

Macromolecules!

Why do we eat food?

When we eat our bodies break down food into tiny particles called organic molecules. Since they are large (macro), we call them macromolecules.

There are four types of macromolecules:

- | | |
|------------------|------------------|
| 1. Carbohydrates | 3. Proteins |
| 2. Lipids | 4. Nucleic acids |

Carbohydrates

Function: Main source of fuel, and can also be used for structure

Are found in: breads, cakes, potatoes, pasta

Are made of: glucose, a sugar molecule

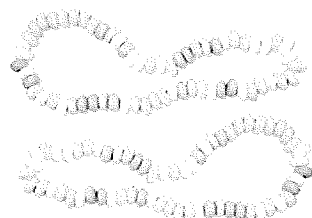
Different types of carbohydrates:



SIMPLE—Example: candy

Made up of glucose (a simple sugar).

Simple carbohydrates are called monosaccharides (mono means “one,” and saccharide means “sugar”).



COMPLEX – Example: potato

Potatoes are made up of starch (a complex sugar).

Complex carbohydrates are called polysaccharides (poly means “many”).

So plants store their energy as the complex carbohydrate called starch.

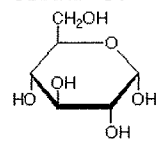
Plants can also have a complex carbohydrate called cellulose. We call cellulose fiber when we eat it.

How do we store energy? Where do we keep it?

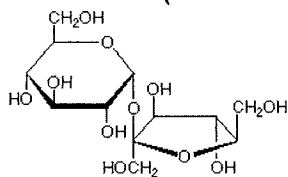
Once carbohydrates are broken down they are converted into glucose, which is stored in the plants as starch and cellulose. Animals store energy in the complex carbohydrate known as glycogen.

When we have too much glucose to be converted into glycogen (when our body doesn’t have room for any more glycogen) then the remainder is stored as fat.

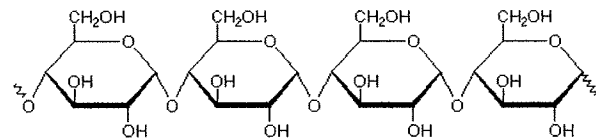
CARBS! They are SUGARS (saccharides)!!



monosaccharide (glucose)

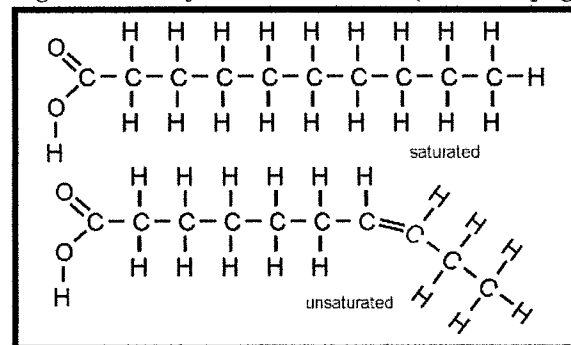


disaccharide (sucrose)



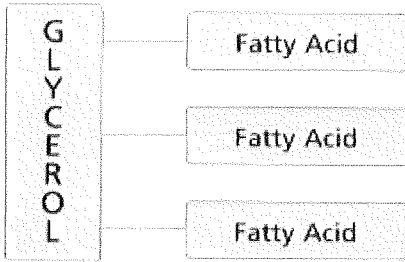
polysaccharide (amylose starch)

Figure 1: Fatty Acid Structures (see next page)



Fats (also called lipids)

Fats are made up of fatty acid chains. Each fat consists of 1 glycerol and 3 fatty acids.

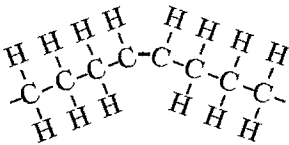


Fatty acid structures can be: (see Figure 1, previous page)

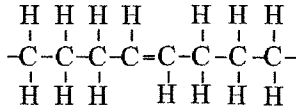
1. Saturated: meaning that each bond is completely filled with hydrogens. They are solid at room temperature because they stack well.

2. Unsaturated: are not completely filled with hydrogen: there is at least one carbon double bond, making them “kinked.” They are liquid at room temperature because they do not stack well.

Trans fats act like saturated fats.



Cis configuration - bent molecule



Trans configuration - straight molecule

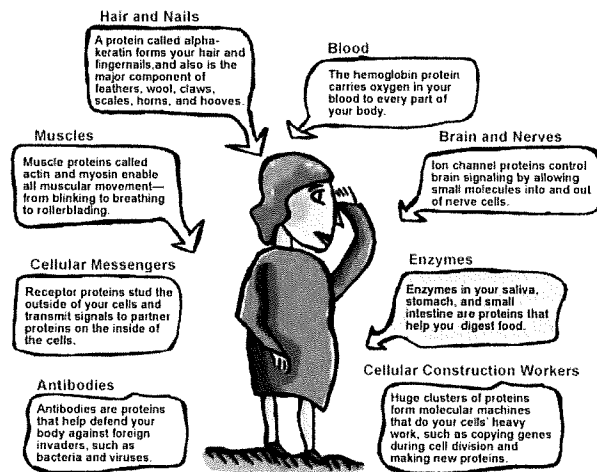
Plant vs. Animal Fat: Which is healthier?

Unsaturated fat is healthier. This is because saturated fats clog organs and blood vessels.

Proteins

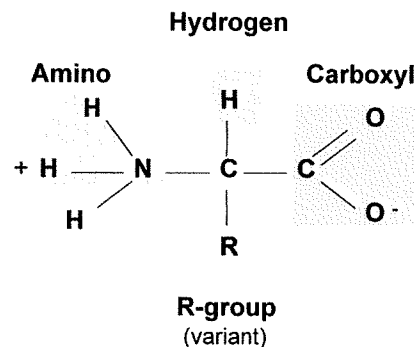
Proteins are made up of long chains of amino acids. Proteins are found in muscle. What is a good source of protein? Animal muscle! Each amino acid is connected by a bond (called a peptide bond). They form large chains which are then folded into proteins.

Proteins are diverse:



Proteins are made up of amino acids:

Amino Acid Structure



Where are proteins found in plants? seeds. This is because they are a nutrient source for the plant embryo, you can also find carbohydrates here in plants.

Nucleic Acids

Nucleic acids are made up of nucleotides. Examples are DNA, RNA. Nucleic acids are important because they help cells replicate and build proteins.

