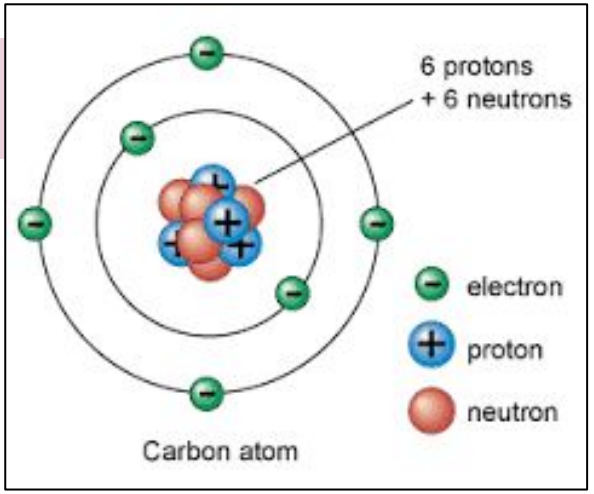
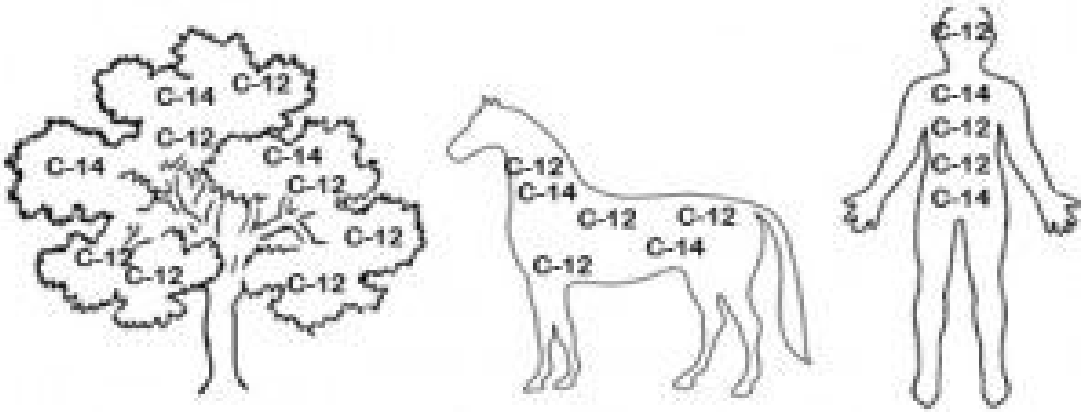
# 2.3 Carbon Compounds

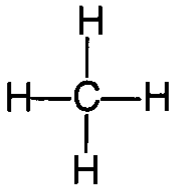



All living things contain carbon in some form.

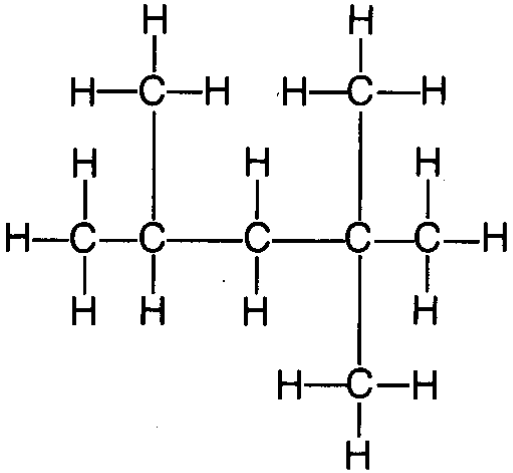
Carbon is the primary component of organic macromolecules



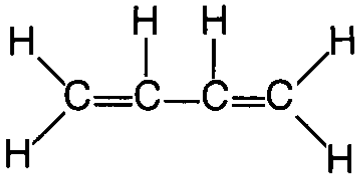
- Carbon atoms have 4 valence electrons
- Carbon atoms can bond to other carbon atoms forming chains



**Methane**

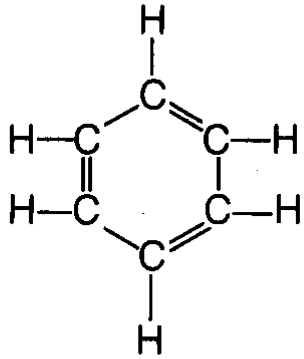


**Iso-Octane**



**Butadiene**

**Acetylene**



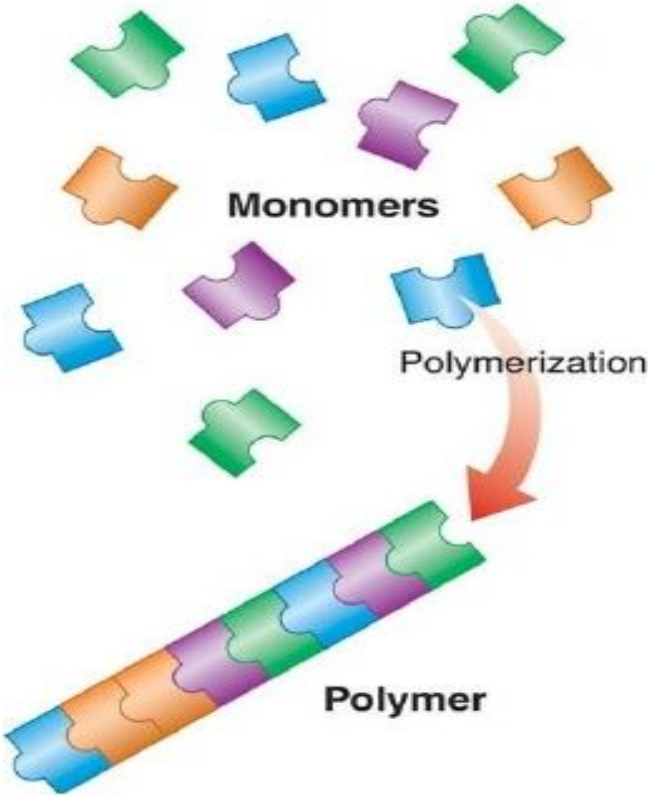
**Benzene**

**Macromolecules:** giant molecules
(macro= giant)

**monomers** : single units
(mono= one, mer= unit)

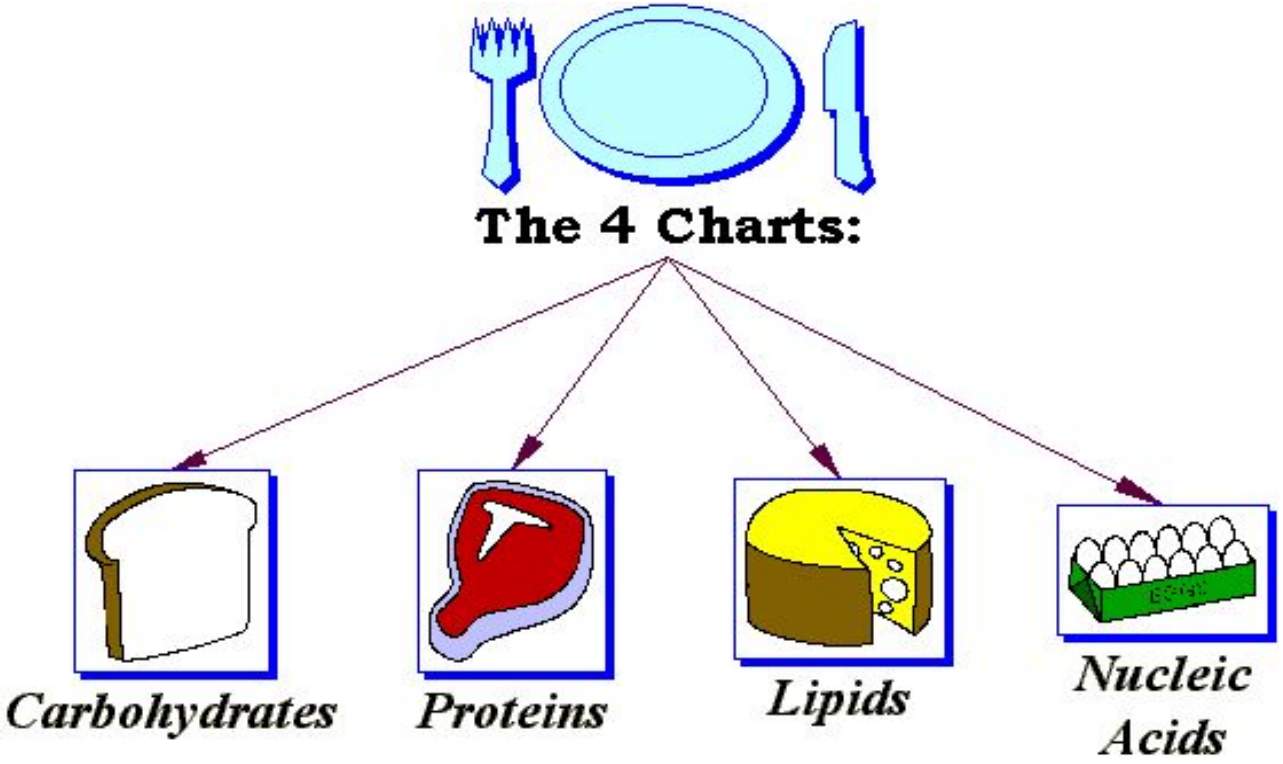
**polymers** : many monomers put together
(poly=many)

**Polymerization**: the process by
which macromolecules are formed

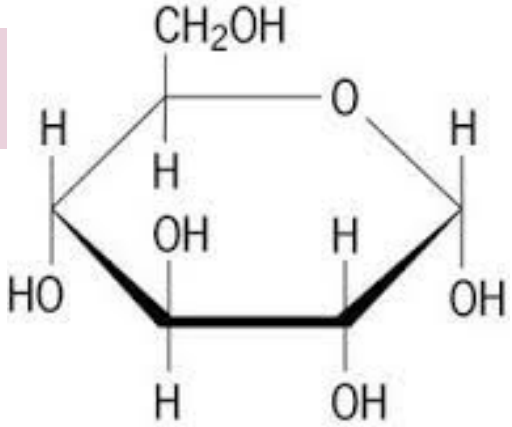


Organic compounds found in living things are organized into four groups:

1. Carbohydrates
2. Lipids
3. Nucleic acids
4. proteins



# Carbohydrates




**Carbohydrates**: compounds made of carbon, hydrogen, and oxygen atoms

- Main source of energy for many living things
- sugars are simple carbohydrates
- Starches and fibers are complex carbohydrates

Molasses
(Glucose)

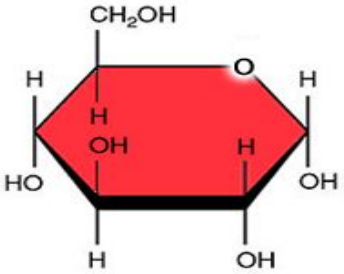
Cherries
(Fructose)

Yogurt
(Galactose)

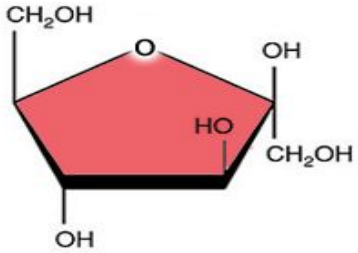
**<u>Monosaccharides</u>**:

Single sugar molecules

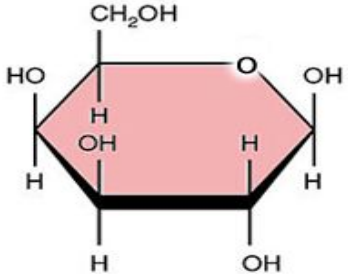
# Monosaccharides




Glucose



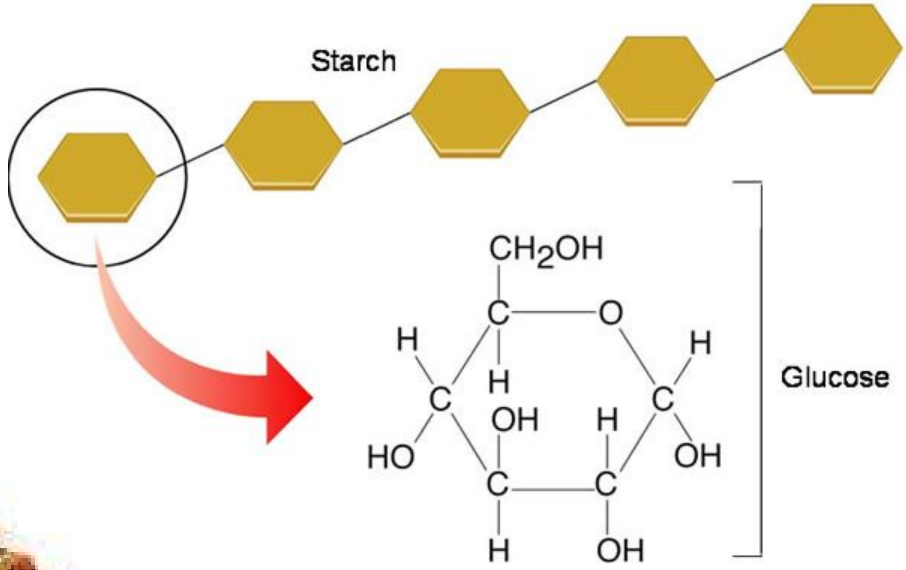

Fructose




Galactose

**Polysaccharides**:

Large molecules formed from monosaccharides

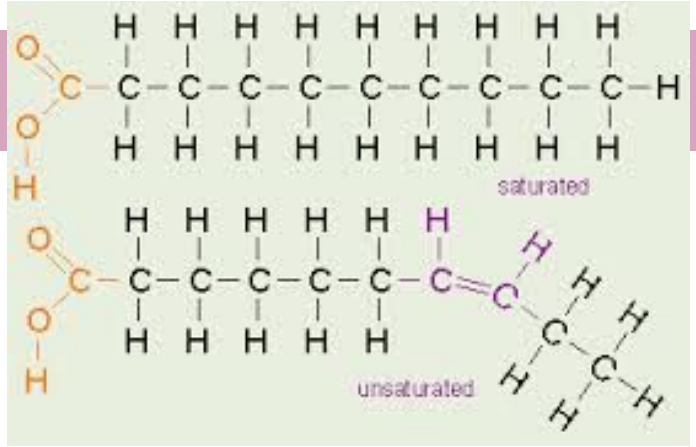




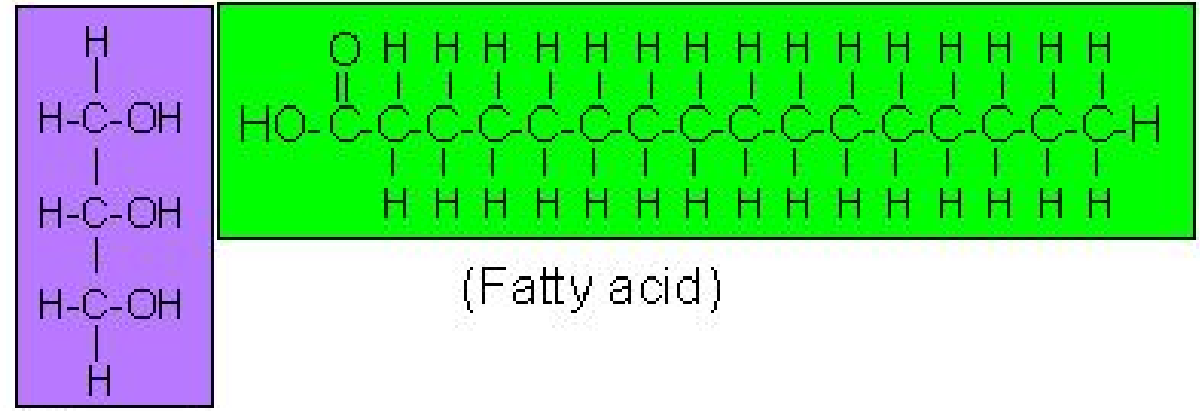
Cellulose

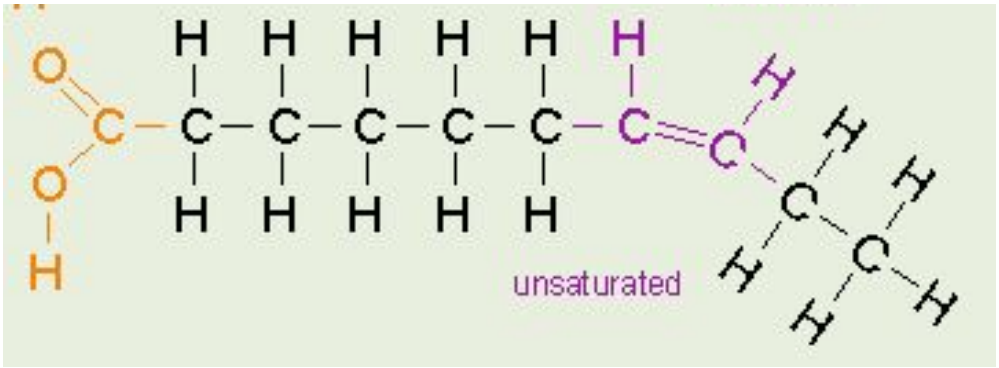
# Lipids

**Lipids**: made mostly of carbon and hydrogen atoms.



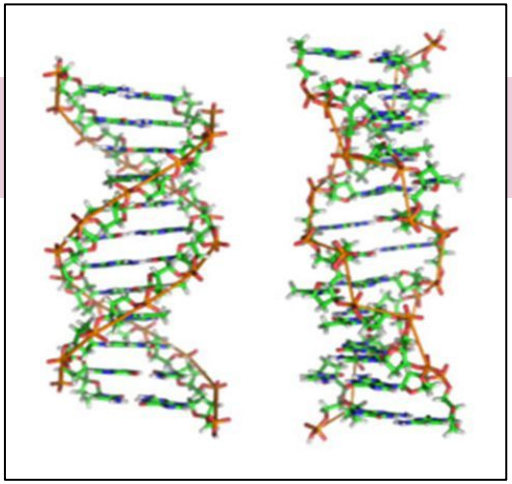

- fats, oils, and waxes
- can be used to store energy.
- important parts of biological membranes
- made up of fatty acids and glycerol




- Single bonded= saturated fat
- double bond= unsaturated fat (with hydrogens!)
- More than 1 double bond= polyunsaturated fat

# Nucleic Acids

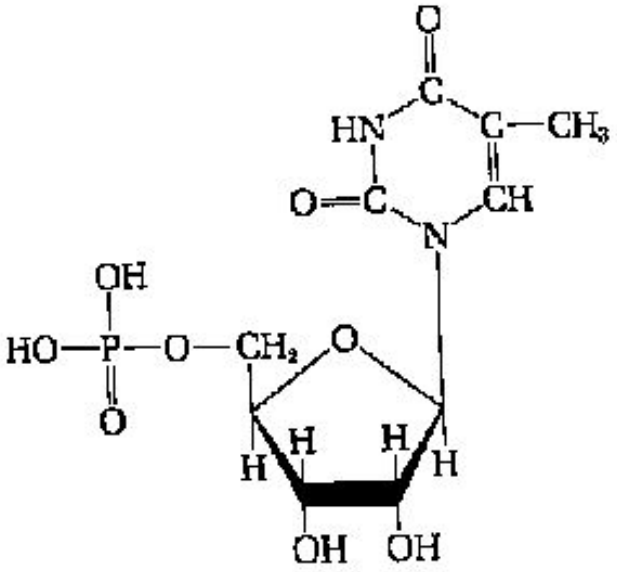


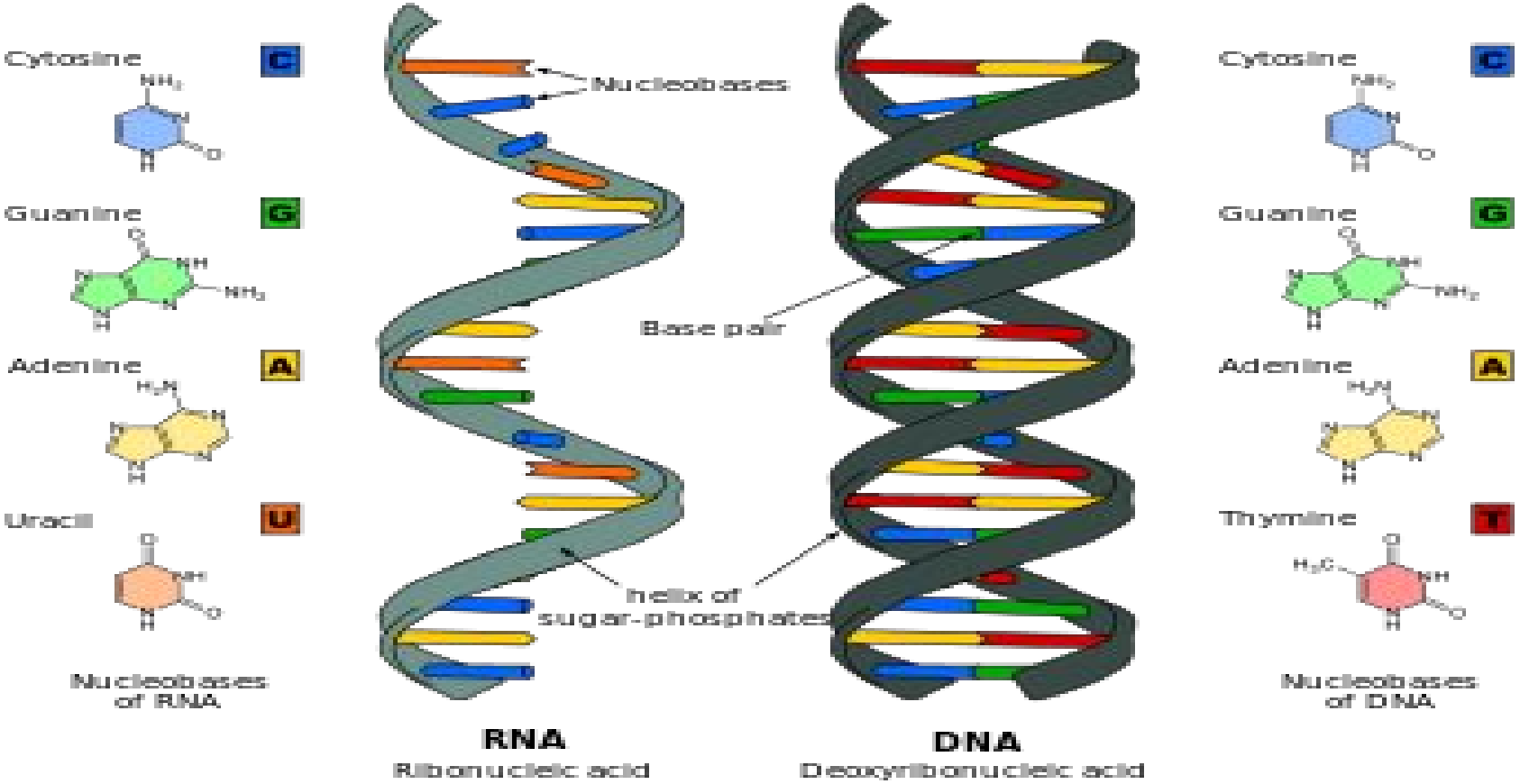
**Nucleic acids:** contain hydrogen, oxygen, nitrogen, carbon, and phosphorus.

- store and transmit genetic information

**Nucleotides**: monomer of nucleic acids

- 5-carbon sugar
- a phosphate group
- a nitrogenous base.





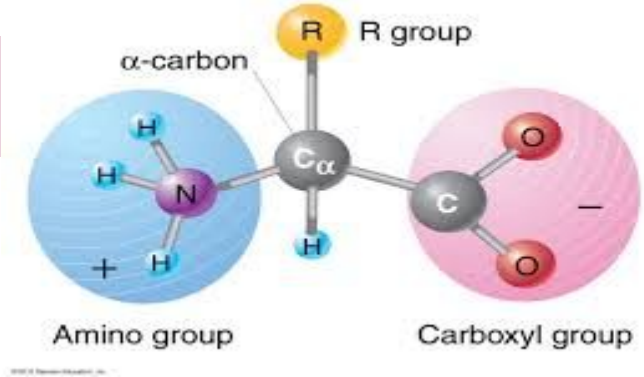

**Ribonucleic acid** (RNA): contains the sugar ribose

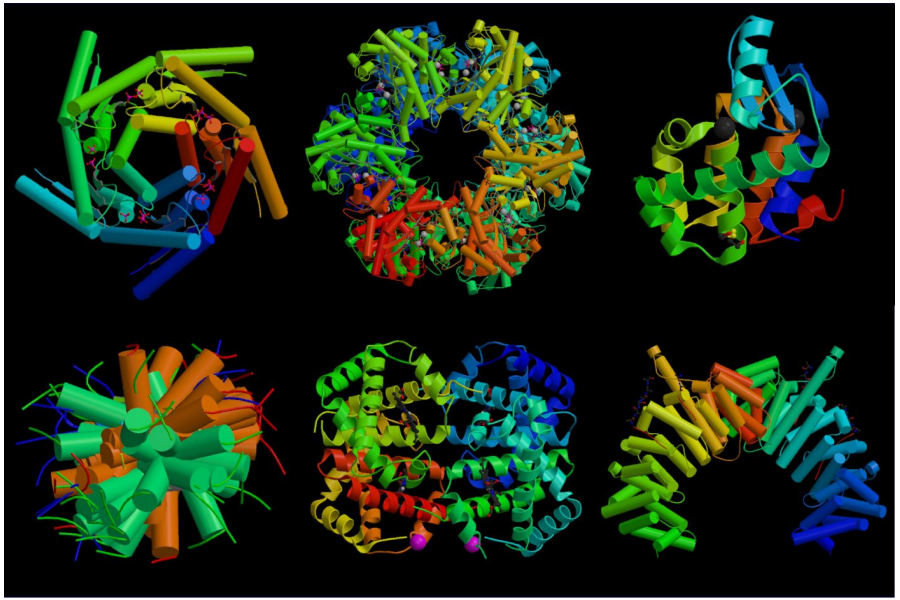
**Deoxyribonucleic acid** (DNA): contains the sugar deoxyribose

# Proteins

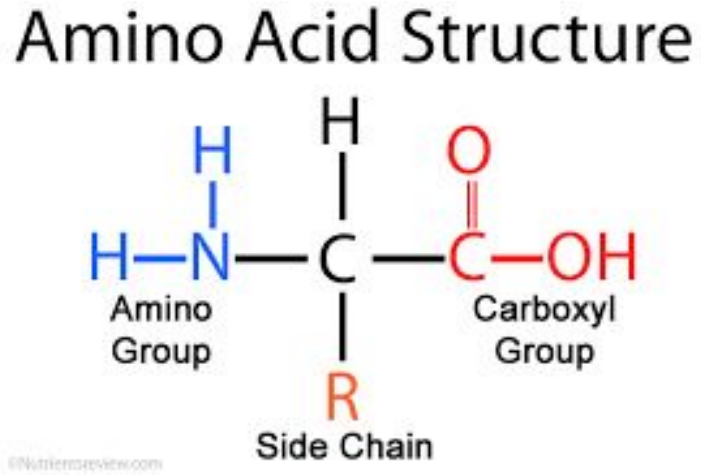
**Proteins** are macromolecules that contain nitrogen as well as carbon, hydrogen, and oxygen.

Proteins are polymers of molecules called **amino acids**.



Amino acids are compounds with an amino group ($-NH_2$) on one end and a carboxyl group on the other end (-COOH)




More than 20 different amino acids are found in nature.