Cell Membrane Structure and Function

Cell Biology · Answer Key · 15 Questions

1. Which organelles utilize specialized membrane biogenesis mechanisms instead of the conventional ER-to-Golgi pathway?

A) Lysosomes and Endosomes
B) Mitochondria and Chloroplasts
C) Golgi and Plasma Membrane
D) Nucleus and Ribosomes

2. What is the primary function of Flippases?

A) Move lipids from outer to inner leaflet
B) Move lipids from inner to outer leaflet
C) Redistribute lipids bidirectionally
D) Synthesize new phospholipids

3. How does cholesterol affect membrane fluidity at high temperatures?

A) Increases fluidity
B) Prevents phospholipid packing
C) Reduces excessive fluidity
D) Has no effect

4. What structural feature of unsaturated fatty acids increases membrane fluidity?

A) Straight hydrocarbon chains
B) Carbon-carbon double bonds creating kinks
C) Increased chain length
D) Higher number of hydrogen atoms

5. What is the role of the Signal Recognition Particle (SRP)?

A) Synthesizes ATP
B) Targets ribosome-mRNA complex to the ER membrane
C) Degrades misfolded proteins
D) Transports vesicles to the Golgi

6. What happens to the cell membrane when temperatures exceed 45°C?

A) Becomes more rigid
B) Becomes freely-permeable and may burst
C) Membrane thickness increases
D) Lipids crystallize

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7. Which force is the primary driving force for the formation of the phospholipid bilayer?

A) Covalent bonding
B) Hydrogen bonding
C) Hydrophobic interactions
D) Van der Waals forces

8. What are Membrane Contact Sites (MCS)?

A) Sites where vesicles fuse with the Golgi
B) Physical non-fusing junctions between ER and mitochondria
C) Locations of protein synthesis
D) Areas of high carbohydrate concentration

9. How do longer fatty acid tails affect membrane fluidity?

A) They increase it
B) They have no impact
C) They decrease it by increasing van der Waals interactions
D) They cause the membrane to melt

10. What is the function of Scramblases?

A) Move lipids from outer to inner leaflet
B) Move lipids from inner to outer leaflet
C) Redistribute lipids between both leaflets
D) Maintain asymmetry

11. What is the result of freezing temperatures (below 0°C) on membrane structure?

A) Increased fluidity
B) Membrane rigidity and potential fracture
C) Increased permeability
D) Enhanced protein activity

12. Which component helps stabilize the three-dimensional folding of membrane proteins in the extracellular environment?

A) Ester bonds
B) Disulfide bonds
C) Glycosidic bonds
D) Ionic interactions

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13. What is the main function of the Sec61 complex?

A) Glycosylation of proteins
B) Translocation of polypeptides into the ER
C) Synthesis of cholesterol
D) Lateral movement of lipids

14. What is the effect of alcohol on the cell membrane?

A) Stabilizes the bilayer
B) Increases permeability by dissolving lipids
C) Decreases fluidity
D) Triggers protein synthesis

15. Why are unsaturated fatty acids important for organisms in cold environments?

A) They provide more energy
B) They prevent the membrane from becoming too rigid
C) They increase the thickness of the membrane
D) They act as transport channels

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