

編號：G 6

系所：臨床醫學研究所

科目：基礎醫學

簡答題：(每題 10 分)

1. The Nobel Prize of Physiology or Medicine 2004 was awarded jointly to Richard Axel and Linda B. Buck. Please briefly describe their important scientific discoveries. (10%)
2. Defects in cell-death pathways are hallmarks of tumors. Please define the pathways of apoptotic and non-apoptotic death in tumor cells. (10%)
3. Nanotechnology is a multidisciplinary field, which covers a vast and diverse array of devices derived from engineering, biology, physics and chemistry. Please discuss the possible applications of this technology in medicine. (10%)
4. From cultured mammalian cells, you wish to isolate DNA enriched in replication origins, for subsequent cloning and sequence analysis. Using any combination of density labels, radioactive labels, cell synchronization techniques, and centrifugal separation procedures, describe how this could be done. (10%)
5. If you were a scientist trying to develop a male contraceptive acting on the anterior pituitary, would you try to block the secretion of FSH or that of LH? Explain the reason for your choice. (10%)
6. A person is taking a drug that inhibits the tubular secretion of hydrogen ions. What effects does this drug have on the body's balance of sodium, water, and hydrogen ions? (10%)
7. For a long time, the development of new pharmaceutical agents depended on exploiting natural substances and their derivatives. But in the past decade the emphasis has been on the use of synthetic molecules, and research into natural products has declined. Please discuss why unrealized expectations from current research and development strategies, along with technological advances, have led to renewed interest in natural products as a source of drugs. (10%)
8. Short interfering RNAs can potentially reduce expression of most RNAs. Researchers hope to harness this ability in using RNA interference (RNAi) as a powerful therapeutic tool, but there is concern about its potential to activate immune responses. Please discuss what can be done to prevent immune responses acting as an obstacle to using RNAi in therapy. (10%)

(背面仍有題目,請繼續作答)

9. Certain nerves to the heart release the neurotransmitter norepinephrine. If these nerves are removed in experimental animals, the heart becomes extremely sensitive to the administration of a drug that is an agonist of norepinephrine. Explain why, in terms of receptor physiology. (10%)

10. Describe several mechanisms by which pain could theoretically be controlled medically or surgically. (10%)