

Questions Lec 1:

1. Which of the following components is primarily found in the outer leaflet of the plasma membrane?

- A) Ethanolamine
- B) Sphingomyelin
- C) Serine
- D) Inositol

Answer: B

2. What is the primary role of inositol in the plasma membrane?

- A) Structural integrity
- B) Energy storage
- C) Cell signaling
- D) Membrane fluidity

Answer: C

3. Lipid rafts are specialized membrane regions enriched in which of the following?

- A) Cholesterol and phospholipids
- B) Cholesterol and sphingolipids
- C) Phospholipids and proteins
- D) Glycolipids and proteins

Answer: B

4. What is the primary function of caveolae in the plasma membrane?

- A) DNA replication
- B) Cell division
- C) Endocytosis and cell signaling
- D) Protein synthesis

Answer: C

5. **Which type of membrane protein is characterized by being loosely associated with the membrane?**

- A) Integral membrane proteins
- B) Peripheral membrane proteins
- C) Lipid-anchored proteins
- D) Glycoproteins

Answer: B

6. **Which of the following processes can restrict the mobility of membrane proteins?**

- A) Lipid bilayer thickness
- B) Interaction with the cytoskeleton
- C) Presence of cholesterol
- D) Membrane permeability

Answer: B

7. **The glycocalyx is primarily composed of:**

- A) Proteins and phospholipids
- B) Oligosaccharides of glycolipids and glycoproteins
- C) Cholesterol and phospholipids
- D) Nucleic acids

Answer: B

8. **What is one of the key functions of the glycocalyx?**

- A) Energy production
- B) Cell-cell interactions and protection from stress
- C) Membrane fusion
- D) Protein synthesis

Answer: B

9. **Which type of membrane protein spans the lipid bilayer and can be classified as single-pass or multi-pass?**

- A) Peripheral membrane proteins
- B) Integral membrane proteins
- C) Lipid-anchored proteins
- D) Glycoproteins

Answer: B

10. **What modification is associated with lipid-anchored membrane proteins?**

- A) Glycosylation
- B) Myristoylation
- C) Phosphorylation
- D) Acetylation

Answer: B

11. **Which of the following is NOT a characteristic of lipid rafts?**

- A) Clusters of cholesterol
- B) Enrichment in glycosylphosphatidylinositol (GPI)-anchored proteins
- C) Formation from peripheral proteins
- D) Involvement in intracellular vesicular trafficking

Answer: C

12. **What structural feature differentiates caveolae from other lipid rafts?**

- A) Lack of cholesterol
- B) Requirement of caveolin and cavin
- C) Absence of sphingolipids
- D) Involvement in protein synthesis

Answer: B

13. **Which of the following is a key function of the plasma membrane?**

- A) Protein synthesis

- B) Energy storage
 - C) Regulation of transport and signaling
 - D) DNA replication
- Answer: C**

14. How do lipid rafts contribute to cell signaling?

- A) By promoting protein synthesis
 - B) By clustering signaling proteins
 - C) By breaking down lipids
 - D) By preventing membrane fluidity
- Answer: B**

15. What is the main composition of the inner leaflet of the plasma membrane?

- A) Choline and sphingomyelin
 - B) Ethanolamine, serine, and inositol
 - C) Cholesterol and glycolipids
 - D) Phosphatidylserine and phosphatidylcholine
- Answer: B**

16. Which statement best describes the role of the glycocalyx?

- A) It serves as a barrier to ions only.
 - B) It is involved in energy production.
 - C) It facilitates cell-cell interactions and provides protection.
 - D) It anchors proteins to the cytoskeleton.
- Answer: C**

17. Which of the following best describes the role of sphingolipids in the membrane?

- A) They primarily facilitate protein synthesis.
- B) They are involved in forming lipid rafts and cell signaling.
- C) They act solely as energy reserves.

D) They are responsible for membrane permeability to water.

Answer: B

18. What is the significance of the asymmetrical distribution of phospholipids in the plasma membrane?

A) It contributes to the fluidity of the membrane.

B) It allows for selective signaling and cellular recognition.

C) It enhances the energy production capabilities of the cell.

D) It protects the cell from mechanical damage.

Answer: B

19. Caveolae play a critical role in various cellular functions. Which of the following is NOT a function attributed to caveolae?

A) Regulation of lipid transport

B) Promotion of apoptosis

C) Endocytosis

D) Cell signaling

Answer: B

20. How does the presence of lipid rafts affect the organization of membrane proteins?

A) It randomly distributes proteins throughout the membrane.

B) It facilitates the clustering of specific signaling molecules.

C) It inhibits the movement of all proteins.

D) It dissolves lipid-anchored proteins.

Answer: B

21. Which of the following best explains the mechanism by which peripheral membrane proteins interact with the membrane?

A) Through covalent bonding with lipid bilayers

B) By forming hydrogen bonds with membrane lipids

C) Through ionic and hydrogen bonds with integral proteins

D) By inserting hydrophobic regions into the lipid bilayer

Answer: C

22. The lipid bilayer's fluidity is influenced by several factors. Which factor is most critical for maintaining membrane integrity during temperature fluctuations?

A) The presence of unsaturated fatty acids

B) The concentration of cholesterol

C) The distribution of integral proteins

D) The thickness of the lipid bilayer

Answer: B

23. In the context of membrane dynamics, what does the term "fence" refer to?

A) The cytoskeleton's role in maintaining protein mobility

B) The barrier formed by lipid rafts

C) The restriction of lateral movement of proteins by membrane domains

D) The protective layer provided by the glycocalyx

Answer: C

24. What potential consequence might arise from a defect in the synthesis of glycosylphosphatidylinositol (GPI) anchors?

A) Increased membrane fluidity

B) Impaired signal transduction

C) Enhanced endocytosis

D) Overproduction of membrane proteins

Answer: B

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