

系所組別： 生物科技研究所甲、乙組

考試科目： 分子生物學

考試日期：0307，節次：1

※ 考生請注意：本試題 可 不可 使用計算機

ESSAY QUESTION 問答題 (Ten points for each question)

1. What is the next step from the pre-genomic to the post-genomic era?
2. The protein presents a hydrophilic surface while the membrane is hydrophobic. How a protein passes through a membrane in cell? Please explain the different mechanisms.
3. (A) What is "pseudogene"? (B) How to discover a pseudogene? (C) Please design an experiment to test that a putative pseudogene is actually a pseudogene?
4. (A) What is "alternative RNA splicing"? (B) Please design an experiment to test a gene undergoes alternative RNA splicing.
5. What are differences between small interfering RNA (siRNA) and microRNA (miRNA)?
6. Which study was awarded the Nobel Prize in chemistry in 2009? Please point out the importance of this scientific finding.
7. (A) In bacteria, there are many AUG triples in mRNA. How to determine the translational initiation site? (B) How was this translational initiation site discovered? Alternatively, please design an experiment to find out this translational initiation site.
8. Please design an experiment to test that the anticodon sequence alone allows aminoacyl-tRNA to recognize the correct codon.
9. If your research topic is a novel vertebrate protein which has no sequence homology to any other known protein and its function remains unknown. Please give some experimental strategies to discover its function.
10. How to determine which genes are essential for the survival of *Drosophila melanogaster*? Please give some experimental strategies and explain reasons that you choose to use these particular methods.