九十一學年度 生命科學院四所 碩士班研究生招生考試

科目 細胞生物學 科號 0806 共 1 頁第 1 頁 *請在試卷【答案卷】內作答

簡答題:

1. 請說明細胞外 K^+ 增加會如何影響神經細胞之膜電位(resting membrane potential)? (12%)
(附參考資料: Goldman equation

$$V_m = \frac{RT}{F} \ln \frac{(P_K)[K^+]_{out} + (P_{Na})[Na^+]_{out} + (P_{Cl})[Cl^-]_{in}}{(P_K)[K^+]_{in} + (P_{Na})[Na^+]_{in} + (P_{Cl})[Cl^-]_{out}}$$

)

2. 請說明 DNA replication, cell cycle, cancer 三者間有何關聯? (13%)
3. 請說明 microtubule, motor proteins 如何參與 cytokinesis. (12%)
4. 請說明細胞如何 regulate 其 glycolysis 與 gluconeogenesis? (12%)
(參考關鍵字:glucagon, cAMP, PFK-1, PFK-2, protein kinase, F2,6BPase, ATP)
5. 請說明如何 density gradient centrifugation 來分離 (13%)
organelles(參考關鍵字: swinging-bucket rotor, sedimentation coefficient, differential centrifugation, Svedberg unit, supernatant, pellet, homogenate)

6. Although mitochondria contains their own DNA and protein-synthesizing machinery, they synthesize relatively few of the polypeptides they require. Most of the proteins in mitochondria are encoded by nuclear genes. Please describe how a protein which is located on the inner mitochondria membrane, can be synthesized and targeted to the right place (15%).
7. Please describe (a) the structural organization of the nucleus and nuclear envelop (b) the mechanism of how a 100 Kd transcription factor can be transported into nucleus (23%).