Genetic Material
DNA Structure & Function

DNA: Amazing Facts

- DNA from a single human cell extends in a single thread for almost 2 metres long!!!

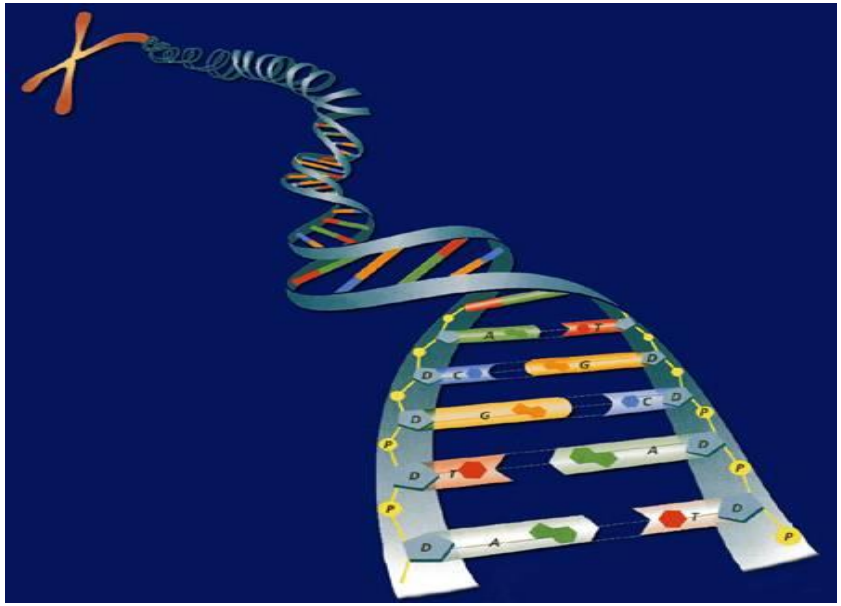
- It contains information equal to some 600,000 printed pages of 500 words each!!!

  (a library of about 1,000 books)

General Purpose of DNA:

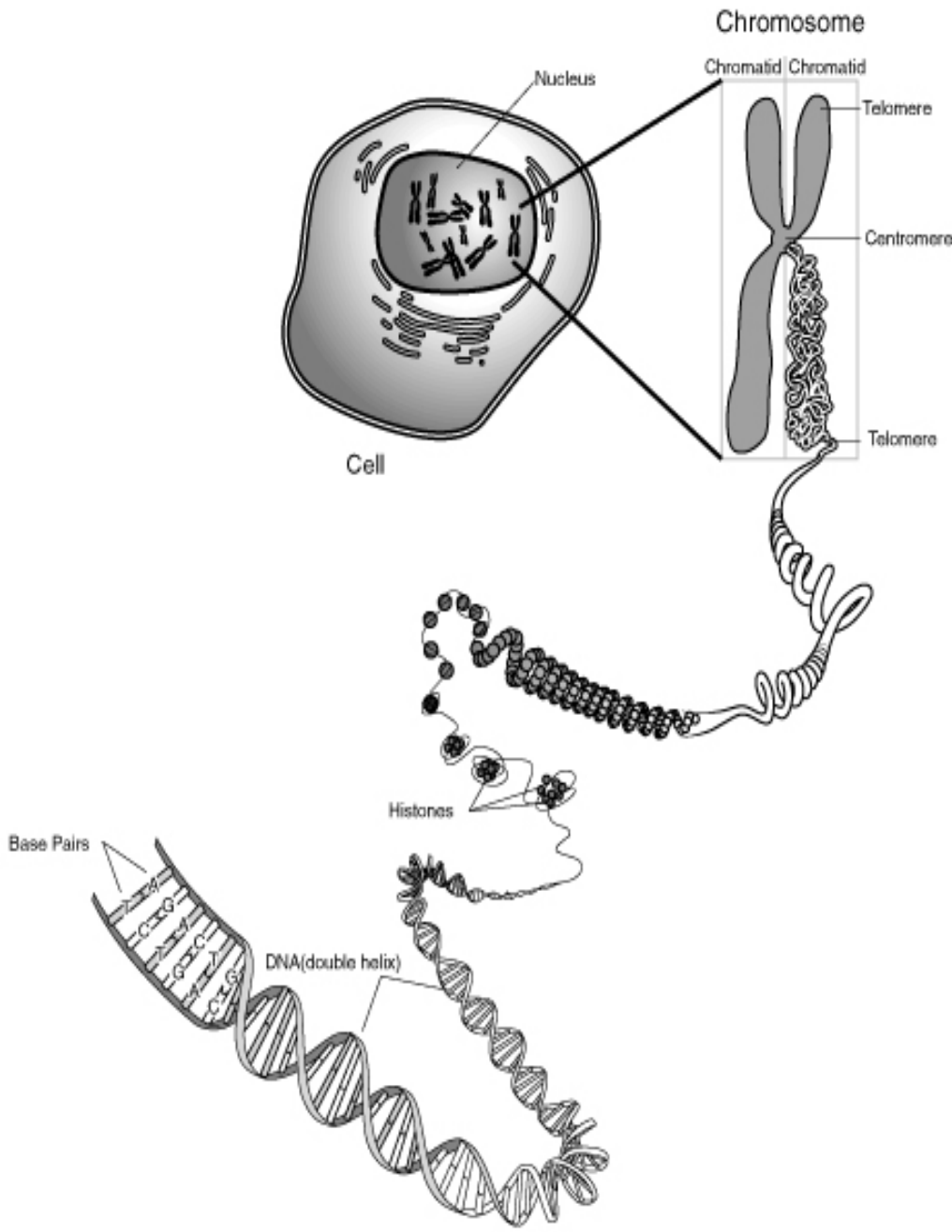
- Stores and transmits genetic information from parent to offspring
- DNA stands for

DEOXYRIBONUCLEIC ACID



DNA Packaging

- DNA exists in long fibres called **chromatin**
- DNA in chromatin is wrapped tightly around **histones**
- DNA & histone are further coiled tightly to form **nucleosomes**
- Nucleosomes are eventually wound together to form **chromosomes**



History of DNA

- **Discovery of the DNA double helix**

  A. **Friedrich Miescher** – started investigating a compound he found in the nucleus of cells, called it "nuclein" **(1869)**

  B. **Rosalind Franklin** - X-ray photo of DNA. **(1952)**

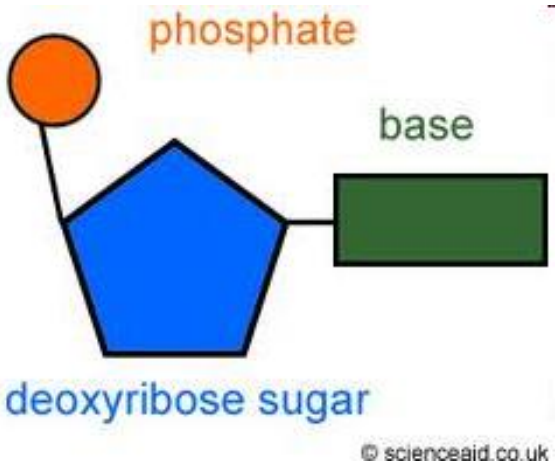
  C. **Watson and Crick** - described the DNA molecule from Franklin's X-ray. **(1953)**

Components of DNA

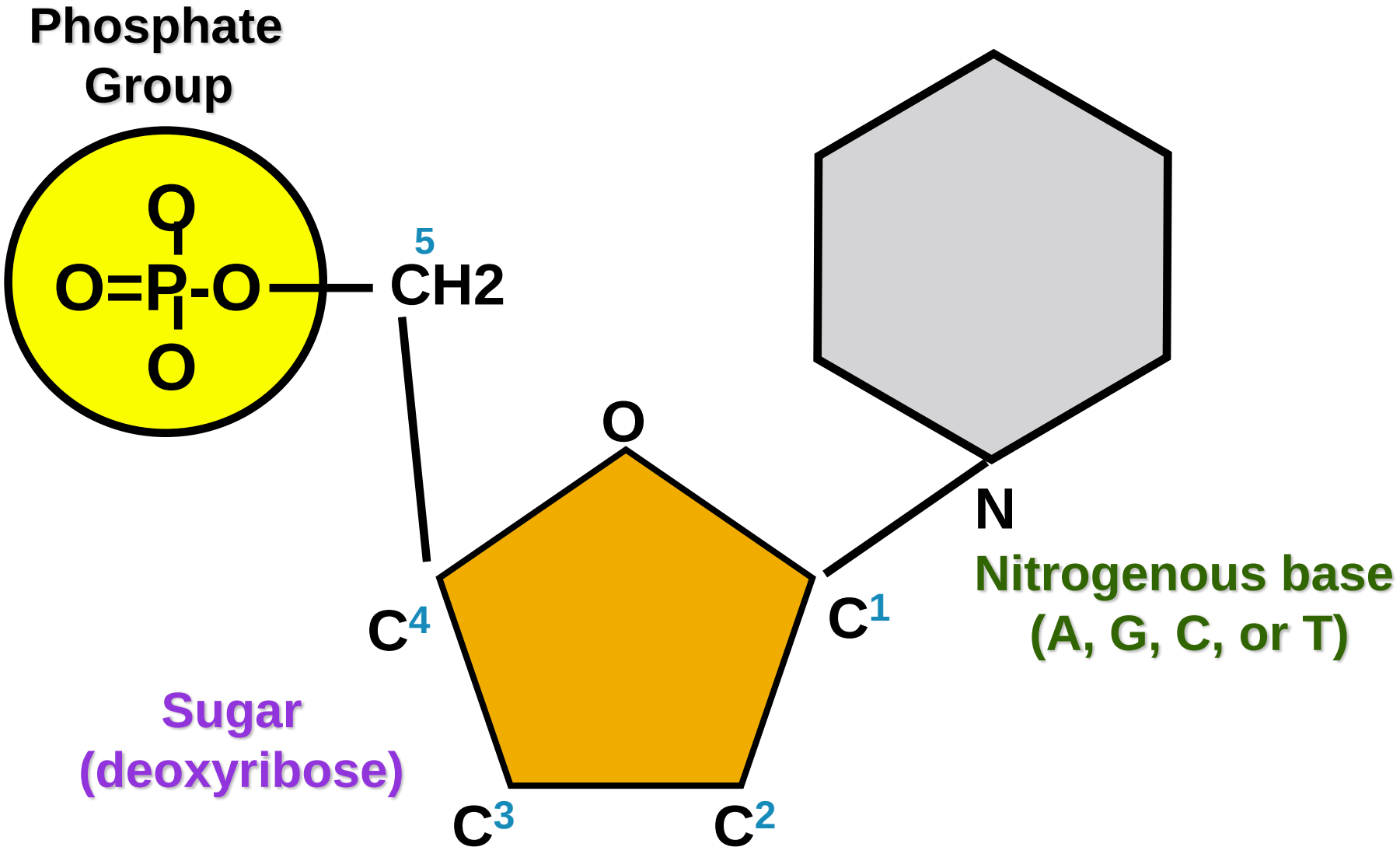
(1) a 5-carbon/pentose sugar called deoxyribose

(2) a PO_4 group or phosphate

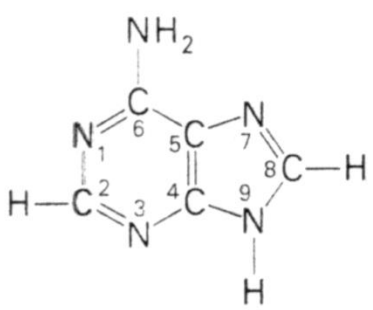
(3) a nitrogen containing base



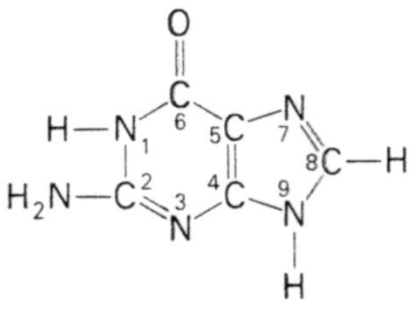
Unit of DNA: The Nucleotide



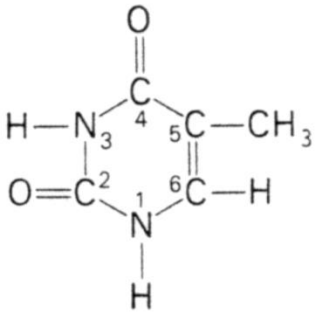
4 Nitrogenous Bases



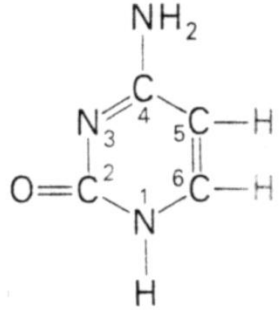
Adenine
(A)



Guanine
(G)



Thymine
(T)

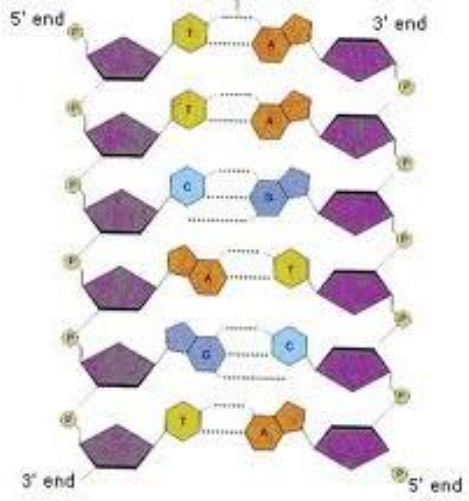


Cytosine
(C)

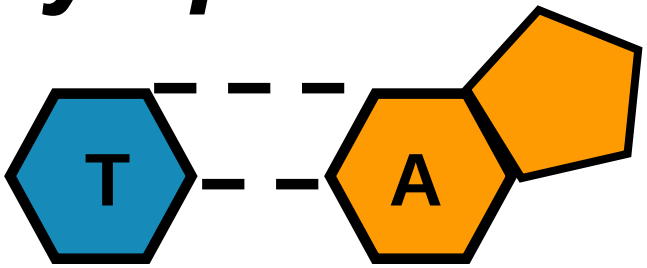
Purines

Pyrimidines

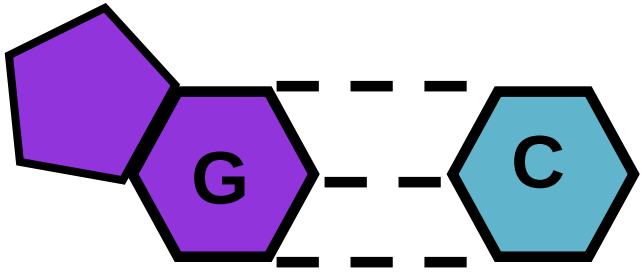
Chargaff's Rule



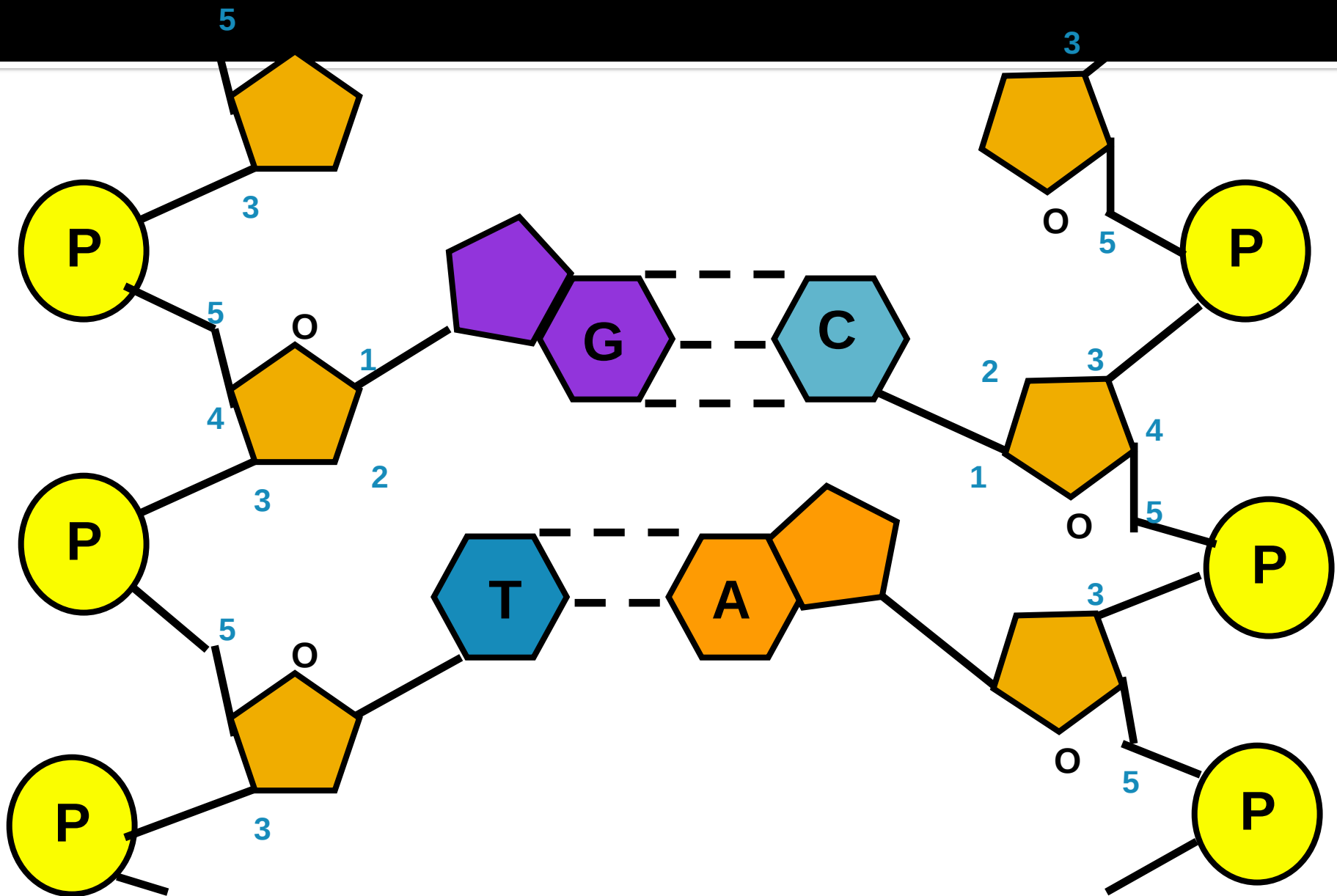
"A" always pairs with "T"



"C" always pairs with "G"

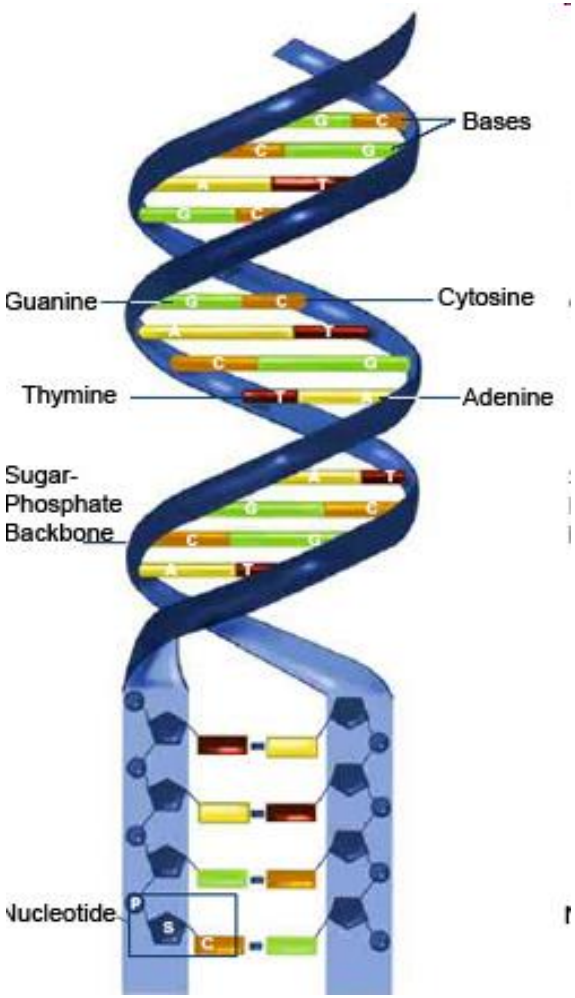


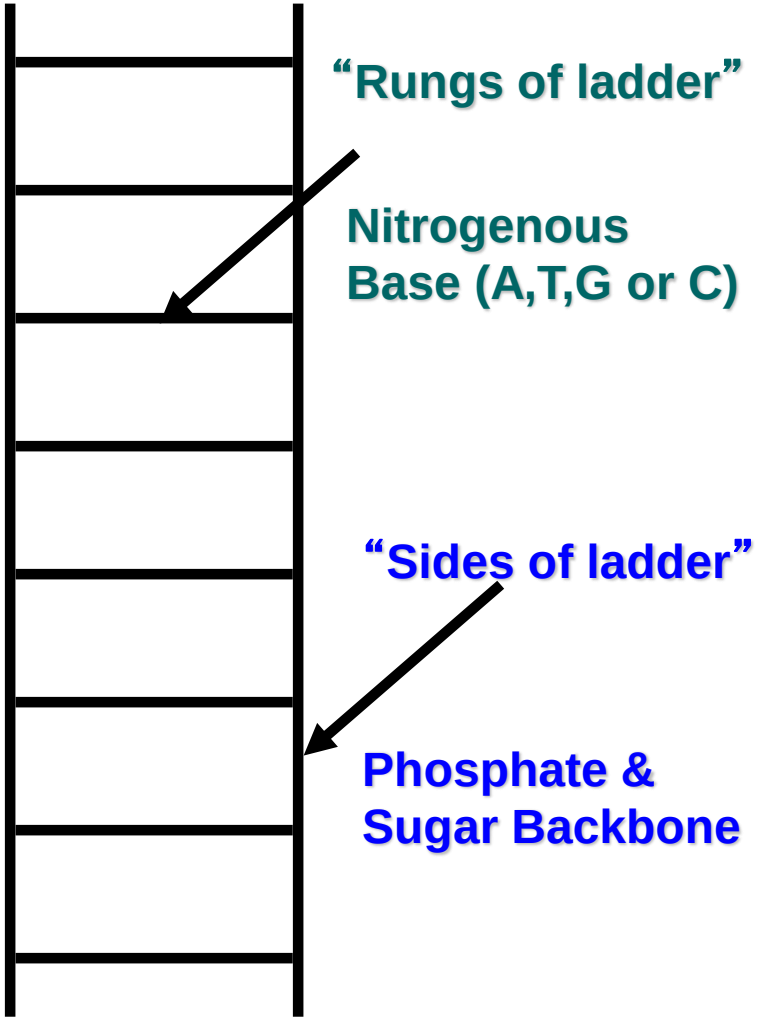
DNA Double Helix

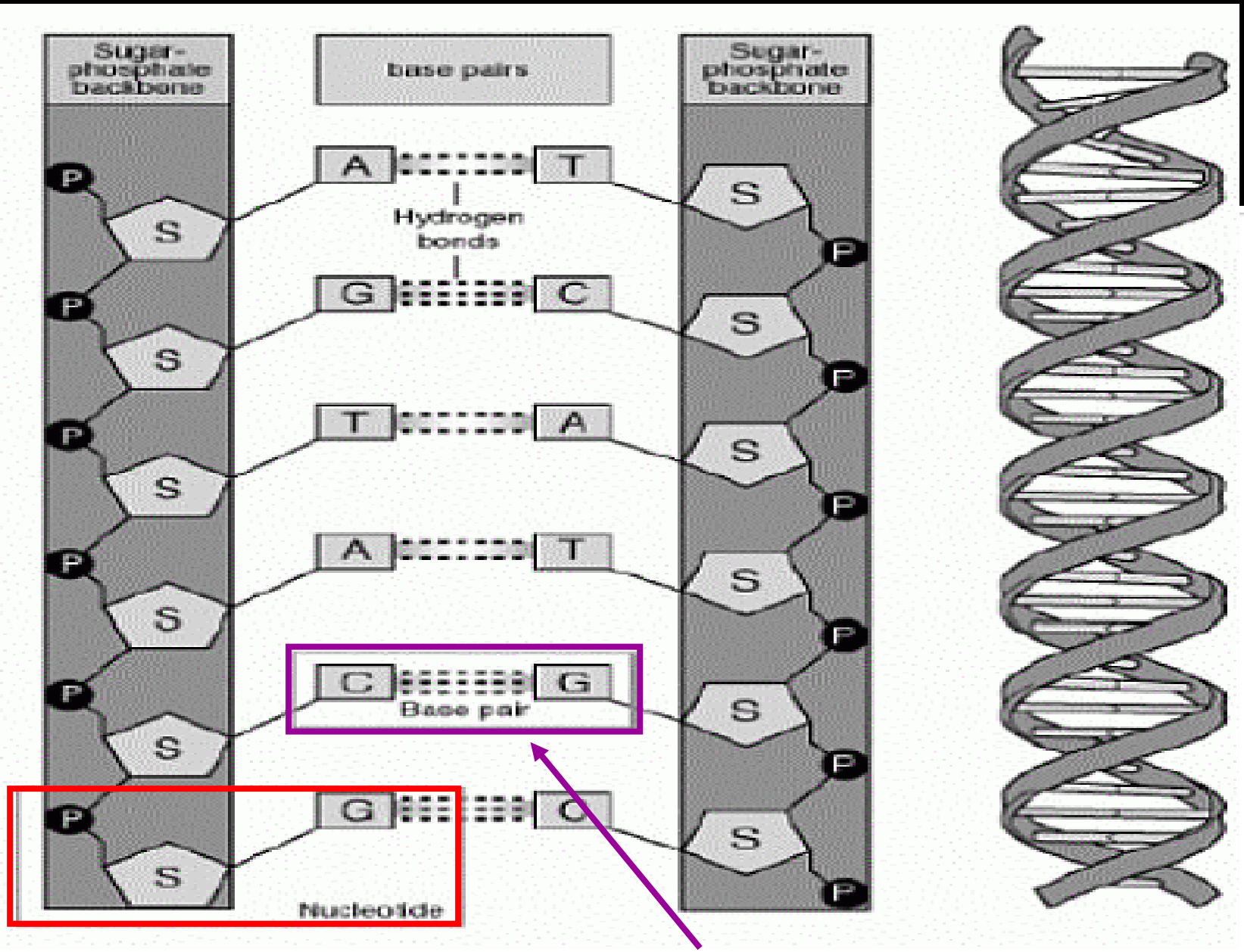


Overall Structure of DNA

Double Helix





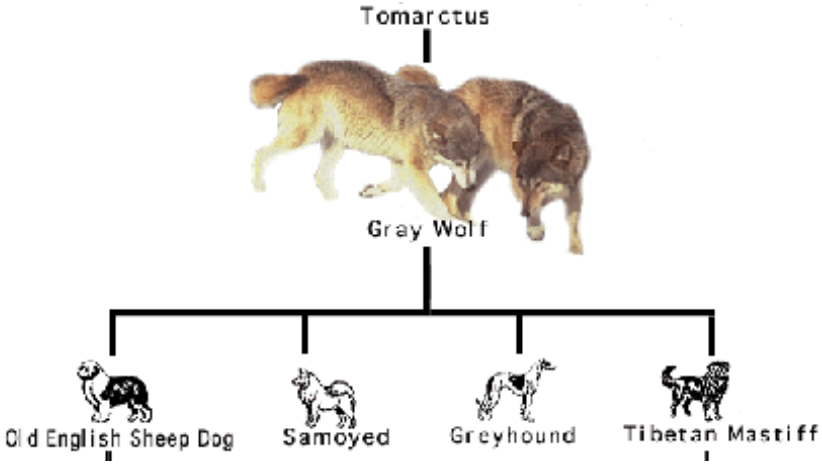


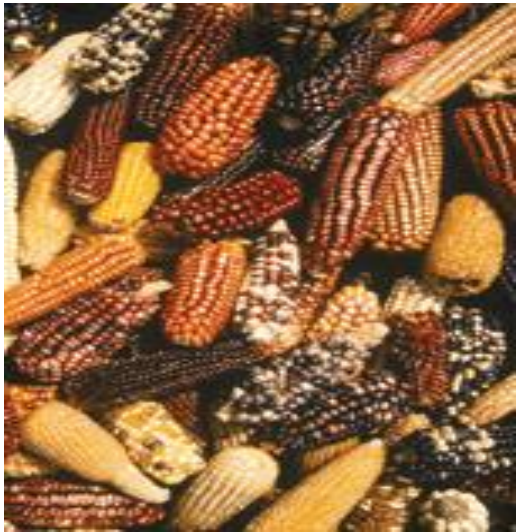
Nucleotide

Base pair

Genetic Diversity

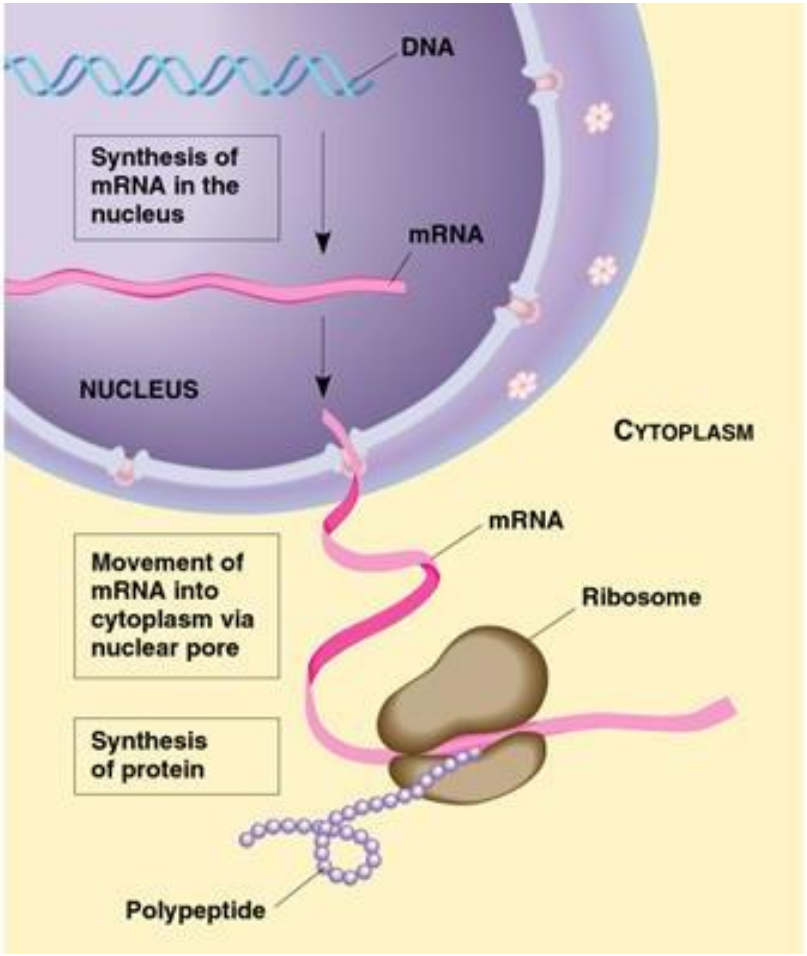
- **Different arrangements of NUCLEOTIDES in a nucleic acid (DNA) provides the key to DIVERSITY among living organisms.**





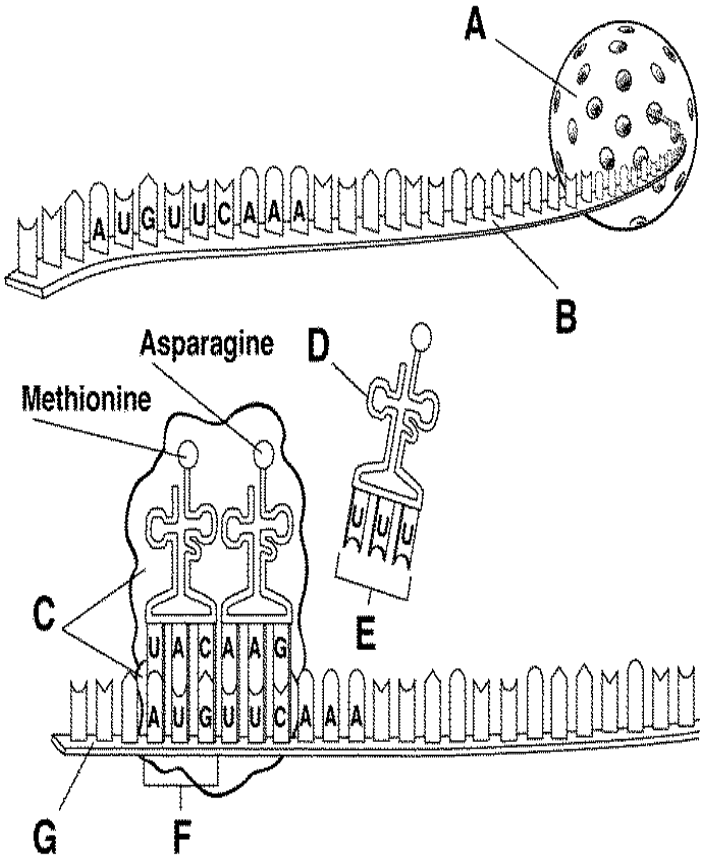
DNA Transcription

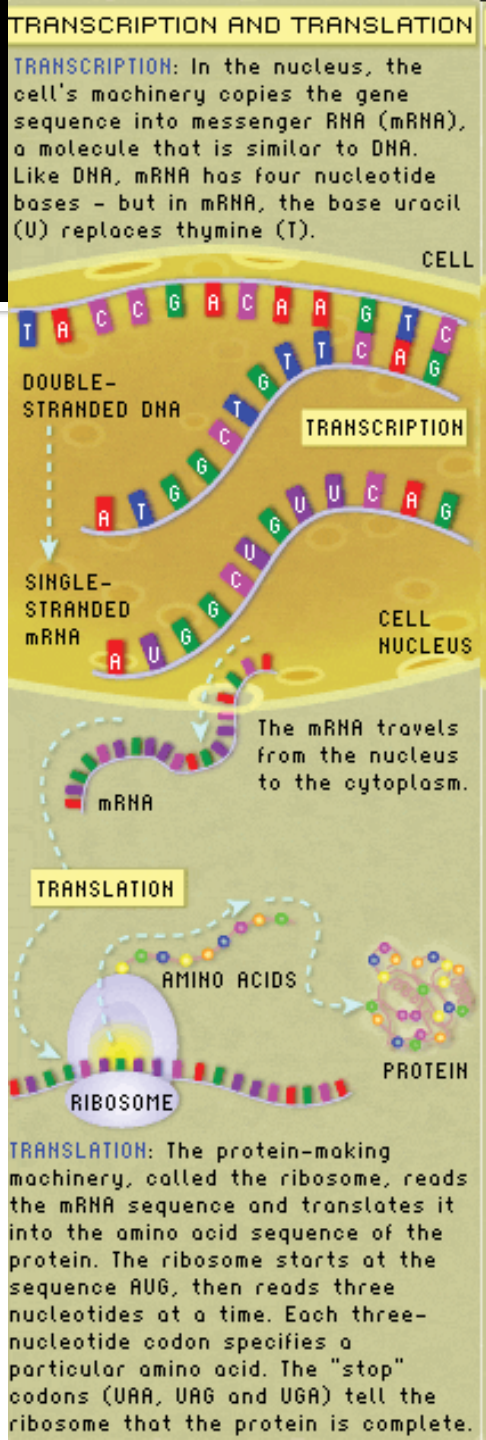
- DNA can "unzip" itself and RNA nucleotides match up to the DNA strand.
- Both DNA & RNA are formed from NUCLEOTIDES and are called NUCLEIC acids.



DNA Translation

- The cell uses information from "messenger" RNA to produce proteins





Why and how is DNA “read”?

- It is “read” in order the make proteins out of amino acids.