

中山醫學大學 101 學年度博士班入學招生考試試題

醫學研究所博士班 (乙組)

考試科目：分子生物學

時間：120 分鐘

※請注意本試題共(1)張，如發現頁數不足，應當場請求補齊，否則缺頁部份概以零分計算。第 (1) 頁

本試題共一大題，總分 100 分。

一、問答題：

1. Please describe the principle of each biotechnology:

- (A) Real-time PCR (7%)
- (B) Reverse-transcription PCR (7%)
- (C) Immunoprecipitation (IP) (7%)
- (D) Chromatin Immunoprecipitation (ChIP) (7%)

2. Please describe the difference between “mRNA” and “microRNA”. (15%)

3. Please define for the following terms:

- (A) Apoptosis (7%)
- (B) Autophagy (7%)
- (C) Necrosis (7%)

4. 以下是選自 Cancer Cell 的一篇文章請說明此篇文章有何發現。(11%)

The von Hippel-Lindau tumor-suppressor gene (*VHL*) is lost in most clear cell renal cell carcinomas (ccRCC). Here, using human ccRCC specimens, VHL-deficient cells, and xenograft models, we show that miR-204 is a VHL-regulated tumor suppressor acting by inhibiting macroautophagy, with MAP1LC3B (LC3B) as a direct and functional target. Of note, higher tumor grade of human ccRCC was correlated with a concomitant decrease in miR-204 and increase in LC3B levels, indicating that LC3B-mediated macroautophagy is necessary for RCC progression. VHL, in addition to inducing endogenous miR-204, triggered the expression of LC3C, an HIF-regulated LC3B paralog, that suppressed tumor growth. These data reveal a function of VHL as a tumor-suppressing regulator of autophagic programs.

5. What is epithelial-mesenchymal transition (EMT)? How to demonstrate “A” gene involved in EMT using cell culture model? (25%)