

1. 請說明細胞骨架(Cytoskeletons) 在運動神經元(Motor Neuron) 細胞中的分佈。(10%)
2. 請說明細胞分選儀 (Cell sorter)在細胞生物學研究上的應用。(10%)
3. 請舉例說明綠色螢光蛋白(Green Fluorescence Protein, GFP)在發育生物學研究上的運用。(10%)
4. 請嘗試畫簡圖來解釋下列名詞：
 - (1) Gap junctions (5%)
 - (2) cadherins (5%)
 - (3) Desmosome (5%)
 - (4) Integrins (5%)
5. 說明細胞程序性死亡 (apoptosis) 在生物體中有哪些功能及其與粒線體的相關性 (10%)。
6. 請問您可以利用哪些方法檢測出細胞受到刺激後，改變某種 protein 的表現量或表現位置 (10%)。
7. 解釋下列名詞 (10%)
 - (A) voltage-gated Na^+ channels in nerve cells
 - (B) chaperone

見背面

8. 由下列選項中，找出最適當答案放入每一題之空格內，使各題成為完整而且正確的敘述。作答時請務必在答案紙上清楚標明題號及所選的項目。(20%)

選項:

centromeres ; telomeres ; N-linked oligosaccharide ; O-linked oligosaccharide ;
DNA polymerase ; RNA splicing ; RNA polymerase ; stem cells ; apoptotic cells ;
antagonist ; agonist ; chaperone ; oncoprotein ; RNA interference ; ubiquitin ; zinc finger ;
TATA box ; ribosome ; diacylglycerol

- (A) Some _____ in a population may divide symmetrically to increase their population, which may be useful in normal development or during recovery from injury.
- (B) A branched oligosaccharide chain attached to the side-chain amino group of an asparagine residue in a glycoprotein is called the _____.
- (C) The action of _____ causes abnormal cell proliferation. It may be a mutant unregulated form of a normal protein, or a normal protein that is produced in excess or in the wrong time or place in an organism.
- (D) _____ causes gene inactivation by destroying the corresponding mRNA.
- (E) The _____ is a molecule, often synthetic, that blocks the biological function of a natural molecule (e.g., hormone) and is widely used research on cell - surface receptors.
- (F) _____ is a small protein that can be covalently linked to other intracellular proteins, thereby tagging these proteins for degradation by the proteasome, sorting to the lysosome, or alteration the function of the target protein.
- (G) The _____, at the two ends of a eukaryotic chromosome, are required for proper chromosome segregation and are replicated by a special process that prevents shortening of chromosomes during DNA replication.
- (H) _____ is a conserved sequence in the promoter of many eukaryotic protein-coding genes where the transcription-initiation complex assembles.
- (I) The _____ is the membrane-bound second messenger that can be produced by cleavage of phosphoinositides in response to stimulation of certain cell-surface receptors.
- (J) The function of _____ copies one strand of DNA (the template strand) to make the complementary strand, forming a new double-strand DNA molecule.