

※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. Please read the abstract and answer the following questions:

A heterogeneous mixture of lipids called oxPAPC, derived from dying cells, can hyperactivate dendritic cells (DCs) but not macrophages. Hyperactive DCs are defined by their ability to release interleukin-1 (IL-1) while maintaining cell viability, endowing these cells with potent aptitude to stimulate adaptive immunity. Herein, we found that the bacterial lipopolysaccharide (LPS) receptor CD14 captured extracellular oxPAPC and delivered these lipids into the cell to promote inflammasome-dependent DC hyperactivation. Notably, we identified two specific components within the oxPAPC mixture that hyperactivated macrophages, allowing these cells to release IL-1 for several days, by a CD14-dependent process. In murine models of sepsis, conditions that promoted cell hyperactivation resulted in inflammation but not lethality. Thus, multiple phagocytes are capable of hyperactivation in response to oxPAPC, with CD14 acting as the earliest regulator in this process, serving to capture and transport these lipids to promote inflammatory cell fate decisions.

(*Immunity*. 2017 Oct 17;47(4):697-709.)

a. Please briefly describe what you know about dendritic cells and how they are activated. (8 %)

b. Please briefly describe what you know about phagocytosis. (8 %)

c. In addition to CD14, what other LPS binding proteins have been identified? (4 %)

d. Please explain “sepsis” and how “sepsis” may cause severe damage in patients. (10 %)

e. Please briefly describe what you know about inflammasome. (10 %)

f. In your opinion, what are the contributions of this research? (10%)

2. Please describe what you know about complement system. (15 %)

3. Please describe what you know about cell-mediated immunity. (10 %)

4. There are five major classes of antibodies in human. Please discuss what you know about them. (15%)

5. Please discuss the factors those may cause secondary immunodeficiency. (10%)