

所別：生命科學系碩士班 醫藥與環境生物科技組(一般生) 科目：細胞學

I. Single Choice: (80%, each for 4%)

- Overexpression of which of the following proteins is most likely to induce development of cancer cells?
(A) P53
(B) Ras
(C) Rho
(D) ABC transporter
(E) P21
- Which structure specifies the location of cytokinesis in animal cells?
(A) Mitotic spindle
(B) Centromere
(C) Centrosome
(D) None of them
(E) All above
- Which type of ion channels is mainly responsible for generation of the nerve impulse (action potential)?
(A) Voltage-gated K^+ channel
(B) Voltage-gated Na^+ channel
(C) Voltage-gated Ca^{2+} channel
(D) Neurotransmitter-gated Na^+ channel
(E) Neurotransmitter-gated Ca^{2+} channel
- Which is the basic unit of eukaryotic chromosome?
(A) Centrosome
(B) Telomere
(C) Nucleosome
(D) Centromere
(E) Nucleolus
- Which of the following description occurs in apoptosis?
(A) Cell shrink
(B) DNA fragmentation
(C) cytoskeleton collapses
(D) Activation of caspases
(E) All above
- During mitosis, in which phase chromosomes are arranged in the center of mitotic spindle?
(A) Prophase
(B) Prometaphase
(C) Metaphase
(D) Anaphase
(E) Telophase
- Which phase in the cell cycle is most likely to be affected by extracellular signals?
(A) Mitosis
(B) G_1 phase
(C) S phase
(D) G_2 phase
(E) G_0 phase
- Which the following description about PDGF is NOT TRUE?
(A) Is a growth factor and mitogen
(B) Binds to receptor tyrosine kinase
(C) Induces myc production
(D) Activate PI3 kinase
(E) None of them

注意：背面有試題

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9. Apoptosis can be induced by cytochrome C. Which organelles cytochrome C is released from?
- (A) Nucleus
 - (B) ER
 - (C) Golgi
 - (D) Mitochondria
 - (E) Endosome

Questions 10-12 refer to the following descriptions.

- (A) Protein is pretranslational but unfolded
 - (B) Protein is posttranslational and folded
 - (C) Protein is^s cotranslational but folded
 - (D) Protein is^{is} posttranslational but unfolded
 - (E) Protein is cotranslational but unfolded
10. When protein is import into nucleus, which state of protein is in?
11. When protein is import into ER, which state of protein is in?
12. When protein is import into mitochondria, which state of protein is in?

Questions 13-16 refer to the following enzymes.

- (A) Cyclin-dependent kinase
 - (B) Protein kinase A
 - (C) Adenylyl cyclase
 - (D) Caspases
 - (E) Mitogen-activated protein kinase
13. Which enzyme is the key regulator of the cell cycle?
14. Which enzyme mediates apoptosis?
15. Which enzyme converts ATP to cyclic AMP?
16. Which enzyme can be activated by receptor tyrosine kinase?

Questions 17-20 refer to the following enzymes?

- (A) DAG
 - (B) IP₃
 - (C) Cyclic AMP
 - (D) Ras
 - (E) Bcl
17. Which activates protein kinase A?
18. Which activates protein kinase C?
19. Which activates Mitogen-activated protein kinase?
20. Which activates calcium?

II Questions: (20%, each for 10%)

1. The Na⁺-K⁺ pump is important to maintain the Na and K ion concentration in the cytosol. How many Na and K ions are exchanged at each pumping cycle? And what is direction of ion flow? (10%)
2. Why do cells only replicate once per cell cycle? (10%)