

所別：生命科學系碩士班 不分組 科目：細胞生物學

**A. Multiple choices (30%): please choose the best answer to each question.**

- Which of the following molecules is the major component of microfilament?  
a.  $\alpha$ -tubulin b.  $\beta$ -tubulin c. actin d. selectin
- The influx of which ion cause the depolarizing phase of an action potential of neurons?  
a.  $\text{Na}^+$  b.  $\text{H}^+$  c.  $\text{K}^+$  d.  $\text{Cu}^{+2}$
- Which ONE of the following enzymes is not involved in prokaryotic DNA replication?  
a. DNA polymerase I b. Helicase c. T4 DNA ligase d. Primase
- Which ONE of the following molecules is involved in the forming of coated pits during receptor-mediated endocytosis?  
a. SNARE proteins b. Clathrin c. glucose d. *Trp* repressor.
- The cloning of Dolly the sheep has proved that genome is not irreversibly modified during development, but there are some exceptions. Which one of the following cell types in which their genome is irreversibly modified?  
a. Neuron b. T cell c. fat cell d. Keratinocyte
- Which one of the following membrane pump can utilize light energy to transport proton?  
a.  $\text{Na}^+/\text{H}^+$  pump b. bacteriorhodopsin proton pump c.  $\text{Na}^+/\text{glucose}$  pump d.  $\text{Na}^+/\text{K}^+$  pump
- Which one of the transportation across membrane employs uniport mechanism?  
a. Glucose by GluT1. b.  $\text{Na}^+$  by  $\text{Na}^+/\text{H}^+$  pump. c.  $\text{H}^+$  by  $\text{Na}^+/\text{H}^+$  pump. d.  $\text{H}^+$  by bacteriorhodopsin.
- Which ONE of the following molecules doesn't function as neural transmitter?  
a. *Acetylcholine* b. *Histamine* c. Dopamine d. Calmodulin
- During the hyperpolarizing phase of an action potential, efflux of one major ion re-establishes the membrane potential back to resting potential. What is this ion?  
a.  $\text{Na}^+$  b.  $\text{H}^+$  c.  $\text{K}^+$  d.  $\text{Cu}^{+2}$
- Which type of the following synapses can achieve fastest transmission?  
a. acetylcholine synapse b. dopamine c. histamine d. electrical
- Which one of the following amino acid residues is not the common targets of membrane receptor phosphorylation?  
a. Serine. b. threonine c. tyrosine d. alanine
- Which of the following molecules is not involved in the cell-ECM/substratum interaction?  
a. Fibronectin. b. integrin c. laminin d. cadherin

參考用

注意：背面有試題

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13. Which one of the following cell junctions can prevent the flow of fluids?  
a. desmosome b. hemidesmosome c. gap junction d. tight junction
14. Which one of the following cell junctions links a cell to its substratum?  
a. desmosome b. hemidesmosome c. gap junction d. tight junction
15. Which ONE of the following molecules is not an usual 2nd messenger found in signal transduction?  
a.  $Ca^{+2}$  b. DDT c. cAMP d. DAG

**B. Questions and short answers (35%): please answer the following questions concisely.**

1. Please list four junctions used in the cell-cell adhesion. (12%)
2. Please identify the three checkpoints controlling cell cycle progression (9%).
3. Please identify the cleavage products of Inositol triphosphate (InsP3) after its cleavage by phospholipase C. Which one is anchored in the membrane? (6%)
4. Please list two growth factor receptors that transmit their signal through intrinsic tyrosine kinase (4%)
5. What are the major structure fibers in the extracellular matrix of animal and plant cells respectively? (4%)

**C. Term definition and short answers (15%): please explain the following terms concisely.**

1. Rough ER (3%)
2. SNARE (3%)
3. Clathrin triskelions (3%)
4. Connexon (3%)
5. Calcineurin (3%).

**D. Questions and answers (20%): please answer the following questions as sufficient as you can.**

1. Please explain the signal transduction pathways of apoptosis induced by cell death signal or DNA damage? (10%)
2. Aberrant regulation of cell cycle is a major contribution to generation of most types of tumor. Can you explain how is the cell cycle regulated and how is it related to the rising of tumor? (10%)

參考用