國立成功大學 104 學年度碩士班招生考試試題

系所組別：微生物及免疫學研究所甲乙丙組

考試科目：微生物學

考試日期：0212，節次：3

1. 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。

請閱讀以下短文並回答問題一以及問題二

Staphylococcus aureus USA300, the clonal type associated with epidemic community-acquired methicillin-resistant *S. aureus* (MRSA) infections, displays the giant protein Ebh on its surface. Mutations that disrupt the ebh reading frame increase the volume of staphylococcal cells and alter the cross wall, a membrane-enclosed peptidoglycan synthesis and assembly compartment. *S. aureus* ebh variants display increased sensitivity to oxacillin (methicillin) as well as susceptibility to complement-mediated killing. Mutations in ebh are associated with reduced survival of mutant staphylococci in blood and diminished virulence in mice. We propose that Ebh, following its secretion into the cross wall, contributes to the characteristic cell growth and envelope assembly pathways of *S. aureus*, thereby enabling complement resistance and the pathogenesis of staphylococcal infections.

1. Based on the information given above, please propose one way scientists can develop novel anti-MRSA treatments or prevention methods to combat MRSA. (30%)

2. Explain why MRSA is considered a very dangerous bacterial pathogen. Please describe its general characteristics, diseases that it may cause, and what separates it from other less harmful *S. aureus*. (20%)

3. 請就 a) DNA 病毒其複製過程在**細胞質**中進行; b) RNA 病毒其複製過程在**細胞核**內進行，各列舉一例說明該病毒之**名稱、分類、特徵、臨床病徵、傳播途徑以及預防與治療的方法**。(25%)

4. 新興病毒(emerging virus)近年來成為威脅人類生命的主要病原微生物。請針對目前流行之**中東呼吸症候群**(middle east respiratory syndrome; MERS)，敘述**病毒之名稱、分類、特徵、臨床病徵、傳播途徑以及該病毒興起爆發之可能原因**。(25%)