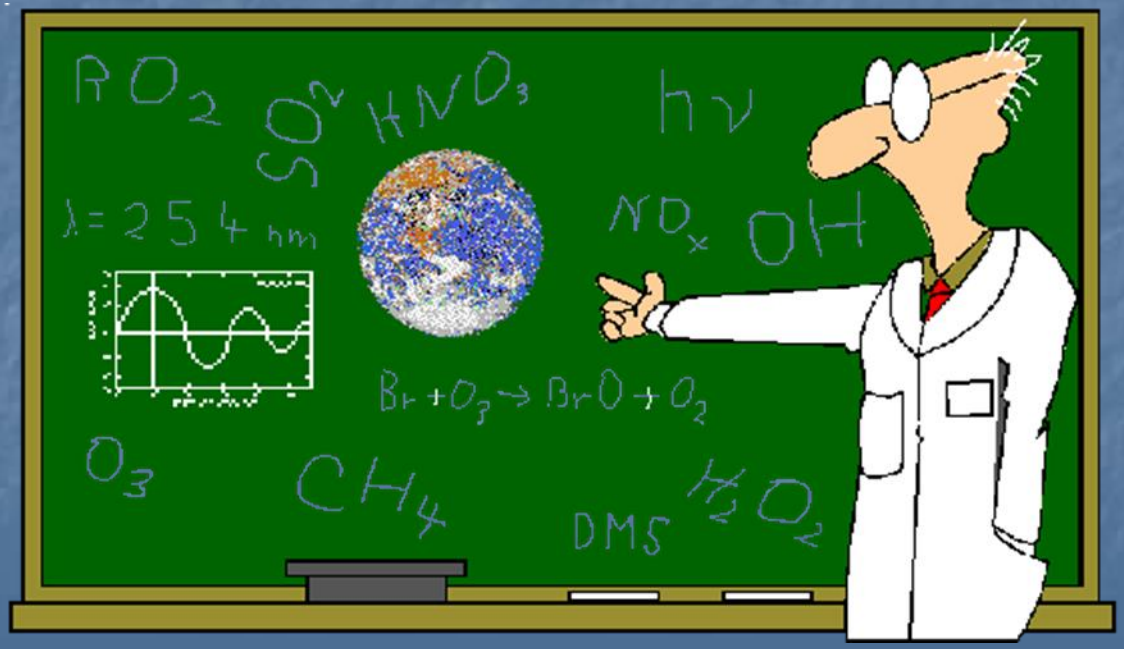
Substances of Life: Macromolecules

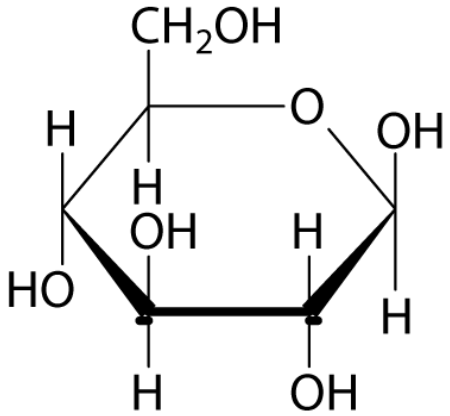


Function of the four ~~Macromolecules of Life:~~

- Carbohydrates
- Lipids
- Proteins
- Nucleic Acids

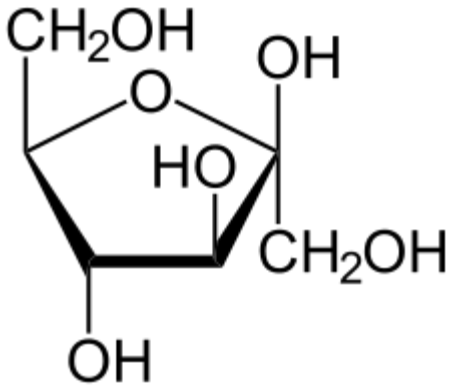
Carbohydrates

- Glucose (a monosaccharide)



RING SHAPE,
C, H, O (1:2:1)

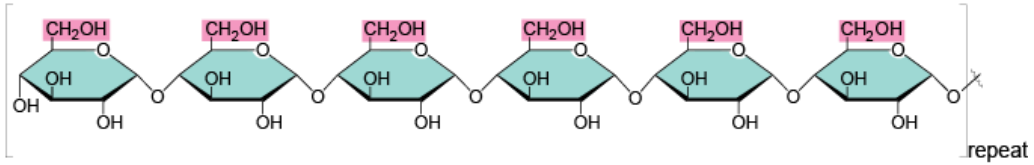
- Fructose (a monosaccharide)



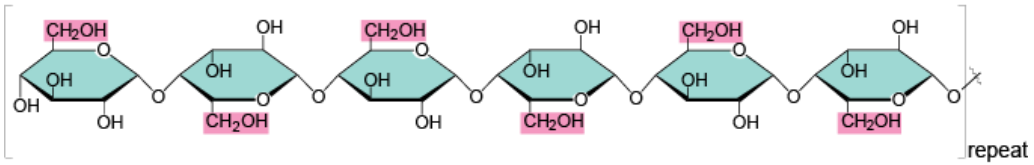
How can you recognize a carbohydrate?

- A polysaccharide is a chain of monosaccharides (more than two)!

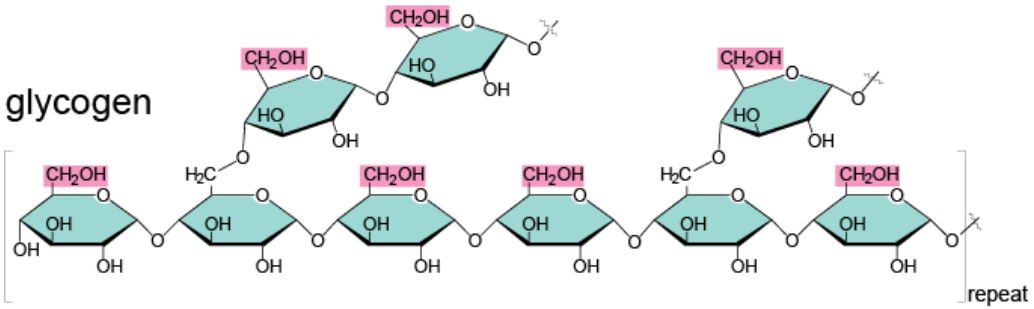
starch



cellulose



glycogen



Function of Polysaccharide Carbohydrates:

- Carbohydrates are for QUICK energy!
  - **Starch** – food storage in plants
    - Stores ATP
  - **Glycogen** – food storage in animals
    - Stores ATP
- They are also for structure
  - **Cellulose** – in cell walls of plants for support

Lipids

- Contain **C, H, O** (ratio: 1:2:low #)
- Insoluble in water (lipids are hydrophobic)
- Lipids are used for long term energy storage, insulation, and protective coatings (cuticle on plant leaves, blubber)

- **Contain Glycerol and Fatty Acids**

Two kinds:

Saturated and Unsaturated

Saturated Fats

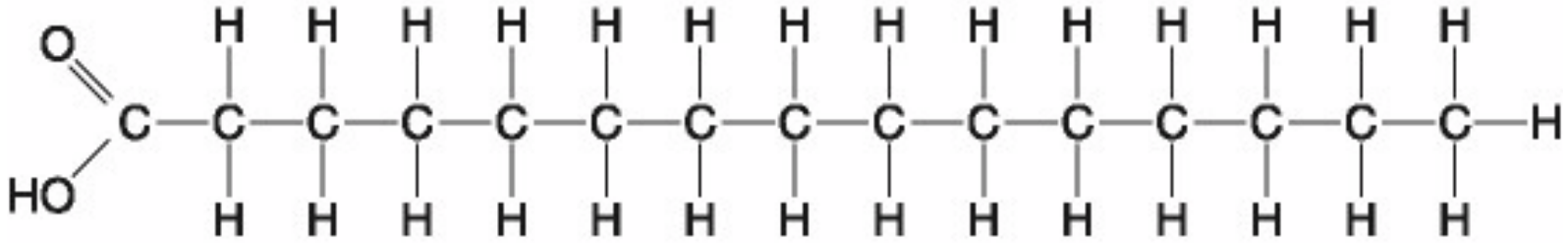
- Saturated fats are saturated (surrounded) by Hydrogen, these are the fats that are considered NOT good for you (but you do need some to remain healthy)
- Solid at room temperature
- Examples are oils, butter, animal fat, cheese, cream

Unsaturated Fats

- Unsaturated fats are not surrounded by hydrogen, they contain double bonds and kinks in their structure. These are considered good for you.
- Liquid at room temperature
- Examples are oils from plants (sunflower, corn, olive), nuts, peanut butter, avocado

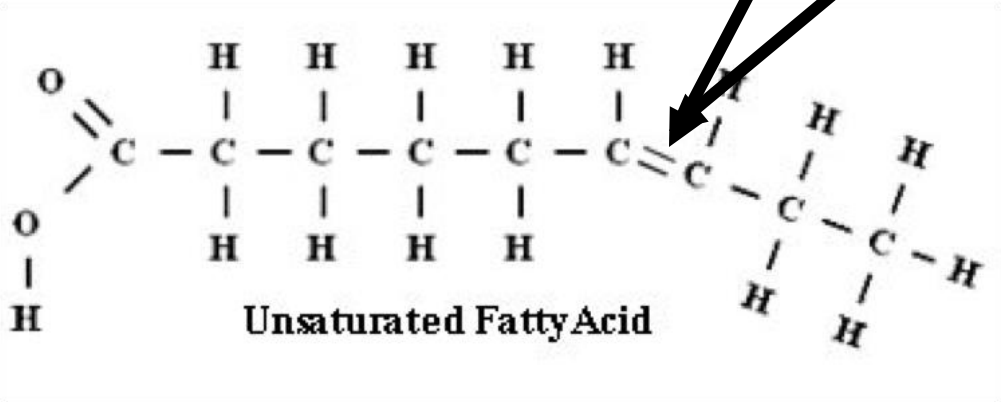
How can you recognize lipids?

- This is a saturated fat (think: surrounded by hydrogens, single bonds)

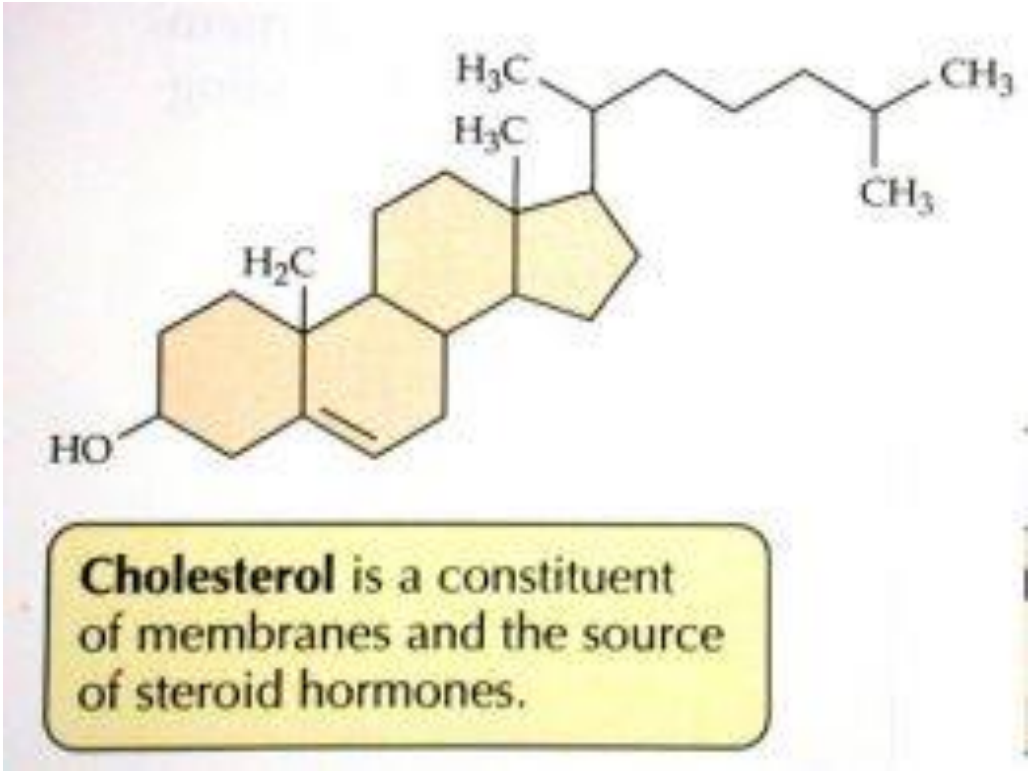


How can you recognize lipids?

- This is unsaturated fat (think: NOT surrounded by hydrogens, Double Bonds and sometimes kinks)



Another type of lipid - cholesterol



Proteins

- Contain C, H, O, N & sometimes S
- Made up of a chain of amino acids – the order of the amino acids is important to make different proteins
- Also called polypeptides

Proteins are . . .

- The major building blocks of our cells and organs
- Used in muscle contraction
- Used for transporting substances like oxygen in the bloodstream
- Providers of immunity
- Used to carry out chemical reactions as enzymes
- Types: motor, structural, transport, enzymes, receptor, contractile, defensive

Enzymes

* Most enzymes are proteins
* Enzymes speed up chemical reactions in the body

  -the enzyme bonds to a substrate at an active site

  -enzyme names typically end in -ase

  -enzymes cause the reactions breaking down molecules or building molecules to occur at an extremely fast rate and use less energy

Nucleic Acids

- Contain C, H, O, N, P
- Made up of nucleotides (3 part units) – the order of the nucleotides is important to make different genes
- Stores genetic information in cells (DNA, RNA)

Biomolecule	Examples	Monomer form	Polymer form	How do I recognize it? Draw the molecule	Functions
Carbohydrates					
	Fats, oils, waxes				
		Amino acids			
			Deoxyribonucleic acid		