Vaccines, Antibiotics, and Hormones

Genetic engineering

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Before the invention of antibiotics and vaccines, diseases that we now consider trivial would be considered a death sentence. Scientifically speaking; vaccines, antibiotics and hormones have come a long way. Before they were not cultivated or sophisticated enough to treat illness in the human body. Scientists weren't fully aware of the degree of detail and preparation that had to go into creating new vaccines or antibiotics, so many people died as a result. Hormones such as insulin have had a great impact on our changing society- with the rise of diseases such as diabetes. The progress that has been made in the last 25 years sets high hopes for the future.

To begin, a little bit about genetic engineering because that is how vaccines, antibiotics, and hormones are made. Genetic engineering is when, scientists, take genes from other organisms and add the to an organism’s genetic code to alter that genetic code. It becomes altered to produce different or more proteins to help advance what we can uses organisms for. It becomes useful when creating a medicine to aide a problem in the body.

Vaccines are a form of genetic modification. They are biologically prepared to help the body fight off specific diseases. Scientists take the virus from an infected human and uses that to create the vaccine. The virus is weakened or dead. When this is added to the body, it allows the body to identify this virus and since it isn't stronger enough, the body is able to create a force against this virus. Thus, if the body ever again came in contact with the virus it would be able to protect itself with the antibodies it created when it came in contact with the vaccine. People of older age and/or with weaker immune systems highly need vaccines to help their body defend itself because of it’s inability to do so itself.

Live attenuated vaccines – weaker and tamer versions of the parasite that is injected into the body

Inactive vaccines – dead parasites that can still trigger the immune response needed

Subunit vaccines – made from the isolated antigen of the pathogen, this further isolation of the antigen can prompt specific responses

DNA vaccines – isolated genes that can produce the antigens needed, when these genes are added they then instruct the body to make the antigens that fights against the virus and creates a stronger immune response and preparation of the body. This development is the best because none of the pathogen is in the vaccines so there is no chance that the pathogen can develop into the disease.

Antibiotics are created from antibiotic-producing microorganisms in the body. This fungi in the body is taken and is cultivated, creating more of the antibiotics. They are genetically modified to improve what the antibiotic compound is able and strong enough to do. Over use of this drug can cause your body to have an immunity to it.

Hormones are what help regulate and maintain mental and physical attributes of humans, such as the growth of the body. Bacteria is manipulated with genetic engineering to create useful human proteins like HGH (which we will get into soon enough). For synthesizing HGH, the HGH gene is cloned for further use.

Advancements are being made towards DNA vaccines.

Bacteria illnesses such as sore throat, bronchitis, pneumonia, or salmonella.

HGH is a hormone that is vital in human development, mentally and physically. Lack of HGH being produced in the human body can result in dwarfism. With genetically modified HGH, it can help those with dwarfism have a fully developed brain, or even help their physical attributes. HGH is also taken by body builders for stamina increase and a reduced recovery time, this helps body builders change routines without resting for hours because their muscle repair and recovery time has been enhanced by the HGH.

In 1796, Edward Jenner injected molecules from the cow pox virus into an 8-year-old boy with the idea that his body should be able to become immune. Cowpox was an infectious disease that was easily transferable from cows to humans, and often grew within unsanitary conditions. It could be transferred in situations such as when a person touched a cow’s udders. It was a success and the little boy didn’t get the disease, thus, creating the first vaccine.

In 1921, Dr. Charles Best and Dr. Fredrick Banting discovered insulin within the pancreatic extracts of dogs. The pair then teamed up with chemist James Collin to help purify the insulin so that it could be used on humans.

Now, we can create vaccines the prevent further illness. With using genetic engineering, we can ensure that these vaccines do not have severe side affects.

In 1928, Sir Alexander Fleming (accidentally) invented Penicillin after finding that a mold had developed on a contaminated staphylococcus culture plate. Penicillin became an instrumental drug when treating soldiers in WW2 because of it's ability to counteract blood poisoning brought on by infected wounds.

Now, antibiotics are regularly used to ensure the health of those with bacteria caused infections. We can produce this bacteria in abundance.

Greatest advancement came when HGH was synthesized, when we cloned the HGH gene. Previously it was extracted from dead humans, causing adverse side effects. Now, we can clone the gene and create the hormone through bacteria, helping us create the drug free of the severe side affects.

The future will see scientists focusing on the prevention of chronic diseases such as Tuberculosis, Alzheimer’s, and cancers hopefully by vaccine. There are already dozens of cancer vaccines still in clinical trial stages.

Due to over-prescribing antibiotics, people are now more likely to become antibiotic- resistant, which could pose an extreme health risk in the future. Antibiotic immunity is acquired when bacteria changes in such a way that it renders the drug useless. A good example would be taking melatonin to aid sleep. If a person takes it for too long, eventually the body sees no need to produce it as it would be getting it from an external source. It is not people who become immune or resistant to an antibiotic. It is the bacteria responsible for infections that become resistant.

Hormone supplements or therapies are said to become more personalized (genetically engineered to the persons benefit) and less consistent with each other. This could be very beneficial to people undergoing a gender transition or dealing with menopausal symptoms.