

國立中山大學九十四學年度博士班招生考試試題

科目：細胞分子生物學【生醫所】

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問答題，每題 20 分；

1. Please describe four hallmarks of human immune system; also include in your answers how the immune system operates in achieving these characteristics from cell molecular biochemical point of view.
2. For a virus to successfully replicate its genome and produce its progeny within its host cell, it evolves to exhibit capability of taking over cellular biochemical machinery for virus own survival. Please describe the strategies that were adopted by virus to successfully switch the cellular translation machinery for producing viral proteins.
3. Maintaining the genomic integrity is crucial after each cellular division. Failure to maintain genome integrity leads to genetic disorder or drastic diseases such as cancer. Research have revealed that checkpoints exist in each cell cycle phase are important for this control. Please state how these cell cycle checkpoints operated in keeping genomic homeostasis during normal cell division or upon cellular exposure to genotoxic agents.
4. RNA interference is a well exploited method in knocking down gene expression in cultured cell or animal model. Please describe the mechanism for RNA interference phenomenon, and also include in your answer the functional significances of the existence of RNA interference in diverse species from biological point of view.
5. Eukaryotic protein expression in prokaryotic system could generate abundant source of protein for further research use. Please describe the important features of the prokaryotic expression vectors widely used and the critical genetic elements that must included in the plasmid for properly expression and facilitate the usage of the expressed eukaryotic protein of your interest.