

1. Friedrich (Fritz) Miescher

<http://www.dnai.org/timeline/index.html>

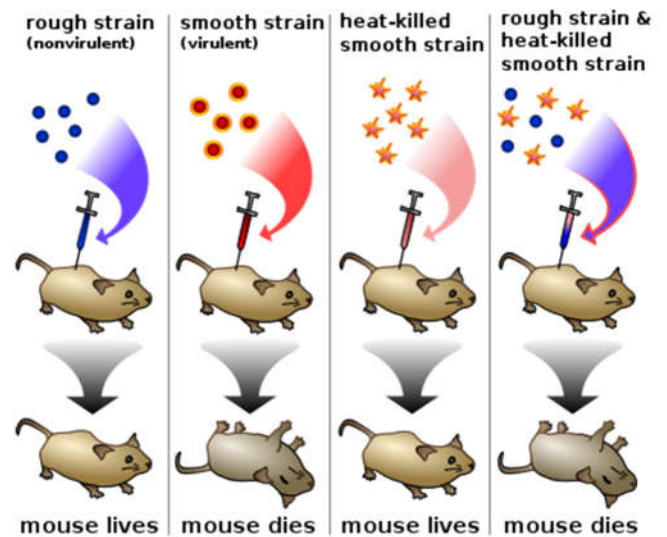
- Find Miescher on the timeline (pre 1920s) and click on the bucket with the Red Cross to watch the animation. What did he collect from hospitals and what did he extract?

2. Frederick Griffith

<http://www.dnafb.org/17/animation.html>

Click through the animation to read about Frederick Griffith's famous experiment that was conducted in 1928 and fill in the blanks.

- The experiments involved using strains of *Pneumococcus* bacteria. The two strains are S, which have a _____ and R which look _____
- Griffith found that mice injected with the _____ would develop pneumonia and die within days. Mice injected with the _____ do not get pneumonia.
- Griffith heated the S strain culture to kill the bacteria. When these were injected into the mice, _____
- When Griffith injected the heat-killed S strain with live R strain into mice, _____
Even more astonishing, he was able to _____ and these cultures could infect other mice.
- Griffith concluded that some "principle" was _____ which transformed the R into the infective S strain.



3. Oswald Avery

(continue with same link as Griffith experiment: <http://www.dnafb.org/17/animation.html>)

- Purpose: to determine what molecule caused the change in Griffith's bacteria strain
- Used detergent to lyse (break open) the heat-killed S cells and used it for transformation experiments
- When he mixed the lysed (broken) heat-killed S cells with a live R strain in a test tube, the test tube assays showed that _____ and the transforming principle was something in the lysate.
- Avery tested each of the lysate components for the transforming activity. First, they heated the heat-killed S lysate with an enzyme that **chewed up the sugar coat**. The sugar coat-less S lysate was _____. This told Avery that the R strain was not just assembling a new S sugar coat from the pieces.
- Next, Avery heated the coat-less S lysate with **protein digesting enzymes**. The protein-less lysate was _____, so the transforming principle was not the protein.
- Lastly, Avery isolated DNA and RNA from the S strain. When they **destroyed the RNA** with an enzyme, the solution still _____
- As a final test, the DNA left in the solution was destroyed with a **DNA-digesting enzyme**. This solution was _____.
- Avery and his colleagues concluded that _____ and published these results in 1944.

4. Alfred Hershey and Martha Chase

http://www.biology-pages.info/H/Hershey_Chase.html (scroll towards the bottom)

- Hershey and Chase knew that **sulfur was found in protein but not in DNA and that phosphorous was found in DNA but not proteins**. So, they made viruses called bacteriophages that were labeled radioactively with sulfur and phosphorus.
- When bacteriophages that contained radioactive phosphorous (^{32}P) infected nonradioactive bacteria, the infected cells _____ and much of the radioactivity was _____
- However, when the bacteria were infected with bacteriophages labeled with radioactive sulfur (^{35}S), practically _____
- Therefore, their experiments showed that _____ is the genetic material instead of proteins.

5. Erwin Chargaff

<http://www.dnai.org/timeline/index.html>

Watch "Chargaff's Ratios" (1950-54). Chargaff used relative proportions of bases in DNA to come up with his rules for base pairing.

- Based on Chargaff's data, he noted that the amount of _____ was very close to the amount of _____
- Similarly, there is just as much _____ as there is _____

<http://fig.cox.miami.edu/~cmallery/150/gene/chargaff.htm>

- Adenine (A) pairs with _____
- Guanine (G) pairs with _____
- The bases that are purines include _____ & _____.
- The bases that are pyrimidines include _____ & _____.

6. Rosalind Franklin.

<https://www.dnalc.org/view/15014-Franklin-s-X-ray-diffraction-explanation-of-x-ray-pattern-.html>

- What does the distinctive X shape tell you about the shape of DNA?

7. James Watson and Francis Crick.

http://www.pbs.org/wgbh/evolution/library/06/3/l_063_01.html (scroll to the bottom “referring to Franklin’s X-ray image).

- What was Watson and Crick’s proposed model for DNA that they eventually received a Nobel Prize for?