

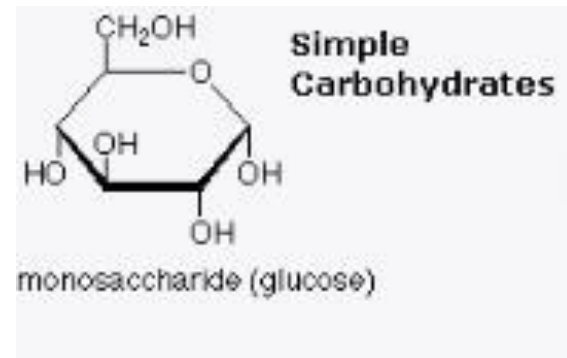
# Carbohydrates



# CARBOHYDRATES



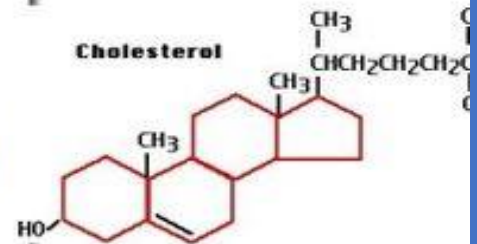
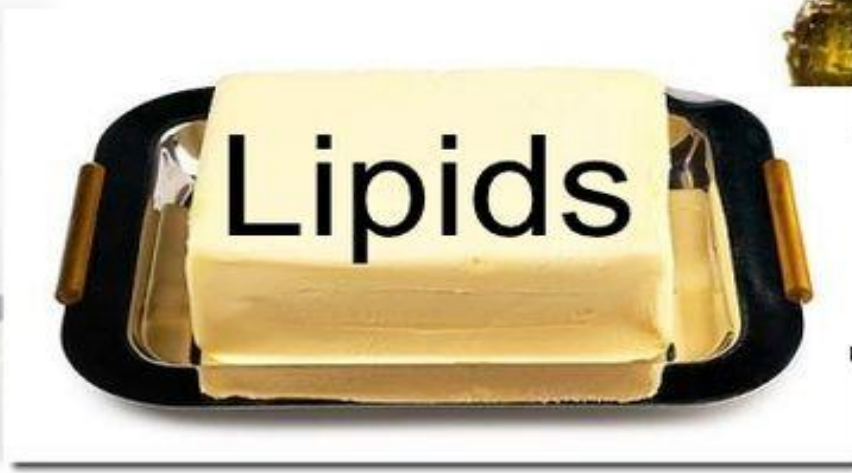
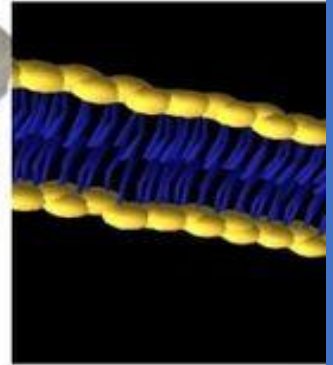
- **ELEMENTS: C H O**
- **BUILDING BLOCKS (SUBUNITS):** monosaccharides (glucose, simple sugars)
- **FUNCTIONS:**
  1. preferred energy source
    - glucose(short term) OR glycogen(long term)
  2. storage material –
    - starch in plants
    - glycogen in animals
  3. structural material-
    - cellulose - plant cell wall
    - chitin - fungus cell wall, insect exoskeleton
- **SOURCES:** Honey, candy, spaghetti, rice, potato, bread
- End in ose (used to identify carbs/sugars on labels)



# More Carbohydrates

- MONOsaccharide: single sugar unit  $C_6H_{12}O_6$   
- glucose
- DIsaccharide: double sugar unit  $C_{12}H_{22}O_{11}$   
- sucrose
- POLYsaccharide: many glucose units  $(C_6H_{10}O_5)_n$   
- cellulose, glycogen, starch

# Lipids

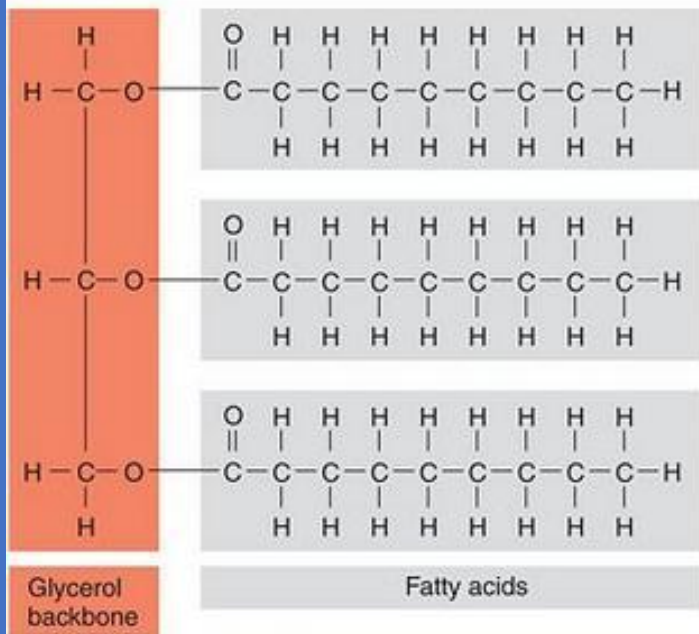




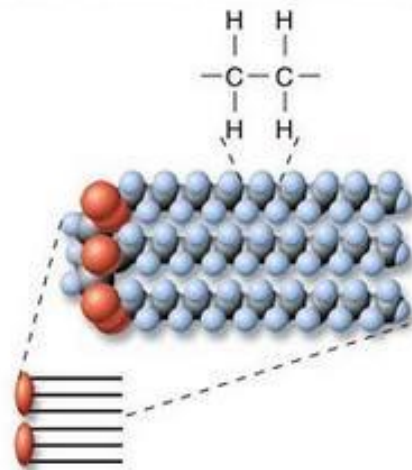
# More About Lipids

- Room temperature: fats-solid, oil-liquid
- Insoluble (doesn't mix with water)
- Saturated fats: contain saturated fatty acids with single carbon bonds. Not good for you, solid.
- Unsaturated fats: contain double carbon bond(s). Good for you, liquid.
- Waxes
- Phospholipids
- Steroids: cholesterol

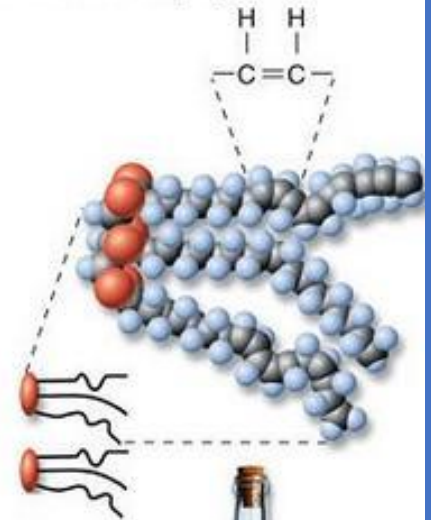




(a) Fat molecule (triacylglycerol)

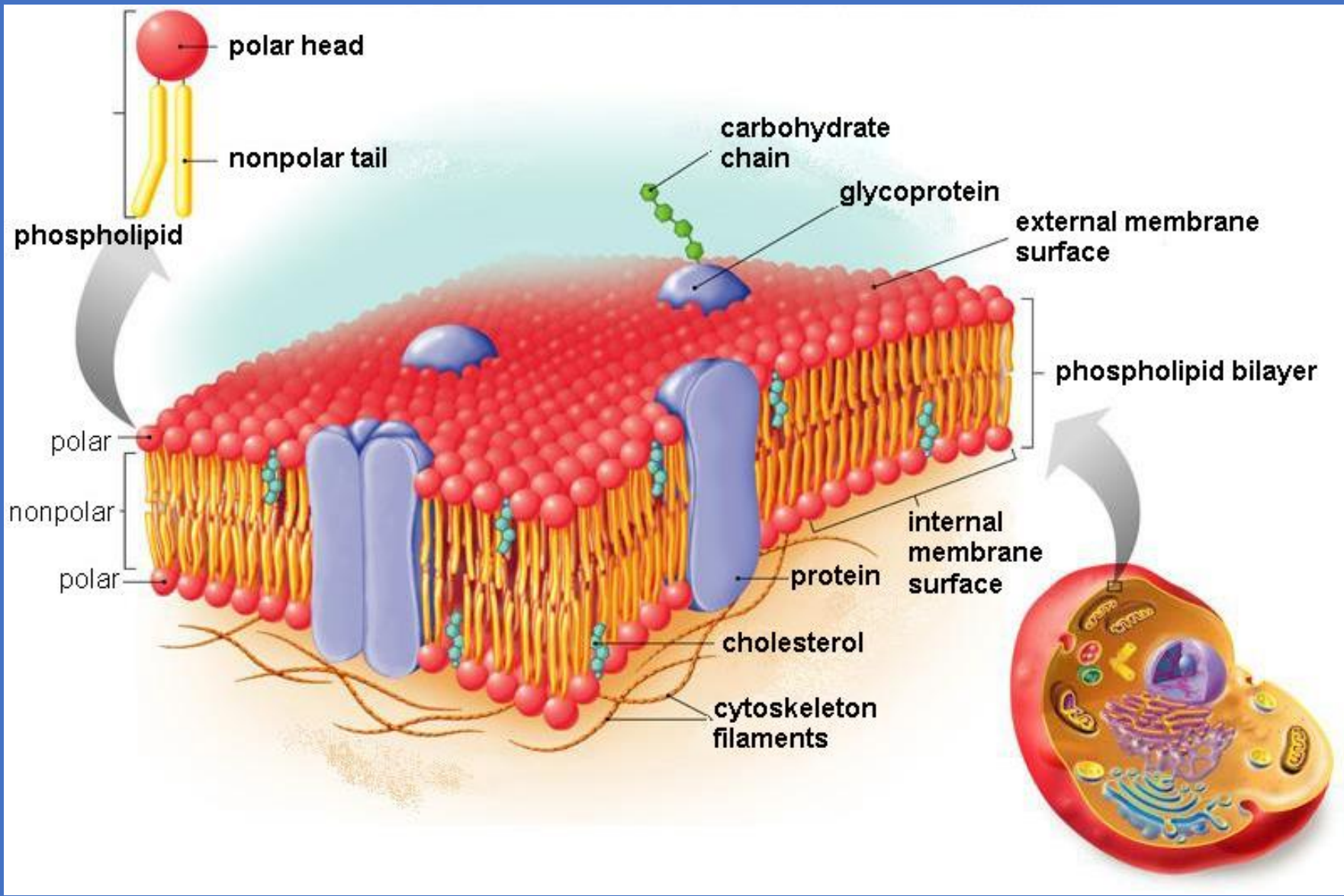


(b) Hard fat (saturated): Fatty acids with single bonds between all carbon pairs



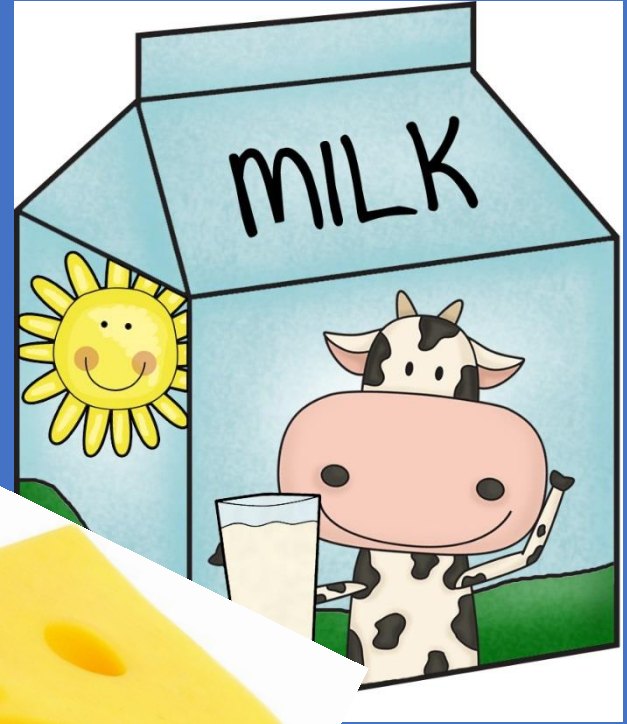
(c) Oil (unsaturated): Fatty acids that contain double bonds between one or more pairs of carbon atoms

# Cell Membrane – Phospholipid Bilayer





# Proteins



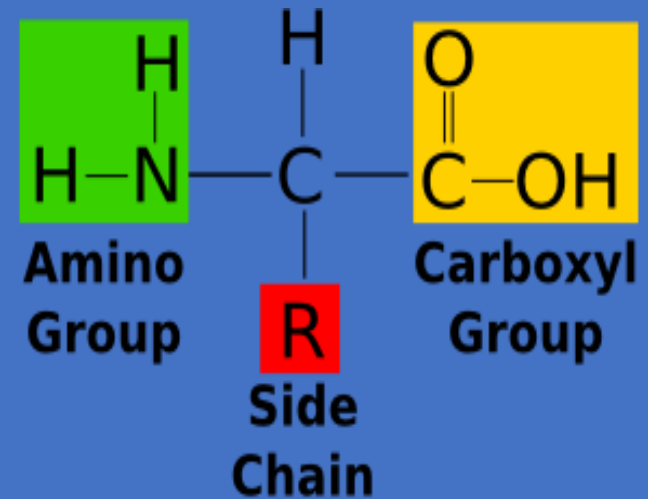
# PROTEIN

- ELEMENTS: C H O N (sometimes P and S)
- BUILDING BLOCKS (SUBUNITS): amino acids (there are 20 amino acids)



- FUNCTIONS:

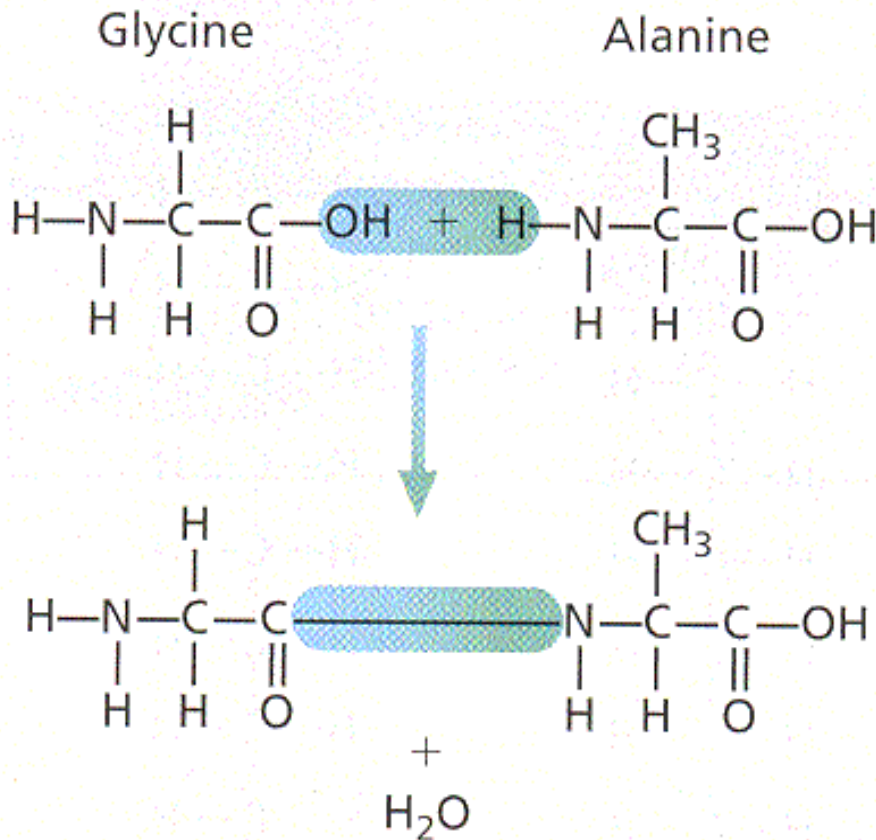
1. growth and repair
2. \*enzymes – speed reactions (End in –ASE)
3. Hormones –insulin, controls blood sugar
4. Immune System – antibodies and white blood cells
5. Hemoglobin – carries oxygen in the blood
6. nails, hair, muscle
7. last resort source of energy\*



- **SOURCES:** dairy products, peanuts, meat, fish

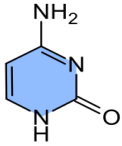
# BONDING OF AMINO ACIDS

- Amino acids bond together making proteins.
- C—N peptide bond forms between amino acids
- Amino acids end in: **ine or -ate**



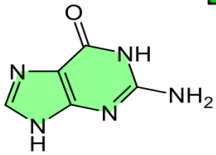
# Nucleic acids

Cytosine



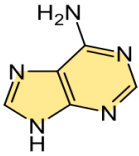
**C**

Guanine



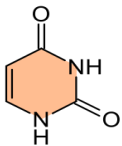
**G**

Adenine



**A**

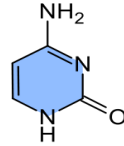
Uracil



**U**

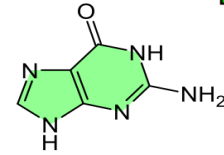
Nucleobases  
of RNA

Cytosine



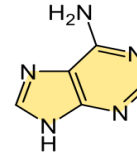
**C**

Guanine



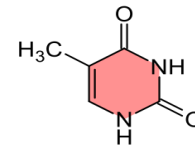
**G**

Adenine



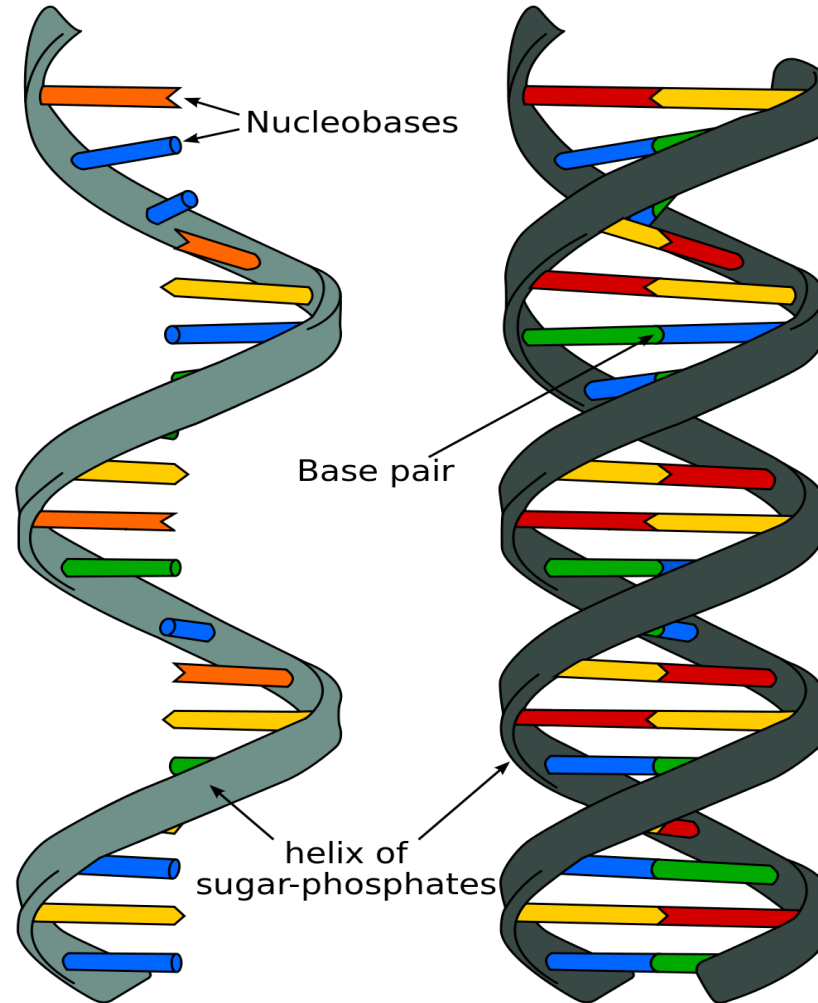
**A**

Thymine



**T**

Nucleobases  
of DNA



**RNA**

Ribonucleic acid

**DNA**

Deoxyribonucleic acid

# NUCLEIC ACIDS

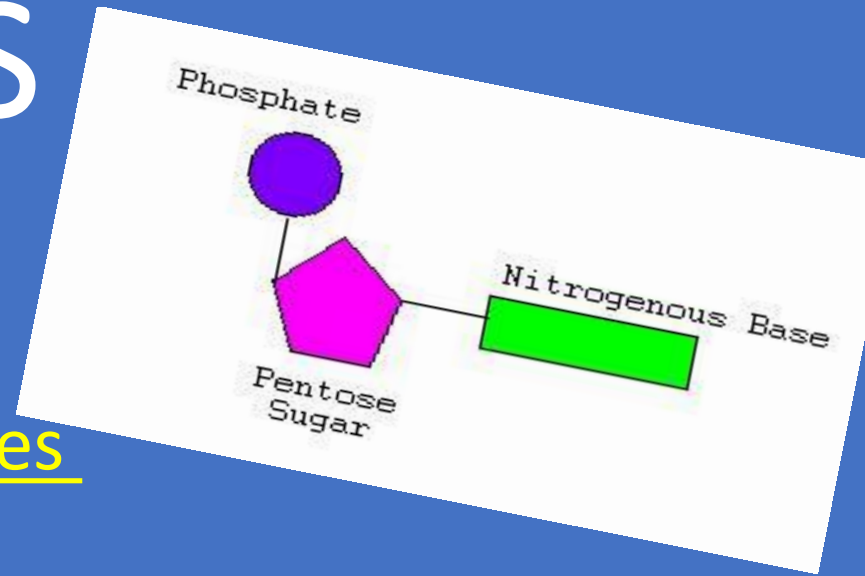
- ELEMENTS: C H O N P

- BUILDING BLOCKS: nucleotides

- Sugar + phosphate + N base

- FUNCTIONS:
  1. genetic blueprints
  2. transferring information

- EXAMPLES: DNA and RNA



**Nucleic acids** are composed of long chains of **nucleotides** linked by **dehydration synthesis**.

## Nucleotides include:

- phosphate group
- pentose sugar (5-carbon)
- nitrogenous bases:
  - ❖ adenine (A)
  - ❖ thymine (T) DNA only
  - ❖ uracil (U) RNA only
  - ❖ cytosine (C)
  - ❖ guanine (G)

