

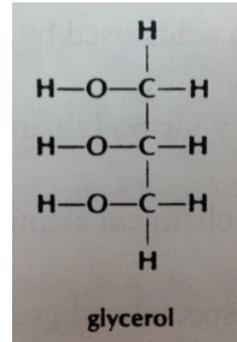
LIPIDS

Fats are presented in living organisms. These chemicals make up certain parts of your body. Fats are often stored when present in excess and also serve as an energy source. Fats are an important part of our diet.

Part A. GLYCEROL

To better understand the chemistry of fats, it is helpful to study the small molecules which join to make up fats. Fat molecules are made up of two small “building blocks,” or chemical molecules. These molecules are called glycerol and fatty acids.

To right is a picture of glycerol ...

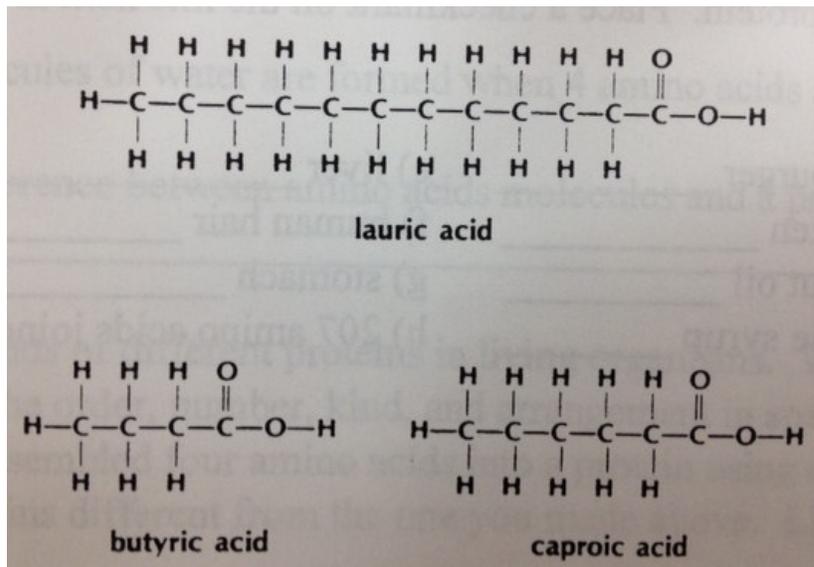


1. What elements are presented in glycerol? _____
2. Are there any elements in glycerol that are not in carbohydrates?

3. How many C, H, O are there in glycerol? C _____ H _____ O _____
4. Is this the same hydrogen to oxygen ratio that you saw in carbohydrates? _____

Part B. FATTY ACIDS

The figure below shows a picture of some fatty acids. Many different fatty acids exist, but all are similar in several ways.

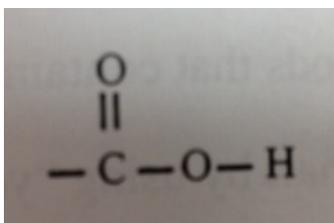


Lipids ... I need ‘em, I like ‘em, they make me fat, they make me pretty!

Biology

1. What elements are present in all fatty acids? _____
2. How many C, H, O are in each type of fatty acids:
lauric acid: C ___ H ___ O ___
butyric acid: C ___ H ___ O ___
caproic acid: C ___ H ___ O ___
3. How do the number of hydrogen atoms compare to the number of oxygen atoms on each fatty acid?

4. Note the end of butyric acid containing the oxygen atoms. This special end arrangement of C, H, O is called a carboxyl group.



5. Is the carboxyl group present in fatty acids shown? _____
6. Does the glycerol also contain a carboxyl group? _____

Part C. COMBINING GLYCEROL AND FATTY ACIDS TO FORM FATS.

A fat molecule consists of one glycerol and three fatty acid molecules joined. Cut out the glycerol and fatty acid paper molecules.

1. Attempt to construct a fat molecule. Will the fat molecule fit together as pieces in a puzzle? _____ What would you need to do in order to fit the pieces together?

2. In the space below, draw the proper structures above the words:



3. Join the leftover - H and - OH ends from you models. How many molecules are formed when one fat molecule is produced? _____ Show this in #2 above.

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Biology

4. Many fats exist in living things. The wide variety of fats are formed by different combinations of fatty acid molecules. A change in the type of fatty acids results in a different type of a fat molecule.

What molecule remains unchanged in all fats? _____

Part D. ANALYSIS

- Name the types of molecules and number of each type needed to form a fat molecule.

- List two ways that a fatty acid molecule differs from a glycerol molecule.

- How can you test for the present of a fat? _____
- Name two examples of foods that contain lipids. _____
- Complete the following chart by using “yes” or “no” answers. Use your notes.

Table 3 - Summary of Glycerol, Fatty Acids, and Amino Acids

	Glycerol	Fatty Acids	Amino Acids
Carbon present			
Hydrogen present			
Oxygen present			
Nitrogen present			
Double the amount of hydrogen as oxygen			
Has a carboxyl group			
Has an amino group			
Molecules join to form fats			
One molecule loses 3 -OH ends			

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