

# History of bacteria, penicillin and germ theories



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### THE GERM THEORY

How this all began was before the germ theory was developed. Edward Jenner who was a doctor came up with vaccination. Smallpox was popular in the 18<sup>th</sup> century and so many people died due to the smallpox. Girls who would milk cows didn't catch smallpox but instead caught cowpox. There was no research into disease and infections in the 18<sup>th</sup> century. Edward Jenner thought of an idea. He thought that people could be protected from smallpox if he would inject them with cowpox so therefore in 1794 he tried this idea which proved his prediction right. Also to provide clear evidence he injected a smallpox victim into the same person he injected cowpox with 2 months after. This caused the person to show no signs of smallpox because he had been injected with cowpox previously. Jenner's idea became widely accepted as it cured a lot of smallpox victims. Jenner's technique of injected cowpox into smallpox victims is now called vaccination. In the 1980s the world health organisation suggested that the disease didn't exist anymore due to an international vaccination programme. This got rid of smallpox. Although Edward Jenner's theory was correct and there's evidence to prove it but his technique would not be permitted today because its considered unethical to use healthy participants and inject them.

In the 18<sup>th</sup> and 19<sup>th</sup> century many women who just gave birth were dying within 5 days of their delivery. There were clear symptoms such as vomiting and inflammation of the womb however no one knew why this was happening. Ignaz Semmelweiss was a doctor who worked in the maternity

wards. Semmelweis found out that his medical students would straight away dissect a dead body to delivering a baby without washing their hands. This made him think if they had the cause of the disease on their hands from the dead patients previously to their pregnant patients. Semmelweis knew that the deaths were caused by an infectious agent so therefore he told all his medical students to wash their hands in soap before they went to the maternity ward. This was effect because the death rates dropped to 1% after 2 years. On the other hand other doctors wouldn't agree with Semmelweis idea because they thought the pain women received after childbirth was due to god punishing them. Washing hands in the 19<sup>th</sup> century was hard because there wasn't always running warm water and the soap made of chlorinated lime would damage the hands but today everyone washes before and after they do anything.

Later in the 1920s Alexander Fleming discovered Penicillin. He noticed a lot of mould on his plates after he came back from holiday. One day he used mould juice which he called penicillin but the problem was that he couldn't get a lot of mould juice because it would go bad so this made him stop doing experiments to prove if penicillin would kill bacteria.

In 1938 Howard Florey and Ernst Chain did further research into penicillin. One of their experiments were based on 8 mice which they injected 4 of them with bacteria that would kill them and 4 with penicillin. The results showed that the 4 injected with penicillin survived whereas the other remaining 4 died. They could prove that penicillin destroyed bacteria. The next problem was making enough of it for everyone so they went to USA with their mould and the big chemical companies helped them make penicillin.

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Penicillin is very popular today as it has been used by many to destroy bacterial infections.

All these past events influenced Pasteur to come up with the germ theory. The germ theory of disease is thought that infectious diseases are caused by a germ. Louis Pasteur who was a chemist and biologist did a lot of research into the germ theory. In order to help him with his experiments people such as Robert Koch developed the microscope so that microorganisms were visible.

Pasteur had an idea that growths that developed like mould on food, were from microscopic organisms which were in the air.

Pasteur did some experiments to see if his prediction was correct so he boiled broth and closed the container and it would be clear however when he added other things that were exposed to the air, he saw that microorganisms developed in the broth which caused it to be cloudy. He repeated many more experiments until he came up with a series of experiments which used swan necked flasks because this proved that microorganisms that appear in boiled broth come from the air.

In 1845 a disease destroyed silkworms. Pasteur again knew this was due to microorganisms because it was found in the tissues of diseased silkworms, moths and eggs which were possible to see by using a microscope. Pasteur tried to get rid of the disease by identifying the eggs which were infected. This helped to save the silk industry and there was clear evidence of microorganisms causing disease.

Many people died of infectious diseases but Pasteur did a lot of investigation on these diseases so therefore he developed vaccines against these diseases. Many of Pasteur's investigations and experiments influenced Joseph Lister who was a scientist.

Pasteur came up with the idea of pasteurisation which is that boiling liquid can effectively remove bacteria or germs.

People thought that small organisms as germs couldn't destroy larger ones such as humans. Pasteur did further investigation in order to explain the causes of many diseases such as smallpox, anthrax, TB and cholera. He found out that these diseases could be eliminated by vaccination and eventually will leave the body. Pasteur became very successful when he developed vaccinations for Rabies.

Joseph Lister was influenced by Pasteur's work. He was a surgeon and used Pasteur's ideology's to make the process of surgery more hygienic which eventually prevented many people from dying

When Lister found out about Pasteur's experiments on wine going bad due to microorganisms in the air, he knew that microorganisms present in the air were causing his patients to die after they had survived surgery. This was due to the infection as the open wounds made it easier for the germs to transfer into the body.

People would use carbolic acid to get rid of cattle parasite in fields so Lister thought it could stop wounds from getting infected by cleaning the patients wounds with carbolic acid as well as soaking the dressings in antiseptic

liquid. Lister's antiseptic surgery caused the death rate to fall to 15% but before Lister came up with his antiseptic surgery the death rate was high due to the bacteria in the air and the lack of using any antiseptic when doing surgery.

Recent events that happened include the discovery of Methicillin in 1960 in order to treat infections caused by bacteria resistant to penicillin.

In 2008 the cervical cancer vaccination programme was developed and introduced in UK. It was suggested to vaccinate girls aged 12 against HPV. 3 vaccinations are given every six months. This vaccination helps to protect against types of HPV. In conclusion all these events tell us that vaccination is very effective so therefore ever since vaccination was first discovered it has been successful.

## References

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