

國立清華大學 102 學年度碩士班考試入學試題

系所班組別：生命科學院碩士班甲組(0504)、生命科學院醫學生物科技學
程碩士班(0507)

考試科目（代碼）：細胞生物學(0405、0705)

共__1__頁，第__1__頁 *請在【答案卷、卡】作答

1. What is Tau protein? What is its function in neuronal cells? (6%)
2. How does calcium regulate skeleton muscle contraction? (6%)
3. Explain the mechanism of cell migration by using the retrograde flow and actin polymerization. (7%)
4. What is FRET? How can it be used as cellular biosensors? (6%)
5. Describe what happens when an action potential reaches an electrical synapse. (8%)
6. What are the important functions of neuronal plasma membranes? (9%)
7. What is myelin? What is it made of? What role does myelin play in neurons? (8%)
8. Do proteins and lipids on the plasma membrane have mobility? What kind of technique can be used to detect the mobility of proteins or lipids on the plasma membrane? (8%)
9. The carbohydrates attached to some proteins and lipids of the plasma membrane are added as the membrane is made and refined in the ER and Golgi apparatus. On which side of the plasma membrane are the carbohydrates found? Why? (7%)
10. What is the cellular location where the lysosomal enzymes being tagged with Mannose-6-phosphate (M6P)? What is the location where M6P-tagged lysosomal enzymes interact with the M6P receptors? What is the predicted fate of lysosomal acid hydrolases in I-cell disease in which cells are deficient in the enzyme required for formation of mannose-6-phosphate? Why? (10%)
11. Please describe how receptor tyrosine kinase acts through (a) Ras-dependent pathway to promote cell proliferation and (b) Ras-independent pathways to promote cell survival. (16%)
12. Please describe the current model for the cotranslational import of polypeptides into the ER. (9%)