

CONCEPT: DISCOVERING THE STRUCTURE OF DNA

- In the early 1950's, *Rosalind Franklin* used _____-Ray diffraction on DNA to capture an important photo (Photo 51).
- In 1953, *James Watson & Francis Crick* used Franklin's photo to help them describe the structure of _____.
 - They described DNA as a _____-helix with _____ *anti-parallel* strands of nucleotides.
 - **Watson & Crick Base-Pairing**: nucleotides on opposite strands *pair* via _____ bonds (**A-T**, **C-G**).

EXAMPLE: X-Ray Diffraction of DNA and Watson & Crick's DNA Structure.



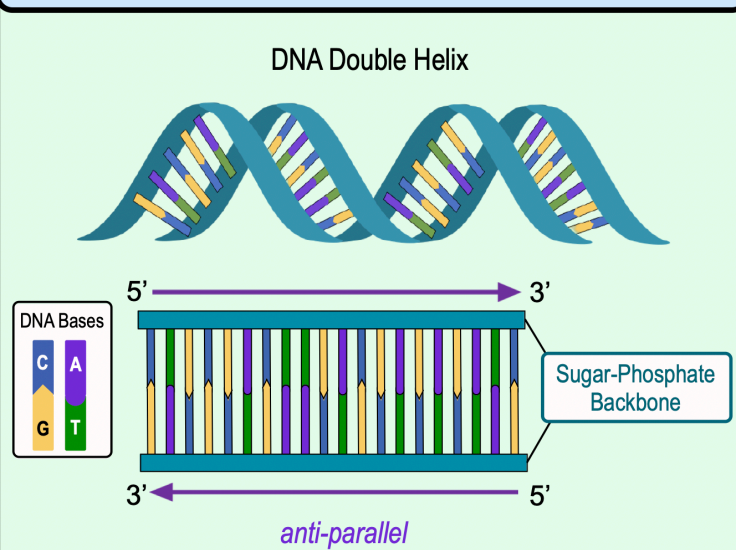
Rosalind Franklin



Franklin's Photo 51
Showing X-ray diffraction pattern of DNA

DNA

DNA Double Helix



5' → 3'

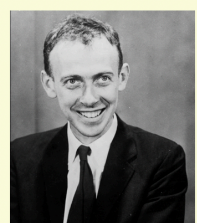
3' ← 5'

anti-parallel

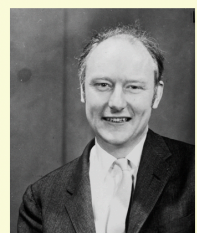
DNA Bases

C A
G T

Sugar-Phosphate Backbone



James Watson



Francis Crick

PRACTICE: The scientist/s that was/were given credit for first determining the structure of DNA is/are:

- a) Hershey and Chase.
- b) Watson and Crick.
- c) Chargaff.
- d) Griffith.
- e) Hershey and Crick.
- f) Watson and Chase.

PRACTICE: The scientist/s that used x-ray diffraction to help reveal the structure of DNA is/are:

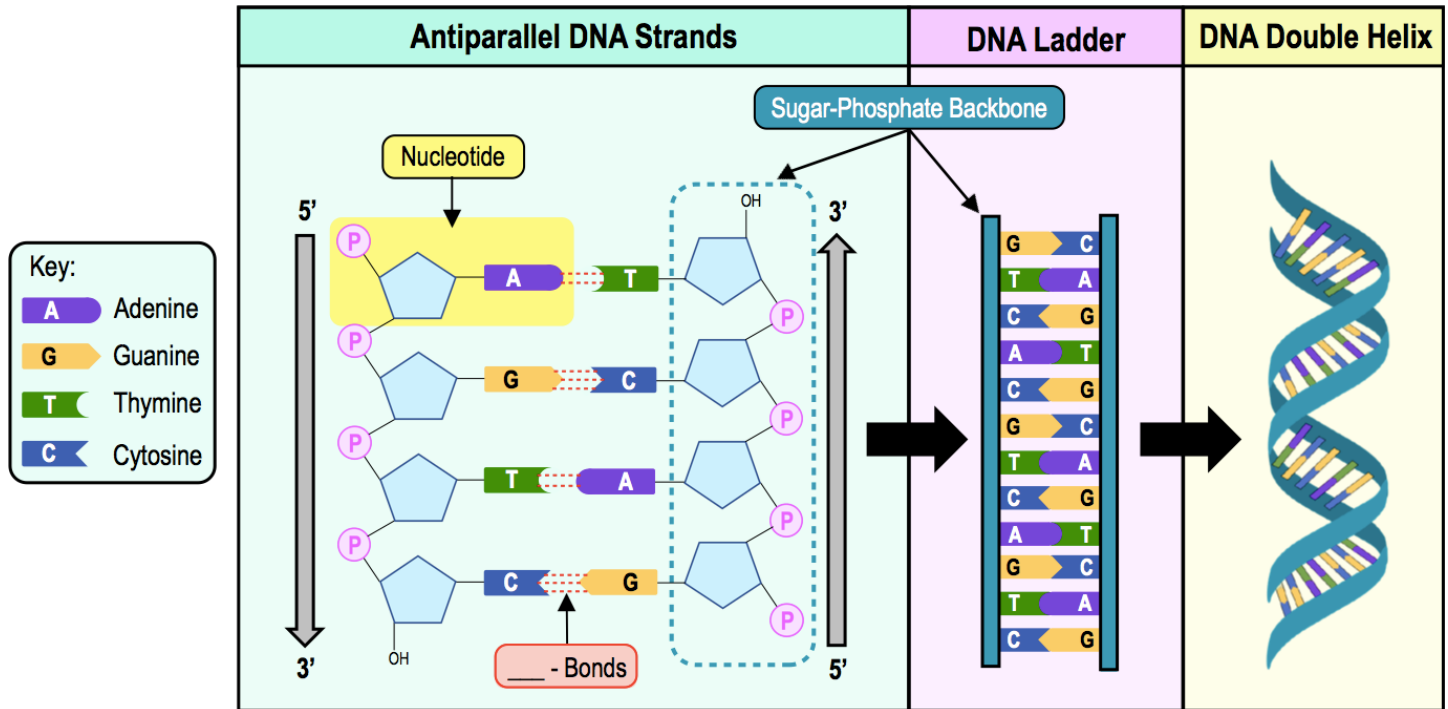
- a) Watson and Crick.
- b) Hershey and Chase.
- c) Avery and Macleod.
- d) Chargaff.
- e) Franklin.

CONCEPT: DISCOVERING THE STRUCTURE OF DNA

Detailed DNA Structure

● Recall: DNA consists of two strands of nucleotide monomers repetitively linked together.

- At the _____' end of each strand is a free _____ group.
- At the _____' end of each strand is a free _____ group (-OH).



PRACTICE: In the polymerization of DNA, a phosphodiester bond is formed between a phosphate group of the nucleotide being added and which of the following atoms or molecules of the last nucleotide in the DNA strand?

- a) The 5' phosphate group.
- b) C6.
- c) The 3' OH.
- d) A nitrogen from the nitrogen-containing base.

PRACTICE: Within a double-stranded DNA molecule, adenine (A) forms hydrogen bonds with thymine (T), and cytosine (C) forms hydrogen bonds with guanine (G). What is the significance of the structural arrangement?

- a) It allows variable width of the DNA double helix.
- b) It permits complementary base pairing.
- c) It determines the tertiary structure of the DNA molecule.
- d) It determines the type of protein produced from the DNA.