Genetic Engineering: A Serious Threat to Human Society

Scientists have been trying to create synthetic life, life created in lab, for many years. The first breakthrough in this process happened about thirty years ago when genetic engineers began to genetically modify organisms (Savulescu). These engineers physically move genes across species in order to improve an organism or to cause an organism to function differently. Even though this process sounds as if it happens only in fantasy games, genetically modified organisms are common. For example, genetically modified crops are used every day in the world’s food supply and genetically modified bacteria have been used in medicine, chemical manufacturing, and bio warfare (Pickrell). Slowly, genetic engineering has become a powerful tool in many different fields. Recently, genetic engineering’s potential power increased when Craig Venter, a famous geneticist and entrepreneurs, recreated a living organism out of synthetic chemicals. His success proved to genetic engineers that functioning genomes can be made purely of synthetic chemicals. This power would allow genetic engineers to build new artificial genomes instead of having to modify naturally existing genomes. Genetic engineers now have the chance to broaden their fields’ applications. However, genetic engineering is unpredictable and dangerous, and broadening the application of genetic engineering only furthers the risks. Genetically engineered organisms pose lethal and economic risks to human society.

The availability of genomic information and genetic engineering technology creates a lethal threat to humanity because terrorists can use both the information and technology to recreate deadly pathogens, such as the poliovirus. The naturally occurring poliovirus killed and paralyzed millions of people for many years. In 1988, a worldwide vaccination campaign against the virus nearly exterminated it from the environment, and this solved the poliovirus epidemic. However, in 2002, well intentioned scientists decided to recreate the poliovirus for research
means. Using the genomic sequence of the poliovirus found on a public database and commercially available machines, these scientists synthesized fragments of viral genomes into a functional poliovirus (Avise 7). These scientists proved that deadly pathogens can be recreated from genetic engineering techniques. Also, the information and technology used in genetic engineering is readily available and relatively cheap (Kuzma and Tanji 3). Mixing the power to recreate a deadly pathogen with the public availability of genetic engineering information and technology creates a lethal risk to humanity when terrorist exist in society. Terrorist could use genetic engineering to reinstate the poliovirus into the environment, and the virus would kill and paralyze more people. Luckily, these scientists were filled with good intent; however, there is nothing to prevent terrorists from harming innocent lives. Recreating deadly pathogens makes genetic engineering dangerous enough; however, genetic engineers also have the potential to improve the effectiveness of deadly pathogens, such as *Y. pestis*.

Genetic engineers can make deadly pathogens, such as *Y. pestis*, resistant to modern antibiotics, and these pathogens could kill innocent people if used as a weapon. *Y. pestis*, also known as the black plague, wreaked havoc on humanity during the Middle Ages by killing millions of people. In response to a *Y. pestis* threat during the 20th century, scientists developed an effective vaccine for the pathogen. However, genetic engineers at Biopreparat, a Russian biological warfare agency, engineered a new *Y. pestis* strain with genetic resistance to modern antibiotics and natural human immunity (Avise 6). The genetically engineered *Y. pestis* was more deadly and effective than the natural *Y. pestis* that killed millions of people during the Middle Ages. Biopreparat’s research proved that deadly pathogens can be genetically engineered into superior forms that are resistant to modern medicine. If this strain of *Y. pestis* was released, a black plague would devastate current human society. Militaries could use the same genetic
engineering techniques that Biopreparat used to create deadly biological weapons. With this ability to make deadly pathogens resistant to modern medicine, genetically engineered organisms become lethal weapons that cannot be stopped. Other than lethal weapons, genetically engineered organisms can produce lethal chemical compounds when they are used as a manufacturing tool in the chemical industry.

Showa Denko’s genetically modified bacteria produced a lethal L-tryptophan amino acid that killed and disabled people who took the company’s food supplements. In 1989, an epidemic of eosinophilia myalgia syndrome, a syndrome that is characterized by a high eosinophil count and severe muscle pain, struck the United States (Genetic Engineering: Too Good to Go Wrong 9). This epidemic killed a hundred people and physically disabled ten thousand patients, some of which were paralyzed. Doctors eventually discovered that L-tryptophan, an amino acid used as a food supplement, was causing the epidemic. In 1990, the Journal of the American Medical Association reported that only people who took the L-tryptophan supplement made by Showa Denko, a Japanese biotech company, came down with EMS. Showa Denko’s genetically engineered organisms produced corrupted forms of L-tryptophan that were dangerous to human health (Smith 4).

Many chemical companies want to use genetically engineered organisms to produce chemicals because it is cheaper than normal manufacturing methods. If chemical companies begin to rely on genetically engineered organisms to produce food and medical chemicals, the public could be at risk for another dangerous outbreak of lethal chemicals. Using genetically engineered organisms to cutting down manufacturing costs seems as if it will help the economy; however, genetically engineered organisms, specifically anti-material organisms, can hurt economies more than help them.
Genetic engineers possess the ability to create anti-material organisms that can degrade infrastructure and man-made materials, and malicious people can use these organisms to tear down society’s infrastructures and economies. In nature, there are many organisms with the ability to degrade infrastructure and man-made materials. These microbes cost governments and industries millions of dollars in biodeterioration and biodegradation damages. For instance, bacteria are the leading cause of road and runway deterioration. In Houston, Texas, microbes have been known to degrade the concrete in the city’s sewage systems, and the city has spent millions of dollars trying to contain the problem. High-tech companies, such as airlines and fuel companies, constantly have their facilities and machinery being degraded away by anti-material organisms. These natural organisms cause enough damage to infrastructure, and fixing the damage is expensive and time consuming (Sunshine Project 2). Similarly to the artificially made poliovirus, genetic engineers have the potential to recreate or improve these naturally occurring anti-material organisms. In theory, malicious people could unleash genetically engineered anti-material organisms on infrastructures worldwide, and this would create an expensive cleanup project for governments and companies. With these expensive damages, genetically engineered organisms can destroy economies. The same economic and environmental dangers of anti-material organisms can also be seen in genetically modified crops.

Genetically modified crops will negatively impact the economy and environment because engineered genetic resistance is ineffective at stopping natural parasites in the long term. Farmers use genetically modified crops because these crops contain a genetic resistance to parasites, such as insect pests and microbes. In evolution, two organisms that are in a parasitic relationship evolve in a balance with each other. When genetically modified plants are placed into a natural environment, parasites will evolve in a direction that allows them to bypass the genetic resistance
engineered into the crops. Since the majority of crop parasites go through successive generations at a fast pace, these parasites will quickly evolve into a population that can surpass the genetic resistance. This evolutionary process makes the benefits of genetically modified crops short lived. Farmers, who pay more for genetically modified seed than natural seed, then have to pay for harmful and expensive pesticides to protect their crops. In the end, farmers will lose money due to the increased costs of buying genetically modified crops and dangerous pesticides. Also, dangerous chemicals, such as DDT, will be reintroduced into the environment (Avise 73). The ineffectiveness of genetically modified crops creates an economic and environmental risk to human society in the long run since farmers will be losing more money and introducing dangerous chemicals into the environment.

Genetically engineered organisms pose an enormous risk to human society on a lethal and economic front. Natural lethal pathogens, such as the poliovirus and *Y. pestis*, can be recreated or improved, and malicious people could use these genetically engineered pathogens to kill millions of people. Chemicals manufactured by genetically modified bacteria have proven to be harmful to human health, which was the case during the EMS epidemic in the United States. On an economic front, genetically engineered organisms increase costs instead of minimizing them, and they harm the environment. Anti-material organisms can be created to deteriorate infrastructures, and this would cost governments and industries millions of dollars in repair costs. Also, genetically modified crops in the long term will cost farmers more money than they save because the advantages of the genetically modified crops will be nullified by evolving parasites. Genetically engineered organisms have a huge potential to harm society. However, researching new methods and applications of genetic engineering will not stop because scientists believe in the vast opportunities of the field. In order to keep human society safe, scientists must exhaust all
options before turning to the power of genetic engineering. It is an unwise idea to rely on genetic engineering since it is unpredictable and imprecise form of engineering.
Bibliography


