

Discovery and Development of Penicillin

International Historic Chemical Landmark

Designated November 19, 1999, at the Alexander Fleming Laboratory Museum in London, U.K. Also recognized at the U.S. Department of Agriculture National Center for Agricultural Utilization Research in Peoria, Ill., and the five American pharmaceutical companies that contributed to penicillin production research during WWII: Abbott Laboratories, Lederle Laboratories (now Pfizer, Inc.), Merck & Co., Inc., Chas. Pfizer & Co. Inc. (now Pfizer, Inc.) and E.R. Squibb & Sons (now Bristol-Myers Squibb Company).

The introduction of penicillin in the 1940s, which began the era of antibiotics, has been recognized as one of the greatest advances in therapeutic medicine. The discovery of penicillin and the initial recognition of its therapeutic potential occurred in the United Kingdom, but, due to World War II, the United States played the major role in developing large-scale production of the drug, thus making a life-saving substance in limited supply into a widely available medicine.

Alexander Fleming's Discovery of Penicillin

Penicillin heralded the dawn of the antibiotic age. Before its introduction there was no effective treatment for infections such as pneumonia, gonorrhea or rheumatic fever. Hospitals were full of people with blood poisoning contracted from a cut or a scratch, and doctors could do little for them but wait and hope.

Antibiotics are compounds produced by bacteria and fungi which are capable of killing, or inhibiting, competing microbial species. This phenomenon has long been known; it may explain why the ancient Egyptians had the practice of applying a poultice of moldy bread to infected wounds. But it was not until 1928 that penicillin, the first true antibiotic, was discovered by Alexander Fleming, Professor of Bacteriology at St. Mary's Hospital in London.

Returning from holiday on September 3, 1928, Fleming began to sort through petri dishes containing colonies of Staphylococcus, bacteria that cause boils, sore throats and abscesses. He noticed something unusual on one dish. It was dotted with colonies, save for one area where a blob of mold was growing. The zone immediately around the mold—later identified as a rare strain of *Penicillium notatum*—was clear, as if the mold had secreted something that inhibited bacterial growth.

Fleming found that his "mold juice" was capable of killing a wide range of harmful bacteria, such as streptococcus, meningococcus and the diphtheria bacillus. He then set his assistants, Stuart Craddock and Frederick Ridley, the difficult task of isolating pure penicillin from the mold juice. It proved to be very unstable, and they were only able to prepare solutions of crude material to work with. Fleming published his findings in the British Journal of Experimental Pathology in June 1929, with only a passing reference to penicillin's potential therapeutic benefits. At this stage it looked as if its main application would be in isolating penicillin-insensitive bacteria from penicillin-sensitive bacteria in a mixed culture. This at least was of practical benefit to bacteriologists, and kept interest in penicillin going. Others, including Harold Raistrick, Professor of Biochemistry at the London School of Hygiene and Tropical Medicine, tried to purify penicillin but failed.

Taken from the ACS website:

<http://www.acs.org/content/acs/en/education/whatischemistry/landmarks/flemingpenicillin.html#alexander-fleming-penicillin>