CONCEPT: DNA AS THE GENETIC MATERIAL

● DNA wasn't always thought of as the genetic material

□ To be genetic material, a molecule needs to have certain _____

- Store information

- Transmit information

- Replicate with little errors

- Be able to change with mutations and variations

□ Before the 1940s, many people believed proteins were the source of genetic material

- **Tetranucleotide hypothesis** stated that the four DNA nucleotides were just repeated over and over

EXAMPLE: Tetranucleotide hypothesis

ACGTACGTACGTACGTACGTACGT

● There were a number of experiments that _____ DNA was the genetic material

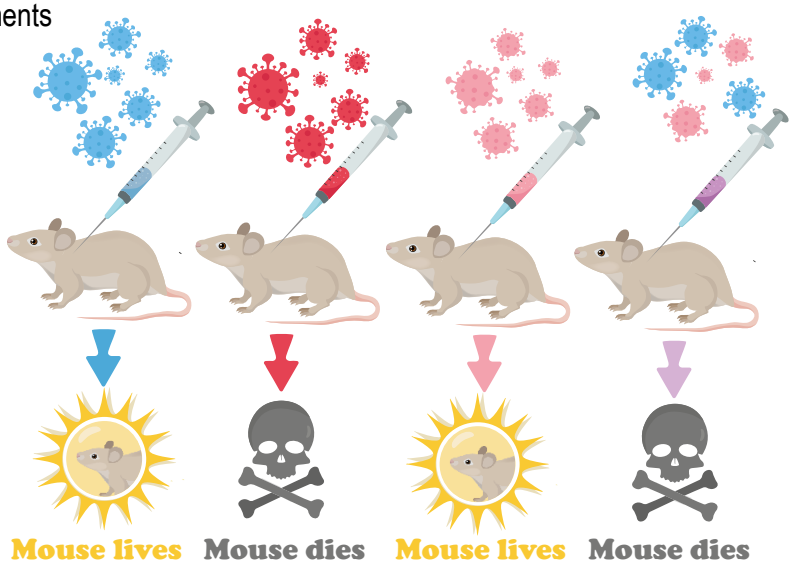
□ Avery, Macleod, and McCarty experiment in 1944

- Infected a mouse with a mixture of heat-inactivated virus, and non-infectious virus

- They wanted to figure out whether proteins, fats, RNA, or DNA "transformed" the virus

- It was DNA

EXAMPLE: Avery experiments

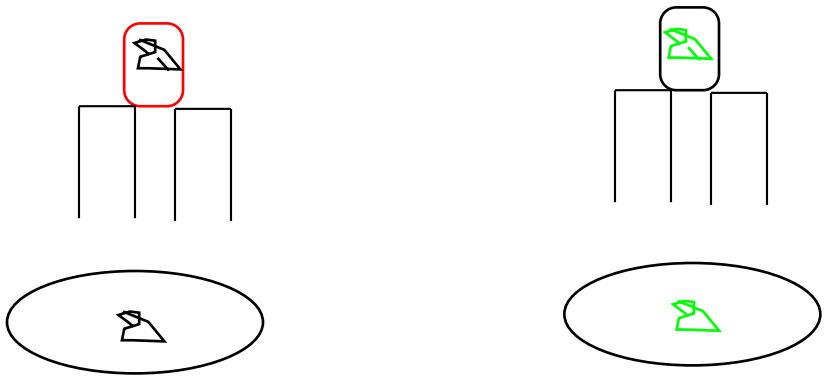


□ The Hershey/Chase experiment in 1952

- Labeled bacteriophages protein and DNA with different radioisotopes

- Labeled-DNA was transferred into the bacterium, not the labeled protein

EXAMPLE:



□ The Watson, Crick, Franklin, and Wilkins discovered 3D structure of DNA

- **X-ray diffraction** beams X-rays at DNA, and uses math to calculate structure from the ray's deflections

  - Rosalind Franklin was the first to do this, her scientific partner was Wilkins

- Wilkins showed Watson and Crick, Franklin's X-ray diffraction data

- Watson and Crick used that data to come up with the 3D double helix model

- Only Watson, Crick, and Wilkins got the Nobel Prize (Franklin had passed away before the award)

EXAMPLE: