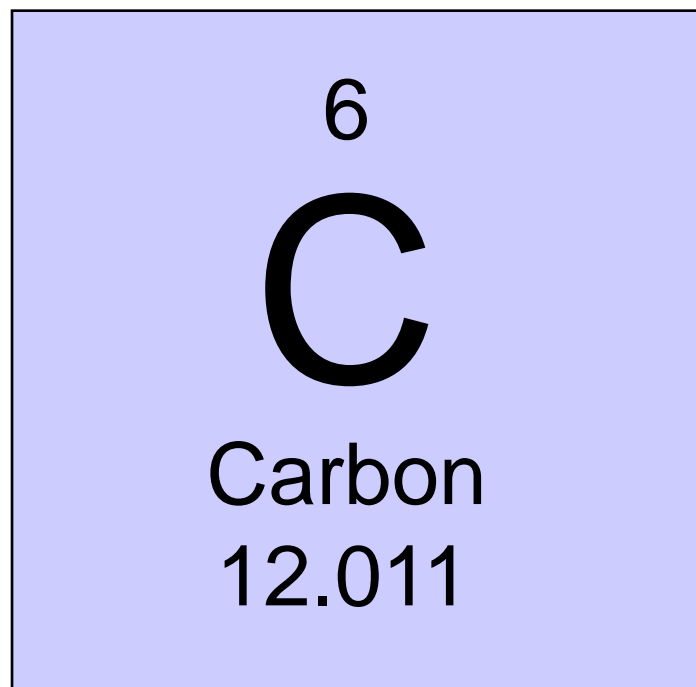


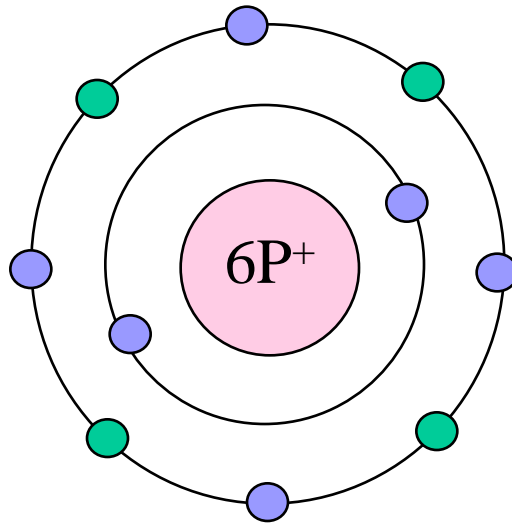
Chapter 2-3  
Carbon Compounds

A. **Organic** compounds- originally thought to be compounds produced by living organism, now it refers to compounds containing **carbon**.



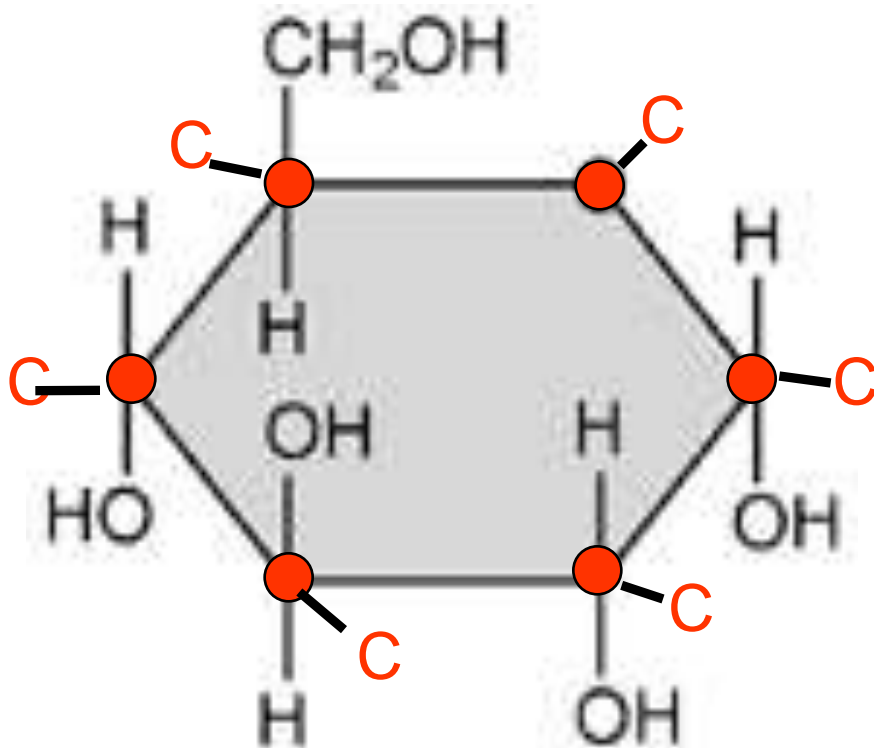
1. The **carbon** atom is unique and carbon compounds are found in **living** organisms.

a. Carbon atoms have **4** valence electrons

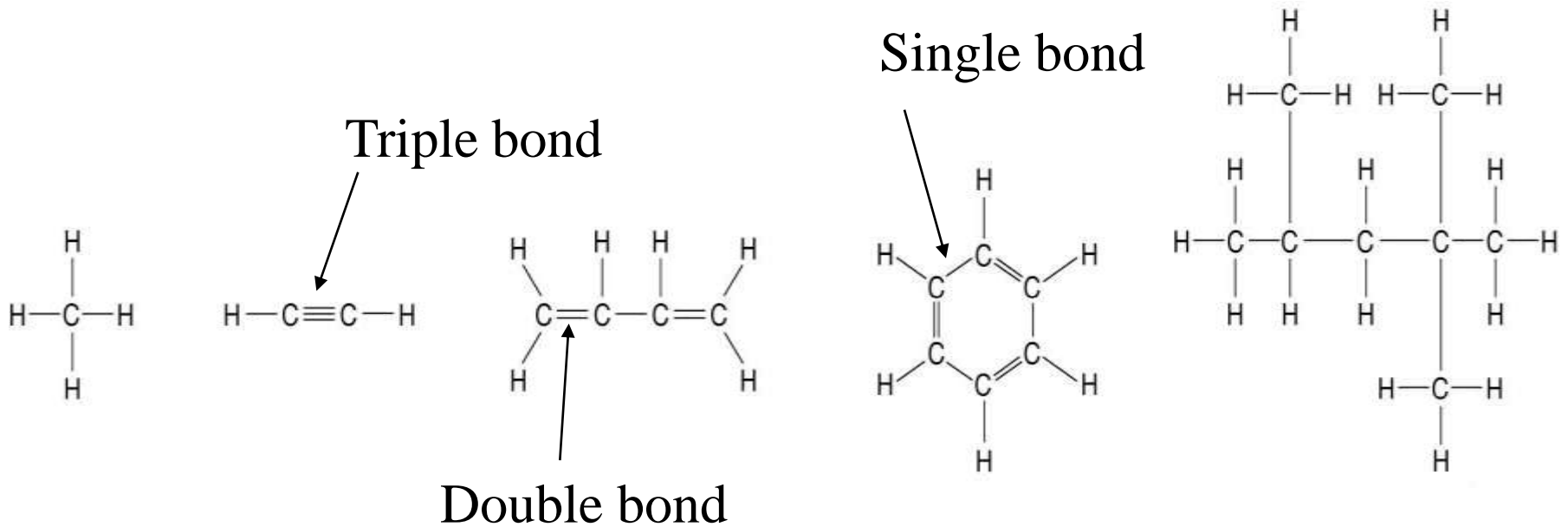


Carbon atoms need to share with 4 additional electrons to achieve an octet— this opens up all sorts of bonding possibilities.

b. Carbon atoms can bond to other carbon atoms so that carbon compounds can form chains and rings.



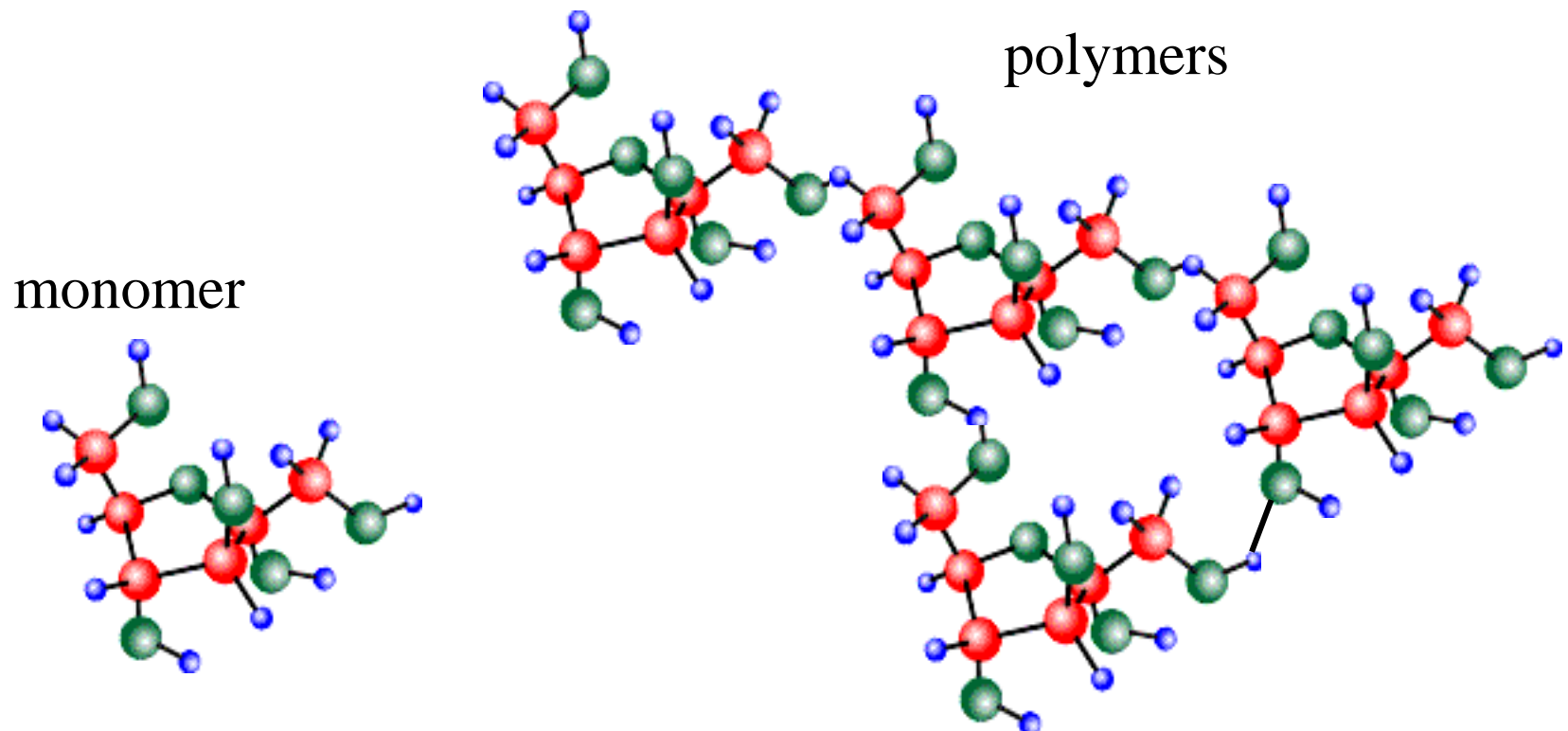
c. Carbon can form millions of different large and complex structures. It is a great building material for living organisms.



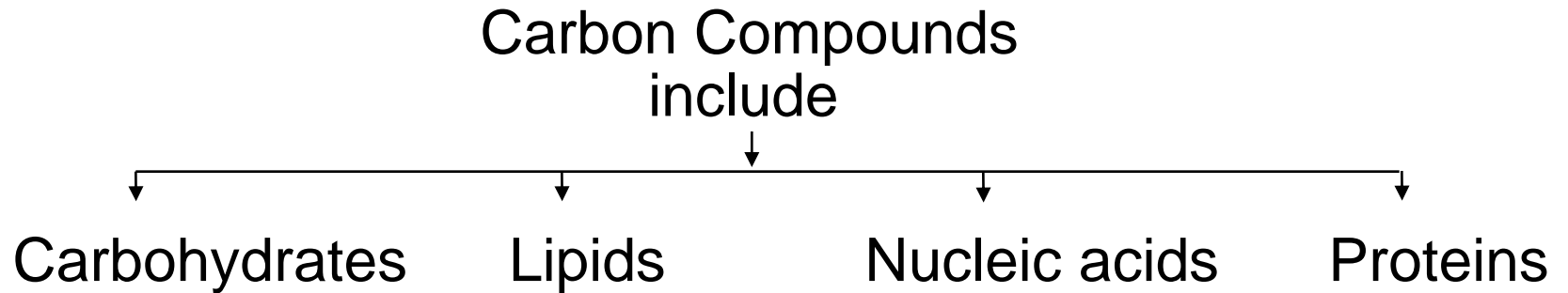
1. **Macromolecules**—giant molecules made from smaller molecules.

a) Formed from **polymerization**, the joining of smaller molecules into large molecules.

b) Smaller molecules are called **monomers** and when joined together form **polymers**.

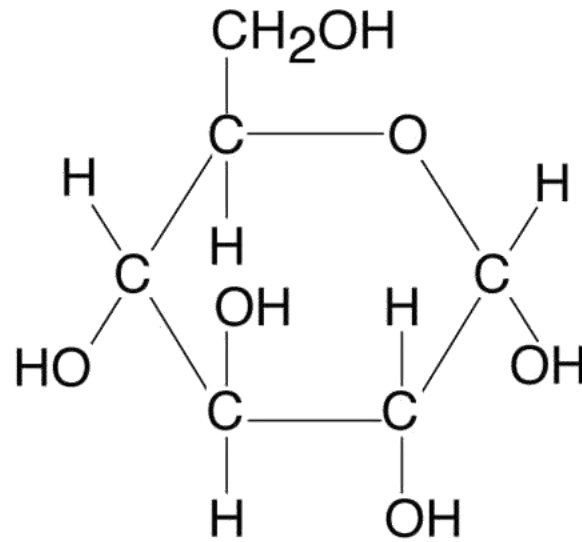


2. Organic (C) compounds are classified into 4 groups.



a. **Carbohydrates**—

1. Compounds made of **carbon, hydrogen and oxygen**
2. glucose is an example:  **$C_6H_{12}O_6$**

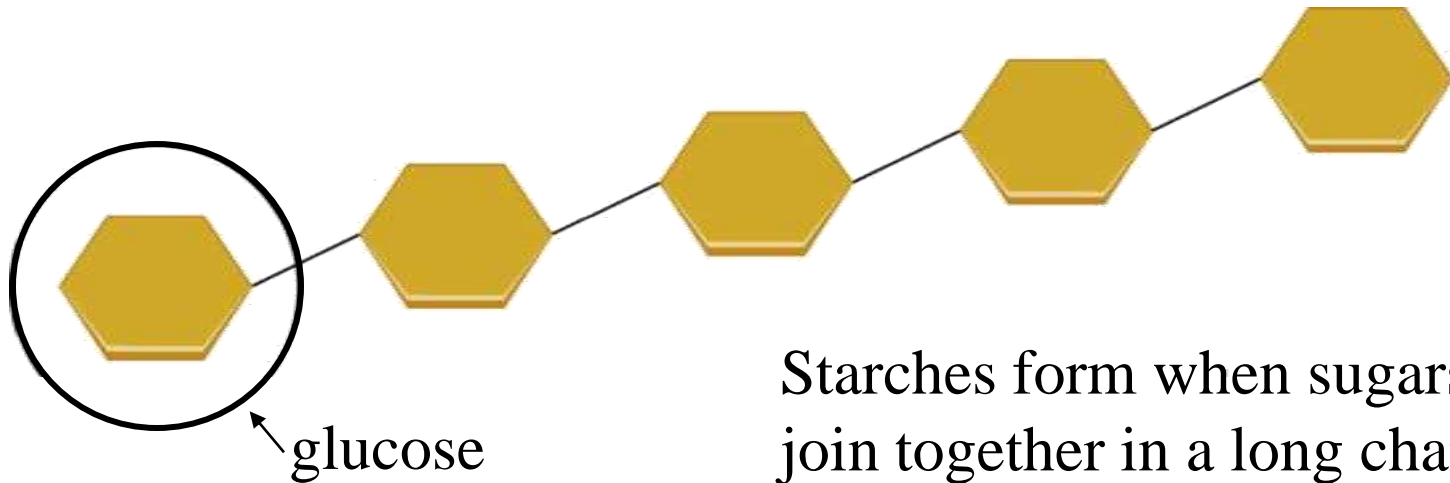




3. The ratio between elements is usually **1:2:1**
  
4. Functions are a source of **quick energy** and structural building.
  
5. **Sugars** and **starches** are carbohydrates

6. Simple sugars are known as **monosaccharides**, examples would include glucose, galactose and fructose.

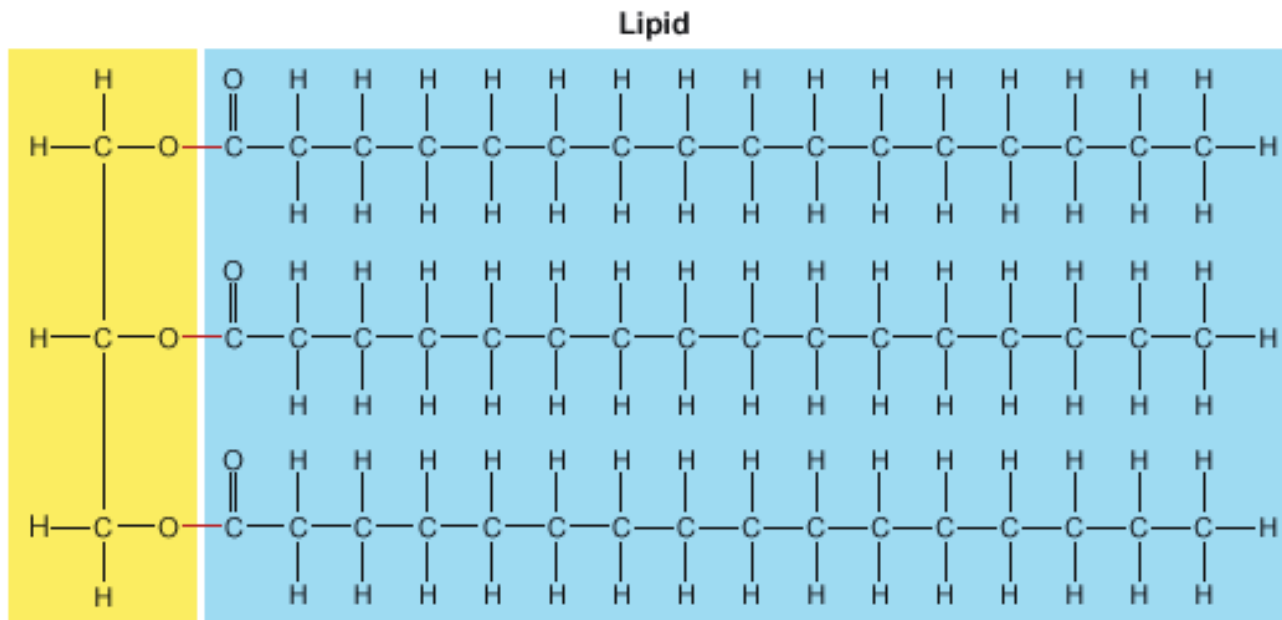
7. **Polysaccharides** are complex sugars made from monosaccharides, examples would be glycogen ( a starch), and cellulose.



b. **Lipids**—

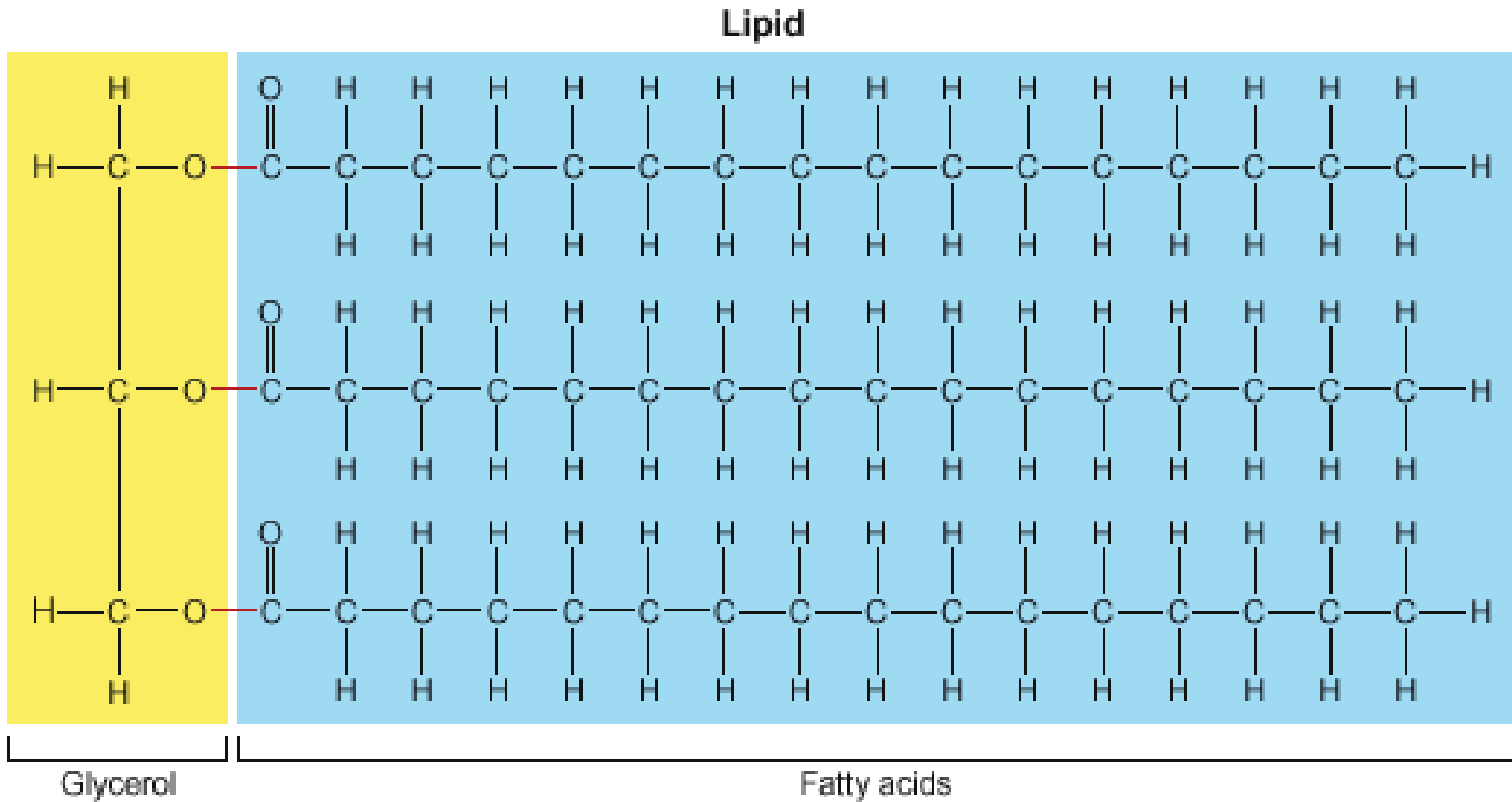
1. Compounds made of **carbon, hydrogen and oxygen**

2.  $C_{54}H_{98}O_6$

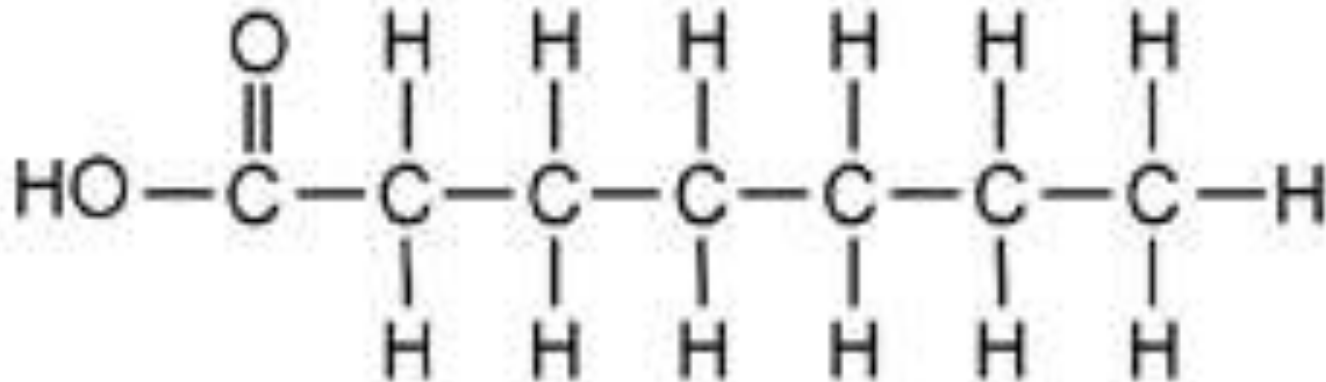


3. Fats, oils, waxes

4. 3 Fatty acids and 1 glycerol are the smaller molecules that compose lipids

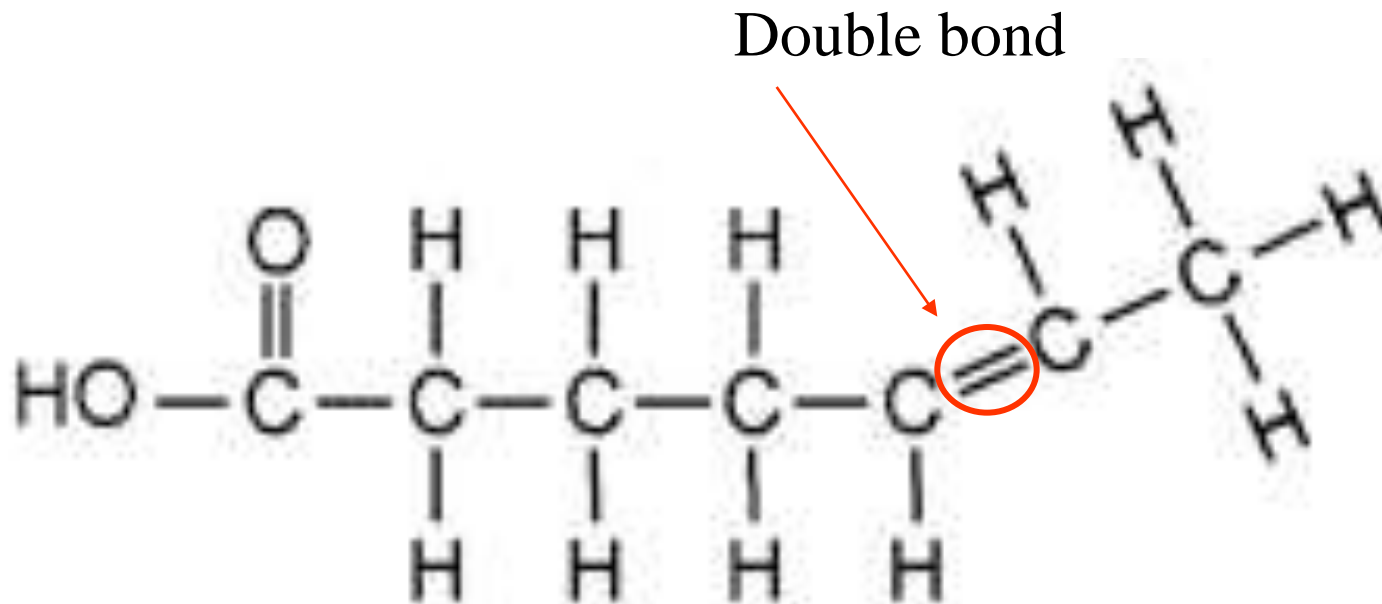


5. **Saturated**- this term refers to a lipid compound that has C atoms joined to other C atoms by **single** bonds. This allows the **maximum** number of **H** atoms to bond to the C atoms.



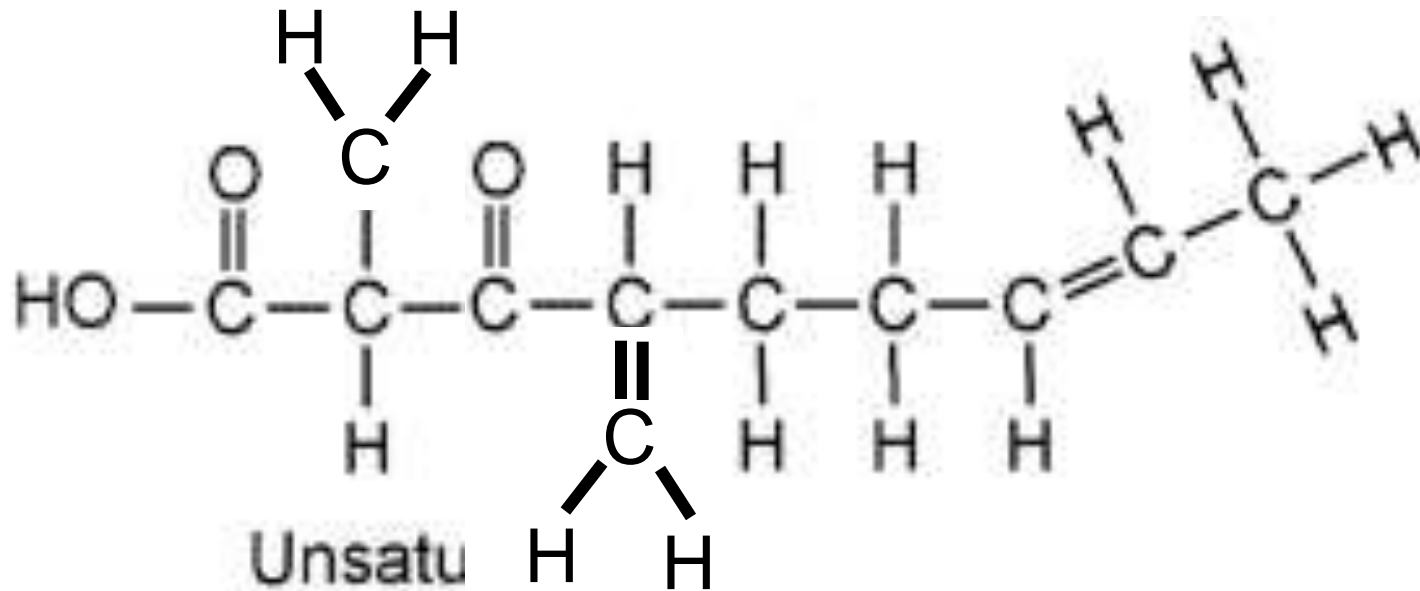
Saturated fatty acid

6. **Unsaturated**- this refers to a lipid compound that has **at least 1 double** bond between C atoms. This means that the maximum number of H atoms are **not** bonded to the C atoms.



Unsaturated fatty acid

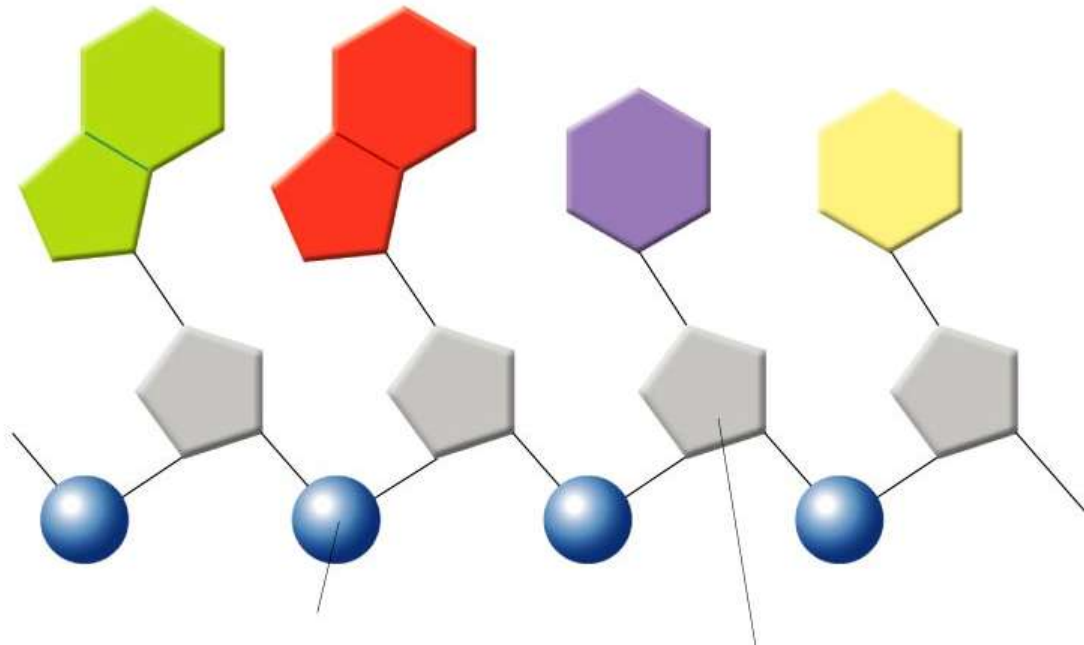
7. **Polyunsaturated**- lipid compounds that have **more than 1 double bond** between C atoms.



Unsaturated fatty acid

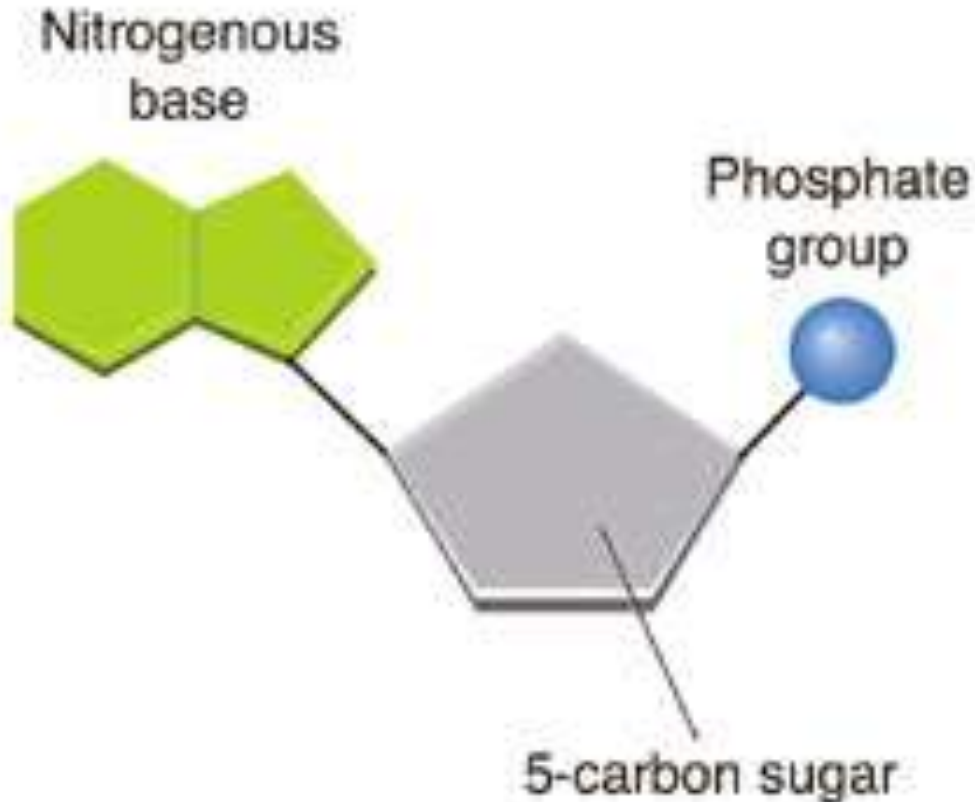
c. **Nucleic Acids**—

1. Macromolecules containing **carbon, hydrogen, oxygen, nitrogen and phosphorus.**
2. Composed of smaller molecules (monomers) called **nucleotides.**





a) **Nucleotides** are composed of **3** parts: **5 C sugar**, a **phosphate** group and a **nitrogenous** base.

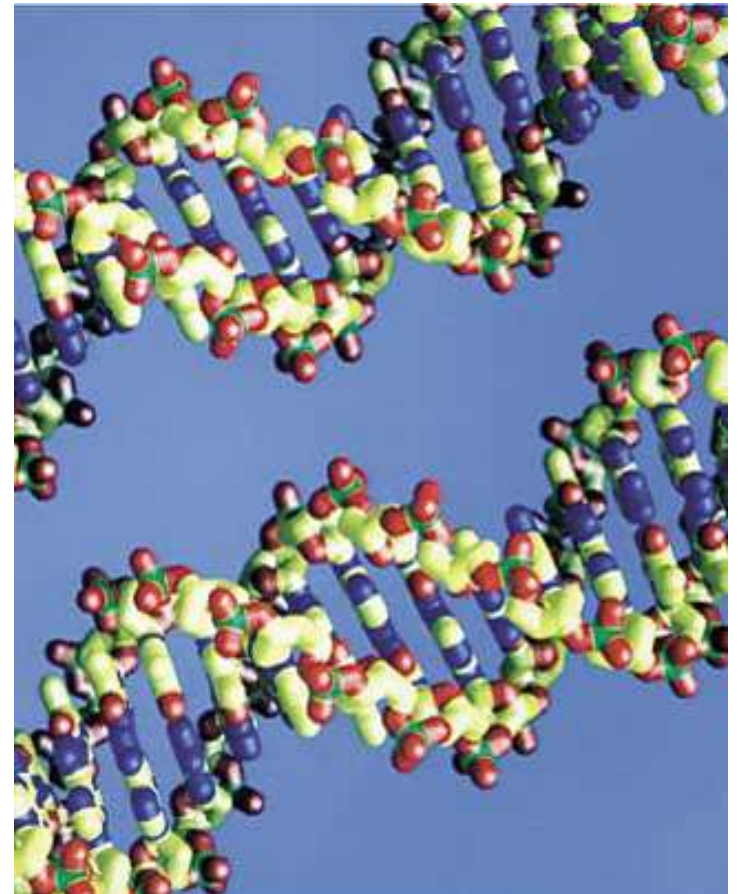


3. Stores and transmits **genetic** information.

4. **2** types:

a) **RNA**- ribonucleic acid:  
ribose sugar, **translates** the  
genetic information

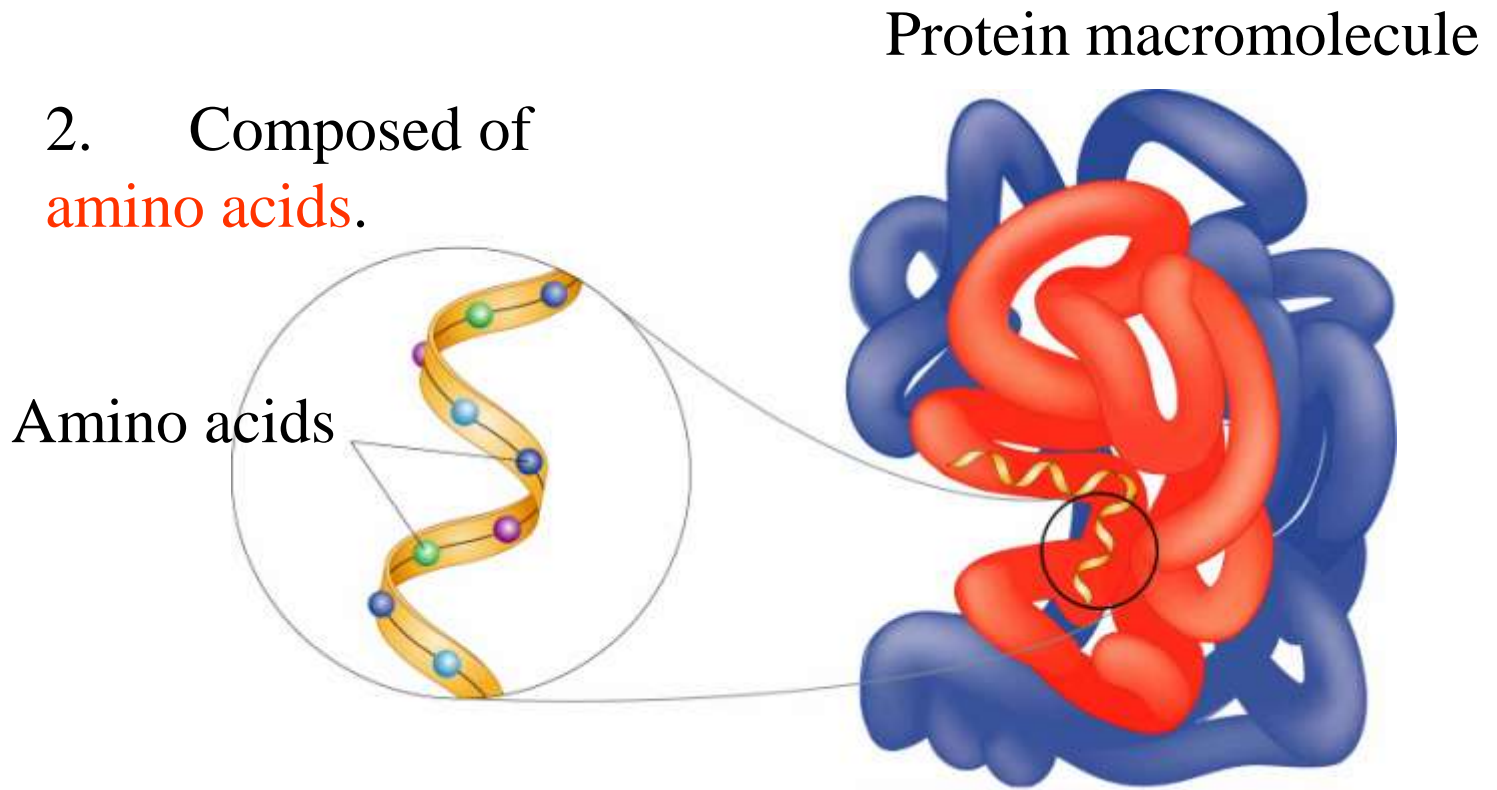
b) **DNA**- deoxyribonucleic  
acid: deoxyribose sugar,  
**stores** the genetic  
information



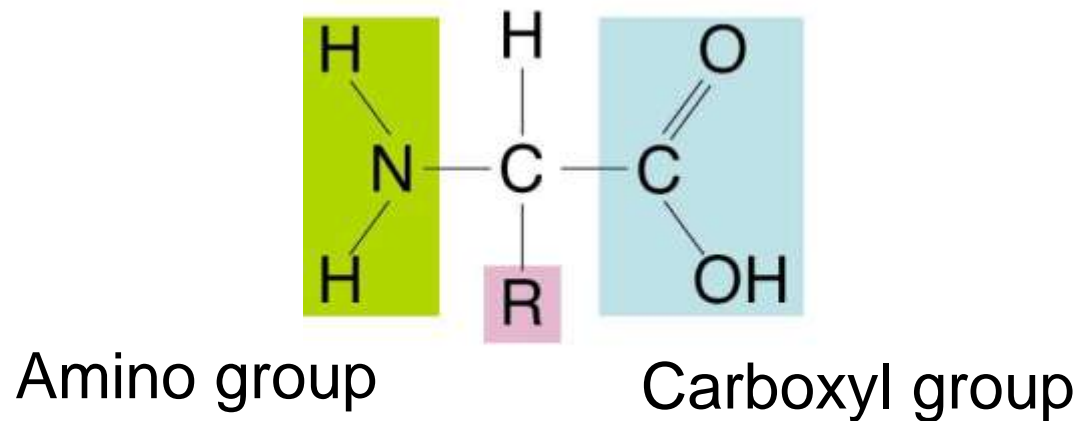
d. **Proteins**

1. Macromolecules that contain **Carbon, Hydrogen, Oxygen and Nitrogen.**

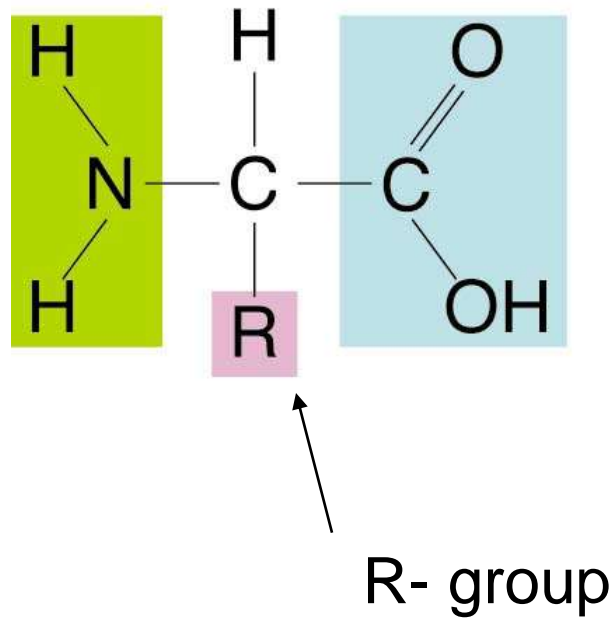
2. Composed of **amino acids.**



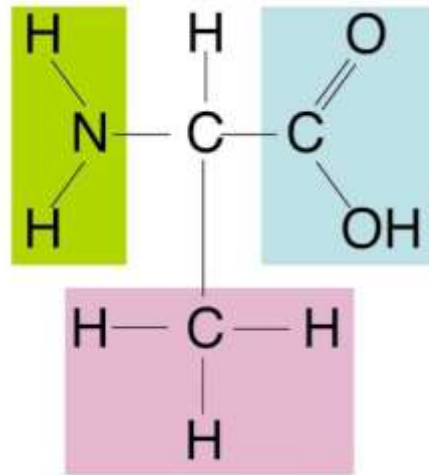
a) Amino acids are smaller molecules with an **amino** group ( -- **NH<sub>2</sub>**) on one end and a **carboxyl** group ( -- **COOH**) on the other.



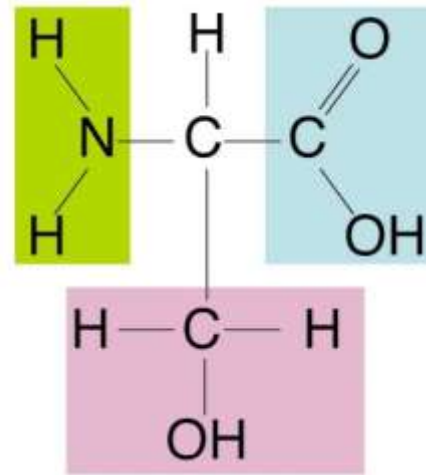
b) The section of the amino acids that is different is called an **R**-group.



R-groups have a variety of characteristics which we use to classify amino acids into different levels.



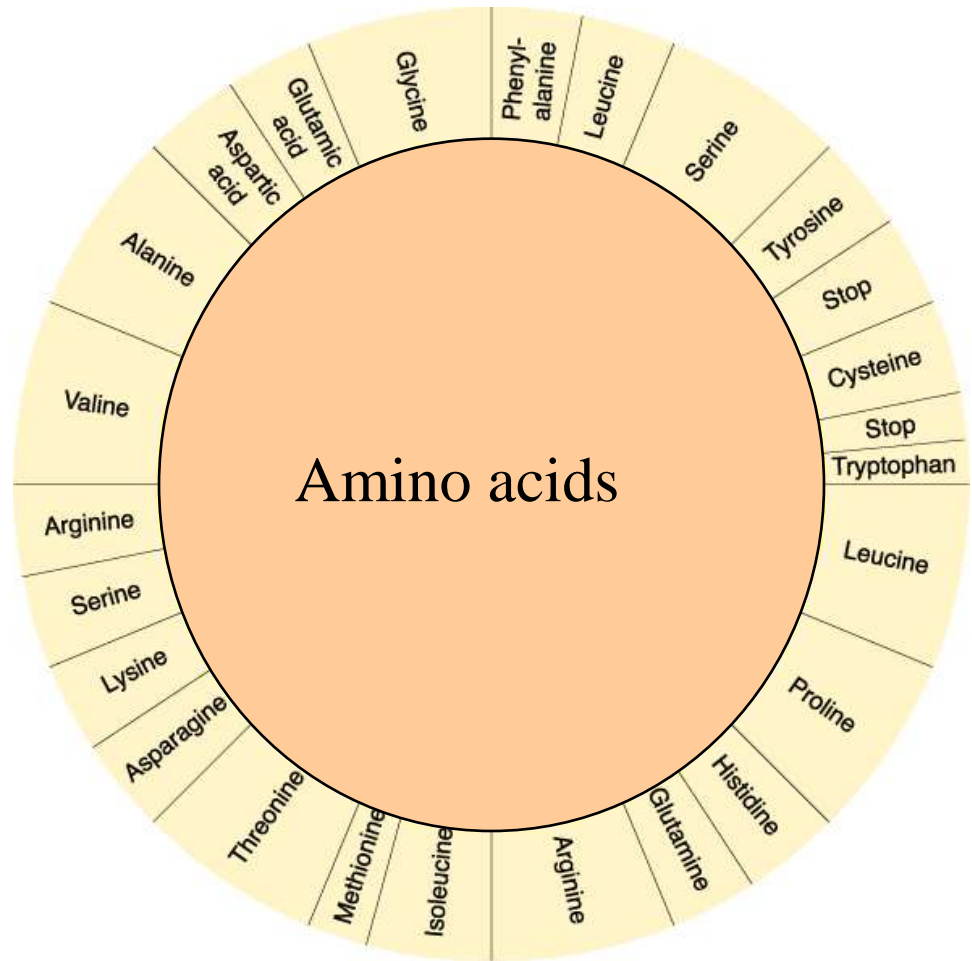
Alanine



Serine

- c) There are 4 levels based on their structure.
- 1) The sequence of amino acids in a protein chain
  - 2) Amino acids within a chain can be twisted or folded
  - 3) The chain itself is folded and
  - 4) If multiple chains, the specific arrangement in space.

3. There are more than **20** amino acids which can be joined together to form a **huge** variety of proteins.





4. These proteins are extremely large molecules and are used for:

a) **building structures,**

b) **hormones** or

c) **enzymes.**

