

# Advantages and disadvantages of genetic engineering essay

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Genetic Engineering: Advantages and Disadvantages essay. During the latter stage stages of the 20th century, man harnessed the power of the atom, and not long after, soon realised the power of genes. Genetic engineering is going to become a very mainstream part of our lives sooner or later, because there are so many possibilities advantages (and disadvantages) involved.

Here are just some of the advantages :

- Disease could be prevented by detecting people/plants/animals that are genetically prone to certain hereditary diseases, and preparing for the inevitable. Also, infectious diseases can be treated by implanting genes that code for antiviral proteins specific to each antigen.
- Animals and plants can be 'tailor made' to show desirable characteristics. Genes could also be manipulated in trees for example, to absorb more CO<sub>2</sub> and reduce the threat of global warming.
- Genetic Engineering could increase genetic diversity, and produce more variant alleles which could also be crossed over and implanted into other species. It is possible to alter the genetics of wheat plants to grow insulin for example. Of course there are two sides to the coin, here are some possible eventualities and disadvantages.
- Nature is an extremely complex inter-related chain consisting of many species linked in the food chain. Some scientists believe that introducing genetically modified genes may have an irreversible effect with consequences yet unknown.
- Genetic engineering borderlines on many moral issues, particularly involving religion, which questions whether man has the right to manipulate the laws and course of nature. Genetic engineering may be

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one of the greatest breakthroughs in recent history alongside the discovery of the atom and space flight, however, with the above eventualities and facts above in hand, governments have produced legislation to control what sort of experiments are done involving genetic engineering. In the UK there are strict laws prohibiting any experiments involving the cloning of humans. However, over the years here are some of the experimental 'breakthroughs' made possible by genetic engineering.

- At the Roslin Institute in Scotland, scientists successfully cloned an exact copy of a sheep, named 'Dolly'. This was the first successful cloning of an animal, and most likely the first occurrence of two organisms being genetically identical. Note : Recently the sheep's health has deteriorated detrimentally
- Scientists successfully manipulated the genetic sequence of a rat to grow a human ear on its back. (Unusual, but for the purpose of reproducing human organs for medical purposes)
- Most controversially, and maybe due to the Essay topic: advantages and disadvantages of genetic engineering. Discuss The development of genetic engineering has increased notably in the last few years.

Some people support the investment in this field whereas others are against it. In this essay I shall delve into both sides before forming an opinion. Genetic engineering is the process of manipulating the genes of an organism. People supporting it use to argue that for instance farmers could have crops more resistant to insects and diseases, and many genetically modified crops can grow faster. These advantages can be extremely positive

for food production in developing nations where people starve. Faster growing cereals, fruits and vegetables would mean more profit.

Moreover, some medicines and vaccines are obtained through genetic engineering process. An important breakthrough that genetic engineering can bring to society is that some inherited diseases would no longer exist. Some genes can be modified before a baby is born improving its life expectancy. It could be said then that genetic engineering might cure some diseases. However there are ethical concerns about its use. Some ecologists warn about the disaster consequences to the Earth. They say that genetically modified crops can affect seriously whole ecosystems as the food chain can be broken if crops are more resistant to predators.

Furthermore, some people are strongly against to human genetic engineering as parents might want to choose their children's characteristics. They support this argument saying that it would be unnatural and in some religions would be unacceptable. Society and human evolution would change completely. To sum up, both sides have strong arguments to support their opinions. As far as my opinion is concerned genetic engineering can bring to humans longer and healthier lives. However there is a thin line between what is ethical and what not. What are the disadvantages of genetic engineering?

5 years ago Best Answer - Chosen by Voters

- probably it would be costly
- a single mistake has devastating repercussions
- it borders on the issue of ethics and morality

- an increasing demand for genetic modification which effectively increases discontentment for the self or for the original genetic configuration of an organism
- prospect of creating new species might create natural imbalances especially on the habitats and feeding habits of other animals (by creating a new species, competition might arise, or it might be a predator to a prey who are already endangered, or for its own survival, it might need to destroy the habitats of others)
- unexpected but undetected mutations can generally alter the future in unpleasant ways.

What are the advantages and disadvantages of genetic engineering?

### **Advantages:**

- Disease could be prevented by detecting people/plants/animals that are genetically prone to certain hereditary diseases, and preparing for the inevitable. Also, infectious diseases can be treated by implanting genes that code for antiviral proteins specific to each antigen.
- Another of genetic engineering is that diseases could be prevented by detecting people that are genetically prone to certain hereditary diseases, and preparing for the inevitable. As well as preventing disease, with genetic engineering infectious diseases can be treated by implanting genes that code for antiviral proteins specific to each antigen
- Animals and plants can be 'tailor made' to show desirable characteristics. Genes could also be manipulated in trees for example, to absorb more CO<sub>2</sub> and reduce the threat of global warming.

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- Genetic Engineering could increase genetic diversity, and produce more variant alleles which could also be crossed over and implanted into other species. It is possible to alter the genetics of wheat plants to grow insulin for example.
- Another advantage of genetic engineering is that animals and plants can be made to have desirable characteristics which could help solve some of the world's problems. For example in trees, genes could be manipulated to absorb more carbon dioxide. This would help reduce global warming, and thus solve one of the biggest problems earth faces.

### **Disadvantages:**

- Nature is an extremely complex inter-related chain consisting of many species linked in the food chain. Some scientists believe that introducing genetically modified genes may have an irreversible effect with consequences yet unknown.
- Genetic engineering borderlines on many moral issues, particularly involving religion, which questions whether man has the right to manipulate the laws and course of nature.
- Another reason why people think that using genetically modified crops and plants is a disadvantage is that they think it will increase our reliance on pesticides, which have a harmful effect on the environment.
- Another disadvantage of Genetic Engineering is Genetic engineering borderlines on many moral issues, particularly involving religion, which questions whether man has the right to manipulate the laws and course of nature. Also it brings into question Darwin's theory of " the

survival of the fittest", if this theory has worked over the last 20 centuries , why change it? ... experimental 'breakthroughs' made possible by genetic engineering.

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Scientists successfully manipulated the genetic sequence of a rat to grow a human ear on its back. Unusual, but for the purpose of reproducing human organs for medical purposes) Most controversially, and maybe due to more liberal laws, an American scientist is currently conducting tests to clone himself. Genetic Engineering Advantages ; Disadvantages During the latter stage stages of the 20th century, man harnessed the power of the atom, and not long after, soon realised the power of genes. Genetic engineering is going to become a very mainstream part of our lives sooner or later, because there are so many possibilities advantages (and disadvantages) involved.

Here are just some of the advantages :

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to absorb more CO<sub>2</sub> and reduce the threat of global warming. Genetic Engineering could increase genetic diversity, and produce more variant alleles which could also be crossed over and implanted into other species. It is possible to alter the genetics of wheat plants to grow insulin for example. Of course there are two sides to the coin, here are some possible eventualities and disadvantages.

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- Most controversially, and maybe due to more liberal laws, an American scientist is currently conducting tests to clone himself. Genetic engineering has been impossible until recent times due to the complex and microscopic nature of DNA and its component nucleotides. Through progressive studies, more and more in this area is being made possible, with the above examples only showing some of the potential that genetic engineering shows. For us to understand chromosomes and DNA more clearly, they can be mapped for future reference.

More simplistic organisms such as fruit fly (*Drosophila*) have been chromosome mapped due to their simplistic nature meaning they will require less genes to operate. At present, a task named the Human Genome Project is mapping the human genome, and should be completed in the next ten years. The process of genetic engineering involves splicing an area of a chromosome, a gene, that controls a certain characteristic of the body. The enzyme endonuclease is used to split a DNA sequence and split the gene from the rest of the chromosome. For example, this gene may be programmed to produce an antiviral protein.

This gene is removed and can be placed into another organism. For example, it can be placed into a bacteria, where it is sealed into the DNA chain using ligase. When the chromosome is once again sealed, the bacteria is now effectively re-programmed to replicate this new antiviral protein. The bacteria can continue to live a healthy life, though genetic engineering and

human intervention has actively manipulated what the bacteria actually is. No doubt there are advantages and disadvantages, and this whole subject area will become more prominent over time.

The next page returns to the more natural circumstances of genetic diversity. Genetic Engineering in Humans is a fascinating subject with unthinkable power. Man, the greatest creation of God and a scientific marvel, has developed the ability to genetically modify and create 'near perfect' life. The term genetic engineering was first used in *Dragon's Island*, a science fiction novel by Jack Williamson in 1951. With the discovery of 'Deoxyribonucleic Acid' or mitochondrial DNA by James Watson and Francis Crick, this fictional plot started to turn into a reality.

Watson and Crick, with their experiments, could prove that DNA was the genetic material that was transferred generation to generation, with genetic information. This genetic information determined all the characteristics of a living being. The tiny, microscopic DNA contained all the genetic information related to the person, like the color of the eyes, the hair, skin tone, height, weight, IQ, EQ, diseases, disorders, etc. and even be able to determine a smile or the shape of nose. This blueprint of life is the most important ingredient of genetic engineering.

Genetic engineering is carried out using five steps, that are: Gene of interest is isolated Transfer vector is inserted into the genes The vector is transferred into the organism that is to be modified The cells of an organism are transformed The last step involves selection of successfully genetically modified organisms (GMO) from those who have failed to be modified. This

biotechnology was first applied to produce synthetic human insulin.  
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This technology was gradually used to apply to a number of vaccines and drugs, that would prove to be beneficial to the human race.

It was applied to plants to produce genetically modified foods, with higher resistance to infections and high nutritional values. With the advancement in technologies and major breakthroughs in genetic engineering, more and more scientists working for private and government companies are spending time experimenting with the human genes. The completion of the Human Genome Project, in 2006, has given a major opening to medical companies, to carry out experiments and genetic tests using genetic engineering.

### **Advantages of Human Genetic Engineering**

It could help prevent life-threatening and incurable diseases like cancer, Alzheimer's disease, even HIV/AIDS. There are cases like cardiomyopathy or susceptibility to viruses, that can be overcome with the help of this technology. Better drugs could be produced that are disease or gene specific and attack the specific genetic mutation in an individual, to help overcome a disease or disorder. Many people want to live a longer, healthier life or are just afraid of death. Such people with a love of life, can place their bets on it to help them live longer.

It is possible to increase the average life span of an individual to 100-150 years. And not just a longer life, but a healthy, long life, free from diseases and disorders. Although this may take a bit longer to achieve, but it does not seem impossible any longer. Women have a craze to look young and maintain their beauty for all eternity. The benefits may make it possible to slow down or reverse certain cellular metabolism, that may be able fulfill this

desire to remain 'forever young' for many dreamers in the near future. You may have heard of designer clothes, designer bags, designer shoes and even a designer nose.

But have you heard of designer babies? Yes, designer babies are possible to be produced with its help in humans. Parents can choose the characteristics of their babies, like blond with blue eyes, high IQ, fair skin, etc. It may even be possible to choose the talent in your favorite idol to be manufactured (pun intended! ) in your baby, for example, a singer like Elvis Presley or maybe a great dancer like Michael Jackson. No, I am not joking, this is all possible with a bit of genetic engineering, within the blueprint of life - DNA.

One could even try to create super-humans by incorporating specific features of certain animals. For example, one could have super-sharp vision like the hawk or could outrun a cheetah. One could create a 'Superman' like human who is indestructible. Do you remember 'Dolly Sheep'? This was a genetically modified, cloned sheep that is now dead for over 6 years. This world-famous sheep was cloned using the cell from the mammary gland of another sheep. Cloning, its another aspect can also be possible. There are many ethical issues of cloning and it is considered illegal by many governments around the world.

It is a crime to clone humans now, but may be in our quest to produce the perfect beings, cloning will soon become a part of life. These are a few advantages of genetic engineering in humans. But as every coin has two sides, there are many disadvantages that cannot be overlooked.

Disadvantages of Human Genetic Engineering Under the pretext of producing a cure for diseases and hereditary disorders, many researchers <https://assignbuster.com/advantages-and-disadvantages-of-genetic-engineering-essay/>

carry out experiments on genetically modifying humans. It can prove to be a bane if: In the pursuit of producing babies without any genetic defects or hereditary disorders, we may end up producing super humans.

Just as the example I mentioned in the beginning of my article, we may have a line of humans that may spell doom to those who are not genetically modified. Smarter humans means, larger brains, that may lead to babies with larger heads that have trouble passing through the birth canal of their mothers. This may cause trouble during birth and a rise in cesarean. Long life could lead to population problems. There may be stress on the natural resources and less living space. Although, you may live free of diseases, you may have a fight for survival for securing the basic necessities.

Just like in the movie Gattaca, there may be a division between genetically engineered humans and those that are normal (just imagine, being normal may prove to be a curse in the future! ). People will no longer be discriminated on the basis of race, religion or creed, but actually on their genes! Human cloning may create problems of copies of men moving about freely around the world. If your clone turns out to be the one with a criminal streak, you may end up in jail for a crime committed by your clone. It is possible, if you can't prove your innocence. Imagine someone else taking over your life, family, work, etc!

The problem faced by many developing countries today, is female infanticide. It may help stop this cruel and barbaric custom of killing the innocent girl child. You may think this is an advantage, I say otherwise. It may help such narrow-minded, biased parents to actually choose the gender of the child. Therefore, more parents opting for a male child over a girl child.

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Thus, directly bringing an end to girl child killing as there will be no birth of the girl child! The idea of 'Superman' may seem tantalizing, but its consequences may be very dangerous.

Imagine a person who is virtually indestructible, may carry out crimes and becomes a danger to mankind. I can go on and on regarding the benefits of genetic engineering in humans, like end of hunger, no disease, cure for all ailments, long life, ageless beauty, super intelligent humans, etc. But, one should always give a second thought to all the disadvantages listed. It is often said, man should not attempt to 'play God'. That's correct, but if God has bestowed us the power to make some beneficial changes to his creations, then we should surely do so wisely.

Genetic engineers have turned into modern-day alchemists, who are searching for the ultimate elixir of life, to produce the genetically modified, perfect human. This precious knowledge is being exploited by greedy men, who are using it just to earn more money. Nothing is bad if exploited within limits. When we harness our present, we should keep in mind all the possible effects it will have on our future. We may not be alive to view the beauty and the ugliness of the future, but our beloved children may be facing the consequences.