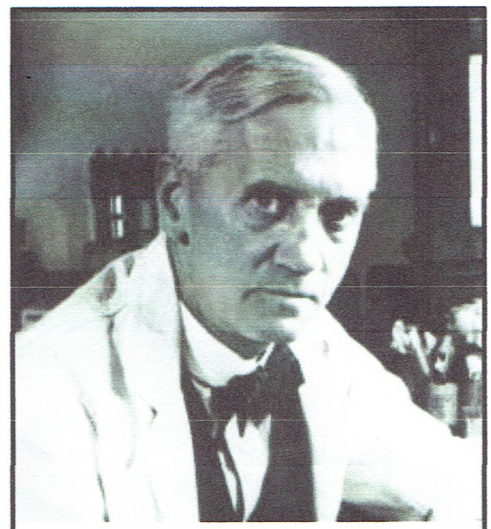
ALEXANDER FLEMING

(1) I am most well known as the scientist who discovered the first antibiotic, penicillin, in 1928. Until this time, many people died prematurely from pneumonia, tuberculosis and *Staphylococcus* and *Streptococcus* infections that are easily treatable with antibiotics today. My discovery has saved the lives of hundreds of millions of people around the world. Not only that but since the advent of antibiotics, life expectancy has gone from an average of 50 years of age in the early 1900s to almost 80 years of age today. All of this happened because I chose not to become a doctor!



Alexander Fleming
Bateriologist (1881-1955)

(2) I was born on August 6th, 1881 in Ayrshire, Scotland. I had a countryside upbringing that nurtured an ability to keenly observe nature. My powers of observation would become one of the biggest assets in my career. My early childhood education was very humble. I walked for 8 miles every day to go to and from school. At the age of 11, my potential was recognized and I got awarded a scholarship to Kilmarnock Academy for two years before moving to live with my older brother Tom in London, where I attended school. Tom was a successful doctor and under his influence I wanted to be one as well. In 1901, I wrote my medical school entrance exams and passed with the highest marks in the United Kingdom. In 1906, when I was 25, I graduated London's St. Mary's Hospital Medical School with a Bachelor of Medicine and Bachelor of Surgery. I seemed destined to become a prosperous doctor one day.

(3) At the time, I was also a voluntary member of the London Scottish Regiment of the British Army. My rifle captain suggested that I work with Sir Almroth Wright, who was a pioneering researcher of vaccines and immunology at St. Mary's Hospital Medical School. I became his assistant bacteriologist (researcher of bacteria) and became fascinated by bacterial infections. In 1908, I got a Bachelor of Science with a specialist in bacteriology. I was not going to be a surgeon after all. In 1909, I set up a successful practice as a venereologist (a specialist in sexually transmitted diseases) and treated patients for bacterial infections like syphilis.

(4) When World War I began in 1914, I was 33 and became a captain of the Royal Army Medical Corp. I worked in battlefield hospitals and saw infected wounds kill many soldiers. The standard treatment for deep wounds was to use antiseptic agents (e.g. boric acid, carbolic acid and hydrogen peroxide) to kill the infectious agents. Since antiseptics were effective at killing bacteria on surfaces, they should kill them in the wound. However, I didn't believe they were working because many of the soldiers died. I investigated the effect of the antiseptics in deep wounds and discovered that the antiseptics were killing the immune system's white blood cells. Using salt water instead of an antiseptic would clean a deep wound without killing the white blood cells. I tried to convince other army doctors to restrict the use of antiseptics only to superficial (surface) wounds and use salt water for deep wounds. Most of them refused to listen to me and this resulted in many preventable deaths.

(5) In 1919, when the war was over, I returned to my research in St. Mary's Hospital Medical School. Three years later, I made a big discovery in the most ordinary way. I had a cold and nasal mucus dripped from my runny nose onto a Petri dish of cultured bacteria. My nose secretions ended up killing the bacteria. I was instantly excited because I was always looking for substances that would kill bacteria. I decided to take other bodily fluids like saliva, tears and blood serum to see their effects on bacteria. The bacteria seemed unable to grow in the presence of these fluids. This is when I knew there must be some substance in the fluids that would be useful in fighting bacteria.

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After isolating different factors, I discovered that an enzyme was responsible for killing the bacteria, but it didn't harm white blood cells. I called the enzyme lysozyme. Lysozymes help protect the body from some infectious agents, but unfortunately, lysozymes don't kill the most pathogenic (disease-causing) bacteria.

(6) I was still on the hunt for a more powerful substance that would kill bacteria but not harm white blood cells. In 1928, I discovered such a substance. I was growing *Staphylococcus* bacteria in Petri dishes and my assistant left the window open. This caused microbes to blow into the lab which contaminated my samples. I was annoyed as this made the samples unusable, but on closer inspection, I saw something very curious about one Petri dish. Mold had begun to grow in the dish and where there was mold, the bacteria didn't grow. This meant that the mold was producing a substance that stopped bacterial growth. The mold was from the genus *Penicillium*. In 1929, I isolated the component in the mold that killed the bacteria and called this substance penicillin. This antibiotic could kill bacteria that had plagued humanity. Penicillin was effective against pneumonia, meningitis, scarlet fever, diphtheria and much more. However, my boss disliked chemists and would not allow one into my lab to help me isolate and create more penicillin. This delayed the development of its use as an antibiotic for years. Not until the 1940s did penicillin come into use as a therapeutic drug. In 1945, I along with the team of researchers that helped turn my discovery into a useful drug, shared a Nobel Prize in Medicine for the discovery of penicillin.