

8.2 Structure of DNA

KEY CONCEPT

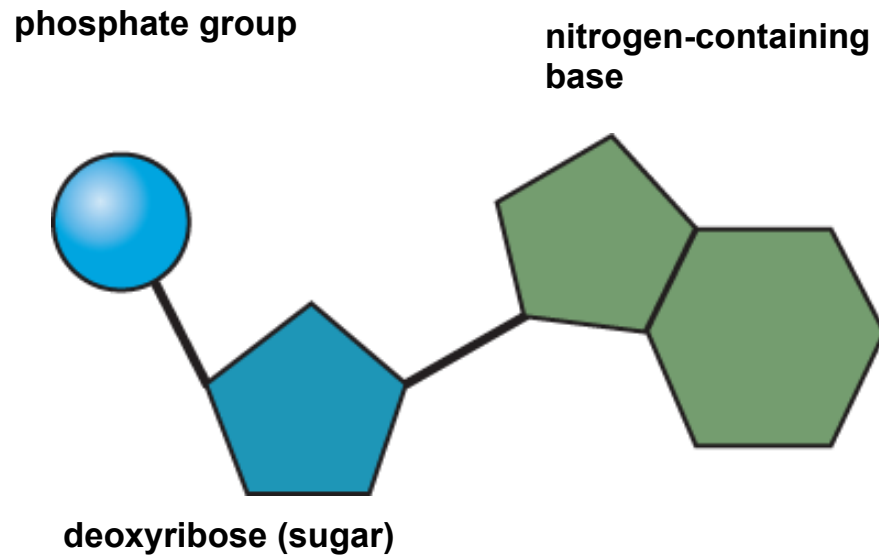
DNA structure is the same in all organisms.



This mouse's eerie green glow comes from green fluorescent protein (GFP), which glows under ultraviolet light. Scientists put a GFP gene from a glowing jellyfish into a virus that was then used to infect a mouse egg. The jellyfish gene became part of the mouse's genes. As a result, the mouse's cells produce the same jellyfish protein and make the mouse glow. Researchers hope to use GFP to track cancer cells.

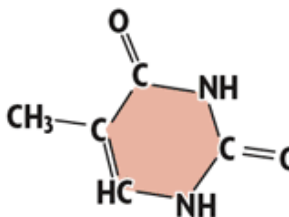

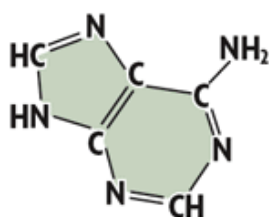

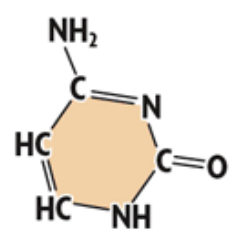

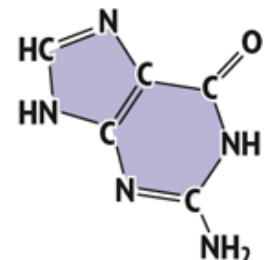

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- ▶ **DNA is composed of four types of nucleotides.**
 - **DNA** is made up of a long chain of **nucleotides**.
 - Each nucleotide has **three** parts.
 - a **phosphate group**
 - a **deoxyribose sugar**
 - a **nitrogen-containing base**



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- The nitrogen containing bases are the only difference in the four nucleotides.

PYRIMIDINES = SINGLE RING			PURINES = DOUBLE RING		
Name of Base	Structural Formula	Model	Name of Base	Structural Formula	Model
thymine			adenine		
cytosine			guanine		

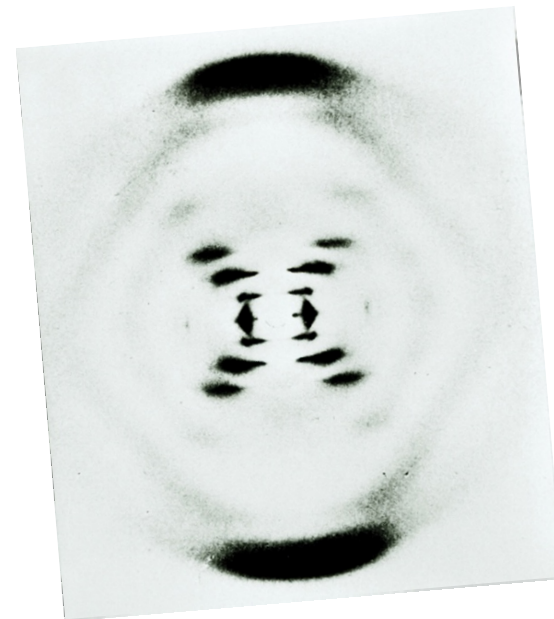
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- ▶ **Watson and Crick determined the three-dimensional structure of DNA by building models.**
- They realized that DNA is a **double helix** that is made up of a sugar-phosphate backbone on the outside with bases on the inside.



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- Watson and Crick's discovery built on the work of Rosalind Franklin and Erwin Chargaff.
 - Franklin's x-ray images suggested that DNA was a double helix of even width.
 - **Chargaff's rules** stated that $A=T$ and $C=G$.



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▶ Nucleotides always pair in the same way.

- The base-pairing rules show how nucleotides always pair up in DNA.
 - **A** pairs with **T**
 - **C** pairs with **G**
- Because a **pyrimidine** (single ring) pairs with a **purine** (double ring), the helix has a uniform width.



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- The backbone is connected by covalent bonds.
- The bases are connected by hydrogen bonds.

