

國立臺灣海洋大學96學年度生物學第一次期中考(命題教師:陳秀儀)

Part I- MULTIPLE CHOICE (50 %, 2 points/each)

Choose the **one** alternative that best completes the statement or answers the question.

1. Which of the following properties or processes do we associate with living things?
A) evolutionary adaptations B) energy processing C) responding to the environment
D) growth and reproduction E) all of the above
2. What is a hypothesis?
A) the same thing as an unproven theory
B) a tentative explanation that can be tested and is falsifiable
C) a verifiable observation sensed directly, or sensed indirectly with the aid of scientific instrumentation
D) a fact based on qualitative data that is testable
E) a fact based on quantitative data that is falsifiable
3. All organisms on your campus make up
A) an ecosystem. B) a community. C) a population. D) an experimental group.
E) a taxonomic domain.
4. Protists and bacteria are grouped into different domains because
A) protists eat bacteria. B) bacteria are not made of cells.
C) bacterial cells lack a nucleus. D) bacteria decompose protists.
E) protists are photosynthetic.
5. There are approximately _____ identified and named species.
A) 1,800 B) 180,000 C) 1,800,000 D) 18,000,000 E) 180,000,000
6. A primary objective of cell fractionation is to
A) view the structure of cell membranes.
B) identify the enzymes outside the organelles.
C) determine the size of various organelles.
D) separate the major organelles so their particular functions can be determined.
E) crack the cell wall so the cytoplasmic contents can be released.

For the 7-9 questions, use the lettered answers to match the structure to its proper cell type. Choose the most inclusive category. Each answer may be used once, more than once, or not at all.

- A. a feature of all cells
- B. found in prokaryotic cells only
- C. found in eukaryotic cells only
- D. found in plant cells only
- E. found in animal cells only

7. plasma membrane

8. tonoplast

9. nucleoid

10. Organelles other than the nucleus that contain DNA include

- A) ribosomes. B) mitochondria. C) chloroplasts. D) B and C only E) A, B, and C

11. All of the following molecules are part of the cell membrane *except*

- A) lipids. B) nucleic acids. C) proteins. D) phosphate groups. E) steroids.

12. Which of the following is a reasonable explanation for why unsaturated fatty acids help keep any membrane more fluid at lower temperatures?

- A) The double bonds form a kink in the fatty acid tail, forcing adjacent lipids to be further apart.
- B) Unsaturated fatty acids have a higher cholesterol content.
- C) Unsaturated fatty acids permit more water in the interior of the membrane.
- D) The double bonds block interaction among the hydrophilic head groups of the lipids.
- E) The double bonds result in a shorter fatty acid tail.

13. An animal cell lacking oligosaccharides on the external surface of its plasma membrane would likely be impaired in which function?

- A) transporting ions against an electrochemical gradient B) cell-cell recognition
- C) maintaining fluidity of the phospholipid bilayer D) attaching to the cytoskeleton
- E) establishing the diffusion barrier to charged molecules

14. You are working on a team that is designing a new drug. In order for this drug to work, it must enter the cytoplasm of specific target cells. Which of the following would *not be a factor that determines whether the molecule enters the cell?*
- A) size of the drug molecule
 - B) polarity of the drug molecule
 - C) charge on the drug molecule
 - D) similarity of the drug molecule to other molecules transported by the target cells
 - E) lipid composition of the target cells' plasma membrane
15. The sodium-potassium pump is called an electrogenic pump because it
- A) pumps equal quantities of Na^+ and K^+ across the membrane.
 - B) pumps hydrogen ions out of the cell.
 - C) contributes to the membrane potential.
 - D) ionizes sodium and potassium atoms.
 - E) is used to drive the transport of other molecules against a concentration gradient.
16. In yeast (*Saccharomyces cerevisiae*), the two sexes are called
- A) S plus and S minus.
 - B) \mathbf{a} and α .
 - C) \mathbf{a} and \mathbf{b} .
 - D) \mathbf{b} and β .
 - E) male and female.
17. From the perspective of the cell receiving the message, the three stages of cell signaling are
- A) the paracrine, local, and synaptic stages.
 - B) signal reception, signal transduction, and cellular response.
 - C) signal reception, nucleus disintegration, and new cell generation.
 - D) the alpha, beta, and gamma stages.
 - E) signal reception, cellular response, and cell division.
18. Membrane receptors that attach phosphates to specific amino acids in proteins are
- A) not found in humans.
 - B) called receptor tyrosine-kinases.
 - C) a class of GTP G-protein signal receptors.
 - D) associated with several bacterial diseases in humans.
 - E) important in yeast mating factors that contain amino acids.
19. Up to 60% of all medicines used today exert their effects by influencing what structures in the cell membrane?
- A) tyrosine-kinases receptors
 - B) ligand-gated ion channel receptors
 - C) growth factors
 - D) G proteins
 - E) cholesterol

20. Testosterone functions inside a cell by
- A) acting as a signal receptor that activates ion-channel proteins.
 - B) binding with a receptor protein that enters the nucleus and activates specific genes.
 - C) acting as a steroid signal receptor that activates ion-channel proteins.
 - D) becoming a second messenger that inhibits adenylyl cyclase.
 - E) coordinating a phosphorylation cascade that increases glycogen metabolism.
21. A cell containing 92 chromatids at metaphase of mitosis would, at its completion, produce two nuclei containing how many chromosomes?
- A) 12 B) 16 C) 23 D) 46 E) 92
22. Which of the following is *false* regarding the bacterial chromosome?
- A) It consists of a single, circular DNA molecule.
 - B) DNA replication begins at the origin of replication.
 - C) Its centromeres uncouple during metaphase of mitosis.
 - D) It is highly folded within the cell.
 - E) It has genes that control binary fission.
23. Proteins that are involved in the regulation of the cell cycle, and that show fluctuations in concentration during the cell cycle, are called
- A) ATPases. B) kinetochores. C) centrioles. D) proton pumps. E) cyclins.
24. Which of the following is *true* concerning cancer cells?
- A) They do not exhibit density-dependent inhibition when growing in culture.
 - B) When they stop dividing, they do so at random points in the cell cycle.
 - C) They are not subject to cell cycle controls.
 - D) B and C only
 - E) A, B, and C
25. Which of the following is (are) true concerning cyclin-dependent kinase (Cdk)?
- A) Cdk is inactive, or "turned off," in the presence of cyclin.
 - B) Cdk is present throughout the cell cycle.
 - C) Cdk is an enzyme that attaches phosphate groups to other proteins.
 - D) Both A and B are true.
 - E) Both B and C are true.

Part II : Explanation (3 points each) (30%)

1. negative feedback
2. resolution
3. basal body
4. peripheral protein
5. osmosis
6. paracrine signaling
7. protein kinase
8. somatic cells
9. kinetochore
10. origin of replication

Part III : Questions (30%)

1. What are major extracellular matrixes involved in many cellular function in animal cell?(10pts)
2. How do hormones activate G-linked receptor signaling?(5pts)
3. You add normal EGF(epidermal growth factor) ligands to cells that have EGF receptors, but cells don't response to the ligands. What are the problems in EGF receptors?(5pts)
4. What are the biological roles of cell cycle? What is the sequence of cell cycle?Please describe M phase briefly. (10pts)