**My Understanding of DNA**

**Genetic engineering: achievements and concerns**

Your Name(s): Zhiwen Qiang

**【Abstract】:** Genetic engineering has always been the most popular subjects among all people. Its progress is strictly related to the people’s daily life. In this passage I am going to emphasize about the life-changing achievements in genetic engineering together with its dangers or concerns aroused by the public.

**【Key Words】:** genetic engineering, achievements, concerns

1. **Introduction**

Genetic engineering is the biotechnology way to manipulate an organism’s genome. It can change the genetic makeup of cells, for example, by artificially synthesizing the DNA and copying the genetic material of interest, it can create new DNA, what’s more, it can transfer genes within or across species boundaries to produce brand new organisms[1].

The term "genetic engineering" was first put forward by Jack Williamson in his science fiction novel *Dragon's Island*, published in 1951[2]. By it was not until 1970s that Genetic engineering was functioned as the direct manipulation of DNA by humans outside breeding and mutations. Over the years, genetic engineering has gone through great achievements as well as many concerns around the public, the following contents will focus on the two aspects of genetic engineering.

1. **Achievements for genetic engineering**

Genetic engineering is making great contribution in many fields to benefit our lives.

In Medicine, Genetic engineering provides human beings with an effective way of manufacturing drugs. For example, before genetic engineering was introduced, insulin was very expensive, for animal bodies contains only a small fraction of that, but now we can use this technology to mass-produce human insulin in bacteria. Also, genetically engineered viruses are being developed that can still confer immunity, but lack the infectious sequences. what’s more, Genetic engineering can be used to create animal models of human diseases. Like the OncoMouse[3], which can ultimately be used to cure human diseases. Apart from that, genetic engineering has many applications to medical diagnosis, prognosis and therapy, for example, professor Lara Dunn & Angela DeMichele found that gene expression profiling changes the expression into signals that prognosticate disease recurrence or therapy reaction[4], which means Genetic engineering can supply signals to predict various types of specific diseases.

Besides that, genetic engineering is frequently used in the industrial fields to reduce industrial pollution and to improve the environment. The reason is that genetic engineering protects the environment by providing alternative clean resources. For instance, genetic engineering technology supports sanitary biofuel production which is a suitable replacement for energy source[5]. This biofuel can also decrease the greenhouse gas emission.

Last but not least, genetic engineering is a powerful tool for scientists to do research. They can create genetically modified bacteria, which is cheap and easy to transform. And in that process the particular gene can be stored inside the bacteria providing an unlimited supply for research.

1. **Concerns related to genetic engineering**

As the saying goes: food is the paramount necessity of the people. In the developing countries, like China, as the economic development and urbanization is growing rapidly, the demand for animal protein and vegetables is increasing dramatically. Which lead to one of the best-known and controversial applications of genetic engineering: genetically modified food.

This kind of food contains many advantages, some crops are developed to increase production, increase tolerance of extremely weathers. For animals, it can create highly efficient and productive livestock. For example, expression of lysostaphin specifically in the bovine mammary gland makes the cow highly resistant to infection by *Staphylococcusaureus*[6]. Also, the GM livestock contain more protein than their normal species.

But scientists also discovered that the critical genes which has been modified may affect important economic traits. Genes can travel to nearby, related plants on their own. For instance, some kind of genetic engineering modified bacteria can affect soil organisms, leading them to death and some kind of genetically modified murine can accidentally produce pox virus.

Although there is a scientific consensus that currently available food derived from GM crops contains no greater risk to human health than conventional food[7], but up until now, we don’t know whether there is some long-term risk. Before further evidence is found, we still need strict regulation and testing for each GM food.

1. **Conclusion**

Some critics make the accusations that scientists are "playing God" and they believe it is a strong violation to religious issues as well as ethical issues. From where I stand, I think the science and technology is the primary productive force. For all those years since genetic engineering was created, it cannot be denied that this kind of technology holds favorable impacts on the environment and mankind. So the genetic engineering and the experimentation with human and nature genes has to continue, but it should be under strict regulations and limited only to the human essence. If there undertakes some kind of experiments which was used to create genetic weapons to threaten the world, it should be abolished immediately. For genetic weapons is much more dangerous than nuclear weapons or chemical weapons. I believed that it is necessary to carry on the experiments that could help people, plants or foods to find the cure and treatments for diseases. Finally I would like to emphasize one point, the genetic scientists are not "playing God", they are bringing welfare to the world in their own way.

**5.Reference**

[1]: https://en.wikipedia.org/wiki/Genetic\_engineering

[2]: Stableford, Brian M. (2004). Historical dictionary of science fiction literature

[3]: https://en.wikipedia.org/wiki/Oncomouse

[4]: Dunn L,DeMichele A.Genomic Predictors of Outcome and Treatment Response[J].Molecular Diagnosis & Therapy

[5]: Benefits of Genetic Engineering to the Environment and Human Health, 2010-10-12

[6]: Advances in genetic engineering of domestic animals, February 8, 2016

[7]:Statement by the AAAS Board of Directors On Labeling of Genetically Modified Foods