Alexander Fleming returned to his research laboratory at St. Mary's Hospital in London after World War I. His battlefront experience had shown him how serious a killer bacteria could be, much worse even than enemy artillery. He wanted to find a chemical that could stop bacterial infection.

He discovered lysozome, an enzyme occurring in many body fluids, such as tears. It had a natural antibacterial effect, but not against the strongest infectious agents. He kept looking. Fleming had so much going on in his lab that it was often in a jumble. This disorder proved very fortunate. In 1928, he was straightening up a pile of Petri dishes where he had been growing bacteria, but which had been piled in the sink. He opened each one and examined it before tossing it into the cleaning solution. One made him stop and say, "That's funny."

Some mold was growing on one of the dishes... not too unusual, but all around the mold, the staph bacteria had been killed... very unusual. He took a sample of the mold. He found that it was from the penicillium family, later specified as *Penicillium notatum*. Fleming presented his findings in 1929, but they raised little interest. He published a report on penicillin and its potential uses in the *British Journal of Experimental Pathology*.

Fleming worked with the mold for some time, but refining and growing it was a difficult process better suited to a chemist. The work was taken over by a team of chemists and mold specialists, but was cut short when several of them died or relocated.

In 1935, Australian Howard Florey was appointed professor of pathology at Oxford University where he headed up a laboratory. This was a daunting task in an economically depressed time, and seeking funding for the researchers and work he hoped to do took much of his time. One researcher he hired soon after his arrival was Ernst Chain. Chain was paid to do cancer research, and work that spilled over into Florey's own interest and work on lysozomes. Chain became quite enthusiastic about the search for antibacterial chemicals. In looking back at old articles written about lysozome, including those by Fleming in the 1920s, he happened across Fleming's paper on penicillin. "I had come across this paper early in 1938 and on reading it I immediately became interested," he wrote.

The Oxford team, as Florey's researchers have become known, began experimenting with the penicillin mold. They took it one step further than Fleming did: they did not just try it topically or in a petri dish, but injected it in live mice. With controlled experimentation, they found it cured mice with bacterial infections. They went on to try it on a few human subjects and saw amazing results. By now it was 1941, and England was at war. As Fleming first foresaw, the wartime need for an antibacterial was great, but resources were tight and penicillin still very experimental. Florey had connections at the Rockefeller Foundation in the United States, however, and it funded further research.

The biggest problem was producing enough penicillin. This was hard and expensive to accomplish. Florey and another researcher traveled to the U.S. to talk to chemical manufacturers and ended up in Peoria, Illinois. An agricultural research center there had developed excellent techniques of fermentation, a process needed for penicillin growth. The agriculture of Illinois proved useful, too. The nutrient base for the penicillin grown there was corn (maize), which was not commonly grown in Britain. The penicillin loved it, and yielded almost 500 times as much as it had before. More vigorous and productive strains of the mold were sought, and one of the best came from a rotting canteloupe from a Peoria market!

By this point, the United States had entered World War II as well. Penicillin's benefits was now known, and the government pushed industry into producing penicillin, recruiting more than 21 chemical companies into production. From January to May 1943, only 400 million units of penicillin had been made; by the time the war ended, U.S. companies were making 650 billion units a month.