



Ethical opinions regarding genetic engineering

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ABSTRACT

Genetic engineering is one of the most ethically controversial scientific principles of human history. Biologists, philosophers, experts and even people that have different jobs, each have their own unique opinion on the subject. It is a known fact that public attitudes are one of the key determinants in the development of a research topic. Based on this fact, we can say that these controversies slow the development of genetic engineering. In this article, opinions that have found a place in academia and ethical concerns about different areas of genetic engineering will be discussed.

Keywords: Genetic Engineering; Ethics; Opinion

INTRODUCTION

Genetic engineering is a set of laboratory-based technologies that are used to alter the genetic makeup of an organism. It is seen to be a very promising area of research that will shape the future. But like any other industries that handle animals and other living things, it brings a lot of controversies and ethical concerns with it.

A few examples to genetic engineering-related technologies are molecular cloning, gene delivery, and genome editing techniques like TALEN and CRISPR. Genetic engineering is applied across an array of subjects including medicine, industry and agriculture.

An organism that has been altered genetically by humans through genetic engineering is called a Genetically Modified Organism (GMO). It can easily be said that GMO foods are the main sources of controversy [1].

In order to render this area of research as an option for companies and research groups, we need to first determine consumer attitudes toward the technologies. The problem here is that the average person's responses to risk issues are not entirely rational. Specific, dramatic, sensational and abstract risks are greatly overestimated among people and they cause social panic. News and other media have a great role in shaping people's understanding of the subject. Media companies usually use risk overestimation as a way to reach more people. That is why they write greatly dramatized headlines and exploit public ignorance.

Science communication is a very important factor in humanity's progress towards a better world. Genuine scientific knowledge is regarded as exclusive to scientists and it not accessible to neither policymakers or the general public. A study by Frewer et al., shows that awareness and knowledge about the subject is correlated with positive attitude towards genetic engineering, and it suggests that the media exposure is essential to raise public awareness [2].

Since genetic engineering made its debut in the 1970's, and market shelves were first stocked with GMO foods in the 1990's, sociologists, philosophers, and bioethicists have been discussing the risk, benefits, and ethics of the subject.

LITERATURE REVIEW

Ethics of technologies

We discussed earlier on that one of the main ethical problems with genetic engineering are about the subjects of these technologies being forms of life, and not inanimate objects. There are two primary views on this issue.

Ethics of technologies as tools: This point of view advocates for the treatment of the products of biotechnology and genetic engineering as tools. Defenders of this rationale often accept all non-human objects to have the sole purpose of human advancement. On this view, the main question is if the tools beneficial to humans overall or not. In the case that the technologies are in fact objectively beneficial, there are two other points of view regarding the necessity and efficiency of the products of genetic engineering.

The necessity view suggests that unless novel techniques or technologies are used, efforts to progress will ultimately fail. This rationale primarily focuses on disease control, and the alteration of genetic conditions in living things. For example, if scientists were able to make newborns fully resistant to a disease using genetic engineering, this view would suggest this project to be developed, disregarding controversies on human genome editing.

The efficiency view suggests that novel techniques or technologies can be used in the possibility that efficiency would be improved regarding the purpose of the tool. This rationale primarily focuses on agricultural and industrial uses of genetic engineering and biotechnology. For example, if efficiency is increased on a GMO food, this view suggests as long as it doesn't hurt humans, it should be used.

Ethics of technologies as forms of life: This point of view advocates for the treatment of the products of biotechnology and genetic engineering as forms of life instead of tools. The technology-as-tool view is not marked as wrong by this view. Technology is a tool but it matters who uses what technology and how. It is essential for human accomplishments. Humans shape technologies and they shape humans.

Technology is fundamentally socially, culturally, politically, economically, and environmentally transformative. This is why when adopting novel tech, it comes with implications. Form-of-life considerations are not against new technology by definition, but it brings a new perspective to reconsider the priorities of the novel ideas.

For example if a novel technique enters the scene, the first question the form-of-life view has for it is "What implications does this have?" It doesn't accept ideas that overlook human values [3,4].

Ethics of animal rights

The moral status of using animals for agricultural, medical, and industrial applications has long been a subject of debate. The debate on the use of animals in genetic engineering and biotechnology applications starts with H.G.Wells' *The Island of Doctor Moreau* in 1896. The book is about Doctor Moreau creating chimeras, or cross-species combinations.

DISCUSSION

Modern discussions on the subject of animal rights started with Ruth Harrison's *Animal Machines*. The most influential views among these will be discussed in this article: Peter Singer's Utilitarianism, Tom Regan's Ethical Vegetarianism, Kantian views, and Rollin's Consensus Morality [5]. In the end, the effect of these views on shaping biotechnological ethics will be discussed.

Peter singer's utilitarianism: Utilitarianism aims balance between cost and benefit or pleasure and pain at an optimum level. This means the pain of a group can be justified if another group's pleasure comes at the expense of it. This rationale can be described in one sentence adequately: "If the gains outweigh the pains, pain is not a problem."

Peter Singer published a book regarding the moral status of animals in 1973. He starts his statements with the guideline that any being capable of experiencing suffering and satisfaction should be considered sentient and sentient experiences must be weighed in moral decision making.

He very directly and objectively analyzes nutritional findings of the early 1970's to compare the aesthetic and nutritional benefits humans derive from eating meat to the pain and discomfort animals go through. He concludes that the current system of animal agriculture cannot be justified.

Singer was the first utilitarian to take on this subject but in later years, some utilitarian's agreed with him while others didn't. Richard Ryder, rejects the utilitarian idea that one's pleasure compensates for another's pain and instead suggests that the compensation should be individually evaluated. This means that Ryder would not in any case find animal food biotechnology to be acceptable, while Singer could [6].

For example, biomedical uses of animals such as the use of transgenic animals for drugs, diagnostics, and research and organ transplantation are help many humans live longer while hurting less animals. Singer would find this acceptable, while Ryder wouldn't. The reason for this is that the animal doesn't have a pleasurable compensation on its own while helping a human.

Tom Regan's ethical vegetarianism: Tom Regan's the case for animal rights are one of the most important philosophical studies of the moral status of animals. Regan rejects utilitarian views because he rejects the opinion in utilitarianism that sentient beings can be used for pleasure of others. He suggests a system that recognizes each animal's dignity and value, but also provides exceptions for cases human and animal interests' conflict.

This view requires moral vegetarianism. It is suggested that a human can take the life of an animal only if it is a life threatening circumstance. The "spirit" of this rationale requires that animal biotechnology should not be permitted unless it is solely for the benefit of the animal itself. This means that biomedical genetic engineering could or could not be permitted based on the techniques used.

Rollin's consensus morality: The main principle of Rollin's Consensus morality is the principle of conservation of welfare. This principle aligns with Singer's utilitarianism. Rollin's criteria for ethical projects accept that animal suffering can be overridden by an ethical goal. This ethical framework accepts that some moral objectives sometimes require animal welfare to be ignored in pursuit of a "greater good" [7].

His "consensus social ethic" concept suggests that "animal rights" should always be a thing, although as guidelines and not rules. The recognition of animal rights should be in societal norms. He promotes a consensus-driven approach and suggests that his principles should serve as adaptable guiding frameworks.

Rollin's versatile and multi-directional ethical guide to animal morality is one of the more easily publicly acceptable views on the subject. It also provides room for the advancement of genetic engineering while also considering ethics. Biomedical genetic engineering is fully permitted in this consensus and food genetic engineering is permitted as long as it doesn't harm human [8].

CONCLUSION

Genetic engineering is where science meets ethics, and there are many different opinions. How the general public thinks about genetic engineering affects the speed at which it develops. There are many things to be considered, and a genetic engineering ethics standard should be built in order to regulate biotechnology. This standard has to consider if we see genetic engineering products as just tools or as living things. The way we treat animals in genetic engineering is also a big ethical question.

When it comes to animals, there are different ideas. This standard must also consider animal genetic engineering. Some bioethicists it's okay to use animals as long as it benefits us more than it hurts them. Others say we should only use animals if it's really necessary to save a life.

Overall, our choices about genetic engineering should be guided by careful thinking and respect for life. We need to talk about it openly and make sure everyone understands the issues involved. By doing this, we can move forward responsibly, avoiding a dystopian future.

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