

國立成功大學

110學年度碩士班招生考試試題

編 號： 282

系 所： 微生物及免疫學研究所

科 目： 微生物學

日 期： 0203

節 次： 第 3 節

備 註： 不可使用計算機

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第1頁，共3頁

※ 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。

【病毒學】

Mosquito-borne human viral diseases are always a major threat to public health and can be a huge society burden. Recently, the mosquito-borne chikungunya virus, dengue virus and zika virus have caught public attention globally. Timing and correct diagnosis for these mosquito-borne viral diseases are critical to the clinical decision and the quality of patient recovery. However, with the similarity of early clinical presentations in affected patients, making a correct diagnosis of the illness resulting from which virus during febrile stage is a major challenge task for attending physician. The salient biological feature of these viruses in plasma of acute patients is viremia, even though the duration of viremia in individuals may be different. Numerous methods derived from the knowledge of molecular biology are helpful to assist the professional health takers to make the differential diagnosis for these virus.

Question ①

Please list at least three technical methods that you think are helpful to differentiate these viruses (15%).

Question ②

Please briefly describe each method you are proposing and address the possible interpretation of the results from your technical approach (10%).

We are living on earth and are sharing with many other creatures on the same planet. One of such creatures is flying birds. These birds often habitat in every corner of the world, but weather conditions may prompt them to migrate to a different place year round. Hence, the migration paths may introduce an unprecedented human infectious agent to a new territory and initiate the spread of the novel pathogen locally. One of the notorious infectious agents is avian influenza A virus. This virus can go through genetic re-assortment and modification programs, generating a much more virulence virus to human host. For example, a bird-adapted strain of H5N1 is the highly pathogenic causative agent of human beings. There are two known ways for genetic modification programs that occur in influenza A virus, antigenic drift and antigenic shift.

Question ③

What do the H and N stand for in H5N1?(5%)

Question ④

What kind of assay is used to antigenically characterize influenza viruses? (5%)

Question ⑤

Please describe what the meaning of antigenic drift and antigenic shift is, and its potential consequence of the outcome in terms of flu endemic, respectively (15%).

【細菌學部分】

Question ⑥

細菌感染人體後，會在宿主體內持續生長而造成進一步傷害。細菌在人體內會利用不同機轉逃脫宿主免疫系統的攻击，請列舉出至少五種細菌避免宿主免疫系統攻击的機制。(10%)

Question ⑦

動物、植物和黴菌屬於真核生物(eukaryotes)，而大部分的細菌和藻類屬於原核生物(prokaryotes)，請比較哺乳類細胞(mammalian cells)和細菌在細胞質結構(cytoplasmic structures)上的差異。(10%)

Question ⑧

微免所教授 P 發現了 gene X 可能是 *Streptococcus pyogenes* 的致病基因，並希望你/妳能利用實驗加以證明，請問你/妳的實驗設計為何？(10%)

Question ⑨

人體的腸道微生物相(microbiome)和人類許多疾病有重要的關聯，試舉出三種腸道正常微生物菌相改變後(dysbiosis)後所引起的疾病，並簡述其發生機制。(10%)

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第3頁，共3頁

Question ⑩.

人類利用疫苗來預防細菌性感染已超過百年歷史，請列舉出五種目前有疫苗可以預防的細菌性感染疾病。

(10%)