
Medicine For Survival: How Did Genetic Engineering Influenced Our Survival

Genetic engineering gives us an option to change the genetics of any animal and microorganisms to a way that may benefit us or simply to our own selfish reasons. As many of you may know, all of the medicine that we see, over the counter and prescribed medicine from your doctor are all products from genetic engineering. Without the basics of genetic engineering, the world today would be like in the past; where there wouldn't be any medicine that treats the most common symptoms of illnesses that occur and there will be more casualties compared to the present. With genetic engineering we are able to create any kind of medicine that will be able to cure the human race of all medical problems that may arise. The best time period for more creation of medicines is the present because the race against technology is rising. As the trend of new technology arises then genetic engineering is likely to follow that trend; both goes hand to hand with each other. For example, if technology is becoming advanced, then for sure medicine will follow that advancement trend. Both can be great and bad since technology can be stalled.

Anything that can be thought of, has been through some kind of processes of genetic engineering and put into the medicines that are currently around. Scientists are mainly focusing on the major sources of issues that are capable of ruining animals' lives including us. This means that the benefits of genetically engineered medicine on society are microorganism vaccinations which helps us fight viral and bacterial diseases which are a common biological danger to society, gene therapy or non infectious diseases, antivenom medications, medications for our companions and livestock, and to help with infertility among people..

Before getting to understand the benefits of medicine in society, we have to get to know about our friend the immune system. The immune system, medicine and diseases influence each other because the immune system is the defense against diseases, disease can affect the immune system both good and a harm way. The disease can strengthen the immune system or it can destroy it by tiring out all of the system's ability. And the medicine that is administered can both affect the immune system and disease. The medicine can either enhance the immune system or weaken the type of microorganisms that cause the infection. Throughout the years of medicine making, not all medicine made available is for infections. The way the immune system fights against the microorganisms that causes the infection does the following: After exposure of the infection the white blood cells called lymphocytes which both consist of T-Cells and B-Cells which creates antibodies which fight against the infection, they communicate with other white blood cell family to fight and clean up the excess, then after the infection is all over, the secondary T-cells called helper T-cells remember who the invaders were which will deter the same disease from happening again (Zimmermann). By knowing how the immune system sets up its defenses, we can now understand why vaccines are important to human survival.

In order for vaccinations to work for the patient, one must be exposed either injection through the arm or being sprayed with at the nostril area which are the only two ways for exposure. The reason why vaccinations work so much for humans is that, inside the particular vaccine that is being used contains the same virus that causes the disease, for example, the Hepatitis B contains Hepatitis B virus. However, it may seem deadly, but the viruses inside of it are either

killed or weakened which is to prevent the virus from multiplying (CDC). The reason why diseases are running rampant for a long time is because of the ability to multiply. The microorganisms are just cells, just like the cells in our body, they will constantly replicate until they are killed. The only defense mechanism that animals have is the immune system and it is the only system that can deter any infections. To get a general understanding how helpful vaccinations are, According to Vanderslott, "2 to 3 million deaths each year are prevented through immunization shows the capability and imperative of vaccination. The prospect that vaccines could prevent an additional 1.5 million deaths each year makes clear what is within reach if the efforts to fight VPDs are continued" (Vanderslott). According to the statistics, we can see that vaccine-preventable deaths can be prevented because of the complexity of the immune system being able to remember which invader has harmed the body. The 1.5 million people who died from these diseases are either misfortunate enough to not get their own vaccination or people who disagree with modern medicines. But most of the time, the other side against modern medication are ignoring the facts. One of the biggest epidemics that the present face is the coronavirus and that has a huge consequence on human society because of the new nature of the virus. Since it is a new strand of virus that is new to scientists, there are no vaccinations for it which is why many have already suffered. This concludes that vaccinations can provide a huge benefit to medicine and society because there is no knowledge whether new diseases might show up. According to Redd, Scientist concur that Earth is about 4.55 billion years old (Redd). How would this relate to the topic of vaccines and disease you may ask?

Viruses and bacteria have been living on earth from the beginning of time, some may be extinct or still frozen. As global warming continues melting the ice we may be exposed to ancient microorganisms affecting our health. In fact, at the Tibetan Glacier, scientists have found thirty-three groups of viruses and there are twenty-eight groups that scientists do not know about (Hauser). There are still more viruses that we don't know more about and with the technology that we have or in a couple of years, we may be able to learn how to protect ourselves and create vaccines against these ancient invaders that will soon emerge from melting ice. When we think of vaccinations, we tend to think about viruses, but that is not true. Vaccinations are available for bacteria as well, same processes how viral vaccines work, but bacteria have more vulnerability.

Which is why antibacterial medications are more common than bacterial vaccinations. What separates bacteria from viruses is that bacteria are actually cells, meanwhile viruses are not and they reproduce by invading cells, so viruses can also attack a bacteria. Though, vaccinations may not be a guarantee to protect ourselves because not all viruses and bacterial infections are safe to be used for vaccinations.

From what modern science and technology may have in store for us, scientists are capable of curing cancer from a process called gene therapy. The process of gene therapy is the only hope for curing cancer because the division rate of these cells are way faster than human reaction. One of the best ways of curing cancer in an early stage is chemotherapy, but that brings more issues besides the cancer itself and it can be too late for such treatment after a certain amount of days has passed. In order for gene therapy to work, the doctor or scientist can insert a gene which can fill in the DNA gaps or shut down a gene that is causing the issue, and they use a virus to do the operation, before the operation starts the virus has already been genetically modified to have the disease removed (FDA). After discussing how viruses attack the human body and how the immune system responds seems counterintuitive, but it is possible since, the

virus, or you may have seen it called vectors are capable of using our body cells to rapidly divide. Since viruses have the capability to make cells replicate with their own DNA, it takes just a matter of time for the newly cells to take over the whole human body, assuming that it would not confuse the immune system into doing something deadly. Gene therapy may also help cure genetic mutations that can occur, especially if it is bad enough that the victim suffers from it.

Though that type of gene therapy may not be yet implemented yet, the future for gene therapy is definitely on the horizon and some people are willing to put themselves on the line for science. Another form of gene therapy that is currently used unlike inserting viruses is stem cell therapy. While there are many types of stem cell therapies, the main one that is focused, according to California Institute for Regenerative Medicine, is bone marrow transplant, this life-saving technique has helped thousands people worldwide who had been suffering from blood cancers, such as leukemia ("Power of Stem Cells"). The bone marrow has the capability to create blood cells, but the donor has to have healthy blood and the same blood type to make the treatment work. Direct surgeries will always help with cases like these, risks may arise, but as the new development in technological intelligences rises these risks will soon be passed. Medicine is not just for diseases, it can be for other things as well.

The medications that will play a huge role in society are antivenom medications. In the present, we encounter many animals and we cannot decide which may cause danger. We will always interact with nature no matter where we go. There are times when we may face something deadly as a black widow, which may bite us and eject venom into our blood. This is when we need antivenom, specifically snakes. Antivenom are made by milking the particular venomous animal, use an animal host to inject the venom to (particularly horses), wait a while until the animal produces antibodies which are produced by white blood cells; it takes about eight to ten weeks for the antibodies to be produced, then take the sample of blood from the host and then you got your very own antivenom (?Pryke?). This way is the most effective way to get a cure for the venom. The time it takes to get the antivenom is usually the cause of death because there are not enough to go around because of the time it takes just to receive a sample. The beginning of trying to get antivenom is hard because scientists need the animal to begin with.

The reason why antivenom are needed is that once it gets inside the body, "the two main ways snakes make us suffer - by attacking the circulatory system (ie. the blood) and/or the nervous system" (BBC). The venom doesn't make us suffer, it kills us because the circulatory system which contains the heart and blood and the nervous system which consists of the brain and spinal cord. These two systems are the most crucial systems which determine if the person is alive or dead. Without one or the other the person is considered dead, they both need to function together. Which is why any type of medicine or surgery based on these two organs are super expensive since life itself is costly. As a person who experienced brain surgery before, I can conclude that the experiences that heavily affect the nervous system are not fun to go through. Many may not like the idea of using animals as test subjects, but it is worth it in the long run because the tested animals can resist the venom that the snake carries and test subject animals may help other animals survive from a disease that can affect many others.

It may not seem like society will benefit by saving an animal from a disease, but actually believe it or not, they do in fact help. If animals are not being taken care of, "People who have close contact with large numbers of animals such as farmers, abattoir workers, shearers, knackery workers and veterinarians are at a higher risk of contracting a zoonotic disease" ("?Department of Economic Development"?). What zoonotic disease is when the disease is able to spread

between humans and animals. Since there are diseases transmittable between humans and animals, it is very important that we take care of livestock animals and pets included. Most animal meat that we consume are all raised in farms and without the care that animals need, all of them might die and we might get affected by their diseases. Majority of farm animals help the farmer grow crops without the usage of pesticides so without the help from the animals, it means that there will be no more animals and then no more plants to sustain a huge population. The biggest issue on medicating animals is that there are rights activists preventing medicine administration on animals which will carry consequences towards the future.

Among the struggles of society with the outbreaks of diseases, genetic engineering may help women with their infertility. One of the main issues that marriage couples find is the inability to have kids and having kids are the more important things that many couples believe. According to the CDC, Two million couples in the United States were infertile (CDC). As the CDC states, many of those couples either have some kind of disorder with their reproductive system or having unhealthy habits. The way that couples have children of their own is when they do in vitro fertilization which is the most common treatment for infertility and in “in vitro fertilization (IVF) Eggs are taken from the ovaries and fertilized by sperm in a lab, where they develop into embryos. Then a doctor puts the embryos into your uterus.” (Pontin). With the advanced technology that the present currently has, it is made possible that this treatment can happen for couples who are in desperate need for children. No matter how unethical this disease may be, many approves of this method because of an emotional standpoint. The doctors have to use the method called artificial insemination to make the egg fertilized because once the sperm is exposed in the air it automatically dies which is why this method of injection is accompanied by IVF.

In conclusion, genetic engineering has been the best thing that has happened to the world of humanity because it is capable of many things, such as curing viral and bacterial diseases, curing diseases that are not involved with microorganisms, it can stop venom from killing anyone, it can help save animals which in return it can help benefits society, and it can help save infertility from women. Genetic engineering is the future because there are still many more we as a collective human being has not experienced yet. The current time may seem advanced but it is the only beginning we still have many more ways to go in a few hundred years. So far and yet we cannot find a cure for cancer yet. As technology and genetic engineering thrives to becoming advanced, the health department is the only beneficial topic that will continue forever along with technology. Medicine is the only thing that will benefit society as the future goes by because there are still uncovered diseases that have been left for billions of years. In the forces of nature that we live in, there is no way that we can become immortal which is why the medicine trend will always follow up with the current advances that have been made. No matter how hard we try we can never defy the motion of forces that we are born into. Without the birth of genetic engineering, the issues about diseases killing millions of people will increase. Meanwhile vaccinations are highly encouraged there are people who can not afford to get flu shots based on their backgrounds. Issues on diseases will always rise, newly introduced or not, society will always find a way to fight for survival. It does not matter which direction genetic engineering goes, it will always benefit society one way or another with enough study and tests being performed.

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