

系所組別：生物資訊與訊息傳遞研究所甲組

考試科目：細胞分子生物學

考試日期：0226，節次：3

一、 名詞解釋：(20%)

1. autophagy
2. cancer stem cell
3. non-coding RNA
4. Kozak sequence
5. operon

二、 選擇題：(40%)

1. DNA replication in eukaryotic genome, which one is correct?
 - (a) the length of daughter DNA molecules can be maintained each time they replicate
 - (b) the Okazaki fragments of leading strand are joined together by DNA ligase
 - (c) DNA polymerase possess 3'→5' endonuclease activity, which allows it to remove improperly base paired nucleotides
 - (d) DNA is licenced once prior to cell division
 - (e) replication of eukaryotic DNA molecules is initiated at only one origin of DNA
2. Cells can sense and respond to specific chemical signals from their environment. Which description is **NOT** correct?
 - (a) the animal body has receptors in their nose to detect chemicals in the air
 - (b) the cells can produce signals themselves
 - (c) the binding of ligand to receptor often results in the production of another molecules to receive signal within the cells
 - (d) hormones can act as endocrine signals
 - (e) different signaling pathways can not be integrated to produce coordinated responses to their environment
3. About the apoptosis, which of the following statement is **NOT** correct?
 - (a) it includes two kinds of pathway, the extrinsic and intrinsic apoptotic pathways
 - (b) casapase 9 is the executioner caspases of apoptosis
 - (c) mitochondria plays an important role in apoptotic process
 - (d) activation of Fas can induce apoptosis
 - (e) apoptosis is triggered by death signals or withdrawal of survival factors

(背面仍有題目,請繼續作答)

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4. The bond that involves in the protein folding and stability is (which is **wrong**)
 - (a) the disulfide bond
 - (b) the hydrogen bond
 - (c) the phosphodiester bond
 - (d) the ionic bond
 - (e) Van der Waals and hydrophobic interactions

5. Meiosis is important for sexual reproducing organism, which statement is correct?
 - (a) in the female, meiosis produces four haploid eggs
 - (b) meiosis result in the production of the same offspring
 - (c) synaptonemal complex formation during meiosis prophase I
 - (d) gametes are the diploid cells for sexual reproduction

6. Which of the following is **NOT** a neurotransmitter?
 - (a) Dopamine
 - (b) γ -Aminobutyric acid (GABA)
 - (c) Histamine
 - (d) Epinephrine
 - (e) Epidermal growth factor

7. Which of the following statement is **NOT** the description of the "Cell theory"?
 - (a) All cells arise only from preexist cells
 - (b) the cells is the fundamental unit of structure and function in all living organisms
 - (c) all organisms consist of one or more cells
 - (d) cells consist of organelles

8. Which of the following amino acid **dose not** favor the formation of α -helix?
 - (a) tyrosine
 - (b) tryptophan
 - (c) cysteine
 - (d) proline
 - (e) threonine

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三、 簡答題：(40%)

1. How do microRNAs work in the cells?
2. What is the “transcriptome”?
3. Please describe the role of microtubule during the cell division.
4. What are the roles of B cells and T cells in immune response?
5. Please explain the “next generation sequencing”, and simply describe its application.