**Section 5.1 Questions**

Bio12 AP **The Structure and Function of** Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Chap 5 **Large Biological Molecules** Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. What are the four main classes of large biological molecules? Which class does not consist of polymers?

Carbohydrates, Lipids, Proteins, Nucleic Acids. are the 4 classes of large organic/biological molecules.

Lipids are generally not considered big enough to be polymers.

2. How many molecules of water are needed to completely hydrolyse a polymer that is ten monomers long? 9 Remember one molecule of water is need to break apart the bond between every 2 monomers

3. What If? Suppose you eat a serving of fish. What reactions must occur for the amino acid monomers in the protein of the fish to be converted to new proteins in your body?

First the fish protein will be broken down by reactions with water (hydrolysis). THEN, Dehydration synthesis reactions need to occur to join the amino acids into a large chain which would make up a new protein in your body (a polymer).

**Section 5.2 Questions**

1. Write the formula for a monosaccharide that has three carbons.

C3H6O3

2. A dehydration reaction joins two glucose molecules to form maltose. The formula for glucose is C6H12O6. What is the formula for maltose?

C12H22O11  Normally the formula is CnH2nOn but remember 1 water (H2O) is lost by dehydration synthesis when the 2 glucose join.

3. What If? After a cow is given antibiotics to treat an infection, a vet gives the animal a drink of “gut culture” containing various prokaryotes. Why is this necessary?

Antibiotics often kill the microbial communities that thrive inside the intestines of animals. In this case, a cow normally has helpful prokaryotes living in it’s guts that break down the cellulose in hay and grass and help convert the glucose stored in theses molecules to other useful compounds for the cow’s nutrition. If antibiotics killed these prokaryotes they would need to be replaced or the cow would struggle to break down it’s food properly and ultimately would not be able to access the glucose it needs for proper nutrition (energy/repair/maintenance).

**Section 5.3 Questions**

1. Compare the structure of a fat (triglyceride) with that of a phospholipid.

A triglyceride is made up of one glycerol molecule that is attached to 3 fatty acids, the molecule itself is considered neutral. An ester linkage is the type of bond that joins each fatty acid to the glycerol- it is a bond between the glycerol’s hydroxyl group and the fatty acid’s carboxyl group.

A phospholipid is made of 2 fatty acids attached to a glycerol and 3rd hydroxyl (OH) group of the glycerol is attached to a phosphate group which has a negative charge. As a result the Phospholipid head is charged and hydrophilic will the tails consisting of the hydrocarbon chains are hydrophobic and avoid water.

2. Why are human sex hormones considered lipids?

Sex hormones such as testosterone and estrogen are made up of 4 carbon rings that are attached together. This structure is consist for a group of lipids called steroids and it is the specific chemical groups that branch off of the 4 carbon rings that distinguish the sex hormones from other steroids like cholesterol. Just like all lipids, steroids such as the sex hormones are hydrophobic.

3. What If? Suppose a membrane surrounded an oil droplet, as it does in the cells of plant seeds. Describe and explain the form it might take.

Membranes are made of phospholipids which have hydrophilic heads and hydrophobic tails. In the case of an oil it is an unsaturated fat (neutral) with glycerol attached to 3 fatty acid hydrocarbon chains. I would assume there would be a single layered membrane form where the hydrophobic tails of the phospholipid membrane would interact with the hydrophobic hydrocarbon chain.