

國立成功大學
110學年度碩士班招生考試試題

編 號：273

系 所：生理學研究所

科 目：細胞生物學

日 期：0203

節 次：第 2 節

備 註：不可使用計算機

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第1頁，共1頁

※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. Decide whether each of the following statements are true or false? Then explain your answer/why.
 - 1.1. The nucleus and mitochondria are surrounded by a double membrane (8 %).
 - 1.2. The majority of human DNA is not important junk/trash (8 %).
 - 1.3. Lysosomes digest only substances that have been taken up by endocytosis (8 %).
2. In his highly classified research laboratory, Dr. Wang is charged with the task of developing a strain of dog-sized rats to be deployed behind enemy lines. In your opinion, which of the following strategies should Dr. Wang pursue to increase the size of rats? Then explain your answer/why (13 %).
 - A. Block all apoptosis.
 - B. Block p53 function.
 - C. Overproduce growth factors, mitogens, or survival factors.
 - D. Obtain a taxi driver's license and switch careers.
3. Two protein kinases, K1 and K2, function sequentially in an intracellular signaling pathway. If either kinase contains a mutation that permanently inactivates its function, no response is seen in cells when an extracellular signal is received. A different mutation in K1 makes it permanently active, so that in cells containing that mutation a response is observed even in the absence of an extracellular signal. You characterize a double-mutant cell that contains K2 with the inactivating mutation and K1 with the activating mutation. You observe that the response is seen even in the absence of an extracellular signal. In the normal signaling pathway, does K1 activate K2 or does K2 activate K1? Explain your answer (13 points).
4. Illustrate 10 types of organelles and their function. (10%)
5. How is protein synthesized in a mammalian cell and secreted to the extracellular matrix? (10%)
6. Describe the general downstream pathway of G protein-coupled receptors (GPCR). (10%)
7. Detail the features, morphologies, dynamic structures, the cellular distributions of three types of cytoskeleton. (10%)
8. What do the motor proteins serve on the microtubule? How do the motor proteins (e.g., kinesins, dyneins) move on the microtubule? (10%)