Internet Assignment: Organic Molecules

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_ Class: \_\_\_\_\_\_\_\_\_\_\_\_

Go to the website below and after reading the introduction click “animation” 🡪 Narrated 🡪 and finally select a module and answer the questions for each section.

# <http://bcs.whfreeman.com/webpub/Ektron/pol1e/Animated%20Tutorials/at0301/at_0301_nucleic_acid_protein.html>

# Proteins

1. According to the introduction, which is the only organic macromolecule that’s not considered a polymer?
2. What is the monomer for a protein?
3. What kind of bond holds these monomers together
4. How many different amino acids are there
5. How does one amino acid differ from another?
6. What accounts for the great diversity of protein structure & function?
7. List 4 hydrophilic and 4 hydrophobic side chains

|  |  |
| --- | --- |
| hydrophilic | hydrophobic |
|  |  |

1. What is at the N terminus of a polypeptide? The C terminus?
   1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What determines amino acid sequences in proteins?
3. What is the most abundant mammalian protein, and what are 3 things its used to make?
   1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
      1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
      2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
      3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. What is MOST responsible for collagens shape?
5. Does its primary structure consist of alpha helicesor Beta pleated sheets?
6. The animation says that proline introduces sharp twists into the amino acid chain. How does glycine effect the shape (a) and why don’t you think proline and glycine have the same effect on the proteins shape(b)?
   1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. Each helix contains how many amino acids per turn?
8. Why is it important that the glycines face collagens center in the polypeptide chain?

# Carbohydrates

1. What do you call a simple sugar?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What shape is glucose typically found in?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. If you were to compare this “form” to a geometric shape, which shape would best represent it?
4. What is the monomer of starch?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. What type of reaction allows new monomers to be added to an organic polymer?
6. In the above reaction, what type of bond is formed (a) and what is the byproduct that’s released (b)?
   1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. The bond forms between the 1st and 4th carbon of the two glucose monomers to create a straight chain, where does it form to create a branched chain?
8. What type of “linkage” forms between glucose monomers

How does plant starch structure compare to glycogen?

1. Polysaccharides are largely considered to have what function?
2. What chemical reaction must happen to release energy from a polysaccharide

# Lipids

1. What are the components of a triglyceride
2. What kind of bond holds the 2 components together?
3. What is most responsible for making the triglyceride nonpolar and hydrophobic?
4. What distinguishes saturated fats from unsaturated fats?
5. How does the double bond in oleic acid alter the shape of palmitic acid
6. As the number of double bonds increase, what happens to the shape of the fatty acid?
7. How do double bonds affect the molecules ability to pack tightly together (a), and what does this result in (b)?
   1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
8. How do mammals get linoleic acid
9. What molecule is removed when a fatty acid is attached to a glycerol molecule?
10. What kind of reaction is this?
11. Do all triglycerides attached to a glycerol have to be the same?
12. What are the 3 types of fatty acids discussed in the animation? Underline the one most likely to be found in butter
    1. .
    2. .
    3. .

# Nucleic Acids

1. DNA & RNA are polymers of what
2. What property allows two nucleic acid polymers to base pair
3. What does this endow nucleic acids with
4. What kinds of bonds hold one nucleotide to another within a single strand of DNA (a)? What kind of bond holds nucleotides from two different DNA strands together (b)?
   1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. How do bases pair in DNA, and how many bonds hold each pair together?
6. What are the 3 parts of a nucleotide?
   1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. What geometric shape does the sugar most resemble
8. Which bases are purines (a), which are pyrimidine’s (b), and what is the main difference between their shapes (c)?
   1. Purine: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. Pyrimidine: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
9. Which carbon is the phosphate group attached to?
10. What “directionality” is pointed out in the animation?
11. A purine can only bind a\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_