

Review 3

1. Match the general type of biochemical reaction catalyzed in the left column with the class of enzyme listed in the column on the right.

___ removes a phosphate group from a molecule	A. ATPase
___ hydrolyzes ATP	B. polymerase
___ hydrolyzes bonds between nucleotides	C. ligase
___ adds phosphate groups to molecules	D. kinase
___ catalyzes reactions in which one molecule is oxidized and another is reduced	E. isomerase
___ hydrolyzes peptide bonds	F. nuclease
___ joins two ends of DNA together	G. oxido-reductase
___ catalyzes the synthesis of polymers such as RNA and DNA	H. protease
___ rearranges bonds within a single molecule	I. phosphatase

2. Any substance that will bind to a protein is known as its _____. Enzymes bind their _____ at the _____. Enzymes catalyze a chemical reaction by lowering the _____, because they provide conditions favorable for the formation of a _____ intermediate called the _____. Once the reaction is completed, the enzyme releases the _____ of the reaction.

activation energy inhibitors products active site isomers
 substrates free energy ligand transition state high-energy low-energy

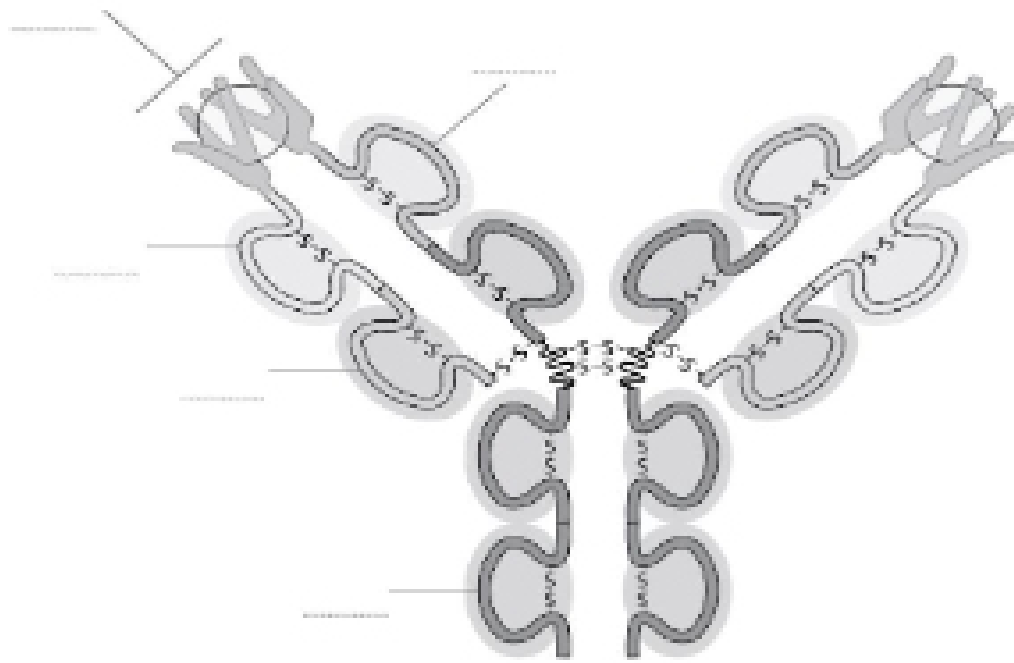
3. The active site of an enzyme usually occupies only a small fraction of the enzyme surface (True or False)
4. Catalysis by some enzymes involves the formation of a covalent bond between an amino acid side chain and a substrate molecule. (True or False)
5. Allosteric enzymes have two or more binding sites. (True or False)
6. The specificity of an antibody molecule is contained exclusively in loops on the surface of the folded light-chain domain. (True or False)
7. Affinity chromatography separates molecules according to their intrinsic charge. (True or False)

8. Feedback inhibition



- 1). The final product, R, will most likely inhibit which reaction?
 a. 1 b. 2 c. 3 d. 4 e. 5
- 2). Which two enzymes would be the most likely ones to regulate if this pathway is freely reversible and can go both ways?
 a. 1 and 2 b. 1 and 3 c. 1 and 5 d. 2 and 4 e. 4 and 5

9. Fill in the blanks with the labels in the list below to identify various parts of the antibody structure in Figure.



- | | |
|----|------------------------------------|
| A. | constant domain of the light chain |
| B. | constant domain of the heavy chain |
| C. | antigen-binding site |
| D. | variable domain of the heavy chain |
| E. | variable domain of the light chain |

10. The human immune system produces _____ of different immunoglobulins, also called _____, which enable the immune system to recognize and fight germs by specifically binding one or a few related _____. The hypervariable structural element that forms the ligand-binding site is comprised of several _____. Purified antibodies are useful for a variety of experimental purposes, including protein purification using _____ chromatography.

- | | | |
|-----------------|--------------|----------------|
| affinity | billions | ligands |
| antibodies | coiled-coils | loops |
| antigens | hundreds | size-exclusion |
| β strands | ion-exchange | |

11. Regulation of protein function

- Amount of protein
- Location of protein
- Modification of protein activity (by modifying the protein's shape)
 - feedback inhibition of allosteric proteins
 - positive regulation of allosteric proteins
 - protein phosphorylation
 - other covalent modifications of proteins
 - binding of GTP
 - binding and hydrolysis of ATP