

國立清華大學 100 學年度碩士班入學考試試題

系所班組別：生命科學院甲組

考試科目（代碼）：細胞生物學(0405)

共__2__頁，第__1__頁 *請在【答案卷】作答

1. Contraction of smooth muscle requires increased calcium concentration. Design an experiment to demonstrate that calcium is from outside of the cell, not from the intracellular calcium store. (10%)
2. How do you do double-labeling in immunoEM? (5%)
3. How can a migrating cell use myosin and actin for the protrusion and forward movement? (5%)
4. Describe the role of tight junction in the transcellular transport of glucose across the intestinal epithelium. (5%)
5. What parts of polypeptide chain participate in the bonds that hold together secondary structure? What parts participate in tertiary structure? (8 %)
6. How would you expect the saturation levels of membrane phospholipid fatty acids to differ in plants adapted to cold environments and plants adapted to hot environments? Please explain. (7 %)
7. *Pseudomonas* toxin will transfer from the Golgi complex to the ER. The C-terminal 24 amino acids of the B subunit of *Pseudomonas* toxin is shown in below:
KEQAISALPD YASQPGKKPPR KDEL
From inspection of these sequences, what is the probable targeting receptor for transfer of *Pseudomonas* toxin from the Golgi apparatus to the ER? What is the possible coat protein required for this transfer? Please provide the explanations. (10 %)
8. Please describe how the cell cycle is controlled by different cyclin-dependent kinase molecules (9%)
9. Please describe how EGF receptor acts through Ras to promote cell proliferation (8%)
10. Please describe the current model for the signal mechanism of cotranslational import (8%)
11. 某人以為鉀鹽無害而改吃鉀鹽以避免吃了太多鈉。請問他的神經細胞之 resting membrane potential 及 action potential 會不會有什麼影響？為什麼？ (8%)

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12. 某生把一感覺及一運動細胞一起培養 兩細胞也形成 synapse
若刺激感覺神經細胞 在運動神經細胞可以量到 EPSP(excitatory post-synaptic potential) 請問 EPSP 的高度, 寬度, 及 EPSP 的上升斜率及下降斜率分別代表什麼?(9%)
13. NO 被視為一種 unconventional transmitter. 你認為它與其他 transmitters 有何不同之處? 為何它可視為一種 transmitter? 為何它是 unconventional? (8%)