2018

ZOOLOGY

ZOO-102

MOLECULAR CELL AND RECEPTOR BIOLOGY

Full Marks: 80

Time: 3 hours

The figures in the margin indicates full marks for the questions :

1) Answer the following multiple choice questions (any eight) 1 x 8=8

i) The rate of diffusion varies enormously, which among these is not a characteristic of molecule that diffuse easily through Plasma membrane

a) Small size of molecules

b) Highly hydrophobic or nonpolar

c) Highly hydrophilic or polar

d) Diffuse down its concentration gradient 1

ii) The function of GAGs protein is to

a) Filters and limit the diffusion of viruses and bacteria in tissue

b) Provides resistance to compressive forces

c) Provides elasticity to tissue

d) None of the above 1

iii) The toll like receptor contribute to the

a) Innate immunity

b) Adaptive immunity

c) Both (a) and (b)

d) None of above 1

iv) The cancer carcinoma arises from

a) Connective tissue

b) Nervous system

c) Epithelial cell

a) Hematopoietic cells 1

v) Angiogenesis is stimulated by
   a) Epidermal Growth Factors (EGF)
   b) Fibroblast Growth Factors (FGF)
   c) Nerve Growth Factor (NGF)
   d) Vascular Endothelial Growth Factor (VEGF)

vi) Which among these is not true about GPCR?
   a) Gs with GDP bound gets turned off which cannot activate adenyly cyclase
   b) Contact of Gs with hormone receptor complex causes displacement of bound by GTP
   c) Gsα -GTP is turned off, and it do not activates adenylyl cyclase
   d) GTP bound to Gsα is hydrolysed by the proten intrinsic GTPase and turns Gsα off

vii) Phospholipid Sphingosine is synthesized from
   a) Choline
   b) Ethanolanine
   c) Glucose-6-phosphate
   d) Palmitoyl CoA

viii) Orphan Nuclear is identified by
   a) Nature of Ligands
   b) Intrinsic Signaling pathways
   c) DNA sequence of receptor
   d) None of these

ix) The level of M-cyclin get destroyed during
   a) Early M Phase
   b) Mid M Phase
   c) G_1/S Phase
   d) G_2 Phase

2) Answer the following short type questions (any five) 2 x 5=10

a) What do you mean by active transport?
b) What do you mean by metastasis?
c) What are the different factors that affect the flexibility of plasma membrane?
d) What are the functions of proteoglycans in extra-cellular matrix?
e) What do you mean by Antiport?
f) What is the significance of Rb protein in cell cycle?

3) Answer the following (any four) 5 x 4=20

a) What are the differences between normal and transformed cell?
b) Toll-Like Receptors (TLRs) is stimulated by what type of molecules and what is its function?
c) Elucidate the β-adrenergic signaling pathway with suitable diagram
d) Distinguish between absolute and relative refractory period.
e) What are the structural and functional differences present between the V-class and F-class proton pumps?

4) Answer the following long type question (any two) 9 x 2=18

a) Write the differences between the finite and continuous cell lines. What are the physio-chemical conditions and equipment required during the cell culture? (4+5)
b) Illustrate how does the transport vesicle select the appropriate molecules that need to be transported excluding others? How these molecules are delivered to the appropriate destinations? (5+4)
c) What do you mean by Ras-GEFs and Ras-GAPs? Describe the pathway of differentiation of photosensitive R7 cell in the eye of Drosophila. What happens when mutation occurs in R8 cells of Drosophila? (3+6)

5) Answer the following very long type question (any two) 12 x 2=24

a) What do you mean by cell cycle? Describe the different checkpoints present in cell cycle and the factors which regulate this cell cycle. (4+8)

b) What are the three major classes of biomolecules that are found in the extracellular matrix of an animal? Describe the structural and functional properties of Fibronectin in cell adhesion. (5+7)

c) How apoptosis differs from necrosis? Describe the mechanism of intrinsic apoptotic pathway and its significance. (4+8)

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