

科目：普通生物學 (一) 系所組：生命科學系

(一)、單選題 (60%)

1. ECM (Extracellular matrix) proteins are made by ribosomes in which part of a eukaryotic cell?  
(A) cytoplasm (B) nuclear envelope (C) Golgi apparatus (D) rough ER.
2. What is the function of the nuclear pore complex found in eukaryotes?  
(A) It regulates the movement of proteins and RNAs into and out of the nucleus.  
(B) It synthesizes the proteins required to copy DNA and make mRNA.  
(C) It synthesizes secreted proteins.  
(D) It assembles ribosomes from raw materials that are synthesized in the nucleus.
3. A cell with a predominance of rough endoplasmic reticulum is most likely \_\_\_\_\_.  
(A) producing large quantities of proteins for secretion  
(B) producing large quantities of proteins in the cytosol  
(C) producing large quantities of carbohydrates to assemble an extensive cell wall matrix  
(D) producing large quantities of carbohydrates for storage in the vacuole
4. A cell with a predominance of smooth endoplasmic reticulum is likely specialized to \_\_\_\_\_.  
(A) store large quantities of water  
(B) import and export large quantities of protein  
(C) actively secrete large quantities of protein  
(D) synthesize large quantities of lipids
5. The liver is involved in detoxification of many poisons and drugs. Which of the following structures is primarily involved in this process and, therefore, abundant in liver cells?  
(A) rough endoplasmic reticulum  
(B) smooth endoplasmic reticulum  
(C) Golgi apparatus  
(D) nuclear envelope
6. Which of the following organelles produces and modifies polysaccharides that will be secreted?  
(A) lysosome (B) mitochondrion (C) Golgi apparatus (D) peroxisome
7. Asbestos is a material that was once used extensively in construction. One risk from working in a building that contains asbestos is the development of asbestosis caused by the inhalation of asbestos fibers. Cells will take up asbestos by phagocytosis, but are not able to degrade it. As a result, asbestos fibers accumulate in \_\_\_\_\_.

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- (A) the Golgi apparatus (B) nuclei (C) peroxisomes (D) lysosomes
8. If plant cells are grown on media containing radioactively labeled thymine for one generation, radioactively labeled macromolecules will be detected in which of the following?
- (A) only in the nucleus  
(B) only in the nucleus and mitochondria  
(C) only in the nucleus and chloroplasts  
(D) in the nucleus, mitochondria, and chloroplasts
9. Suppose a young boy is always tired and fatigued, suffering from a metabolic disease. Which of the following organelles is most likely malfunctioning in this disease?
- (A) lysosomes (B) Golgi apparatus (C) mitochondria (D) smooth endoplasmic reticulum
10. Vinblastine, a drug that inhibits microtubule polymerization, is used to treat some forms of cancer. Cancer cells given vinblastine would be unable to \_\_\_\_\_.
- (A) form cleavage furrows during cell division  
(B) migrate by amoeboid movement  
(C) separate chromosomes during cell division  
(D) maintain the shape of the nucleus
11. A defect in which of the following intercellular junctions would allow partially digested material to leak passively between the cells of the small intestine into the abdominal cavity?
- (A) desmosomes (B) gap junctions (C) plasmodesmata (D) tight junctions
12. The membranes of winter wheat are able to remain fluid when it is extremely cold by \_\_\_\_\_.
- (A) increasing the proportion of unsaturated phospholipids in the membrane  
(B) decreasing the percentage of cholesterol molecules in the membrane  
(C) decreasing the number of hydrophobic proteins in the membrane  
(D) increasing the proportion of glycolipids in the membrane
13. Which of the following statements correctly describes *osmosis*?
- (A) Osmosis only takes place in red blood cells.  
(B) Osmosis is an energy-demanding or "active" process.  
(C) In osmosis, water moves across a membrane from areas of lower solute concentration to areas of higher solute concentration.  
(D) In osmosis, solutes move across a membrane from areas of lower water concentration to areas of

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higher water concentration.

14. Which of the following activities would be inhibited by a drug that specifically blocks the addition of phosphate groups to proteins?

- (A) binding of G proteins to G protein-coupled receptors
- (B) ligand-gated ion channel signaling pathways
- (C) adenylyl cyclase activity
- (D) receptor tyrosine kinase activity

15. What is a primary function of transcription factors?

- (A) They regulate the synthesis of DNA in response to a signal.
- (B) They convert ATP into cAMP.
- (C) They control gene expression.
- (D) They regulate the release of calcium from the endoplasmic reticulum.

16. When we see chiasmata under a microscope, that lets us know which of the following has occurred?

- (A) asexual reproduction
- (B) meiosis II
- (C) anaphase II
- (D) prophase I of meiosis I
- (E) separation of homologous

17. Caffeine is an inhibitor of phosphodiesterase. Therefore, the cells of a person who has recently consumed coffee would have increased levels of (A) phosphorylated proteins. (B) GTP. (C) cAMP. (D) adenylyl cyclase.

18. Which of the following describes the events of apoptosis? (A) The cell dies, it is lysed, its organelles are phagocytized, and its contents are recycled. (B) Its DNA and organelles become fragmented, it dies, and it is phagocytized. (C) Its nucleus and organelles are lysed, then the cell enlarges and bursts. (D) Its DNA and organelles are fragmented, the cell shrinks and forms blebs, and the cell self-digests.

19. An example of a connective tissue is the (A) skin. (B) nerves. (C) blood. (D) smooth muscles.

20. Positive feedback has occurred when (A) an increase in blood sugar increases the secretion of a hormone that stimulates the movement of sugar out of the blood. (B) a decrease in blood sugar increases the secretion of a hormone that increases the conversion of glycogen to glucose. (C) uterine contractions needed for the birthing process are expedited by the pressure of a moving baby in its mother's uterus. (D) an increase in calcium concentration increases the secretion of a hormone that promotes the storage of calcium in bone.

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21. The only vertebrates in which blood flows directly from respiratory organs to body tissues without first returning to the heart are the (A) amphibians. (B) birds. (C) fishes. (D) reptiles.
22. Engulfing-phagocytic cells of innate immunity include all of the following *except* (A) neutrophils. (B) macrophages. (C) dendritic cells. (D) natural killer cells.
23. This type of immunity is present only when a newborn infant is being fed by actively nursing on its mother and ends when nursing ends. (A) innate immunity. (B) active immunity. (C) passive immunity. (D) cell-mediated immunity
24. The nitrogenous waste that requires the most energy to produce is (A) ammonia. (B) ammonium. (C) urea. (D) uric acid.
25. Following which molecule mechanisms is involved in animal morphogenesis:  
(1) reorganized cytoskeleton ; (2) induced apoptosis ; (3) Cell movement ; (4) DNA rearrangement.  
(A) 1, 2 (B) 2, 3 (C) 1, 2, 3 (D) 2, 3, 4
26. Increased activity in the sympathetic nervous system leads to (A) increased secretion by the pancreas. (B) increased secretion by the gallbladder. (C) increased contraction of the stomach. (D) relaxation of the airways in the lungs.
27. Short-term memory information processing usually causes changes in the (A) brainstem. (B) medulla. (C) hypothalamus. (D) hippocampus.
28. Following which hormone is a endogenous neuropeptide that might function as a natural analgesic.  
(A) substance P (B) endorphine (C) dopamine (D) acetylcholine
29. Animals use pheromones to communicate (A) species recognition. (B) gender recognition. (C) danger. (D) All options are correct.
30. Which of the following occurs in meiosis but not in mitosis? (A) chromosome replication (B) homologous chromosome separation (C) alignment of chromosomes at the equator (D) condensation of chromatin.

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(二) 問答題 (40%)

1. 請解釋下面的名詞 (10%, 每題 5 分):

(1-A) checkpoint in cell cycle

(1-B) stem cells

2. To detail describe the antibody function. (10 points)

3. When the animals loss a lot of water or suffer the severe bleeding, how animal body to response it and to regulate the fluid retention in the kidney? (10 points)

4. To detail describe the hormones control of the female reproductive system in female vertebrates. (10 points)

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