

※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

一、配對題，請在以下 a 到 j 等10則答案選項說明中挑選最適合的一個。不同問題的答案可能相同。每一題五分，共50分。

1. DNA methylation
2. Ubiquitination
3. Phosphorylation
4. Autophagy
5. Apoptosis
6. Replicative senescence
7. Cre/lox recombination system
8. Signal-anchor sequence
9. Helix-turn-helix motif
10. microRNA

答案選項 (Key)：

- a. The lysine residues on the protein substrate are the targets. This reaction consequently affects proteins in many ways: it can signal for their degradation via the proteasome and alter their cellular location.
- b. It is a cluster of hydrophobic amino acids of protein adjacent to some ionic residues and is responsible for cell membrane insertion.
- c. It is one of several regulatory events on DNA structure that directly influence the activity of a promoter.
- d. It describes the amino acid sequence of protein responsible for specific target DNA binding.
- e. It refers to the small non-coding RNA molecule that functions in RNA silencing and post-transcriptional regulation of gene expression.

- f. It is a result of telomere shortening that ultimately triggers a DNA damage response.
- g. It is widely used to carry out deletions, insertions, translocations and inversions at specific sites in the DNA of cells.
- h. It can be initiated through one of two following pathways. In the intrinsic pathway the cell kills itself because it senses cell stress, while in the extrinsic pathway the cell kills itself because of signals from other cells.
- i. It allows the orderly degradation and recycling of cellular components. During this process, targeted cytoplasmic constituents are isolated from the rest of the cell within a double-membraned vesicle.
- j. It is a reversible process that modifies serine, threonine and tyrosine residues leading to conformational change in the structure in many enzymes and receptors.

二、請解釋Promoter的功能，並設計三個實驗找出細菌染色體上，含有Promoter序列的DNA片段/位置。(25分)

三、請描述動物細胞的細胞週期(cell cycle)，及各時期的特徵。(20分)

四、教科書除外，請寫出五本科學家發表“分子生物學”最新發現的國際性科學雜誌/期刊。(5分)