

Name _____

Course/Section _____

Date _____

Professor/TA _____



Activity 4/5.2 What predictions can you make about the behavior of organic macromolecules if you know their structure?

1. Twenty amino acids are commonly utilized in the synthesis of proteins. These amino acids differ in the chemical properties of their side chains (also called R groups). What properties does each of the following R groups have? (*Note: A side chain may display more than one of these properties.*)

R Group	Basic, acidic, or neutral	Polar or nonpolar	Hydrophilic or hydrophobic
a. $\begin{array}{c} \\ \text{CH}_2 \\ \\ \text{CH} \\ / \quad \backslash \\ \text{CH}_3 \quad \text{CH}_3 \end{array}$			
b. $\begin{array}{c} \\ \text{CH}_2 \\ \\ \text{O}=\text{C} \\ \\ \text{O}^- \end{array}$			
c. $\begin{array}{c} \\ \text{CH}_2 \\ \\ \text{CH}_2 \\ \\ \text{CH}_2 \\ \\ \text{CH}_2 \\ \\ \text{NH}_3^+ \end{array}$			
d. $\begin{array}{c} \\ \text{CH}_2 \\ \\ \text{OH} \end{array}$			

2. Polypeptides and proteins are made up of linear sequences of amino acids. In its functional form, each protein has a specific three-dimensional structure or shape. Interactions among the individual amino acids and their side chains play a major role in determining this shape.

a. How are amino acids linked together to form polypeptides or proteins? What is this type of bond called?

b. Define the four structures of a protein.	c. What kinds of bonds hold each of these structures together?
Primary:	
Secondary:	
Tertiary:	
Quaternary:	

3. Lipids as a group are defined as being hydrophobic, or insoluble in water. As a result, this group includes a fairly wide range of compounds—for example, fats, oils, waxes, and steroids like cholesterol.

a. How are fatty acids and glycerol linked together to form fats (triglycerides)?

b. What functions do fats serve in living organisms?

c. How do phospholipids differ from triglycerides?

d. What characteristics do phospholipids have that triglycerides do not have?