

# The History of DNA



# Early Work



- Friedrich Miescher, 1869, first isolates a substance from the nucleus of cells that he calls “nuclein.” later “nucleic acid.”
- Biochemists identify two types of nucleic acids, RNA and DNA.
- In 1929, Phoebus Levine at the Rockefeller center identifies the four bases of DNA.

# What Does DNA Do?

- Researchers knew that DNA was found in chromosomes, they doubted that it was the hereditary material.
- Only four bases. How could four bases code for all sorts of proteins?
- Researchers thought that the protein also found in chromosomes was probably the hereditary factor.

# Frederick Griffith

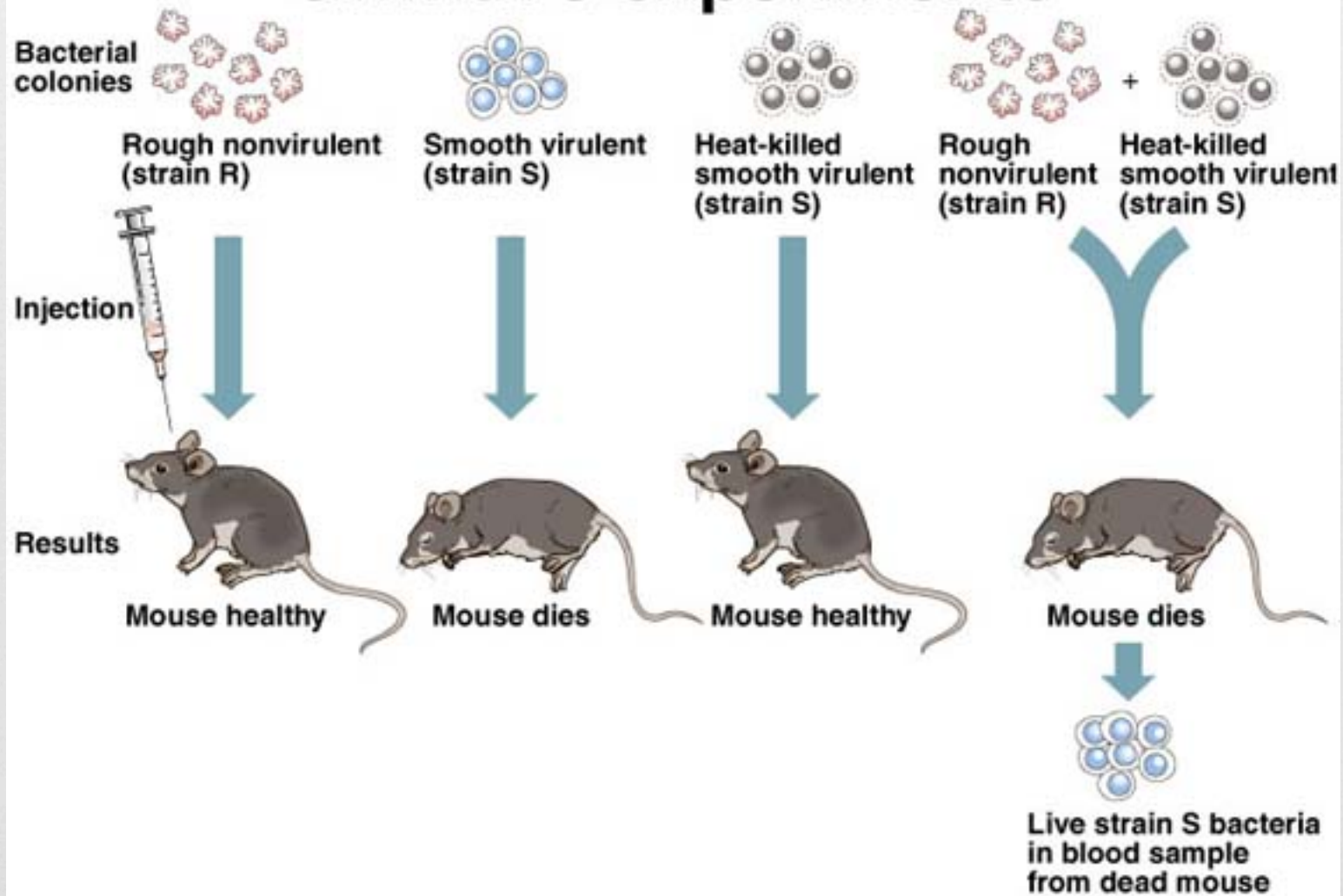


- In 1928, Frederick Griffith carried out experiments on pneumonia bacteria in mice.
- Discovery: something in heat-killed virulent bacteria could be transferred to live, harmless bacteria and make them virulent.

# Griffith's Experiment

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## Griffith's experiments



# Oswald Avery



Isolated proteins, carbohydrates, nucleic acids and applied them to non-virulent bacteria. Only nucleic acids (DNA) caused a change.

# Avery's Work

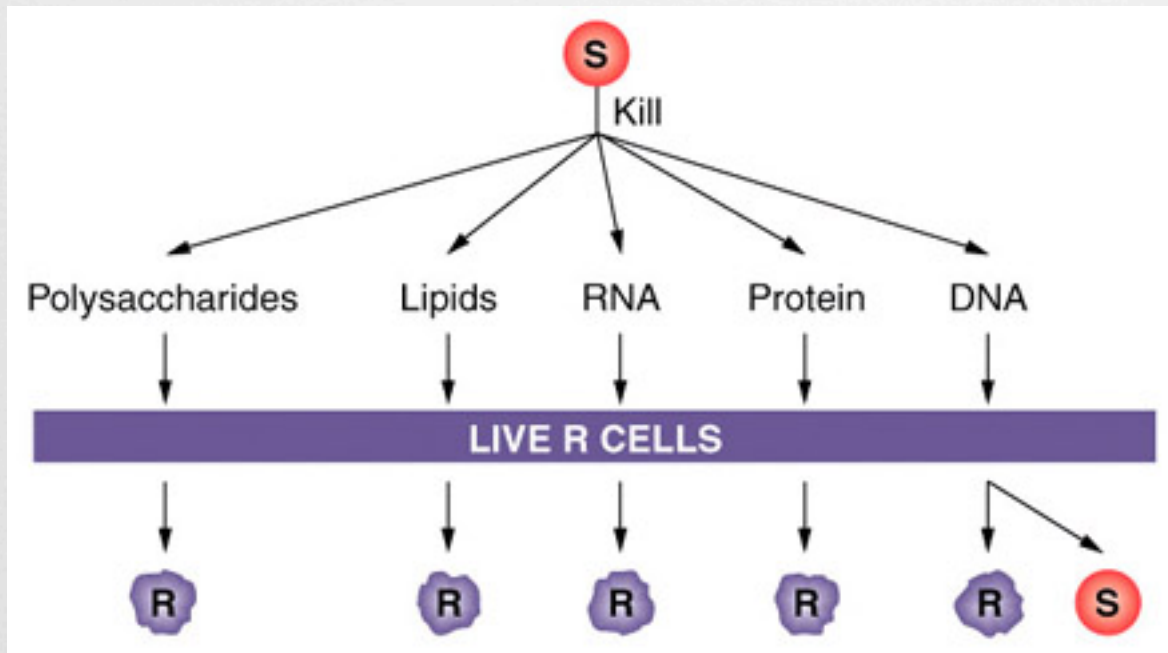


Fig. 8.2. O. T. Avery (1877-1953).

# Erwin Chargaff



- Chargaff studied DNA itself, providing some clues about its structure.
- Discovered that there are always equal amounts of the bases Adenine and Thymine, and equal amounts of Cytosine and Guanine.
- Chargaff proposed that these bases pair with one another.





# Wilkins and Franklin



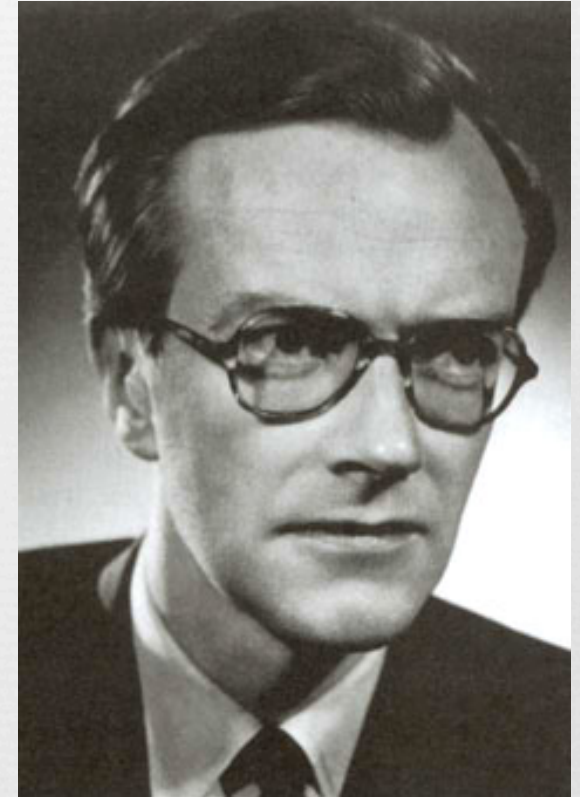
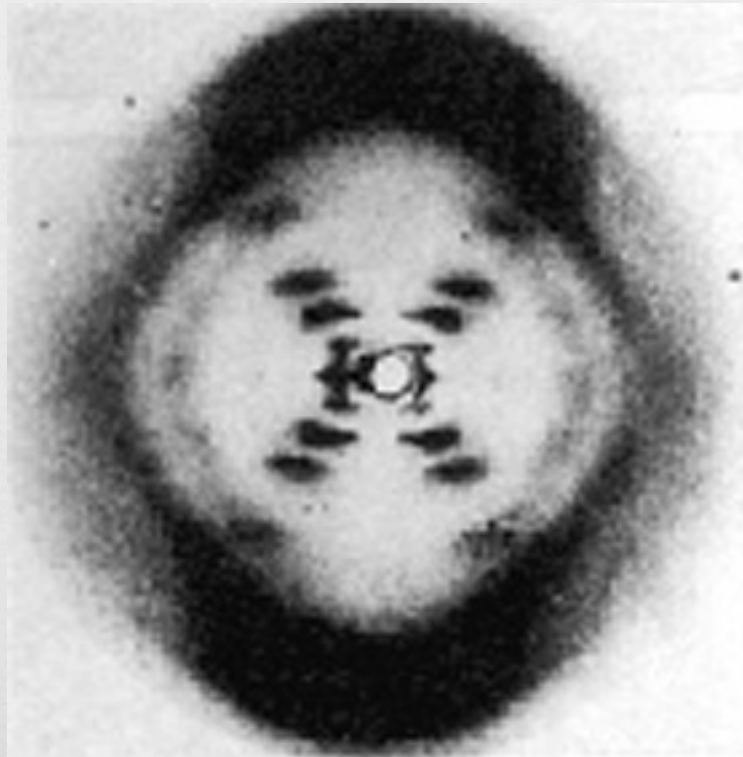
- Rosalind Franklin and Maurice Wilkins worked with X-ray crystallography to find more clues about the structure of DNA.
- Franklin's X-ray images suggested a helical structure.

# Franklin and Wilkins



Rosalind Franklin

Cold Spring Harbor Laboratory Archives



# Watson and Crick

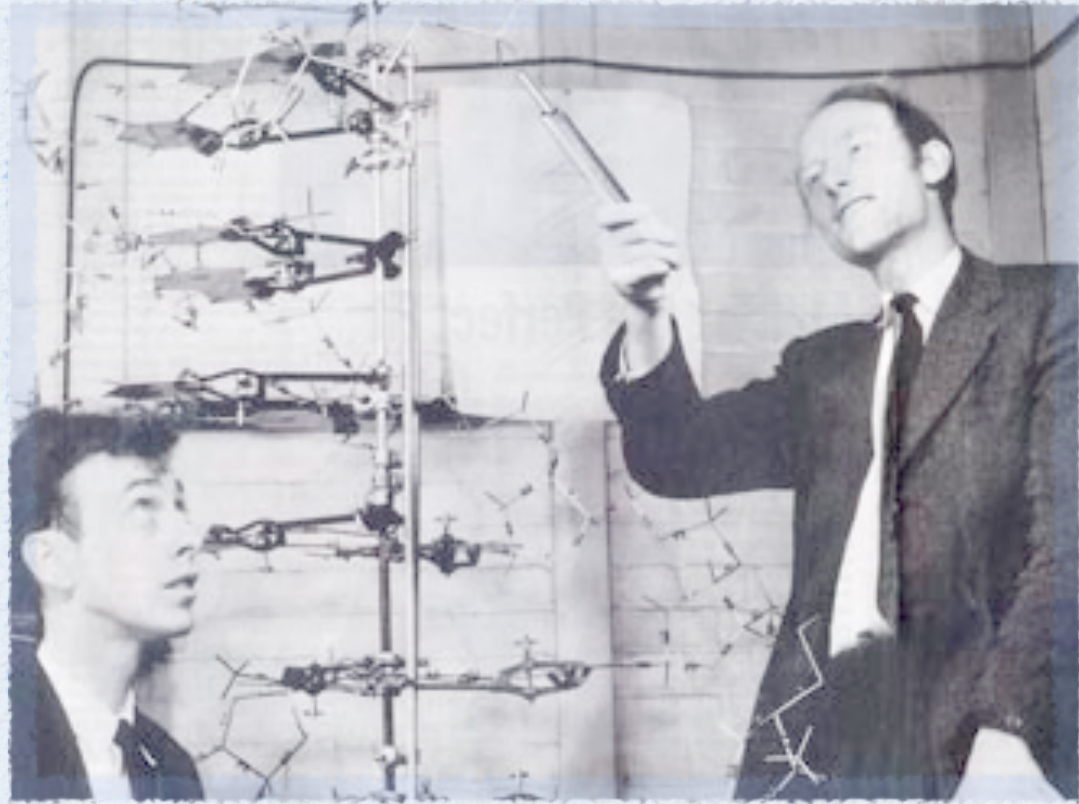


- James Watson and Francis Crick were also working on discovering the structure of DNA.
- Applied Chargaff's rule, assumed that A always pairs with T, C with G.
- Watson was not entirely convinced of the helical structure that Franklin had suggested, and his critique of her work led her to doubt herself.

# Watson and Crick

- Wilkins consulted with Watson and Crick. Without Franklin's knowledge, he handed them the data that he and Franklin had worked on.
- Watson immediately recognized the significance. He and Crick went to work on a model of DNA.





# The First DNA Model