

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：0307，節次：3

※ 考生請注意：本試題 可 不可 使用計算機

1. (1)What is "**cancer**"? (2)What are "**oncogene**" and "**tumor suppressor gene**"? (3)In cancer cells, what do you expect the expression profiling of above two genes? (4) How to use "**target therapy**" for cancer? (5) Please provide another method for cancer therapy. (25%)
2. You have recently identified and cloned the "*goodluck*" gene for a novel protein that you think it may target on the nuclear membrane. Therefore, you want to confirm the localization of gene expression. Please explain two methods used to **localize your novel protein** and briefly describe the critical **controls** for each one. (20%)
3. You have tried to measure the expression of one novel gene, "*JOY*"; however, you could not detect the mRNA and protein expression of this gene in some samples. You are very sure the "*JOY*" gene is inside each genome. Therefore, you are speculating about the epigenetic modification on your novel gene. Please describe (1) what is "**epigenetic**", and (2) briefly provide **two epigenetic mechanisms** to explain the silence of "*JOY*". (15%)
4. You have identified one novel gene, *happy*, related to happiness in the mouse brain, and found one mouse, HAPPIEST, is happier than others; therefore, you would like to compare the "mRNA" and "protein" expression level of *happy* gene with other mice in the brain. Please briefly describe how you will do, and follow the guidance to answer: (1) What kind of samples will you need to collect? (2) What kind of methods will you use to compare the expression level of "**RNA**" and "**protein**"? (3) What kind of **control** will you use for each experiment? (20%)
5. (1)What is "**embryonic stem cell**"? (2)What is "**adult stem cell**"? (3)What is "**induced pluripotent stem cell**"? Please also provide one advantage and one disadvantage for each stem cell. Additionally, please provide one potential application of stem cells in translational research. (20%)