

本試題是否可以使用計算機:  可使用,  不可使用 (請命題老師勾選)

1. Please describe the potential effects of genetic polymorphism in promoter, exon, or intron sequence of genes in disease susceptibility or drug responsiveness. (20%)
2. Please describe the major differences between prokaryotic and eukaryotic genes from gene structure, mRNA, and protein translation levels. (15%)
3. Please describe the molecular mechanisms of RNAi-induced gene silencing and the potential targets of RNAi-based gene therapy in virus infection and cancer. (5%)
4. Despite tremendous progress in basic and epidemiological research, effective prevention of most types of cancer is still lacking. Vaccine use in cancer therapy remains a promising but difficult prospect. However, new mouse models that recapitulate significant features of human cancer progression show that vaccines can keep precancerous lesions under control and might eventually be the spearhead of effective and reliable ways to prevent cancer. Why should vaccines be particularly effective in cancer prevention? Please discuss the rationale for, and the challenges involved in, developing such preventive vaccines. (20%)
5. Physiologically important cell-signaling networks are complex, and contain several points of regulation, signal divergence and crosstalk with other signaling cascades. By the concept of "critical nodes", please define this important concept in the signaling pathways. Illustrate this concept using any cellular signaling pathway as a model. (20%)
6. Many patients with functional (noncardiac) chest pain exhibit hyperalgesia. Hyperalgesia is an extreme sensitivity to pain, which in one form is caused by damage to nociceptors in the body's soft tissues. Hyperalgesia can be experienced in focal, discrete areas, or as a more diffuse, body-wide form. The focal form is typically associated with injury. (20%)  
Based on the description above, please
  - 1). describe the Central Pathways in Somatic Sensation
  - 2). explain how the descending control modifies pain sensation.
  - 3). propose a possible mechanism responsible for hyperalgesia
  - 4). design several experiments to support the mechanism you proposed.
  - 5). List a possible treatment for the patients with functional (noncardiac) chest pain and provide clear explanation why the treatment can be effective..