

編號：F 459
454

系所：微生物及免疫學研究所乙組, J

科目：免疫學

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. What are Major Histocompatibility Complex (MHC) molecules and their functions in the immune system? (Answer in English or Chinese) (20 points)

2. Please describe the importance and mechanisms of the generation of antibody diversity. (Answer in English or Chinese) (20 points)

3. T-cell activation plays a central role in the adaptive immunity. It requires the interaction between a naïve T cell and an antigen-presenting cell. (A) Describe what molecules are involved in this process and how they function. (B) What consequences would you expect if an individual lacks of these molecules? (Answer in English or Chinese) (20 points)

4. Please read the following Abstract of an article from Zhu, C. et al (Nature Immunology, 2004, 6: 1245-52) and answer questions (Answer in English or Chinese) (20 points)

Tim-3 is a T helper type 1 (T(H)1)-specific cell surface molecule that seems to regulate T(H)1 responses and the induction of peripheral tolerance. However, the identity of the Tim-3 ligand and the mechanism by which this ligand inhibits the function of effector T(H)1 cells remain unknown. Here we show that galectin-9 is the Tim-3 ligand. Galectin-9-induced intracellular calcium flux, aggregation and death of T(H)1 cells were Tim-3-dependent in vitro, and administration of galectin-9 in vivo resulted in selective loss of interferon-gamma-producing cells and suppression of T(H)1 autoimmunity. These data suggest that the Tim-3-galectin-9 pathway may have evolved to ensure effective termination of effector T(H)1 cells.

(A) What are T helper type (T(H)1) cells and their function in immunity?

(B) What is the effect of "Galectin-9" on T(H)1 cells and through what mechanisms?

5. Please select 5 out of 7 following immunology-related terms and explain them briefly: (Answer in English or Chinese) (20 points)

- (1) Apoptosis
- (2) Peripheral tolerance
- (3) Clonal selection theory
- (4) Dendritic cells
- (5) Graft-versus- host reaction
- (6) Toll-like receptors
- (7) Vaccination