

Note: this lab is completed online. Visit the following address and click on “Lab 4”

<http://labs.7bscience.com/unit-9.html>

Purpose: To explore the history of penicillin from its discovery to its first use in humans.

Part One – Background

Read the information below on the history of penicillin.

The story of penicillin, like numerous other discoveries, involves a chain of observations, discoveries and researches involving several different people.

The Players

Alexander Fleming was born in 1881 in Darvel, Ayrshire, Scotland. When he was 13, he moved to London. He later trained there as a doctor. After the First World War he joined St Mary's Hospital in London as a research assistant in the inoculation department.

Ernst Chain was a German-Jewish refugee working in Oxford. He was the first to separate penicillin following Fleming's observations. His initial interests were scientific and not medical.

Howard Florey was born in Adelaide, Australia. He was appointed as Professor of Pathology at Oxford University in 1935. He led the efforts in Oxford to separate penicillin and to make enough to carry out the first medical trials¹.

The Story

Alexander Fleming returned from the First World War and went back to his research work at St Mary's Hospital, London. His experiences during the war had shown him the importance of being able to treat infection in wounded patients, and his subsequent work at the hospital involved him in researching agents which might help fight infection.

In 1922, Fleming discovered lysozyme (LIE so zime), an enzyme found in human tears, which is capable of destroying bacteria. However, while the new discovery was effective at inhibiting the growth of harmless bacteria, it proved ineffective against those that caused disease.

¹ Medical Trials: the use of the scientific method on human health.

Name	Period	Date
------	--------	------

In 1928 Fleming made an interesting observation while he was looking at a pile of neglected Petri dishes. He found these in the general untidiness of his lab. The dishes had originally been cultured with Staphylococcus (STA fuh lo CAW cus) bacteria (known to cause wounds to go septic²) but the agar³ had gone moldy. However, Fleming was surprised to notice that, in the areas around the mold, the colonies of Staphylococcus had stopped growing. It appeared that something produced by the mould was inhibiting the growth of the bacteria. After further testing, Fleming was able to identify the inhibitory substance and name it penicillin.

Building on Alexander Fleming's initial observations, Howard Florey and Ernst Chain took the discovery of penicillin towards the development of the drugs that we know as antibiotics.

The overwhelming casualties during the Second World War led Florey and Chain to look at resurrecting Fleming's work. After much refinement they were able to develop a powdered form of penicillin.

In 1941, the first human was treated. Penicillin was given to Reserve Constable Albert Alexander who was dying of blood poisoning from a small cut. The drug proved successful but Alexander died 5 days later when the supply of the drug ran out.

With World War II raging in Europe, Florey and one of his assistants moved to the United States to continue their work with penicillin. When the United States also entered the war, it gave added incentive to the penicillin project. Their project was declared a war project and given top priority. Penicillin was a wartime asset kept secret by the allies. British and US supplies were for military use only. Wounded troops benefited and much early penicillin was used to treat venereal disease⁴, which was the scourge⁵ of the North Africa Campaign.

With the development of new production methods, it became possible to make larger quantities of penicillin. By the end of the Second World War, enough penicillin was produced to treat seven million patients a year. After 1945, British and US civilians were also treated with penicillin, while the rest of Europe depended on a flourishing black market.

The success story of penicillin led pharmaceutical firms to search for more antibiotics. Molds and fungi are common in soil, so thousands of soil samples were screened in the 40s and 50s with several positive outcomes. The cephalosporins (CEF a low spore ins), now the biggest selling antibiotics in the world, were found in sewage in Sardinia⁶.

² Septic: to become infected by bacteria.

³ Agar: a gel-like substance often used in Petri dishes to grow cultures of bacteria.

⁴ Venereal disease: a disease that is passed through reproduction

⁵ Scourge: something that causes great trouble or suffering

⁶ Sardinia: large Italian island in the Mediterranean Sea, west of Italy

Nowadays, new antibiotics are often made by chemical manipulation in laboratories.

Recognizing Achievements

Although Fleming was the discoverer of the medical effects of penicillin, he could not separate the drug or test it. However, in 1944, he was knighted along with Howard Florey, and a year later was awarded the Nobel Prize in Physiology and Medicine along with Florey and Chain.

A recent study showed that in 1988, penicillin was effective almost 90% of the time it was used. In 1995, its success rate plummeted to a mere 25%.

Part Two - Observations and Data

Now you will make a timeline of the events you read about in "The Story of Penicillin." Complete the table below with the correct years. Then, write a short description of what happened in each event.

Year	Event	Description
	Birth of Fleming	
	Fleming moves to London	
	Florey becomes a professor	
	Fleming discovers lysozyme	
	Fleming discovers penicillin	
	First human treated w/ penicillin	
	First civilians are treated with penicillin	
	Fleming, Florey, and Chain receive the Nobel Prize	
	Penicillin has 25% success rate	

With you table filled out, follow the instructions below for completing an online timeline. If you need help with the TimeRime site, please use their help page. At the bottom of the page is an example of a timeline.

1. Visit TimeRime and create a free account: <http://www.timerime.com/en/login/> (link opens in new window)
2. The site will have you verify your email. Check your email so ou can login.
3. Login.
4. Click on "Make a new timeline."
5. Give a title to your timeline in this format: "P#, Initials, Timeline Title" Here's an example. Bobby A is a student in first period. His title would look like this: "P1 BA History of Penicillin Timeline"
6. Write a short description of what your timeline is showing your viewers. You do not need to pick a category (although "Science and Technology" works very well for this timeline!).
7. Make you timeline private by clicking "Private" at the bottom of the page.
8. Click Save.
9. You will automatically be taken to the "Item" page. Enter the following information for each event:
 - Item Name (event from table)
 - Begin date and time (Year from table) ** Only enter the year! Leave the other boxes blank!
 - Short description (description from table)
10. Click on "Save and New"
11. Repeat steps 8 and 9 until you have added all events to your timeline.
12. Find an image for each event on your timeline. Upload the images to TimeRime (super easy to do!) and add them to the correct events.
13. When your timeline is complete, click on "Extra Features" in the gray box.
14. In the boxes under number 2 "Invite people to cooperate on your timeline," put Mr. Ower's e-mail address and click "Send."
15. You're done!