

Questions ::

« قَالَ لَا تَخَافَا إِنِّي مَعَكُمَا أَسْمَعُ وَأُبْصِرُ »

Mays Aljundi ✓

Biochem ✓

GLOBULAR PROTEINS

1. Which type of bonds primarily stabilize the tertiary structure of globular proteins?

- a) Peptide bonds
- b) Hydrogen bonds
- c) Disulfide bonds
- d) Both b and c

2. What type of secondary structure is most commonly found in globular proteins?

- a) Alpha helix
- b) Beta sheet
- c) Random coil
- d) Both a and b

3. What role do hydrophobic interactions play in globular proteins?

- a) Stabilizing the primary structure
- b) Determining the protein's overall charge
- c) Stabilizing the tertiary structure by promoting folding
- d) Facilitating the formation of disulfide bonds

4. Which globular protein serves as a major carrier of fatty acids in the blood?

- a) Hemoglobin
- b) Myosin
- c) Albumin
- d) Ferritin

5. How do globular proteins typically fold in aqueous environments?

- a) Hydrophilic side chains face outward, and hydrophobic side chains face inward
- b) Hydrophobic side chains face outward, and hydrophilic side chains face inward
- c) There is no specific folding pattern
- d) They form a linear chain without folding

6. Which of the following is a key feature of the quaternary structure of globular proteins?

- a) Alpha helices and beta sheets
- b) Disulfide bridges
- c) Association of multiple polypeptide chains
- d) Sequence of amino acids

7. What is the role of chaperone proteins in the folding of globular proteins?

- a) They degrade misfolded proteins
- b) They assist in the correct folding of proteins
- c) They form disulfide bonds
- d) They phosphorylate proteins

ANS:

1-D
2-D
3-C
4-C
5-A
6-C
7-B



1. Which of the following is insoluble in water?

- a) Fibrous proteins
- b) Globular proteins
- c) Membrane proteins
- d) Hormones

2. Which of the following is not a function of globular proteins?

- a) Provide structural stability
- b) Catalyze organic reactions
- c) Transport biomolecules through membranes
- d) Regulate various bio-reactions

3. What is a holoenzyme?

- a) Molecular interaction between co-enzyme and cofactor
- b) Molecular interaction between enzyme and its cofactor
- c) Molecular interaction between enzyme and substrate
- d) Molecular interaction between enzymes

9. Globular proteins are classified as ____

- a) Alpha, beta, gamma
- b) Alpha, beta, alpha and beta, alpha or beta
- c) Alpha, beta, delta
- d) Alpha, beta, gamma, delta, mu

5.

In globular proteins, where does the hydrophobic R group coil up?

- inside
- outside
- both
- none

6. What is the primary function of myoglobin in muscle tissue?

- Regulating blood pH
- Storing oxygen
- Transporting carbon dioxide

7. What role does hemoglobin play in red blood cells?

- Transporting oxygen and carbon dioxide
- Storing carbon dioxide
- Producing energy

8.

What is the composition of heme?

- A complex of protoporphyrin IX and iron
- A simple sugar molecule
- A type of fatty acid

ANS:

1 - B
2 - A
3 - B
4 - B
5 - A
6 - B
7 - A
8 - A



REGULATION OF HEMOGLOBIN

1

Problem

In hemoglobin, the equilibrium transition from R state to T state is triggered by:

- A Fe²⁺ binding.
- B Heme binding.
- C Oxygen binding.
- D 2,3-BPG binding.

Problem

4

Fetal hemoglobin binds oxygen with a _____ affinity than adult hemoglobin, because it lacks the binding site for _____, which is an allosteric _____ of oxygen binding to adult hemoglobin.

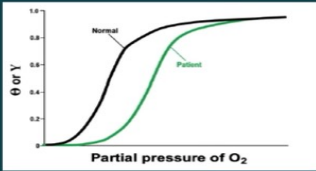
- A Lower ; BPG ; inhibitor.
- B Higher ; H+ ; inhibitor.
- C Higher ; BPG ; activator.
- D Higher ; BPG ; inhibitor.
- E Lower ; CO ; inhibitor.

ANS:

- 1 - D
- 2 - B
- 3 -
- 6 - A → A
- 7 - B → B
- 8 - C → A
- 4 - D
- 5 - B
- 6 - C
- 7 - B
- 8 - C

Problem

A 9-month old girl with hemolytic anemia is found to have a deficiency in the enzyme responsible for the conversion of molecule-B to pyruvate. Shown below is the oxygen saturation curve for hemoglobin in the erythrocytes of this patient (green curve), compared to the corresponding black curve in normal red blood cells. Which of the following is the most likely explanation for the observed oxygen saturation curve in this patient?



- A Decreased [BPG].
- B Increased [BPG].
- C Decreased blood glucose.
- D Increased blood glucose.

5. What is the effect of the Bohr effect on hemoglobin?

- a) Increased oxygen binding at lower pH
- b) Decreased oxygen binding at lower pH
- c) Increased oxygen binding at higher CO₂ concentrations
- d) No effect on oxygen binding

6. How does carbon monoxide affect hemoglobin's ability to carry oxygen?

- a) It decreases hemoglobin's affinity for oxygen
- b) It increases hemoglobin's affinity for oxygen
- c) It irreversibly binds to hemoglobin, preventing oxygen binding
- d) It increases the release of oxygen to tissues



3

Problem

What is the effect of the following changes on the O₂ affinity of hemoglobin?

- A) A drop in the pH of blood plasma from 7.4 to 7.2.
 - a) Lower the O₂ Affinity. b) Increase the O₂ Affinity.
- B) A decrease in the partial pressure of CO₂ in the lungs from 6 kPa (holding one's breath) to 2 kPa (normal).
 - a) Lower the O₂ Affinity. b) Increase the O₂ Affinity.
- C) An increase in [BPG] from 5 mM (normal altitudes) to 8 mM (high altitudes).
 - a) Lower the O₂ Affinity. b) Increase the O₂ Affinity.

7. How does a decrease in blood pH (acidic conditions) affect hemoglobin's oxygen-binding affinity?

- a) It increases oxygen-binding affinity
- b) It decreases oxygen-binding affinity
- c) It has no effect on oxygen-binding affinity
- d) It increases hemoglobin's capacity to carry more oxygen

8. Which of the following conditions is most likely to increase the production of 2,3-BPG in red blood cells?

- a) High oxygen concentration
- b) Alkalosis (high pH)
- c) Hypoxia (low oxygen levels)
- d) Decreased CO₂ levels

1. How does an increase in body temperature affect hemoglobin's oxygen affinity?

- a) It increases oxygen affinity
- b) It decreases oxygen affinity
- c) It has no effect on oxygen affinity
- d) It shifts the curve to the left

6. What happens to hemoglobin's oxygen-binding affinity when it transitions from the T state to the R state?

- a) Affinity decreases
- b) Affinity remains the same
- c) Affinity increases
- d) Affinity fluctuates

ANS:

- 1- B
- 2- C
- 3- A
- 4- A
- 5- C
- 6- C
- 7- D
- 8- C
- 9- B

2. What is the shape of the hemoglobin-oxygen dissociation curve?

- a) Linear
- b) Hyperbolic
- c) Sigmoidal
- d) Exponential

7. Which condition is most likely to cause a leftward shift in the hemoglobin-oxygen dissociation curve?

- a) High altitude
- b) Increased CO₂ levels
- c) Decreased pH
- d) Alkalosis

3. What is the primary reason for the sigmoidal shape of the hemoglobin-oxygen dissociation curve?

- a) Cooperative binding of oxygen
- b) High affinity for the first oxygen molecule
- c) Low affinity for oxygen
- d) Non-cooperative binding of oxygen

8. How does the Bohr effect help to enhance tissue oxygen delivery?

- a) By decreasing CO₂ levels
- b) By increasing the oxygen affinity of hemoglobin
- c) By promoting oxygen release in areas with high CO₂ levels
- d) By stabilizing the R state of hemoglobin



4. In the context of hemoglobin, what does the term "T state" refer to?

- a) The tense state with low oxygen affinity
- b) The relaxed state with high oxygen affinity
- c) The transition state during oxygen binding
- d) The state when hemoglobin is bound to carbon monoxide

9. What effect does anemia typically have on the hemoglobin-oxygen dissociation curve?

- a) It shifts the curve to the left
- b) It shifts the curve to the right
- c) It has no effect on the curve
- d) It steepens the curve

5. Which of the following conditions is likely to cause a leftward shift of the hemoglobin-oxygen dissociation curve?

- a) Increased 2,3-BPG
- b) Increased CO₂ levels
- c) Increased pH
- d) Increased body temperature

IMMUNOGLOBULIN

1. Synthesis of antibodies takes place by which of the following cells?

- a) Bone marrow cells
- b) T-cells
- c) B-cells
- d) Lymph

10. Name the class of immunoglobulin which takes part in hypersensitivity reaction?

- a) IgG
- b) IgE
- c) IgA
- d) IgM

2. The basic structure of antibodies are _____

- a) Y-shaped
- b) X-shaped
- c) Linear
- d) Hyperbolic

3. Name the heavy chain of immunoglobulin G.

- a) μ
- b) ϵ
- c) α
- d) γ

4. What is the name of the hypervariable region of immunoglobulin, which is responsible for its diversity?

- a) CDR
- b) Hinge region
- c) Epitope
- d) Agretope

6. Which of the following amino acid is found in the hinge region?

- a) Alanine
- b) Asparagine
- c) Proline and cysteine
- d) Phenylalanine

7. Which immunoglobulin can pass through placenta?

- a) IgD
- b) IgE
- c) IgM
- d) IgG

8. Name the class of immunoglobulin which has a pentameric structure?

- a) IgE
- b) IgG
- c) IgA
- d) IgM

9. Which of these immunoglobulins is present in external secretion?

- a) IgG
- b) IgM
- c) IgA
- d) IgE

ANS:

1-C

2-A

3-D

4-A

5- صافي رقم 5 ت

6-C

7-D

8-D

9-C

10-B



1. Which of the following immunoglobulins makes the largest percentage in breast milk?

- (a) IgM
- (b) IgD
- (c) IgG
- (d) IgA

9. How are the different classes of immunoglobulins different from each other?

- a) Variability in amino acid sequence of variable domain
- b) Variability in amino acid sequence of constant domain
- c) Variability in amino acid sequence of hypervariable domain
- d) Variability in amino acid sequence of all the three domains

2. Antibodies are

- (a) prostaglandins
- (b) steroids
- (c) lipoproteins
- (d) glycoproteins

10. An immunoglobulin is essentially a glycolipid.

- a) True
- b) False

3. Which of the following antibodies is predominantly present in tears, saliva and mucous

- (a) IgM
- (b) IgG
- (c) IgE
- (d) IgA

4. Antigen binding sites are present in

- (a) Fab regions of an antibody
- (b) F_c region of an antibody
- (c) only in the light chain
- (d) only in the heavy chain

5. The term epitope refers to _____

- a) Individual antigen binding to a structure within an antibody
- b) Antigen binding to any host cell
- c) Individual antibody binding to a specific structure within an antibody
- d) Production of antibody

6. The most abundant type of antibody found in all body fluids is _____

- a) IgA
- b) IgM
- c) IgE
- d) IgG

7. Which of the following is also called the natural antibody?

- a) IgA
- b) IgM
- c) IgE
- d) IgG

8. The four polypeptide chains found in IgG are bound together by _____

- a) Noncovalent and disulphide bonds
- b) Covalent and disulphide bonds
- c) Disulphide and hydrogen bonds
- d) Noncovalent and hydrogen bonds

ANS:

- 1- D
- 2- D
- 3- D
- 4- A
- 5- C
- 6- D
- 7- B
- 8- A
- 9- B
- 10- B



1. Which immunoglobulin is found predominantly on the surface of mature B cells?

- a) IgG
- b) IgA
- c) IgM
- d) IgD

2. Which immunoglobulin is a pentamer in its secreted form?

- a) IgG
- b) IgA
- c) IgM
- d) IgE

3. What is the primary function of IgG?

- a) Mucosal immunity
- b) Sensitization to allergens
- c) Neutralization of toxins and pathogens
- d) Activation of the complement system

4. Which immunoglobulin class is predominantly found in the extracellular fluid?

- a) IgG
- b) IgA
- c) IgM
- d) IgE

5. Which immunoglobulin class is primarily involved in secondary (anamnestic) immune responses?

- a) IgG
- b) IgA
- c) IgM
- d) IgE

6. Which immunoglobulin is known for its ability to bind to basophils and mast cells?

- a) IgG
- b) IgA
- c) IgM
- d) IgE

7. Which immunoglobulin has a major role in activating the complement system and forming antigen-antibody complexes?

- a) IgG
- b) IgA
- c) IgM
- d) IgE

8. Which immunoglobulin class is often measured to assess passive immunity transferred from mother to infant?

- a) IgG
- b) IgA
- c) IgM
- d) IgE

ANS:

1-D
2-C
3-C
4-A
5-A
6-D
7-C
8-A



PLASMA PROTEINS

MCQs

1) ~~Prealbumin found in lower level in:~~

- A. Liver disease.
- B. Nephrotic syndrome.
- C. Malnutrition.
- D. All.

2) 80 % of plasma oncotic pressure is maintained by albumin.

- A. True.
- B. False.

3) Hypoalbuminemia could be carried by:-

- A. Decrease in synthesis in liver.
- B. Loss of albumin.
- C. Sever burns.
- D. All of them.

4) Clinical consequences of alpha (α)-antitrypsin deficiency :-

- A. Jaundice. → *ماندری به*
- B. Pulmonary emphysema. ✓
- C. Liver cirrhosis. ✓
- D. All above.
- E. A & B.

5) Ceruloplasmin important in :-

- A. Iron absorption from intestine.
- B. Transplant.
- C. Non of them.
- D. Both of them.

6) Which protein is important in prevent

Hb loss from kidney :

- A. Haptoglobin.
- B. Ceruloplasmin.
- C. Transferrin.
- D. Non of them.

7) High plasma level found in rheumatoid arthritis.

- A. Haptoglobin.
- B. C-reactive protein.
- C. B₂-Microglobulin.
- D. Ceruloplasmin.

8) Monoclonal proliferation marker for multiple sclerosis.

- A. True.
- B. False.

9) Which one is true regarding transferrin :-

- A. Negative acute phase protein. ✓
- B. Major iron transport. ✓
- C. Limit iron loss by prevent Hb loss from kidney. ✗
- D. Positive acute phase protein. ✗
- E. A & B

❖ what are the Functions of plasma proteins?

1. Transport.
2. Maintain plasma oncotic pressure.
3. Defense .
4. Clotting & fibrinolysis.

❖ What are the Types of plasma proteins?

1. Prealbumin.
2. Albumin.
3. α₁-Globulins (α₁ antitrypsin, α-fetoprotein)
4. α₂-Globulins (ceruloplasmin, haptoglobin)
5. B-Globulins. (CRP, transferrin, B₂-microglobulin).
6. Y-globulins

❖ What are the Functions of albumin?

1. Maintain oncotic pressure.
2. Non specific carrier.
3. Useful in liver disease & hemorrhage & shock and burns
4. Tissue cells take up and hydrolyzed it to amino acid.

❖ What are the Effects of hypoalbuminemia?

1. Edema b/c of decrease oncotic pressure.
2. Decrease transport of drugs .
3. Decrease protein bound calcium (ionized ca is intact).

What are the differences between polyclonal hypergammaglobulinemia & monoclonal?

Polyclonal	Monoclonal
<ul style="list-style-type: none"> • Many clones of B cells → wide range of antibodies. • Y-globulin band appear large in electrophoresis. • Clinical condition : acute & chronic infection, autoimmune disease, Chronic liver disease. 	<ul style="list-style-type: none"> • Single B cell → single type of Ig. • Appear as a separated dense band. • Clinical condition: Multiple myeloma.

The normal reference range for total plasma proteins is.....

- a) 2.5-4.5 gm/dl
- b) 4.5-6.0 gm/dl
- c) 6.0-8.3 gm/dl**
- d) >8.3gm/dl

6) Which of the following plasma protein is not involved in iron homeostasis?

- a) Haptoglobin ✓
- b) Transferrin ✓
- c) Ferritin ✓
- d) Ceruloplasmin *Copper***

Which of the following protein is present in the gamma-globulin fraction?

- a) Ceruloplasmin
- b) Haptoglobin
- c) Immunoglobulin**
- d) Transthyretin

<https://quizlet.com/88335132/plasma-proteins-study-questions-flash-cards/?i=5m79vu&x=1jqY>

3) C-reactive protein, a plasma protein that is elevated during inflammation and infections.

C-reactive protein falls into the category of which of the following proteins?

- a) Transport proteins
- b) Clotting proteins
- c) Plasma Enzymes
- d) Acute-phase proteins**



4) Albumin (69kDa) is the major plasma protein constituting 60% of total plasma protein content.

Which of the following is not the function of albumin?

- a) Maintenance of osmotic pressure ✓
- b) Binding and transport of fatty acids and bilirubin ✓
- c) Transport of iron**
- d) Transport of drugs such as sulphonamides

غالباً موعنا

5) Which of the following protein has a half-life of approximately 48 hours and is also measured as a biomarker for acute hepatic failure or malnutrition?

- a) Albumin
- b) Transthyretin (*pre albumin*)**
- 3) Ceruloplasmin
- d) Haptoglobin

ENZYMES INTRO

1. A _____ is a biocatalyst that increases the rate of the reaction without being changed.

- a) Aluminum oxide
- b) Silicon dioxide
- c) Enzyme
- d) Hydrogen peroxide

2. Enzyme increases the rate of reaction by lowering the activation energy.

- a) True
- b) False

3. What is an apoenzyme?

- a) It is a protein portion of an enzyme
- b) It is a non-protein group
- c) It is a complete, biologically active conjugated enzyme
- d) It is a prosthetic group

4. Name the enzyme which catalyzes the oxidation-reduction reaction?

- a) Transaminase
- b) Glutamine synthetase
- c) Phosphofructokinase
- d) Oxidoreductase

5. What is the function of phosphorylase?

- a) Transfer inorganic phosphate
- b) Transfer a carboxylate group
- c) Use H_2O_2 as the electron acceptor
- d) Transfer amino group

6. Mark the CORRECT function of enzyme, Peptidase?

- a) Cleave phosphodiester bond
- b) Cleave amino bonds
- c) Remove phosphate from a substrate
- d) Removal of H_2O

7. Which of the following reaction is catalyzed by Lyase?

- a) Breaking of bonds
- b) Formation of bonds
- c) Intramolecular rearrangement of bonds
- d) Transfer of group from one molecule to another

8. Which of the statements regarding enzymes is false?

- a) Enzymes are proteins that function as catalysts.
- b) Enzymes are specific.
- c) Enzymes provide activation energy for reactions.
- d) Enzyme activity can be regulated.
- e) Enzymes may be used many times for a specific reaction.

ANS:

- 1 - C
- 2 - A
- 3 - A
- 4 - D
- 5 - A
- 6 - B
- 7 - A
- 8 - C



1. What class of enzymes transfers functional groups from one molecule to another?

- a) Transferases
- b) Hydrolases
- c) Lyases
- d) Ligases

2. Which enzyme class catalyzes the cleavage of bonds by the addition of water?

- a) Isomerases
- b) Hydrolases
- c) Ligases
- d) Oxidoreductases

3. What type of enzyme catalyzes the rearrangement of atoms within a molecule?

- a) Transferases
- b) Lyases
- c) Isomerases
- d) Ligases

4. Which class of enzymes catalyzes the joining of two molecules with the concomitant hydrolysis of ATP?

- a) Hydrolases
- b) Ligases
- c) Lyases
- d) Oxidoreductases

5. What type of enzyme catalyzes the breaking of bonds without the use of water?

- a) Hydrolases
- b) Ligases
- c) Lyases
- d) Isomerases

6. Which of the following is an example of an oxidoreductase enzyme?

- a) Dehydrogenase
- b) Phosphatase
- c) Kinase
- d) Esterase

7. Which of the following enzymes is classified as a hydrolase?

- a) Lipase
- b) Dehydrogenase
- c) Kinase
- d) Decarboxylase

8. What type of reaction is catalyzed by a ligase enzyme?

- a) Oxidation-reduction
- b) Group transfer
- c) Hydrolysis
- d) Formation of covalent bonds

ANS:

1- A
2- B
3- C
4- B
5- C
6- A
7- A
8- D



1 In this below equation, Enzyme Y belongs to which class of enzymes?

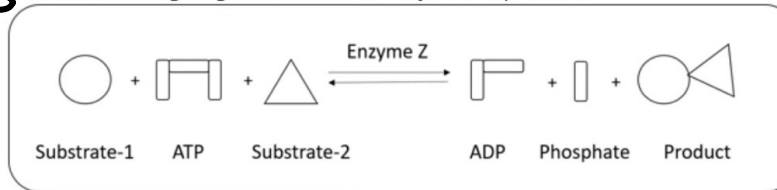


- a) Peroxidase
- b) Hydrolases
- c) Pectinase
- d) Aldolase

2 Glycosidases, lipases and proteases belong to which class of enzymes?

- a) Hydrolases
- b) Ligases
- c) Isomerases
- d) Transferases

3 In the following diagram, what does enzyme Z represent?



- a) Hydrolases
- b) Ligases
- c) Aldolases
- d) Glucose isomerase

4 Which of the following is an example for Oxidoreductases?

- a) Glucose oxidase
- b) Glutathione synthetase
- c) Aspartate aminotransferase
- d) Histidase

5 Kinase enzyme belongs to

- a) Isomerase
- b) Ligase
- c) Transferase
- d) Oxidoreductase

ANS:

1 - B
2 - A
3 - B
4 - A
5 - C



ENZYMES KINETICS

1. Which of the following is true about Michaelis-Menten kinetics?

- a) K_m , the Michaelis constant, is defined as that concentration of substrate at which enzyme is working at maximum velocity
- b) It describes single substrate enzymes
- c) K_m , the Michaelis constant is defined as the dissociation constant of the enzyme-substrate complex
- d) It assumes covalent binding occurs between enzyme and substrate

2. When the velocity of enzyme activity is plotted against substrate concentration, which of the following is obtained?

- a) Hyperbolic curve
- b) Parabola
- c) Straight line with positive slope
- d) Straight line with negative slope

3. Which of the following is the correct Lineweaver-Burk equation?

- a) $\frac{1}{V_0} = \frac{K_m}{V_{max}[S]} + \frac{1}{V_{max}}$
- b) $\frac{1}{V_{max}} = \frac{K_m}{V_0[S]} + \frac{1}{V_0}$
- c) $V_0 = \frac{V_{max}[S]}{K_m + [S]}$
- d) $V_{max} = \frac{V_0[S]}{K_m + [S]}$

4. The rate determining step of Michaelis-Menten kinetics is _____

- a) The complex dissociation step to produce products
- b) The complex formation step
- c) The product formation step
- d) None of the mentioned

5. The catalytic efficiency of two distinct enzymes can be compared based on which of the following factor?

- a) K_m
- b) Product formation
- c) Size of the enzymes
- d) pH of optimum value

7. The Michaelis-Menten equation is $V = (V_{max} * [S]) / (K_m + [S])$. What does [S] represent?

- Product concentration
- Enzyme concentration
- Substrate concentration
- Reaction rate

The maximum reaction rate (V_{max}) in Michaelis-Menten kinetics

8. The maximum reaction rate (V_{max}) in Michaelis-Menten kinetics is achieved when:

- [S] = 0
- [S] is very high compared to K_m
- [S] at $\frac{1}{2}$ of V_{max}
- [S] = K_m

9. The Michaelis constant (K_m) in Michaelis-Menten kinetics represents the substrate concentration at which:

- The enzyme is fully saturated with product
- The reaction rate is equal to V_{max}
- The enzyme is fully saturated with substrate
- The reaction rate is half of V_{max}

10. Enzymes that follow Michaelis-Menten kinetics typically exhibit saturation behavior, which means:

- The reaction rate plateaus at high substrate concentrations due to limited enzyme availability
- The reaction rate increases linearly with substrate concentration
- The reaction rate increases as the enzyme concentration increases
- The reaction rate remains constant regardless of substrate concentration

11. The turnover number (kcat) of an enzyme refers to:

- The rate at which an enzyme converts substrate to product
- The rate at which an enzyme binds to substrate
- The number of substrates required to saturate the enzyme
- The total number of enzyme molecules in a reaction

ANS:

- 1 - B
- 2 - A
- 3 - A
- 4 - A
- 5 - A
- 6 - A
- 7 - C
- 8 - B
- 9 - D
- 10 - A
- 11 - A



6. Michaelis-Menten kinetics describes the relationship between:

- Substrate concentration and reaction rate
- Enzyme concentration and reaction rate
- Enzyme concentration and product concentration
- Enzyme concentration and substrate concentration

1. The Lineweaver-Burk plot is a double reciprocal plot of the Michaelis-Menten equation. What is the x-intercept of this plot?

- Km
- Vmax
- $-1/V_{max}$
- $-1/K_m$

• What type of plot is used to determine Vmax and Km from the Michaelis-Menten equation?

- a) Scatchard plot
- b) Lineweaver-Burk plot
- c) Eadie-Hofstee plot
- d) Dixon plot

ANS:

1 - D
2 - D
3 - B
4 - D
5 - A
6 - C
7 - C
8 - B
9 - A

2. A high value of Km indicates:

- Saturated enzyme activity
- A fully active enzyme
- High enzyme-substrate affinity
- Low enzyme-substrate affinity

9. How does a high substrate concentration affect the reaction rate in enzyme kinetics?

- a) The reaction rate approaches Vmax
- b) The reaction rate decreases linearly
- c) The reaction rate remains constant
- d) The reaction rate becomes zero

3. The Michaelis-Menten equation is valid for enzymes that follow:

- Sequential reaction mechanisms only
- All types of reaction mechanisms
- Random reaction mechanisms only
- Ping-pong reaction mechanisms only

4. The catalytic efficiency of an enzyme is measured by:

- kcat
- Km
- Vmax
- k_{cat}/K_m



5. Which of the following statements is true about Michaelis-Menten kinetics?

- Vmax and Km are independent of each other
- Vmax is directly proportional to Km
- Vmax is inversely proportional to Km
- Vmax and Km are always equal

6. What does the term "enzyme specificity" refer to?

- a) The ability of an enzyme to bind to a variety of substrates
- b) The ability of an enzyme to catalyze a reaction at a high rate
- c) The ability of an enzyme to bind to a specific substrate
- d) The ability of an enzyme to function at different pH levels

7. What is the effect of increasing substrate concentration on the reaction rate in a zero-order reaction?

- a) Reaction rate increases linearly
- b) Reaction rate increases exponentially
- c) Reaction rate remains constant
- d) Reaction rate decreases



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