

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034



M.Sc. DEGREE EXAMINATION – BIOTECHNOLOGY

SECOND SEMESTER – APRIL 2016

BT 2955 – CELL SIGNALING

Date: 27-04-2016

Dept. No.

Max. : 100 Marks

Time: 01:00-04:00

PART – A (20 Marks)

Answer ALL the Questions

I. Choose the correct answer

(5 x 1 = 5 Marks)

- Which among the following signal molecules regulates inflammation?
a) Paracrine b) Homocrine c) Juxtacrine d) Endocrine
- PKC is activated by
a) IP3 b) DAG c) IP3 and Ca²⁺ d) DAG and Ca²⁺
- Dendrotoxin is associated with which of the following ion channels?
a) Cl⁻ b) K⁺ c) Acetylcholine d) Ca²⁺
- Which of the following receptor possesses intrinsic enzymatic activity?
a) EPO receptor b) Ion channels c) Insulin receptor d) TLR 5
- DNA translocation is aided by which of the following process?
a) Methylation b) ATP hydrolysis c) Phosphorylation d) Proteolysis of histone

II. State whether the following are true or false, if false, give reason

(5x1=5 Marks)

- Steroid hormones bind to transmembrane receptors.
- Plasmodesmata is made up of connexons.
- The normal membrane potential of an animal cell is -70mV.
- B- Catenin possesses a nuclear localization signal.
- C terminal tails of histones are subjected to modifications.

III. Complete the following

(5 x 1= 5 Marks)

- Vulva induction in *C.elegans* is an example of _____ form of signaling.
- Cytokines are transported from one cell to another via _____.
- The enzyme that lowers the concentration of acetylcholine in the synaptic cleft _____.
- Permeabilization of outer mitochondrial membrane releases _____.
- _____ causes methylation of DNA.

IV. Answer the following, each within 50 words

(5 x 1 = 5 Marks)

- Define signal transduction.
- How many transmembrane domains are present in GPCR?
- What is desensitization of signals?
- List any two factors that accounts for the sensitivity of signal transducer.
- Mention any one role of histone deacetylases.

PART B

(5 x 8 = 40 marks)

Answer the following, each within 500 words. Draw diagrams wherever necessary

- (a) Outline the various forms of cell signaling, and discuss the process of signal transduction and amplification.

(OR)

- (b) Explain the process of contact dependent cell signaling with a specific example.

22. (a) Discuss the various types of mutations and their effects in GPCR mediated signal components.

(OR)

(b) Explain the role of Gap junctions in cell signaling.

23. (a) Given an overview of light associated signal transduction in rod cells.

(OR)

(b) Comment on the classification, structure, distribution and functions of transient receptor potentials.

24. (a) Explain the mechanism of action of Erythropoietin receptor.

OR

(b) Summarize the steps involved in death receptor mediated apoptotic pathways.

25. (a) Explain the two proposed models of DNA eviction in chromatin remodeling.

OR

(b) Discuss in brief about the techniques used to study DNA fragmentation and cell death.

PART – C

(2 x 20 = 40 Marks)

Answer any TWO of the following, each within 1500 words. Draw diagrams wherever necessary

26. Describe in detail about neuronal transmission mediated by neuropeptides.

27. Write in detail about GPCR signaling, mediated by adrenergic receptors.

28. Elaborate the structure and function of Na⁺ and acetylcholine receptor.

29. Describe the structure and role of Toll like Receptors family in innate immunity. Summarize the steps involved in Myd88 mediated pathway to evade infections.