**Quiz II**

**Biochemistry I April 7, 2020**

**Name: 钟子涵 ID (学号):2020040043**

1. **Multiple-choice questions:**
2. Which of the following statement is true of both -helix and -sheet?

A) An extended conformation of the polypeptide chain.

B) Hydrophobic interactions are responsible for the structure.

C) Stabilized by hydrogen bonds between -NH and -CO groups.

D) Only found in globular proteins.

**Answer**  C

2. Which of the following parts of IgG are *not* involved in binding to an antigen?

A) Heavy chain B) Fc C) Fab D) Light chain E) Variable domain

**Answer**  B

3. Which of the following binding constants represents the highest affinity?

A)*K*d = 1.0 x 10-9 M B) *K*d = 1.0 x 10-9 M-1

C) *K*a = 1.0 x 107 M-1 D) *K*a = 2.0 x 108 M-1 E) *K*d = 1.5 x10-9 M

**Answer**  E

4. Which of the following statement about enzymes is true?

A) They ensure that all substrate is converted to product.

B) They are consumed in the reactions that they catalyze.

C) They increase the activation energy for conversion of substrate to product.

D) They increase the rate at which substrate is converted to product.

**Answer**  D

5. Which of the following about allosteric control of enzymatic activity is wrong?

A) Allosteric effectors give rise to sigmoidal *V*0 vs. [S] kinetic plots.

1. Allosteric proteins are generally composed of several subunits.
2. Heterotropic allosteric effectors compete with substrate for binding sites.
3. An effector may either inhibit or activate an enzyme.
4. Binding of the effector changes the conformation of the enzyme.

**Answer**  C

|  |
| --- |
|  |

**II. Simple-answer questions:**

1. What is Michaelis-Menten equation? For an enzyme with *K*m = 0.009M, what substrate concentration is needed for the reaction rate to be 0.25 times Vmax of the enzyme? What is the effect of increasing concentrations of a competitive inhibitor on *K*m and Vmax of the enzyme?

(1) [S]=0.003M

(2) Km will increase and Vmax won’t change significantly.

2. What is the biological advantage to the sigmoidal binding curve of hemoglobin for oxygen?

This property makes hemoglobin have high affinity for oxygen in high O2 concentration and low affinity in low O2 concentration. So, hemoglobin tends to bind oxygen in lung and release oxygen in tissue.