1. 免疫耐受性(tolerance)可經由那些機制來達成？請分別以 central tolerance 和 peripheral tolerance 來說明。(20 分)

2. 抗體藉由那些方式來參與免疫防禦機制？(20 分)

3. 請敘述腫瘤如何逃避免疫監測(immune surveillance)？有那些方式可增強抗腫瘤的免疫力？(20 分)

4. 解釋名詞：(每小題 5 分)
   a. MHC polymorphism
   b. α and β chemokines
   c. Lipid raft
   d. Type IV hypersensitivity

5. 針對下列 summary 請回答兩個問題：(20 分)
   a. 敘述你對 cross-presentation 的了解。
   b. 這篇 abstract 的主要內容和結論。

Heat Shock Protein-Mediated Cross-Presentation of Exogenous HIV Antigen on HLA Class I and Class II

Strong $CD4^+$ and $CD8^+$ T cell responses are considered important immune components for controlling HIV infection, and their priming may be central to an effective HIV vaccine. We describe in this study an approach by which multiple $CD4^+$ and $CD8^+$ T cell epitopes are processed and presented from an exogenously added HIV-1 Gag-p24 peptide of 32 aa complexed to heat shock protein (HSP) gp96. $CD8^+$ T cell recognition of the HSP/peptide complex, but not the peptide alone, was inhibited by brefeldin A, suggesting an endoplasmic reticulum-dependent pathway. This is the first report to describe efficient processing and simultaneous presentation of overlapping class I- and class II-restricted epitopes from the same extracellularly added precursor peptide complexed to HSP. Given previous reports of the strong immunogenicity of HSP/peptide complexes, the present data suggest that HSP-complexed peptides containing multiple MHC class I- and class II-restricted epitopes represent potential vaccine candidates for HIV and other viral infections suitable to induce effective CTL memory by simultaneously providing CD4 T cell help.

(Brefeldin A: an inhibitor of MHC class I-restricted antigen presentation)