

系所組別： 生理學研究所甲、乙組

考試科目： 生命科學及技術

考試日期：0220，節次：5

※ 考生請注意：本試題 可 不可 使用計算機

1. Explain the techniques (at least two) to be used to identify that
 - (a) there is direct binding (interaction) between two proteins. (10%)
 - (b) the transcriptional factor binds to promoter of target gene. (10%)

2. We have known that excess caloric intake is strongly associated with the development of increased adiposity, glucose intolerance, insulin resistance, dyslipidemia, and hyperleptinemia (that is the cardiometabolic syndrome). Research efforts have focused attention primarily on the quality (that is nutritional content) and/or quantity of ingested calories as potential causes for diet-induced pathology. Despite growing acceptance that biological rhythms profoundly influence energy homeostasis, little is known regarding how the timing of nutrient ingestion influences development of common metabolic diseases.
Based on the above introduction, please **design five experiments and get expectant results** to test the hypothesis that the time of day (the beginning or end of the active period) at which dietary fat is consumed significantly influences multiple cardiometabolic syndrome parameters. (30%)
※ Please use mice as an experimental model and measure the changes in body weight, body fat, and energy expenditure, and the above-mentioned parameters of cardiometabolic syndrome.

3. (a). What is "circadian rhythm"? (5%)
(b). Where is " biological clock " located in our body? (5%)
(c). What are "circadian genes" ? (5%)
(d). What is "Chronobiology"? (5%)
(e). List diseases with a high risk during the night. (5%)

4. Describe the methods to determine (a) cell proliferation (b) cell aging (c) angiogenesis (d) neurogenesis (e) autophagy. (25%)