國立中興大學95學年度研究生碩士班招生考試試題

科　目：獸醫病理學　　所　別：獸醫病理學研究所

本科目 〈不能使用〉 計算機　　本科目試題共 1 頁

95 學年度 獸醫病理學研究所 碩士班入學病理學考試試題

1. 試述冠狀病毒(Coronavirus)對豬、牛、貓、鼠、雞所造成的各種疾病。(15%)

2. 解釋名詞(10%)
   a. Nephrosis syndrome
   b. Crush syndrome

3. 細胞脂肪變性(fatty change)之主要形態學變化及可能作用機制。(10%)

4. 您具有獸醫及病理專業訓練，若從病理學觀點，您該如何診斷前年國內乾狗糧疑似黴菌毒素(mycotoxins)污染引發犬腎衰竭事件，此事件為何種黴菌毒素引起？請描述其主要肉眼及組織病理變化？您又如何建議犬腎衰竭事件應採取何種因應措施為妥？(15%)

5. 心臟因冠心動脈狹窄而發生功能障礙時，心臟如何啟動代償機制以作為因應？又，最後引致心衰竭時，可能見到心臟的肉眼病變如何？(15%)

6. 試說明肺臟對於入侵之病毒所可能引發之炎症反應？(10%)

7. 請敘述病原一旦入侵腦組織後可能發生導致之病變有那些？又，請問腦組織是以何種細胞進行修復，而其主要之鏡下變化又為何？(15%)

8. 請問禽類一旦感染禽流感後可能呈現的肉眼病變及鏡下變化為何？(10%)

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Part I: 病毒學 (35%)

一、閱讀以下短文並回答下列各問題。

『Porcine circovirus type 2 (PCV2) is associated with post-weaning multisystemic wasting syndrome (PMWS). Pseudorabies (PR) is also an important infectious disease in swine and sometimes co-infect with PCV2. A recombinant PRV expressing ORF1–ORF2 fusion protein of PCV2 was constructed and its immunogenicity was tested in pigs. The recombinant pseudorabies virus PRV–PCV2 was purified by plaque purification and identified by PCR and Southern blotting. Expression of the ORF1–ORF2 fusion protein by the recombinant PRV–PCV2 virus was demonstrated by Western blotting analysis. In pigs, PRV–PCV2 elicited significant immune response towards PRV and PCV2 as indicated by PRV-ELISA, PRV neutralization assay and PCV2 specific lymphocyte proliferation assay, respectively.』

(1) 請簡要敘述此篇短文之意義。（5 分）
(2) 請簡述 PCR、Southern blotting、Western blotting、ELISA 及 neutralization assay 等五種方法在臨床病毒診斷上之應用與重要性。（10 分）
(3) 請以 PR 病毒為例，簡述一個完整病毒顆粒之基本結構及病毒蛋白主要之功能；又病毒的含量(力價)如何表示？並簡述影響病毒致病能力(毒力)的可能原因。（10 分）
(4) 請簡述病毒之各種可能傳播途徑及病毒感染細胞後，被感染細胞可能產生的影響結果及細胞形態上之變化；並請簡述造成感染動物持續感染之可能原因。（10 分）

Part II 細菌學（35%）

一、解釋名詞 (10%)：

(1) Facultative intracellular bacteria　(2) Superantigens　(3) Defensin (4) Septic shock (5) Quorum sensing

二、問答題：

1. Compare the cell wall of Gram-negative and Gram-positive bacteria in detail (5%)
2. Describe five mechanisms by which bacteria evade host defense system (10%)
3. Explain the action of the following antimicrobial agents (10%):
   (1) polymyxin　(2) erythromycin　(3) ciprofloxacin　(4) sulfonamide　(5) rifamycin

Part III. 選擇題 (30%)

Please select the best answer in each question

1. Interferons can be best bedescribed as (A) interfering directly with viral translation of viral mRNA (B) interfering with viral adsorption onto the cell membrane (C) inducing the production of antiviral proteins that interfere with translation of viral mRNA (D) blocking the penetration of viruses into susceptible cells (E) inducting host cell RNase that hydrolyzes the viral genome.
2. In order to be immunoreactive, an epitope must be (A) part of globular protein (B) linear (C) electronegative (D) spatially accessible (E) part of a glycoprotein.
3. Anaphylatoxin inactivator is a serum enzyme that destroys the biological activity of (A) C1a, (B) C2a, (C) C2b, (D) C3a, (E) C3b
4. One of the characteristics of the secondary immune response is that it (A) is mainly IgM antibody. (B) require a low dose of immunogen for induction (C) has low-affinity antibodies (D) has a short duration of antibody synthesis (E) has a slow rate of antibody synthesis.
5. The macrophage-derived cytokine that is intimately in the immune response is (A) interleukin-I (B) interleukine-2 (C) interleukin-3 (D) macrophage-activating factor (E) transforming growth factor-beta
6. The injection of large doses of protein results in immune tolerance that is due to (A) removal of antibody by excess antigen (B) catabolism of antibody as rapidly as it is formed (C) production of a nonreacting antibody (D) suppression of B cells, T cells, or both (E) induction of cytotoxic anti-idiotype antibodies
7. The major immunoregulatory effect of interferon seems to be (A) differentiation of plasma cells (B) enhancement of natural killer cells and macrophages (C) suppression of cell-mediated immunity (D) enhancement of antibody production (E) provision of passive immunity
8. In enumerating immune cells, the important marker in the cytoplasm of the pre-B cell is immunoglobulin heavy chain (A) α (B) δ (C) ε (D) γ (E) μ
9. What is the most direct method of treating atopic allergies (A) hyposensitization (B) Environment control (C) Administration of modified allergens (D) Administration of antihistamines (E) Administration of corticosteroids
10. The critical induction of acquired immune deficiency syndrome in human immunodeficiency virus infection is due to (A) a defect in CD4 T cells number (B) a defect in CD8 T cells number (C) a defect in B cells number(D) a defect in macrophage function (E) a defect in neutrophil function

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95 學年度 獸醫病理學研究所 碩士班入學生化考試試題

I、解釋名詞 (20%) ：

1. Reverse transcriptase
2. Glycolysis
3. Topoisomerase
4. Isoelectric point
5. Intron
6. Apoptosis
7. siRNA
8. Okazaki fragment
9. Proteasome
10. Polymerase chain reaction

II. Translate the following amino acid sequence into one-letter code (5%):

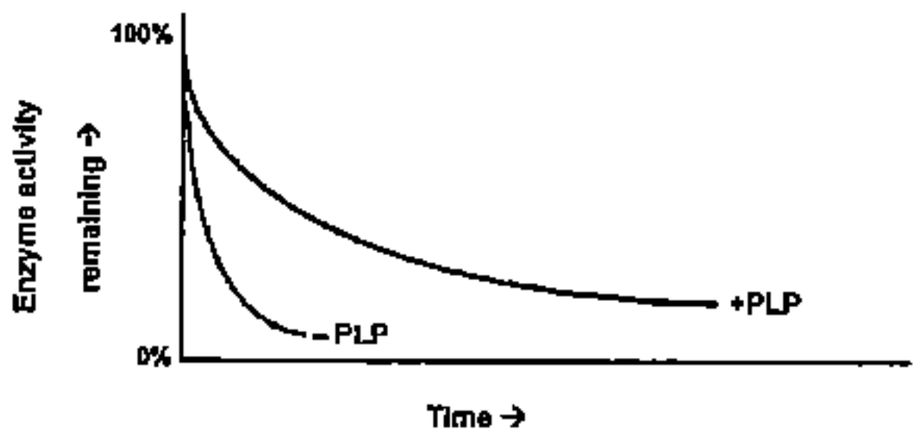
(1) Arg (2) Glu (3) Asn (4) Asp (5) Ala

III. The composition (in mole-fraction units) of one of the strands of a double-helical DNA molecule is [A] = 0.29 and [G] = 0.24.

(1) What can you say about [T] and [C] for the same strand? (2%)

(2) What can you say about [A], [G], [T], and [C] of the complementary strand? (3%)

IV. Pyridoxal phosphate (PLP) is a coenzyme for the enzyme ornithine aminotransferase. The enzyme was purified from cells grown in PLP-deficient media as well as from cells grown in media that contained pyridoxal phosphate. The stability of the enzyme was then measured by incubating the enzyme at 37°C and assaying for the amount of enzyme activity remaining. The following results were obtained.



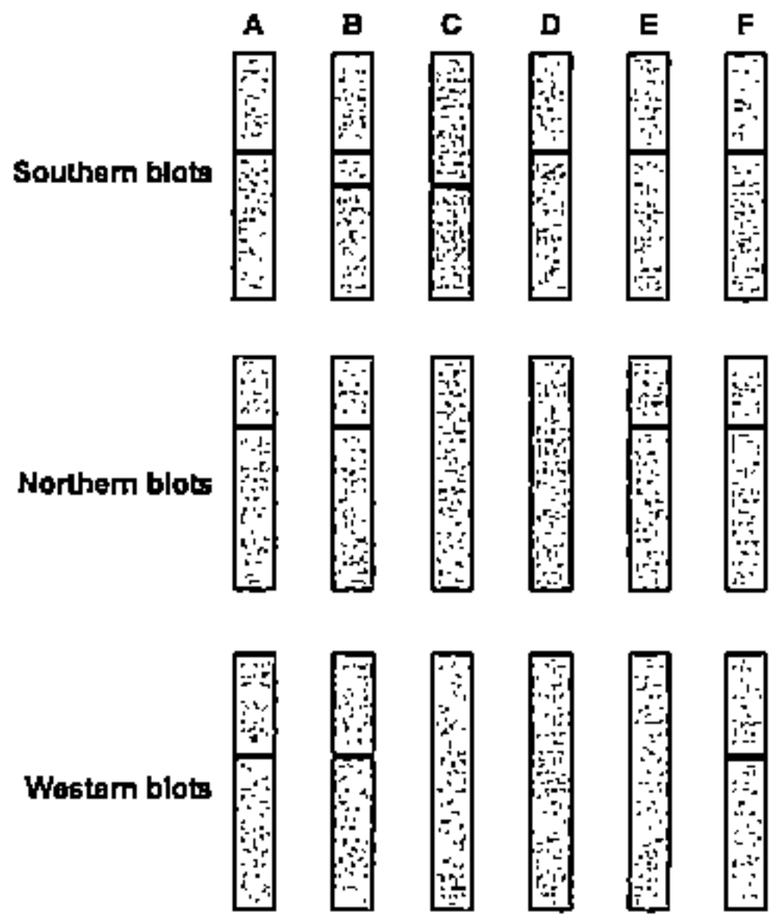
(1) Why does the enzyme activity decrease with the time of incubation? (5%)

(2) Why does the enzyme activity from the PLP-deficient cells decline more rapidly? (5%)

V. Activity of many protein kinases are regulated through phosphorylation. Name three amino acids which are most commonly phosphorylated. (5 %)

VI. Write the sequence of the mRNA molecule synthesized from a DNA template strand having the sequence: 5'-ATCGTACCGTTA-3' (5%)

VII. A series of people are found to have difficulty eliminating certain types of drugs from their bloodstreams. The problem has been linked to a gene *X*, which encodes an enzyme Y. Six people were tested with the use of various techniques of molecular biology. Person A is a normal control, person B is asymptomatic but some of his children have the metabolic problem, and persons C through F display the trait. Tissue samples from each person were obtained. Southern analysis was performed on the DNA after digestion with the restriction enzyme *Hin*dIII. Northern analysis of mRNA also was done. In both types of analysis, the gels were probed with labeled *X* cDNA. Finally, a Western blot with an enzyme-linked monoclonal antibody was used to test for the presence of protein Y. The results are shown bellow.



(1) Why is person B without symptoms? (5%)

(2) Suggest possible defects in the other people (person C to F). (10%)

VIII. Describe in detail the major differences of gene expression (transcription and translation) between prokaryotic genes (e.g. *E. coli*) and eukaryotic genes (e.g. animal cell). (20%)

IX. Describe and compare those methods used for introduction of foreign DNA into bacteria and mammalian cells. (15%)