

Genetically modified animals essay sample

[Science](#), [Biology](#)



Genetically modified (GM) animals are the result of deliberately changing a genome through genetic engineering. The process of modifying the genetic composition of a mammal scientist starts with Deoxyribonucleic acid (DNA). DNA makes up the genes of all living things and by using DNA sequencing scientist are able to identify a specific gene. Each parent passes along one set of genes, each set forming on side of the two sided DNA strand. The two DNA strands are known as polynucleotides. Similarities found between species prompt scientist to research and theorize utilizing variations found during research. Ribonucleic acid (RNA) plays a part in the genetic engineering process because the RNA is a strand of nucleotides. The amount of research required to confirm the desired strand can be substantial, however once the RNA needed is identified, it can then be isolated, and replicated for further experimentation. The replication process is most commonly referred to as cloning.

GM is done by taking DNA from one organism and combining it with the DNA of another organism. Scientist inserts a compatible nucleotide or protein that will generate a desired modification into the gene sequence of a fertilized egg. The new hereditary genetic information will be passed to future offspring. There are many reasons for genetically engineering changes in a multitude of species. The eldest known and most common reason is for medical advancements. As early as the 1920 animal proteins have been used as pharmaceuticals, insulin extracted from pig pancreas is one of the first examples of such a use. Animals are modified to produce proteins for extraction, purification, and therapeutic use.

In 2008 the FDA approved the use of GM goats that were engineered to produce human AT in their milk; AT is protein found in the human body and needed to assist in the blood clot process. (FDA Veterinarian, 2008) Scientists and medical professionals anticipated that other biological products, will be considered for production from animals such as goats, sheeps and cows. Rats, chickens, and pigs are among the other animals that have been used in research for medical advancements. Genetic manipulation has also been utilized in order to increase the resistance of pathogens animals are susceptible to.

The idea is that if viruses and bacteria that affect animals can be eliminated in animals, the risk of humans being contaminated will be reduced. An example of this theory is the sterilization of mosquitoes in certain areas of the country. Mosquitoes carry various, potentially fatal viruses that can be passed to humans. In an effort to control the population, scientist modified male mosquitoes so that they cannot reproduce. In theory the technique should eventually eradicate mosquitoes where the GM have been introduced (McKie, 2010). Implications

People are in opposition of genetic engineering on religious, ethical, or social grounds. Are the benefits of manipulating the natural process worth the risk of altering genetic codes? This is a social concern, as there is a risk that possible harmful organisms can be accidently released into the populace via inadequate measures of containment or unethical or immoral practitioners. The CDC, FDA and other agencies impose regulations to reduce the chance of an epidemic resulting from a mutation in a GM animal carrying a virus or

other harmful organism. These regulations limit but do not eliminate the possibility of such an outbreak, nor do they protect from other considerable risks.

One such potential risk results from the incorporation of transgenic DNA into the genomes, which could introduce a new pathogen that may coincidentally be a human pathogen as well. Not everyone is opposed to GM animals and believes that with the proper protocols there is minimal risk of harmful effects. A lot of good has come from GM and without the research conducted many medical advances would not have been made. Yet the negative repercussions from such research could equally be extensive and world changing. The pros and cons of genetically engineering any organism will be viewed differently based on an individual's background, education and culture. Ethical concerns are a major area of debate surrounding GM animals. Many believe that scientists go too far in the name of research.

A line has to be drawn but at what point and who determines the appropriate limits. However the determination of where the line should be drawn is equally a point of contention. Cloning and genetic engineering are controversial due to the fear of the potential abuse of power and the lack of long term data on the effects of genetic modification. In recent years the number of experiments performed on GM animals has increased into the millions while experiments performed on un-modified animals have decreased. Animal rights activists argue that any experiments conducted on animals, GM or otherwise, is cruel and unethical. The counterpoint to this argument is that some modification poses no threat to the animals.

Pigs and chickens have been modified with enzymes from jellyfish that cause them to glow; this modification does not harm the animals and allows for researches to use the illumination to study the animals. The right or wrong of modifying these animals has to be weighed against the benefits of the information that can be found in the research conducted. Another argument against genetic engineering revolves around the spiritual belief in maintaining the balance of the world as it was created. Religious individual's question is whether humans have the right to transfer genetic information from one organism to another. Some consider genetic manipulation the act of playing God, and view it as an affront to the foundation or essence of their respective belief system. The belief that science negates the faith religion is founded on is a global issue, and on an individual level, will be different for everyone. Personal Viewpoint

I am personally conflicted on the argument for or against GM animals. The medical benefits are numerous, and I personally have many reasons to be thankful for the research stemming from GM animals. While experimenting on animals is not what I consider ideal, it is preferential to human experimentation, and since animals and humans have traits in common it is understandable to use animals. I do worry that because genetics is relatively a new science we do not have sufficient information to determine if the practice of genetic modification is safe as believed. A concern is the approval of the sale of GM animal meat to the general public. What unknown long term effects lay in wait? Surely, those questions have been addressed logically enough to have come this far, but those explanations boil down to no more than a very well educated guess.

In the case of eradicating mosquitoes, the lack of food source could have a unforeseen effect on the ecosystem, although personally, I feel that fewer mosquitoes would be welcomed. Like life, science is an evolving entity; given time it will change into something that today we lack the knowledge or capacity to comprehend.

References

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