

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、醫學生物科技學程

考試科目（代碼）：生物學(0402、0702)

共 3 頁，第 2 頁 *請在【答案卷】作答

7. Select one of the choices below to indicate whether it is a characteristic of miRNA or siRNA.
- A. miRNAs function to silence gene expression primarily by blocking transcription of targeted mRNAs.
 - B. siRNA induces degradation of the target mRNA.
 - C. miRNAs usually base-pair perfectly with target mRNA
 - D. siRNAs are formed by cleavage from a stem-loop RNA.
8. Which following statement is right during homologous recombination?
- A. RecBCD has a DNA exonuclease activity
 - B. RecA and RecB are involved in branch migration of a Holliday junction
 - C. RuvC could bind to and resolve Holliday junctions
 - D. Spo11 creates single strand breaks in DNA in baker yeast.

III. 問答題

9. Please give chemical structures and describe “Adenosine deamination” for RNA editing. (4%)
10. Describe DNA replication on beta clamp cycles in lagging strand. (4%)
11. What are the dendritic cells? (2%)
12. What are the cytokines? (2%) Please describe the biological actions of cytokines on eukaryotic cells. (4%)
13. Please describe the penetration and uncoating processes in paramyxovirus and HIV, respectively. (8%)
14. How does the avian influenza virus interact with sialic acid receptor? (4%)
15. Please describe how the cell cycle is controlled by different cyclin-dependent kinase molecules. (8%)
16. Please describe how EGF receptor acts through Ras to promote cell proliferation. (6%)
17. Please describe the current model for the signal mechanism of cotranslational import. (6%)
18. Describe how a countercurrent heat exchanger may function to retain heat within an animal body. (5%)

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19. Explain how osmotic pressure and hydrostatic pressure regulate the exchange of fluid and solutes across the capillary walls. (5%)
20. Describe clonal selection and distinguish between effector cells and memory cells. (5%)
21. Explain how the antagonistic hormones insulin and glucagon regulate carbohydrate metabolism. (5%)
22. Explain the significance of Spemann's organizer in amphibian development. (5%)
23. Describe saltatory conduction in vertebrate axons. (5%)
24. Explain the sliding-filament model of muscle contraction. (5%)
25. Explain how density-dependent and density-independent factors may affect population growth. (5%)