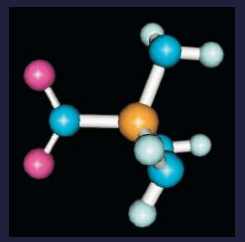
Biological Compounds

Chapter 24 Section 4

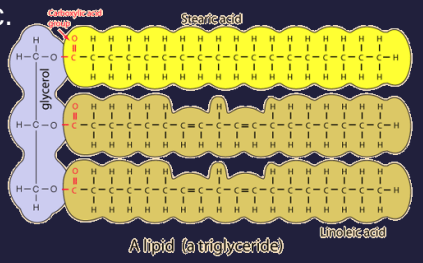
Organic compounds

- Carbon compounds: contain carbon and are important to living things
- Macromolecules: really large organic compounds
- **4 types of macromolecules**
  - **Lipids**
  - **Carbohydrates**
  - **Proteins**
  - **Nucleic acids (DNA)**

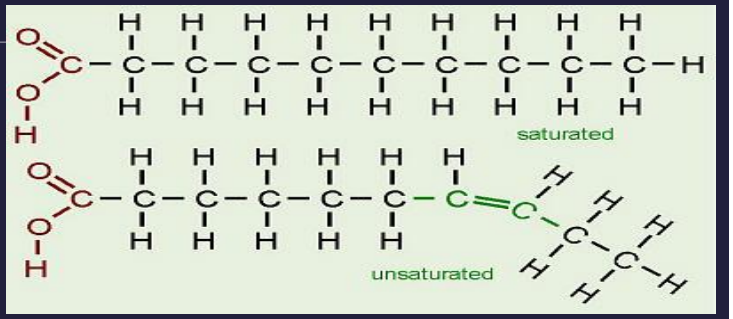


Lipids – what are they?

- Contain only carbon, hydrogen & **oxygen**
- Include “oils” (liquid at room temp)
- Include “fats” (solid at room temp)
- Examples: cholesterol, olive oil, butter, vegetable oil, etc.



Fatty Acids Are Long Hydrocarbons with a Carboxylic Acid Functional Group



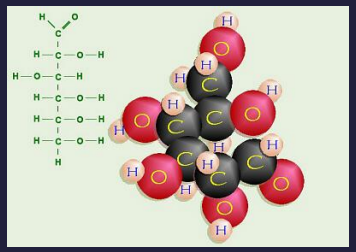
- **Saturated** fatty acids usually come from animal sources and are solid at room temperature, these are high in caloric value. (“Saturated” lipids are more likely to clog arteries)
- **Unsaturated** fatty acids usually come from plant sources and are liquid at room temperature, these are lower in caloric value.

Lipids – why are they important?

- Used to store lots of energy (fat)
- Fats more difficult to break down (metabolize), but store more energy than carbohydrates Fats in animal bodies play important in thermal insulation
- Lipid coating around nerves acts as electrical insulation
- Oil and Wax on surface of skin, fur, and feathers repel water

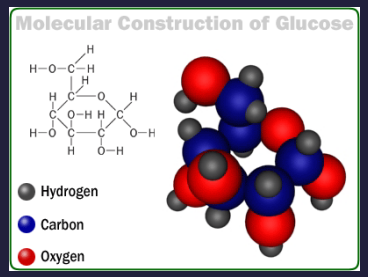
Carbohydrates – what are they?

- Contain carbon, hydrogen, and oxygen
- Include Sugars and Starches
  - Fructose (honey, fruit sugar)
  - Lactose, lactose (dairy products)
  - Glucose (very common in starches)



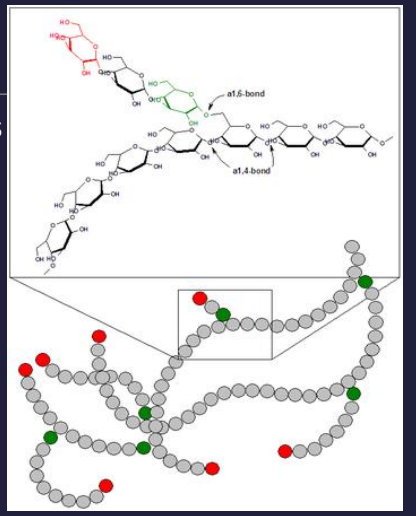
Carbohydrates – glucose

- Most living things use glucose to release energy and produce carbon dioxide
- Complex carbohydrates are easily broken down into glucose
- Fats can be broken down into glucose, slowly



Glycogen

- Energy from starches can be stored in liver and muscle cells in the form of glycogen.

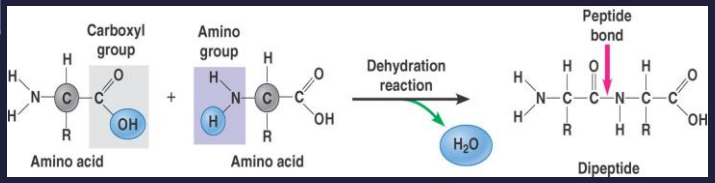


Carbohydrates - why are they important?

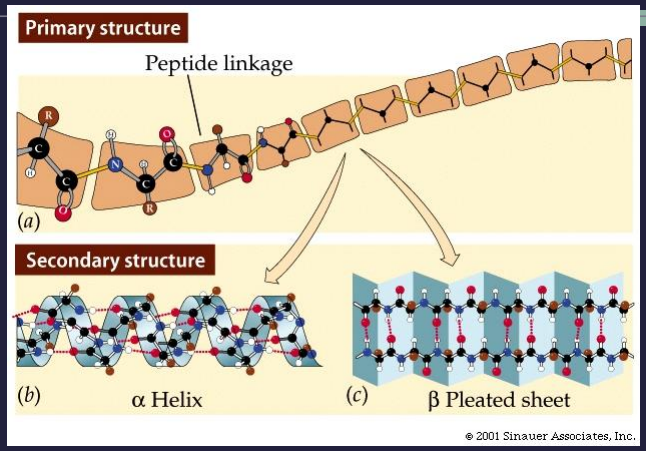
- Starch (plants) and glycogen (animals) can be very quickly broken down into glucose
- Glucose is easily metabolized to release energy
- Starch, glycogen, carbs in general – contain less energy than lipids, but are easier to metabolize

Proteins – what are they?

- Contain carbon, hydrogen, oxygen, and **nitrogen**
- They are macromolecules made of amino acids joined together
- Each amino acid contains a(n)
  - carboxylic acid (-COOH)
  - amine group ($-NH_2$)



Proteins – what do they look like?

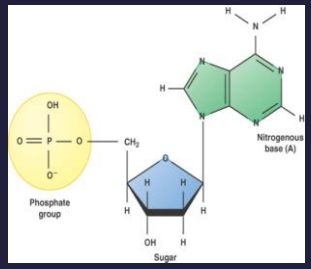


Proteins – why are they important?

- Proteins:
  - Form muscles, bone, other important structures
  - Move materials in and out of cells
  - Helps with immune responses
  - Control the rate of chemical reactions

Nucleic Acids-what are they

- Nucleic Acids are polymers specialized for the storage, transmission, and use of genetic information
  - Sugar
    - Carbon, hydrogen, oxygen
  - Nitrogen base (C, H, N)
  - Phosphate group (P, O, H)



Nucleic Acid

- Two types
  - DNA (deoxyribonucleic acids)
    DNA is a informational molecule that carries genetic information
  - RNA (ribonucleic acids)