

Chem 464
Biochemistry
Third Hour Exam

Multiple guess (Circle correct answer. Three points per problem)

1. In a double-stranded nucleic acid, cytosine typically base-pairs with:
 - A) adenosine.
 - B) guanine.
 - C) inosine.
 - D) thymine.
 - E) uracil.
2. Which one of the following is true of the pentoses found in nucleic acids?
 - A) C-5 and C-1 of the pentose are joined to phosphate groups.
 - B) C-5 of the pentose is joined to a nitrogenous base, and C-1 to a phosphate group.
 - C) The bond that joins nitrogenous bases to pentoses is an O-glycosidic bond.
 - D) The pentoses are always in the β -furanose forms.
 - E) The straight-chain and ring forms undergo constant interconversion.
3. Which of the following statements concerning fatty acids is correct?
 - A) One is the precursor of prostaglandins.
 - B) Phosphatidic acid is a common one.
 - C) They all contain one or more double bonds.
 - D) They are a constituent of sterols.
 - E) They are strongly hydrophilic.
4. Which of the following statements about membrane lipids is true?
 - A) Glycerophospholipids are found only in the membranes of plant cells.
 - B) Glycerophospholipids contain fatty acids linked to glycerol through amide bonds.
 - C) Lecithin (phosphatidylcholine), which is used as an emulsifier in margarine and chocolate, is a sphingolipid.
 - D) Some sphingolipids include oligosaccharides in their structure.
 - E) Triacylglycerols are the principal components of erythrocyte membranes.
5. Identify the molecule(s) derived from sterols.
 - A) Arachidonic acid
 - B) Gangliosides
 - C) Phosphatidylglycerol
 - D) Prostaglandins
 - E) Vitamin D
6. Membrane proteins:
 - A) are sometimes covalently attached to lipid moieties.
 - B) are sometimes covalently attached to carbohydrate moieties.
 - C) are composed of the same 20 amino acids found in soluble proteins.
 - D) diffuse laterally in the membrane unless they are anchored
 - E) have all of the properties listed above.

7. Which of these is a general feature of the lipid bilayer in all biological membranes?
- A) Individual lipid molecules are free to diffuse laterally in the surface of the bilayer.
 - B) Individual lipid molecules in one face (monolayer) of the bilayer readily diffuse (flip-flop) to the other monolayer.
 - C) Polar, but uncharged, compounds readily diffuse across the bilayer.
 - D) The bilayer is stabilized by covalent bonds between neighboring phospholipid molecules.
 - E) The polar head groups face inward toward the inside of the bilayer.
8. Facilitated diffusion through a biological membrane is:
- A) driven by a difference of solute concentration.
 - B) driven by ATP.
 - C) endergonic.
 - D) generally irreversible.
 - E) not specific with respect to the substrate

Theme Questions (12 points each)

9. Draw the structure of ATP

10. There are several reactions that occur in your cells that spontaneously destroy DNA. Tell me about three different kinds of DNA degrading reactions.

11. The two major phospholipids are glycerophospholipids and sphingolipids. How are these lipids similar? How are they different? (A picture might help)

12. What are the three different types of Eicosanoids and how are they used in your body.

13. Discuss the structure of the cellular membrane. Include such details as: What kinds of lipids are found there, what kinds of proteins? How are the membrane proteins different from those found in the cytosol? How are the lipids and proteins distributed in the membrane? What kind of movement is seen in the components of the membrane? Add other details for more points.

14. Ouabain specifically inhibits the Na^+K^+ ATPase activity of animal tissues, but has no effect on any of the enzymes that are used in cellular respiration. Explain, then why adding Ouabain to kidney tissue inhibits oxygen consumption by 66% .

1. Ans: B
2. Ans: D
3. Ans: A
4. Ans: D
5. Ans: E
6. Ans: E
7. Ans: A
8. Ans: A