms of somatic cell manipulation are poorly understood, and the effects can be lethal.

Some people still argue that somatic cell manipulation in consenting individuals could be justified to treat serious diseases, if it could ever be shown to work the way it is supposed to.

As of at least 2001, no positive or fully approved results of gene therapy had been achieved.

1. Why are scientists studying these techniques?

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Some researchers see somatic cell manipulation as a promising way to treat serious diseases, such as cystic fibrosis. Other genetic engineers may have less idealistic motives. Human cell engineering is seemingly attractive, and the mere fact that we possess this technology is, for some people, reason enough to use it. Some tech optimists are fascinated by the idea of ​​germline engineering as a way to "take evolution into our own hands" by redesigning the genetic information in our children's cells.

Human cell engineering could also be a great money maker. For example, one company hopes to create a market in "organ repair" by generating cloned cells and tissues to insert into existing people's organs. Other companies and researchers simply want to keep the option of designing human cells open because it could be profitable in the future.

**EXERCISE 2**

Carefully read the next page and briefly write about what the GREENPEACE organization believes about this topic.

<https://history.greenpeace.org/aotearoa/genetic-engineering/>

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Greenpeace began work on the subject of genetic engineering (GE) in 1992. Initially Greenpeace asked for a review of two requests for field tests from GE, as a result of Greenpeace's intervention it was highlighted that New Zealand had no legislation to protect the environment and human health from commercial importation and exploitation of transgenic organisms. He urged that GMO technology be not allowed in New Zealand and instead promoted organic and organic farming as positive alternatives.

Greenpeace released an updated Real Food Guide showing New Zealand food companies GMO-free.

Greenpeace and the other groups campaigning against GMO releases in New Zealand launched "The People's Moratorium," urging the public to demand that food companies continue to remove GMO ingredients from their products and to challenge all new applications. to grow GM crops in New Zealand.

Greenpeace's GMO Campaign, Toxics Campaign and Climate Campaign highlighted different aspects of the environmental impacts of New Zealand agriculture in the 1990s.