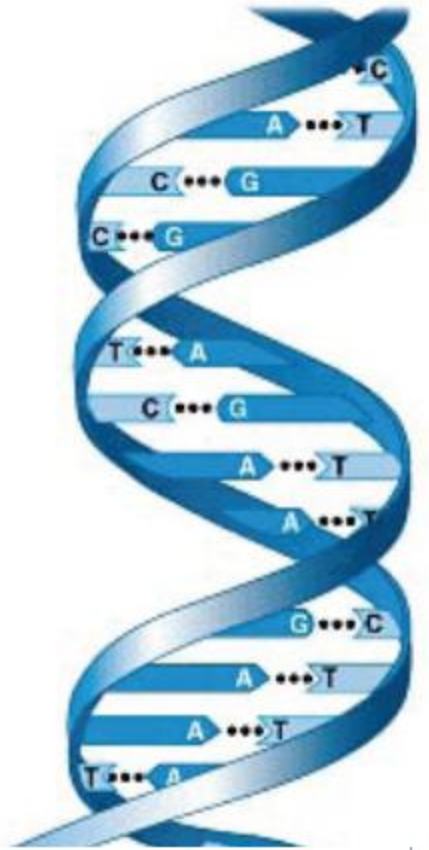


NUCLEIC ACIDS



Nucleic Acids

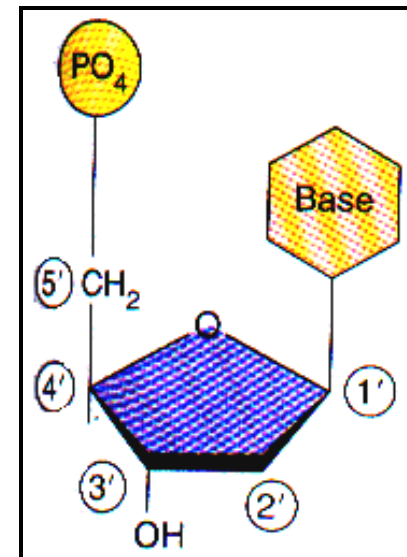
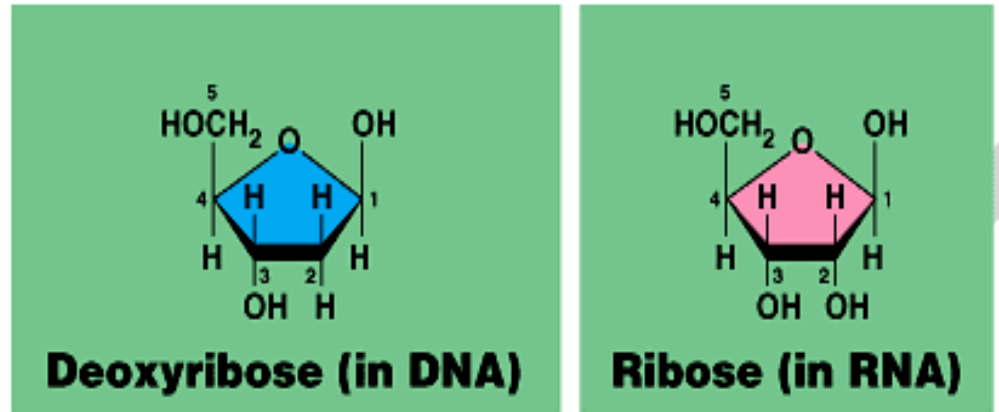
- Function:
 - Store and transmit hereditary information
 - Primary storage molecules in all living organisms.
- Examples:
 - DNA – Deoxyribonucleic Acid
 - RNA – Ribonucleic Acid
- Structure:
 - Monomers: **Nucleotides**

Nucleotide Structure

□ 3 Parts:

1. Nitrogen containing base (C-N ring)
2. Pentose sugar (5C)
 - Deoxyribose in DNA
 - Ribose in RNA
3. PO_4 Group

□ Nucleoside (base + sugar)



Types of Nucleotide Bases

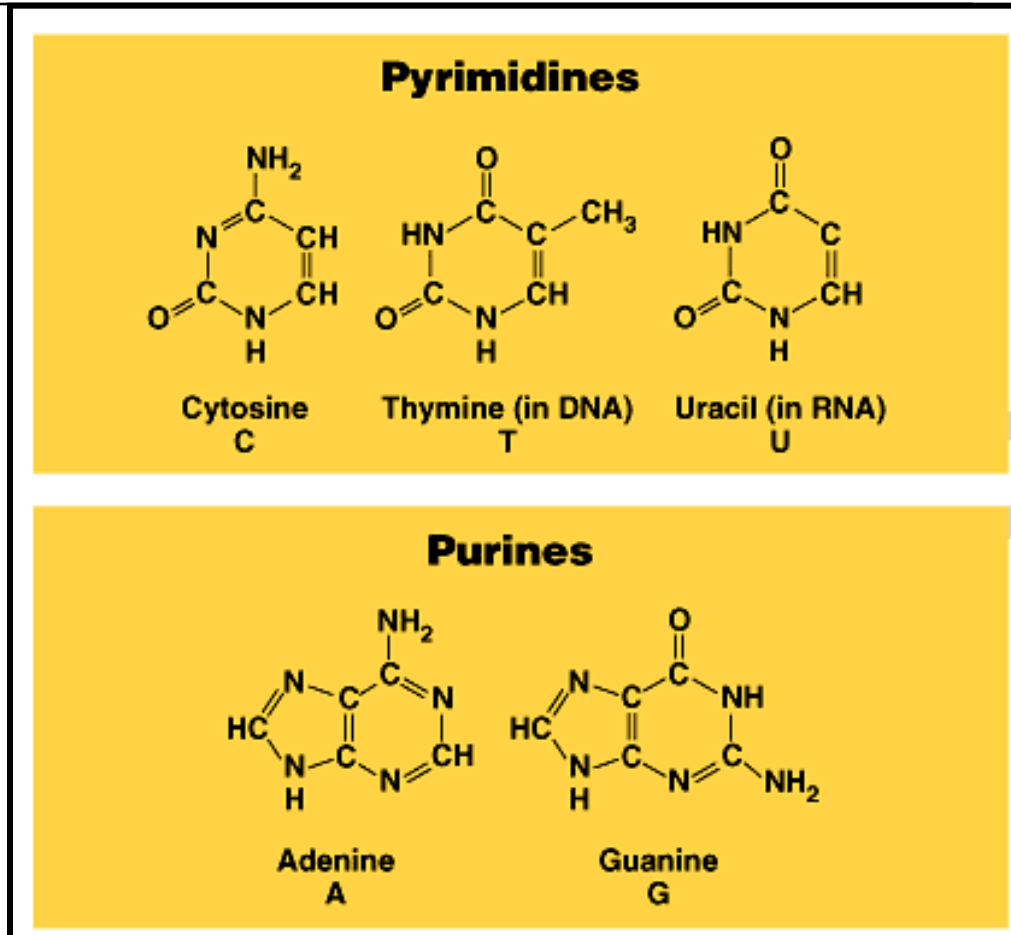
□ 2 Types of Bases

1. Pyrimidines

- Single ring N-base
- Cytosine (C)
- Thymine (T)
- Uracil (U)

2. Purines

- Double ring N-base
- Adenine (A)
- Guanine (G)



DNA Bases

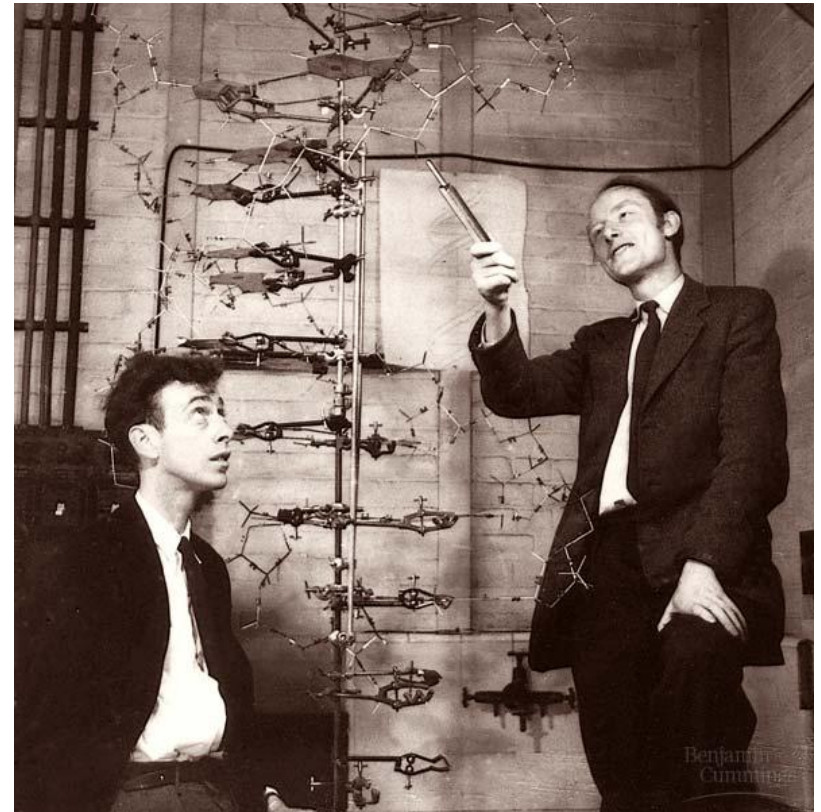
□ **4 DNA bases:**

1. Thymine
 2. Cytosine
 3. Adenine
 4. Guanine
-
- The diagram shows a list of four DNA bases. The first two, Thymine and Cytosine, are enclosed in a blue bracket on the right, which points to a blue box labeled 'pyrimidines'. The last two, Adenine and Guanine, are enclosed in a red bracket on the right, which points to a red box labeled 'purines'.

- Adenine always bonds with thymine (**A-T**)
- Guanine always bonds with cytosine (**G-C**)
- Bases are always found **located on the inside** portion of the DNA molecule.
- Bases of one strand are bonded in the inside portion of the DNA molecule to the bases of the other strand using **hydrogen bonds**.

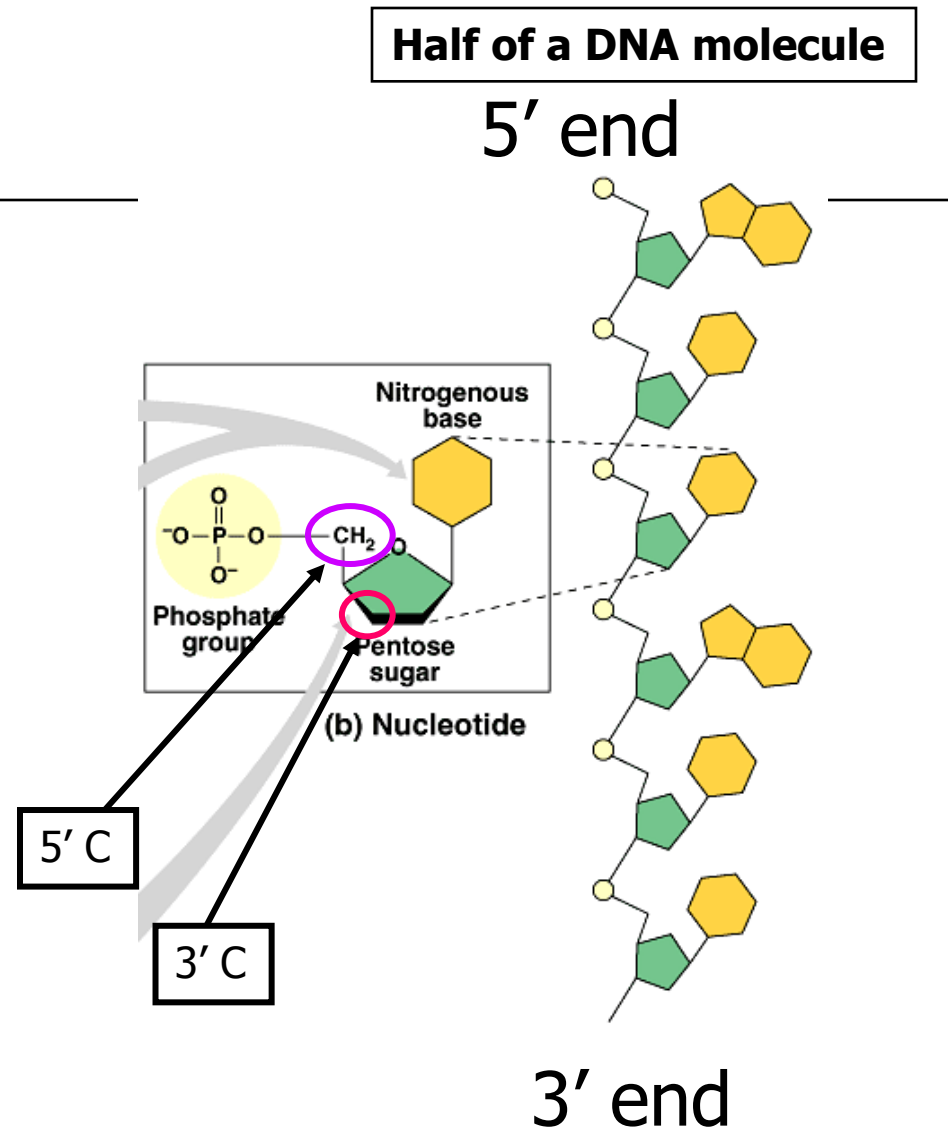
Nucleic Acids

- Inheritance based on DNA replication
- Double helix (Watson & Crick - 1953)
 - H bonds – between paired bases
 - van der Waals – between stacked bases



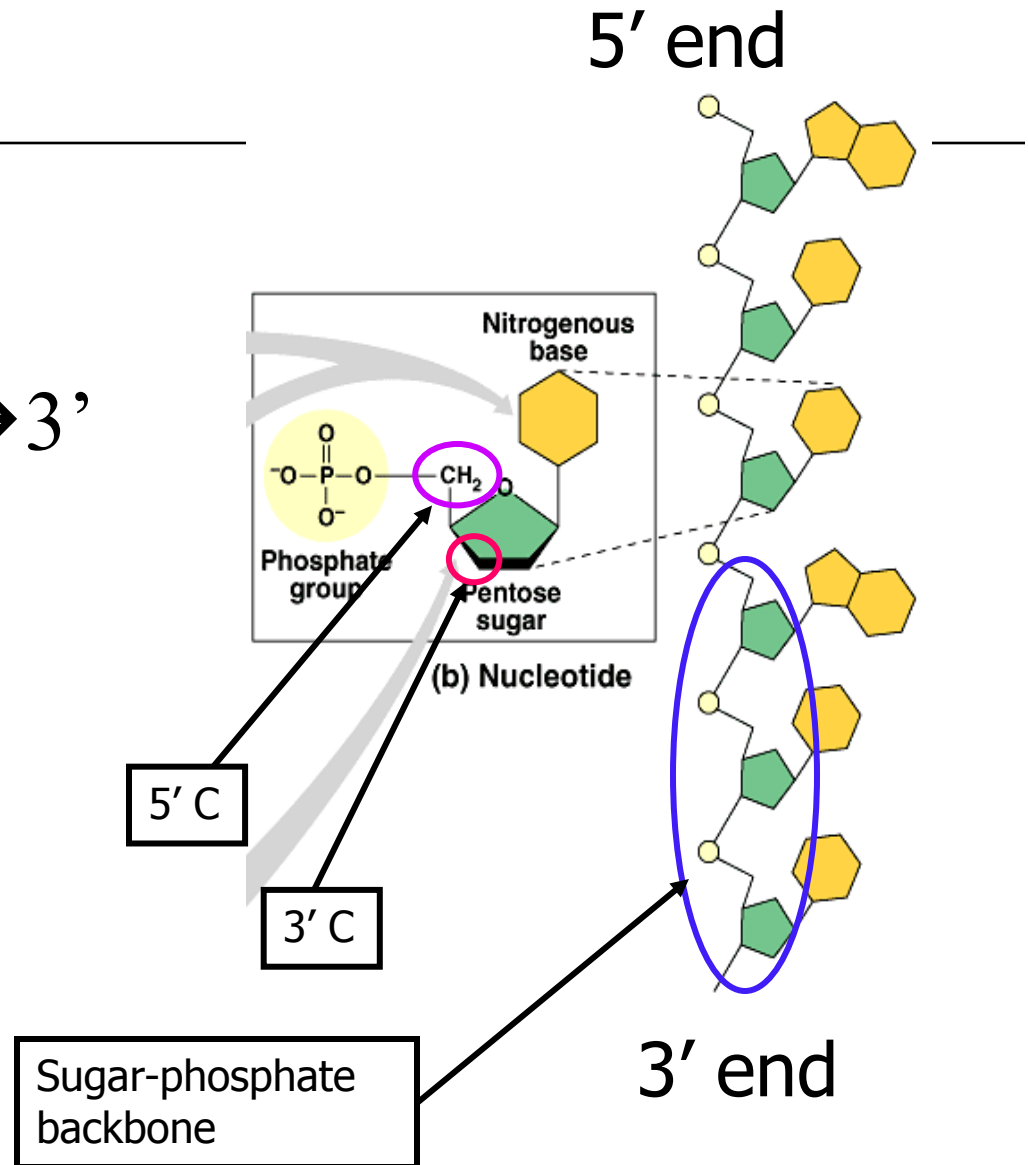
Building DNA

- DNA is a polymer of **polynucleotides**.
- Each nucleotide is bonded to another nucleotide on a DNA or RNA strand using covalent bonds called **phosphodiester linkages**:
 - Bond between -OH group on the 3' carbon of one nucleotide and the phosphate group on the 5' carbon on the next nucleotide.



Building DNA

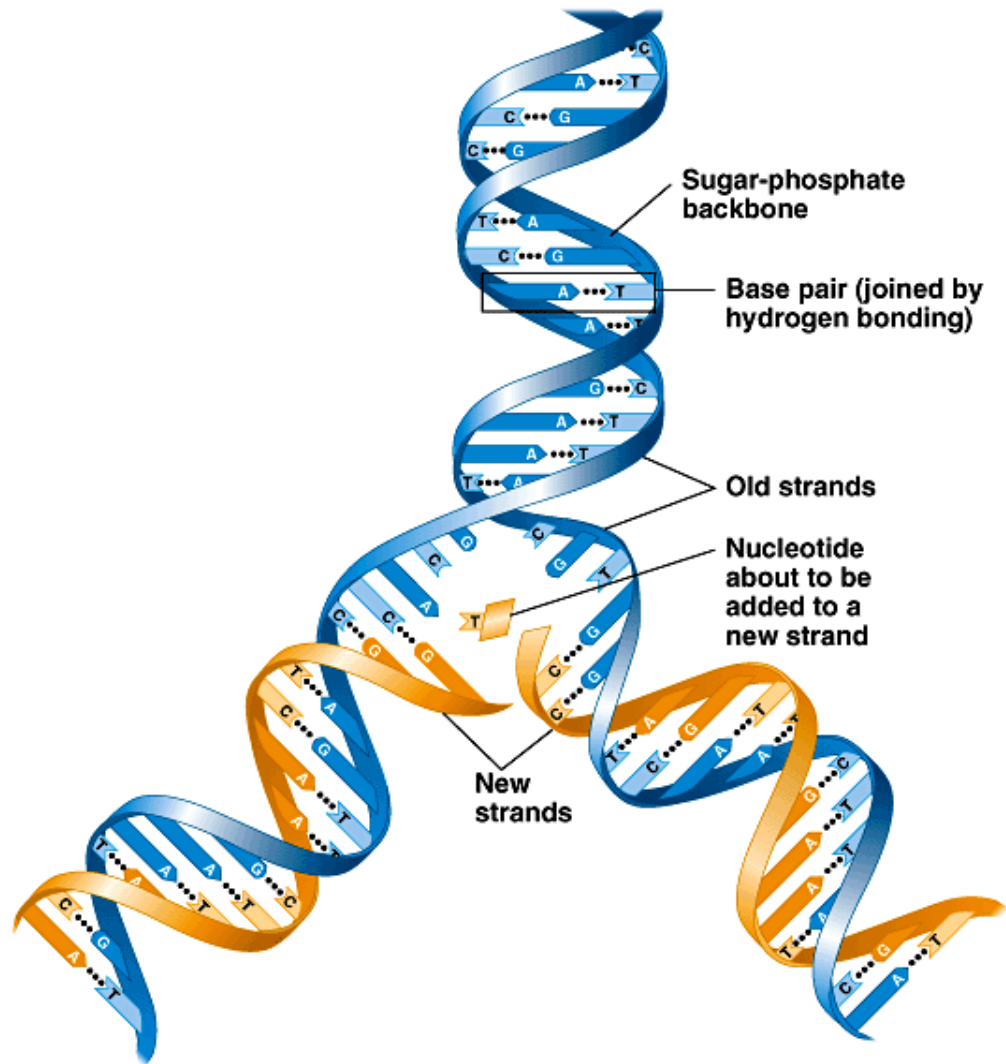
- Nucleotides are added in the $5' \rightarrow 3'$ direction.
- Nucleotides are added one at a time.



DNA

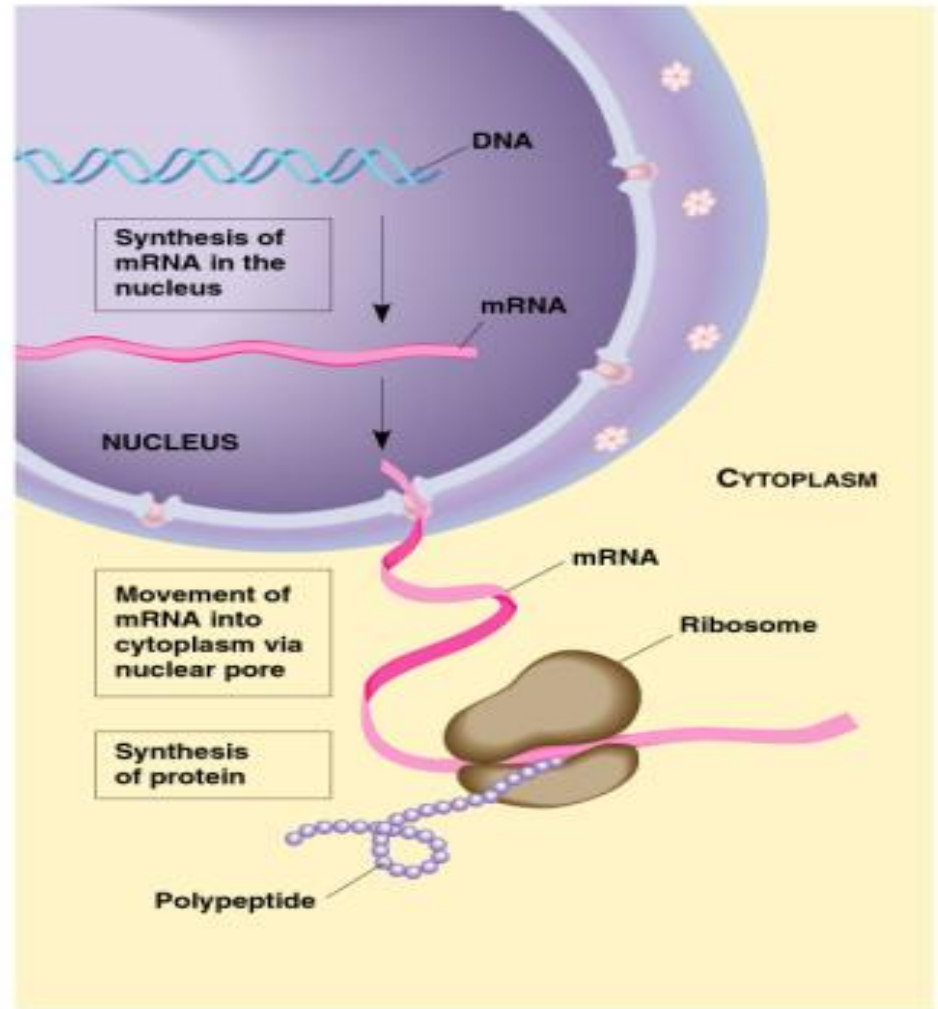
□ General:

- Double stranded
- 4 bases (A, T, C, G)
- DNA Replication
 - Occurs when cell is about to divide
 - Semi-conservative model of replication



Nucleic Acids

□ DNA → RNA → Protein



RNA Bases

- Single stranded
- Made from DNA

- RNA Bases:

1. Cytosine
 2. Uracil
 3. Adenine
 4. Guanine
- pyrimidines
- purines

