

試題廿六題共四頁，總分 100 分。請依題號順序於答案卷作答；未依序作答者不予計分。

一. 選擇題；1-10 題，每題二分，均為單選。

1. Which of the following statements concerning the fluid mosaic model of a membrane is correct?
 - A. Transverse movement of a protein in the membrane is thermodynamically favorable.
 - B. Proteins are distributed asymmetrically in the membrane.
 - C. The transmembrane domain has largely hydrophilic amino acids.
 - D. Proteins are always completely embedded in the lipid bilayer.
 - E. None of the above.

2. Lysosomes function to
 - A. carry out digestion of materials taken in from the environment.
 - B. carry out digestion of all cytosolic components.
 - C. ingest materials from the extracellular environment.
 - D. synthesize various cellular macromolecules.
 - E. none of the above.

3. Which of the following statements concerning membranes is correct?
 - A. The lipid compositions of the two layers of the membrane equilibrate due to flip-flop movement.
 - B. An increase in the cholesterol content of a membrane decreases the fluidity of the membrane.
 - C. The amount of cardiolipin is high in plasma membrane.
 - D. Cell membranes contain free carbohydrate such as glucose.
 - E. None of the above.

4. A mediated transport system would be expected to
 - A. exist only in plasma membrane.
 - B. exhibit nonspecific binding of solute to transporter.
 - C. show saturation kinetics and substrate specificity.
 - D. establish a concentration gradient across the membrane.
 - E. none of the above.

(背面仍有題目,請繼續作答)

5. Smooth endoplasmic reticulum (SER) functions to
- A. synthesize of energy-rich compounds.
 - B. produce ribosomes.
 - C. provide genetic material.
 - D. synthesize of steroid hormones, and detoxification of a wide variety of organic compounds.
 - E. none of the above.
6. Which type of cell junctions contain actin filaments?
- A. Desmosome
 - B. Adherens junction
 - C. Hemidesmosome
 - D. Desmoglein
 - E. None of the above.
7. Molecular chaperones
- A. act only on fully synthesized polypeptide chains.
 - B. when bound to protein, increase the rate of protein degradation.
 - C. bind and stabilize unfolded or partially folded proteins, thereby preventing these proteins from being degraded.
 - D. guide the folding of polypeptide chains into patterns that would be thermodynamically unstable.
 - E. none of the above.
8. The fundamental contractile unit of skeletal muscle is the
- A. myofiber.
 - B. myofibril
 - C. thick filament.
 - D. sarcomere.
 - E. none of the above.
9. Which of the following statements concerning actin and myosin is correct?
- A. Actin is the major protein of the thick filament.
 - B. Myosin is the major protein of the thin filament.
 - C. The binding of ATP to the actin-myosin complex promotes dissociation of the actin and myosin.
 - D. The globular head section of actin has domains for binding ATP and myosin.
 - E. None of the above.

10. After the disruption of plasma membrane by homogenization, the organelles in the cell can be separated physically using
- A. electron microscopy.
 - B. centrifugation
 - C. x-ray crystallography.
 - D. salt precipitation.
 - E. none of the above.

二. 配合題；11-15 題，每題二分。

- 11. Fibronectin
 - 12. Collagen
 - 13. Selectin
 - 14. Laminin
 - 15. Proteoglycan
- A. A glycoprotein of the extracellular matrix, which consists of three different polypeptide chains linked by disulfide bonds and organized into a molecule resembling a cross with three short arms and one long arm.
 - B. Recognizes and binds to a particular arrangement of sugars in the oligosaccharides that project from the surfaces of other cells.
 - C. Consists of three polypeptide chains, called α chains, wound around each other to form a unique, rod-like triple helix.
 - D. Consists of two similar, but non-identical, polypeptides joined by a pair of disulfide bonds located near the C-termini.
 - E. Consists of a core protein molecule to which chains of glycosaminoglycans are covalently attached.

三. 配合題；16-20 題，每題二分

- 16. Receptor-mediated endocytosis
- 17. Bulk-phase endocytosis
- 18. Clathrin

(背面仍有題目,請繼續作答)

19. Phagocytosis
20. Late endosome
- A. Process by which relatively large particles are internalized by certain eukaryotic cells.
- B. A sorting vesicle with an acidic internal pH in which bound ligands dissociate from their membrane-bound receptor proteins.
- C. Forms a lattice structure to direct internalization of hormone-receptor complexes from the plasma membrane.
- C. Is the uptake of specific extracellular ligands usually in the fluid form or as dissolved solutes following their binding to receptors on the external surface of the plasma membrane.
- D. Is the nonspecific uptake of extracellular fluids.

四. 問答題；21-26 題。

21. Describe the following molecules involved in mitosis: (a) CDC2 (b) sister chromatid (c) cohesion (d) separase (e) MAD2. (10%)
22. Describe the molecules and pathways in regulating cell cycle G1 phase to S phase. (10%)
23. Describe the intrinsic and extrinsic pathways of apoptosis. (10%)
24. Please describe the main differences between prokaryotic and eukaryotic cells from molecular and cellular aspects. (10%)
25. Please describe the main differences of protein targeting signal between mitochondrion and peroxisome, and the targeting mechanism of mitochondrial matrix protein. (10%)
26. Please describe the biological function of germ cell, and the differences between mammalian oogenesis and spermatogenesis. (10%)