

Review Sheet Macromolecules

Lester BIOL 150

General things to do to prepare for the exam:

- study the PowerPoints
- write out the answers to the learning objectives found with each PowerPoint
- listen to my lecture recordings

Chapter 5

Explain the following: Macromolecules are polymers, built from monomers.

Describe hydrolysis and dehydration reactions.

Describe carbohydrates, both simple and complex.

What are the 3 monosaccharides?

What is a disaccharide? Polysaccharide? Give examples.

How do you recognize a sugar from its name?

Why can most animals digest starch but not cellulose?

What are starch, glycogen, and cellulose made out of?

Describe chitin. Where is it found?

Describe lipids in general and a triglyceride in detail.

What is the difference between a saturated and unsaturated fatty acid? Describe their physical properties at room temperature.

Describe a protein/polypeptide. What are they made of (monomer)? What kind of bond holds them together?

Describe the general structure of an amino acid.

Describe the four levels of protein structure.

What is denaturation and how can that be accomplished?

Describe nucleic acids and the general structure of DNA.

Sample Exam Questions Chapter 5

Which of the following is *not* a polymer?

- A) glucose B) starch C) RNA D) DNA

Maltose is a disaccharide that can easily be digested into glucose molecules. The glycosidic linkage between glucose molecules in maltose is:

- A) β 1—4 B) α 1—2 C) α 1—4 D) β 1—2

Which of the following best summarizes the relationship between dehydration reactions and hydrolysis?

- A) Dehydration reactions assemble polymers; hydrolysis reactions break polymers apart.
- B) Dehydration reactions eliminate water from membranes; hydrolysis reactions add water to membranes.
- C) Dehydration reactions and hydrolysis reactions assemble polymers from monomers.
- D) Hydrolysis reactions create polymers, and dehydration reactions create monomers.

What is the major structural difference between starch and glycogen?

- A) the types of monosaccharide subunits in the molecules
- B) the type of glycosidic linkages in the molecule
- C) whether glucose is in the α or β form
- D) the amount of branching that occurs in the molecule

A molecule with the chemical formula $C_6H_{12}O_6$ is probably a:

- A) fatty acid
- B) polysaccharide
- C) nucleic acid
- D) monosaccharide

Humans can digest starch but not cellulose because:

- A) humans have enzymes that can hydrolyze the α -glycosidic linkages of starch but not the β -glycosidic linkages of cellulose
- B) starch monomers are joined by covalent bonds, and cellulose monomers are joined by ionic bonds
- C) the monomer of starch is glucose, while the monomer of cellulose is galactose
- D) Starch is softer than cellulose

Which of the following statements is true for lipids?

- A) Lipids are true polymers.
- B) Waxes and pigments are not lipids.
- C) Lipids mix poorly with water.
- D) Lipids are true polymers and mix poorly with water.

What makes lipids/fats hydrophobic?

- A) their long carbon skeleton
- B) the carboxyl group at one end of the molecule
- C) the glycerol component
- D) presence of relatively nonpolar C—H bonds

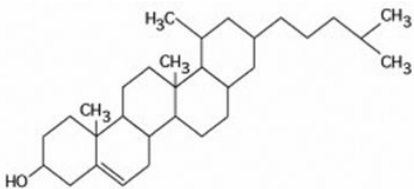
For lipids to be fluid at room temperature, they should have:

- A) single bonds only
- B) a higher number of glycerol molecules
- C) a higher number of *cis* double bonds
- D) a longer carbon chain

The label on a container of margarine lists "hydrogenated vegetable oil" as the major ingredient. Hydrogenated vegetable oil:

- A) is solid at room temperature
- B) has more "kinks" in the fatty acid chains
- C) has fewer *trans* fatty acids
- D) is less likely to clog arteries

Use the following figure to answer the question.



The molecule shown the figure is a:

- A) fatty acid
- B) steroid
- C) triacylglycerol
- D) phospholipid

You disrupt all hydrogen bonds in a protein. What level of structure will be preserved?

- A) primary structure
- B) secondary structure
- C) tertiary structure
- D) quaternary structure

The relation between amino acid and polypeptide is similar to the relation between:

- A) nucleotide and nucleic acid
- B) triglycerides and steroids
- C) phospholipid and plasma membrane
- D) glycogen and glucose