

Name: _____

Date: _____

HW #2.3: Lipids

Directions: Using the passage below and **your notes**, answer questions 1-6.

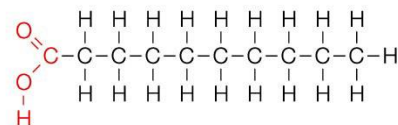
Lipids are large molecules containing the stored energy of numerous carbon-carbon and carbon-hydrogen bonds. They are found in foods such as fats and oils. Lipids are *synthesized* from *fatty acids* and *glycerol*. When stored in fat tissues in the body, they function as stored energy. Lipids contain more energy than any other molecule due to their high number of chemical bonds. Lipids together with proteins are needed to synthesize cell membranes.

Excessive consumption of fats is a common problem in the American diet. However, it is important to consider not only the total amount of fat consumed, but also the kinds of fats consumed. Fats may be saturated or unsaturated.

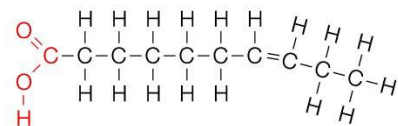
A molecule of *saturated fat* contains all the hydrogen atoms it can hold (*Refer to Figure*). The carbon-carbon backbone of its fatty acid component contains only single bonds. Saturated fats are solid at room temperature. They are found in meat and in milk products.

An *unsaturated fat*, however, contains double bonds in the fatty acid portion of the molecule (*Refer to Figure*). Unsaturated fats are oils that are found at room temperature. They appear considered healthier than saturated fats.

Saturated



Unsaturated



1. List two examples of lipids. _____

2. What is one important function of lipids? _____

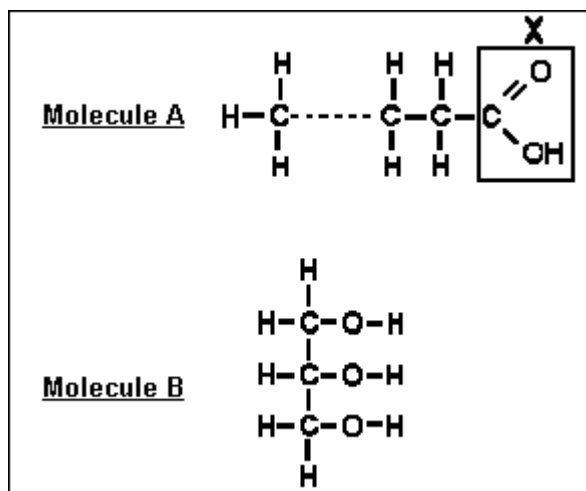
3. What are the building blocks of lipids? _____

4. Explain the difference between saturated and unsaturated fats.

5. In living organisms, lipids function mainly as

1. Sources of stored energy and transmitters of genetic material
2. Sources of stored energy and components of cellular membranes
3. Transmitters of genetic material and catalysts of chemical reactions
4. Catalysts of chemical reactions and components of cellular membranes

6. The diagram shows the **building blocks** of a lipid molecule.



a. Determine the name of each type of molecule.

i. Molecule A: _____

ii. Molecule B: _____

b. How many molecules of *A* normally combine with one molecule of *B* to form a single fat molecule?

1. 5

2. 6

3. 3

4. 4

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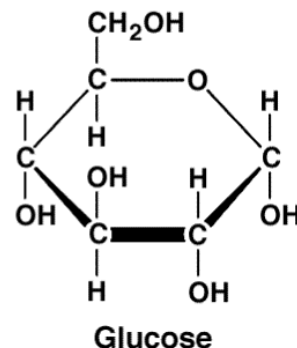
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HW #2.4: Carbohydrates

Directions: Using the passage below and **your notes**, answer questions 1-9.

You may have heard of runners eating large quantities of spaghetti or other starchy foods the day before a race. This practice is called *carbohydrate loading*. It works because the carbohydrates' main function is to be used by cells to store and release energy. A **carbohydrate** is an organic compound composed the following elements: carbon, hydrogen, and oxygen with a ratio of about two hydrogen molecules to every one oxygen molecule (2 Hydrogen : 1 Oxygen).

The simplest type of carbohydrate is a simple sugar called a **monosaccharide**. Common examples include *glucose* and *fructose*. (Note the both end in -ose). Two monosaccharides form a disaccharide, a two-sugar carbohydrate.



The largest carbohydrate molecules are known as **polysaccharides**, polymers (large molecules) composed of many monosaccharide subunits. *Starch*, *glycogen*, and *cellulose* are examples of polysaccharides. Starch is used as food storage by plants. Mammals use glycogen as their storage carbohydrate. Cellulose is found in the cell walls of plants and cannot be digested by humans.

1. List two examples of carbohydrates. _____
2. What is one important function of carbohydrates? _____

3. What elements are carbohydrates composed of? _____
4. Explain the difference between a polysaccharide and a monosaccharide. _____

5. Which chemical formula represents a carbohydrate?

1. CH₄

2. NaCl

3. C₁₂H₂₂O₁₁

4. CO₂

6. Which compound is a polysaccharide?

1. glucose

2. maltose

3. ribose

4. starch

7. Two examples of carbohydrates are

- | | |
|-----------------------------|----------------------------|
| 1. fatty acids and glycerol | 3. fats and waxes |
| 2. sugars and starches | 4. amino acids and alcohol |

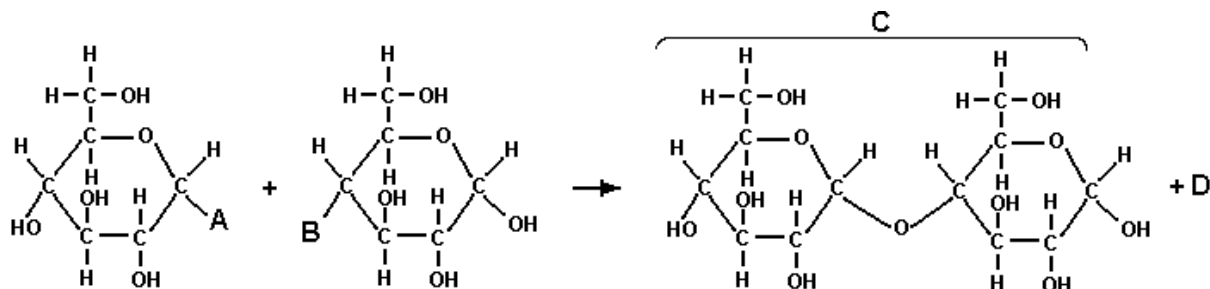
8. In humans, excess glucose is stored as a polysaccharide known as

- | | | | |
|-------------|-------------|------------|--------------|
| 1. glycogen | 2. glycerol | 3. maltose | 4. cellulose |
|-------------|-------------|------------|--------------|

9. Two monosaccharides bond together to form a disaccharide. This process is known as

- | | | | |
|---------------|--------------------------|----------------|-------------------|
| 1. hydrolysis | 2. dehydration synthesis | 3. respiration | 4. photosynthesis |
|---------------|--------------------------|----------------|-------------------|

Base your answers to question 10-12 on the diagram of the chemical equation which represents a metabolic activity and your knowledge of biology.



10. Which chemical substance is labeled C?

- | | | | |
|------------|----------------|-------------------|-----------------|
| 1. a lipid | 2. a dipeptide | 3. a disaccharide | 4. a nucleotide |
|------------|----------------|-------------------|-----------------|

11. Which substance is represented by letter D?

- | | | | |
|----------|---------|------------|-------------------|
| 1. water | 2. salt | 3. ammonia | 4. carbon dioxide |
|----------|---------|------------|-------------------|

12. Molecule C belongs in the general class of substances known as

- | | | | |
|-------------|-------------|--------------------|----------------------|
| 1. vitamins | 2. minerals | 3. inorganic acids | 4. organic compounds |
|-------------|-------------|--------------------|----------------------|