

系所組別：生理學研究所乙組

考試科目：細胞及分子生物學

考試日期：0307，節次：2

※ 考生請注意：本試題 可 不可 使用計算機

1. What does epigenetics mean? How can histone modification affect gene expression? (10%)
2. Single nucleotide polymorphisms and gene copy-number variation are important determinants of differences between individuals of a species. Please propose at least one mechanism for each of them to affect individual susceptibility to diseases? (15%)
3. Gene expression of protein-coding genes can be regulated at different levels. Please describe three types of post-transcriptional regulation (15%)?
4. Proteins are degraded in cells. What is ubiquitin, and what role does it play in tagging proteins for degradation? What is the role of proteasomes in protein degradation? How might proteasome inhibitors serve as chemotherapeutic (cancer-treating) agents? (15%)
5. Is this statement true or false: The number and shape of mitochondria is constant in different cell types? Explain why or why not? (15%)
6. Cells communicate in ways that resemble human communication. Decide which of the following forms of human communication are analogous to autocrine, paracrine, endocrine, and synaptic signaling by cells? (15%)
 - A. A telephone conversation
 - B. Talking to people at a cocktail party
 - C. A radio announcement
 - D. Talking to yourself
7. Neurons, particularly those in the brain, receive multiple excitatory and inhibitory signals. What is the name of the extension of the neuron at which such signals are received? How does the neuron integrate these signals to determine whether or not to generate an action potential? (15%)