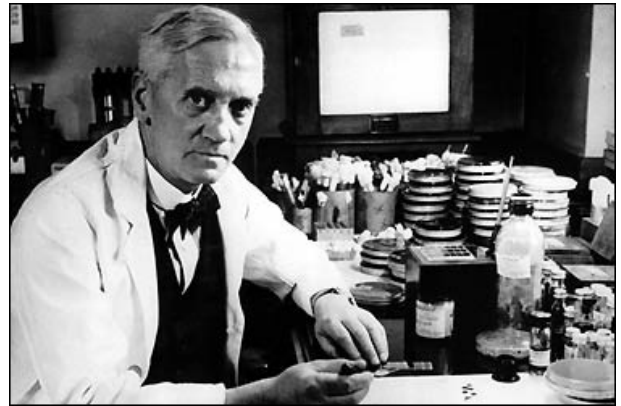


# The History of Penicillin



Penicillin Mold Fungus



Alexander Fleming

Penicillin is one of the earliest discovered and widely used antibiotic agents, derived from the *Penicillium* mold. Antibiotics are natural substances that are released by bacteria and fungi into their environment, as a means of inhibiting other organisms - it is chemical warfare on a microscopic scale.

## History of Penicillin

Penicillin was discovered by bacteriologist Alexander Fleming working at St. Mary's Hospital in London in 1928. He observed that a plate culture of *Staphylococcus* bacteria had been contaminated by a blue-green mold and that colonies of bacteria adjacent to the mold were being dissolved. Curious, Alexander Fleming grew the mold in a pure culture and found that it produced a substance that killed a number of disease-causing bacteria. Naming the substance penicillin, Dr. Fleming in 1929 published the results of his investigations, noting that his discovery might have therapeutic value if it could be produced in quantity.

It was not until 1939 that Dr. Howard Florey, a future Nobel Laureate, and three colleagues at Oxford University began intensive research and were able to demonstrate penicillin's ability to kill infectious bacteria. As the war with Germany continued to drain industrial and government resources, the British scientists could not produce the quantities of penicillin needed for clinical trials on humans and turned to the United States for help. They were quickly referred to the Peoria Lab where scientists were already working on fermentation methods to increase the growth rate of fungal cultures. On July 9, 1941, Howard Florey and Norman Heatley, Oxford University Scientists came to the U.S. with a small but valuable package containing a small amount of penicillin to begin work.



Howard Florey

Pumping air into deep vats containing corn steep liquor (a non-alcoholic by-product of the wet milling process) and the addition of other key ingredients was shown to produce faster growth and larger amounts of penicillin than the previous surface-growth method. Ironically, after a worldwide search, it was a strain of penicillin from a moldy cantaloupe in a Peoria market that was found and improved to produce the largest amount of penicillin when grown in the deep vat, submerged conditions.

By November 26, 1941, Andrew J. Moyer, the lab's expert on the nutrition of molds, had succeeded, with the assistance of Dr. Heatley, in increasing the yields of penicillin 10 times. In 1943, the required clinical trials were performed and penicillin was shown to be the most effective antibacterial agent to date. Penicillin production was quickly scaled up and available in quantity to treat Allied soldiers wounded on D-Day. As production was increased, the price dropped from nearly priceless in 1940, to \$20 per dose in July 1943, to \$0.55 per dose by 1946.

As a result of their work, two members of the British group were awarded the Nobel Prize. Dr. Andrew J. Moyer from the Peoria Lab was inducted into the Inventors Hall of Fame and both the British and Peoria Laboratories were designated as International Historic Chemical Landmarks.



**Dorothy Crowfoot Hodgkin**

In 1945, British chemist Dorothy Crowfoot Hodgkin used x-rays to find the structural layouts of atoms and the overall molecular shape of over 100 molecules including penicillin. Dorothy's discovery of the molecular layout of penicillin helped lead scientists to develop other antibiotics. Hodgkin was awarded the Nobel Prize in Chemistry for using this technology to determine the structure of Vitamin B12.