

一、單選題 (30 分) ※注意：請於試卷「選擇題作答區」依題號作答。※

1. FISH is an abbreviation for a technique called _____.
 - a. field-induced sequence hybridization
 - b. fluorescence *in situ* hybridization
 - c. fragment insert sequence hybridization
 - d. feedback inhibition of sequence hybridization
 - e. frameshift incorporation of sequence homology

2. Pyrimidine dimers _____.
 - a. block DNA replication and transcription
 - b. can be repaired by photoreactivation
 - c. can be repaired by nucleotide-excision repair
 - d. All of the above
 - e. None of the above

3. DNA methylation patterns and their resulting genetic imprinting are inherited by which of the following mechanisms?
 - a. Enzymes put a methyl group on cytosine residues of newly replicated CpG sequences across from G-methyl-C sequences.
 - b. Methyl-CTP is incorporated into DNA during replication only across from a G-methyl-C sequence.
 - c. When its gene is activated, a methyl group is added to certain CpG sequences in the promoter region.
 - d. All of the above
 - e. None of the above

4. Eukaryotic ribosomes recognize and initially bind to what structure on the mRNA?
 - a. A Shine-Dalgarno sequence
 - b. A TATA sequence
 - c. The 7-methylguanosine cap
 - d. An AUG initiation codon
 - e. A CAT sequence.

5. The nuclear localization signal is recognized by and binds to which protein in the process of nuclear protein import?
 - a. Ran
 - b. The outer fibril protein
 - c. Nucleoporin
 - d. Exportin
 - e. Importin

6. Lysosomal proteins are marked by the addition of a phosphate to a _____ group.
 - a. mannose
 - b. serine
 - c. GDP
 - d. glucose
 - e. GPI

7. In what way does the mitochondrial genetic code differ from the "universal" genetic code?
 - a. Some codons code for different amino acids.
 - b. Some codons code for different stop codons.
 - c. The wobble rules are different.
 - d. All of the above
 - e. None of the above

見背面

8. Which of the following movements is not based on actin-myosin interactions?
a. Cell migration (crawling) over surfaces b. Chromosome movement during anaphase A
c. Cytokinesis of animal cells d. Phagocytosis
e. None of the above
9. The flow of which of the following ions makes the largest contribution to the resting potential?
a. Cl^- b. Na^+ c. K^+ d. H^+ e. Ca^{2+}
10. The major protein of the extracellular matrix of animal cells is _____.
a. keratin b. fibronectin c. chitin d. chondroitin sulfate e. collagen
11. Peptide hormones and growth factors act on target cells by binding to _____ receptors.
a. cell surface b. cytosolic c. nuclear d. Both a and b e. All of the above
12. For how long can human oocytes remain arrested in meiosis I?
a. One month b. Nine months
c. Ten years d. Fifty years
e. Oocytes do not arrest in diplotene.
13. Most cells in adult animals are in the _____ stage of the cell cycle.
a. G_1 b. G_2 c. G_0 d. S e. M
14. Which of the following is a common difference between normal cells and cancer cells?
a. Density-dependent inhibition of proliferation b. Contact inhibition of migration
c. Growth factor requirements d. Cell adhesion
e. All of the above
15. The first tumor suppressor gene was identified in studies of which of the following human tumors?
a. Burkitt's lymphoma b. Retinoblastoma
c. Glioblastoma d. Promyelocytic leukemia
e. Intestinal carcinoma

※下列題目請標明題號，依序作答於試卷內「非選擇題作答區」。可用中文或英文作答※

二、 Please describe the following terms (20 %):

- (1) Apoptosis
- (2) Chaperone
- (3) Endocytosis
- (4) Mass spectrometry
- (5) Stem cell

接次頁

題號： 457

國立臺灣大學 103 學年度碩士班招生考試試題

科目：分子與細胞生物學

節次： 7

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- 三、 Many proteins entering the secretory pathway are modified by carbohydrates termed glycosylation. Please briefly describe three possible functions of glycosylation. (10%)
- 四、 Please explain how cholesterol affects membrane fluidity at high and low temperature. (10%)
- 五、 If you fuse a cell at mitotic M phase with a G1 phase cell, please describe how the two cells will change. (10%)
- 六、 Steroid hormones and simple gas NO are regulatory molecules that directly enter target cells to change their activities. They, however, have different molecular bases of actions. Please explain their action mechanisms in target cells. (10%)
- 七、 Proteasomes and lysosomes complement each other to mediate intracellular degradation of miss-folded polypeptides and damaged organelles, respectively. Please explain the mechanisms how substrates are delivered to the proteasomes and lysosomes. (10%)

試題隨卷繳回