Name_____ Date_____

Penicillin

Reading and Discussion

In 1928, **Sir Alexander Fleming** discovered penicillin at **St. Mary's Hospital in London**. It was a huge breakthrough for medicine and for sick people. For ages, doctors and scientists were looking for something to kill germs without harming the patients. There had been many substances found and discovered that would kill germs, such as iodine and arsenic, but the main problem was that they were found to be poisonous if taken in large doses or in the wrong way.

Penicillin was found to be effective as it killed the germs that were causing the diseases, without harming the patient.

Penicillin is an antibiotic that is taken from mold. It can kill bacteria and stop them from growing. Penicillin kills only the bacteria that are growing and reproducing, not the bacteria that are stationery. Penicillin is used to treat infections caused by bacteria. It treats many illnesses, including **ear infections**, **strep throat**, **pneumonia**, **meningitis**, **scarlet fever**, and many others.

The way that Sir Alexander Fleming discovered penicillin was a tremendous stroke of luck. In his cluttered lab, before leaving on holiday, he left some of his culture dishes in which he had been growing germs called **staphylococci**. Culture dishes are dishes in which scientists grow cells or bacteria to allow them to grow, reproduce, and cultivate. The germs that Sir Alexander Fleming was working on were known as the '**staph bacteria**,' which cause blood poisoning and boils. When he came back from his vacation, he discovered that some blue green mold, like the one that grows on stale bread or rotten food, had grown in some of the culture dishes. Fleming observed that in the place where the mold had grown, there was a circle around the mold itself free from the bacteria. He interpreted this to mean that the mold must have released a substance that did not allow the bacteria to grow.

Fleming made some experiments and identified the mold as '***Pencillium notatum***,' which he named 'penicillin.' In reality, Sir Alexander Fleming was not the first scientist to describe the traits of the Penicillium mold. The first to investigate the anti-bacterial properties of the mold was **John Tyndall** and published his findings in 1875. However, it was Fleming who realized the importance of his observation and decided to grow a pure culture of this mold. Unfortunately, he was unable to chemically purify the penicillin, as he was mainly a biologist specializing in bacteria and immunology, and lacked the chemical experience to develop penicillin any further. By 1932, he abandoned his work on penicillin, but he provided samples of the mold to other researchers, as he realized the importance of his observations.

In 1939, a scientist by the name of **Howard Florey** and a team of very talented scientists at **Oxford University** got their hands on a sample of Sir Alexander Fleming's mold. Amongst the team was also a scientist called **Ernst Boris Chain**, who was a very skilled chemist and had fled Nazi Germany. The team worked on the mold trying to

Name_____ Date_____

isolate the substances in the mold that killed the bacteria. After many trials, Florey, Chain, and the team of scientists were able to purify penicillin and successfully treated mice that were injected with the bacteria. These first experiments on mice proved that the purified penicillin was harmless to the mice and able to cure them.

Many trials were carried out to try and cure human patients. The team faced problems regarding the amount of penicillin available and restrictions during times of war. In 1942, **John Bumstead** and **Orvan Hess** successfully treated a patient using penicillin. The Oxford team continued its work and played a huge role in getting pharmaceutical companies to mass-produce penicillin so that it was readily available to the soldiers during World War II.

In 1945, **Sir Alexander Fleming**, **Florey**, and **Chain** received the **Nobel Prize for Medicine** for their contributions that changed the practice of medicine.

Name_____ Date_____

Activities

Activity A: Multiple Choice:

1. The discovery of Penicillin by Sir Alexander Fleming was mainly due to:

    a. careful planning;
    b. years of hard work;
    c. a stroke of luck;
    d. None of the above.

2. When Sir Alexander Fleming observed that where the mold had grown, there was a circle around the mold itself free from the bacteria, he concluded:

    a. he should not have left the culture dish to grow mold;
    b. the mold had nothing to do with the research he was conducting;
    c. the mold must be releasing a substance that does not allow the bacteria to grow;
    d. All of the above.

3. Purifying penicillin and getting the pharmaceutical companies to mass-produce it was thanks to:

    a. Sir Fleming;
    b. Florey, Chain, and the Oxford team of scientists;
    c. John Bumstead and Orvan Hess;
    d. All of the above.

Activity B: List Three things that can be treated with penicillin:

1. _____

2. _____

3. _____

Activity C: True or False:

____ 1. Penicillin is an antibiotic that kills bacteria and attacks only bacteria that are growing and reproducing.

____ 2. Sir Alexander Fleming was responsible for mass-producing penicillin as a drug.

Name_____ Date_____

Answer Key

Activity A

1. The discovery of Penicillin by Sir Alexander Fleming was mainly due to:

    a. careful planning;
    b. years of hard work;
    c. a stroke of luck;
    d. None of the above.

2. When Sir Alexander Fleming observed that where the mold had grown, there was a circle around the mold itself free from the bacteria, he concluded:

    a. he should not have left the culture dish to grow mold;
    b. the mold had nothing to do with the research he was conducting;
    c. the mold must be releasing a substance that does not allow the bacteria to grow;
    d. All of the above

3. Purifying penicillin and getting the pharmaceutical companies to mass-produce it was thanks to:

    a. Sir Fleming
    b. Florey, Chain, and the Oxford team of scientists
    c. John Bumstead and Orvan Hess
    d. All of the above

Activity B

1. Ear infections
2. Strep throat
3. Pneumonia
4. Meningitis
5. Scarlet Fever

Activity C

__T__ 1. Penicillin is an antibiotic that kills bacteria and only attacks bacteria that are growing and reproducing.

__F__ 2. Sir Alexander Fleming was responsible for mass-producing penicillin as a drug.