

Impact of the discovery of the vaccination



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*An important Discovery in Microbiology**Edward Jenner**Discovery of the vaccination*

Thesis: The discovery of the vaccine was extremely important to the lives of both humans and animals.

There are many discoveries that are extremely important to the advancement of microbiology currently today. Micro-organisms cannot be seen with the naked eye their discovery was linked to the production of the microscope. The first person to see micro -organisms was a microscope maker Antoni van Leeuwenhoek in 1664. (Madigan et al 2003) Centuries after that discovery, a man called Edward Jenner discovered vaccination. He achieved this by eliminating small pox back in the eighteenth century. In the eighteenth century, this disease was a fatal disease that accounted for 10% of deaths. That with the most part of the disease effecting young children and the killed 20-50% of those that was effected. And those that survived was led to blindness with the small pox's. (Smith 2011) I believe this is the most important discovery in microbiology to date, and this is what I am going to be writing about in my essay.

Edward Jenner was a scientist who invented the small pox vaccination back in 1798. He discovered that by using a material from cow pox this would prevent many people from getting infected with small pox. This man started the science of immunology (Smith 2011). Pox viruses are the most complex and largest viruses and are not able to metabolize on their own. By the

achievement of Edward Jenner, the application of this vaccine, has eradicated in the wild and is the first disease to be eliminated in this way. (Madigan et al 2003)

Edward Jenner grew up in the countryside and this is where he achieved his early studies of smallpox and first inoculation. This is where he immunized the power of the cow pox. He collected any information from the milk maids about the disease, and then observed the milk maids for 10 years and then brought about his own experiment by inoculating a young boy. This young boy never had small pox and Jenner inoculated him with cow pox. The infected young man became ill, but after a few days made a full recovery with no side effects (Mc Nally 2001). This young boy became resistant to this disease because he was exposed to the disease, this is called passive immunity. Passive immunity occurred here because the young boy was exposed to the antigen which was the small pox. Edward Jenner achieved this when he injected the young boy with the material of the antigen. The young boy that Jenner injected acquired the infection and became immune to the disease. When the disease was introduced into the body the immune cells produced a large quantity of the antigen specific immune effector molecules that caused the immunity. The herd effect had a major impact on the termination of the small pox disease, the uptake of large amount of vaccines into different amounts of people caused the vaccine to become eradicated.

Edward Jenner is said to be the father of immunity, and he achieved this by preventing deaths during the seventeenth century. He was a pioneer to many other scientists and demonstrated that his inoculations saved many humans

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lives. Many years after this a second vaccine was discovered by a scientist called Louis Pasteur wanted to portray the same idea as Edward Jenner only Louis Pasteur did not want to save the lives of humans but the lives of animals. Louis Pasteur developed a vaccine against chicken cholera a disease that was terminating chickens caused by the bacteria *Pasteurella multocida*. This concept of using an 'attenuated' organism for a vaccine happened by accident in the lab of Pasteur and his fellow scientists. When he inoculated the chickens with the bacteria they became ill and when he injected them accordingly days after this they didn't become ill. (WU X et al 2011). This showed that there was 75% of the infected diseases were zoonotic and this showed there was a vaccine against rabies a disease which was infecting both humans and animals. Initially Pasteur injected a series of increasingly viral solutions, that contained infected spinal cord from rabbit in suspect animal, mainly dogs that he used for his purpose. (Baer et al 2007). During Pasteur's experiment he increased the volume of rabies which meant that there was an increase in the death of his patients. Improvements of this experiment in 1911 by another scientist called Sir David Semple. He produced a vaccine that was produced by sheep brain tissue that was activated a substance that could inactivate all the virus in the vaccine. In 1955 an American scientist introduced another improvement in the vaccine. He took brain tissue from suckling mice. He completed this as he wanted to eliminate the neurological side effects of the disease that was concerned with the myelin in the brain tissue of adult mice. (Schneider et al 1994). The amount of myelin was greatly reduced but there still was side effects that was occurring. This was the way in which the discovery of the vaccines became an essential need for the protection of both humans and animals.

In the past centuries, we have seen a vast amount of vaccines that have been produced. Ranging from chicken poxes to hepatitis. In addition, there are vaccines being developed today which have a dramatic effect in developing countries such as malaria and meningococcal vaccines. (Wilby et al 2012) (Kristiansen et al 2013). In these developing countries there is a higher rate of disease which causes the population to experience a greater loss of human lives. These vaccines have been proven successful because of the changes in technology which has saved millions of lives. Vaccinations are the most important achievement in the 20th century according to the The Centres for Disease Control and Prevention (CDC) (Scudder 2013). The benefits of successful vaccinations are very clear, not only direct protection but also has indirect effects on the unvaccinated individuals in the case of animals in groups or herds. (Doherty et al 2016) Proven to be protection in the herd. The herd immunity is a way in which the vaccine benefits beyond the animal being injected. The indirect protection of the unvaccinated person is when the injected suspect immunity prevents the circulation of the infectious disease into the populations. (Kim et al 2011) The death rate of not just humans but animals would have been dramatically increased and this would have a huge effect on the environment that we live in today.

This is an important discovery in microbiology because this cured many diseases that not only affected human health but affected animal health. There are multiple vaccines now produced today that prevent many diseases such as Chickenpox (Varicella), Diphtheria, Flu (Influenza), Hepatitis A, Hepatitis B, Hib, Human Papillomavirus (HPV) and Measles in humans and DHPP (vaccines for distemper, adenovirus [hepatitis], parainfluenza, and

parvovirus), rabies, Eastern Equine Encephalitis (EEE), Tetanus, Venezuelan Equine Encephalitis, leptospirosis, BVD, Rhinotracheitis and Calicivirus in animals. These examples are only some of many vaccines discovered, to prevent death. This discovery according to me is defiantly a vial discovery to life today. The work of both Edward Jenner and Louis Pasteur is greatly known to be very valuable work to the health of humans and to help maintain the pathogenic bacteria.

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