

September-18



Dear Club Member,

On the 28th of September 1928 Sir Alexander Fleming made an observation that changed the face of modern medicine. The Scot came back from a summer holiday and discovered that some of the bacteria he had been studying had been contaminated with mould growth. And here's the crucial part, instead of just cleaning out the dishes, he made an observation, the bacteria he had been studying had been killed off by the mould. He recognised that discovery, wrote a scientific paper about his findings, and identified that if the mould growth could be industrialised it may be possible to use it to treat bacterial diseases. However, he neither had the resources or the knowledge to continue the development of the process to go from penicillium mould to what we now call antibiotics.

It took another 10 years for the right person to come across Fleming's scientific paper. Dr Florey was the director of the Sir William Dunn School of Pathology at Oxford University. He read the paper, and set one of the laboratory employees to work. Dr Ernst Chain was a Jewish German immigrant, and he developed a method of extracting the crucial compounds from penicillium mould. The science was tested on a group of mice, who were infected with streptococcus bacteria. Those that were injected with the penicillin survived. At this point the science was sound, but a big problem still existed before penicillin as a treatment became viable. It took 2000 litres of mould solution to treat a single case of sepsis in a human. Dr Norman Heatley was another member of the lab who worked on developing processes to produce the mould in large quantities. The drug was first put to the test in September 1940, but the lab couldn't produce enough of the penicillin to complete the course of treatment, the patient started to get better, but then the drug supply ran out, and he unfortunately died.

In the summer of 1941 the USA entered World War II and Florey and Heatley flew to America, together with American scientists they worked on developing methods to mass produce the drug. One of the key break throughs was when a laboratory assistant, Mary Hunt, bought a different mould species in to the lab for testing. This species of Penicillium yielded 200 times the amount of penicillin as the original mould discovered by Fleming. By the end of the war American pharmaceutical companies were producing 650 billion units of penicillin a month, the death rate from bacterial pneumonia in World War I was 18 percent, in World War II the use of antibiotics meant it fell to less than 1 percent.

Fleming actually had very little to do with the development of penicillin as a drug, but he was still awarded the Nobel prize on 1945, along with Florey and Chain. In his acceptance speech Fleming wanted that overuse of penicillin could well lead to bacterial resistance.

So next time you let a piece of bread go mouldy, look down at that patch of blue-green fuzz, and say thank you! Mouldy bread poultices had been used as treatment for wounds since ancient times, but taking a pill is definitely more convenient!

Happy Spinning,  
Katie

Further Reading-

The story of Penicillin

<https://www.pbs.org/newshour/health/the-real-story-behind-the-worlds-first-antibiotic>

Ernst Chain, a German Immigrant who arrived in England with £10

[https://en.wikipedia.org/wiki/Ernst\\_Chain](https://en.wikipedia.org/wiki/Ernst_Chain)

History of Penicillin

[https://en.wikipedia.org/wiki/History\\_of\\_penicillin](https://en.wikipedia.org/wiki/History_of_penicillin)

Further details on the discovery of Penicillin, including production in Europe during WWII

[https://wwwnc.cdc.gov/eid/article/23/5/16-1556\\_article](https://wwwnc.cdc.gov/eid/article/23/5/16-1556_article)

The work of Florey and Chain

<https://www.sciencehistory.org/historical-profile/howard-walter-florey-and-ernst-boris-chain>

Dorothy Hodgkin- Discovered the chemical structure of Penicillin and is the only British woman to have been awarded a Nobel Prize-

[https://en.wikipedia.org/wiki/Dorothy\\_Hodgkin](https://en.wikipedia.org/wiki/Dorothy_Hodgkin)

<http://www.rsc.org/diversity/175-faces/all-faces/dorothy-hodgkin-om-frs/>