M.Sc., IV Sem.
SOFT CORE PAPER-1
GENERAL AND MOLECULAR ENDOCRINOLOGY

48 Hours.

I) a) Introduction : 08 Hrs

i.Endocrine, Paracrine and autocrine secretions, Local hormones, Neuroendocrine secretions and Neurotransmitters ii. An over view of Mammalian endocrine system, iii. General classes of chemical messengers-Peptide, Amino acid derived and Steroid hormones, iv. Neurotransmitters-Neuropeptides, v. Growth stimulating factors, Chalones Eicosanoids and Pheromones.

b) Hormones and Homeostatsis :

i. Glucose, Calcium and Sodium Homeostasis, ii. Neuro-endocrine integration:milk ejection reflex and water balance.

II) a) Endocrine Methodologies : 08 Hrs

i. Histological-Cytological, ii. Surgical and Hormone replacement Therapy, iii. Bioassay, iv. RIA, v. Radioreceptor Assay, vi. ELISA, vii. Autoradiography, viii. Recombinant DNA techniques, ix. Gene knockout animal models.

b) Genetic control of hormone synthesis :

i. Structure and expression of protein hormone encoding gene- Posttranslational modification, molecular aspects of peptide hormone secretion and delivery, ii. Molecular aspects of synthesis and delivery of thyroid hormones, biogenic amines and steroid hormones, iii. Transport and peripheral activation of hormones.

III. Mechanism of hormone action : 08 Hrs

i. Membrane bound , cytoplasmic and nuclear hormone receptors, ii. Regulation of receptor number, iii. Non-genomic mechanism of hormone action, Signal transduction:secondary messengers - cyclic AMP, prostaglandins, DAG and calmodulin, iv. Genomic mechanism of hormone action-Steroid and thyroid hormones - regulation of gene expression v. Termination of hormone action and metabolism of hormones.

IV.a) Hypothalamo-Hypophyseal system : 08 Hrs

i. Endocrine Hypothalamus : Structure and Function, Chemical structure and control of hypothalamic hormones-TRH, GHRH, GnRH, CRH, Somatostain and dopamine, Control of release of these hormones and their action on target cells, ii. Pituitary- Location, Development, structure and functional cell types, Hypothalomo-hypophysial portal system, Pituitary hormone and their physiological actions with emphasis on molecular mechanisms-GH and Prolactin, FSH, LH and FSH (Glycoprotein Hormones), Pro-opiomelanocortin and Neurohypophysial Hormones, iii. Control of Hypophysial Hormones, secretion and Feed back regulation, iv. Pituitary patho-physiology : Hyperprolactinaemia, Pituitary dwarfish, Gigantism and Acromegaly.

b) Pineal gland : Morphology and physiological actions of melatonin

V. a) Thyroid and Parathyroid Glands: 08 Hrs

i. Position and Morphology, ii. Bio-chemistry of synthesis, secretion and metabolism of thyroid hormones and Parathormone, iii. Actions with emphasis on molecular mechanisms, iv. Patho-physiology-Goiter, Grave's disease and Cretinism.

b) Adrenal Gland.

i. Anatomy, embryology and histology, ii. Control of synthesis, secretion and physiological roles of cortical hormones with emphasis on molecular actions, iii. Adrenal chromaffin tissue : Synthesis, Chemistry, actions and metabolism of catecholamine, iv. Addison's disease and Cushing's syndrome.

VI. a) Endocrine Pancreas : 08 Hrs

i. Structure and cell types of Islets of Langerhans, ii. Secretion and metabolism of Insulin, Glucagon and other pancreatic hormones, iii. Cellular and molecular actions of Insulin and Glucogon, iv. Insulin and Non Insulin Dependent Diabetes Mellitus, v. Islet cell tumor

b) Gastro-Intestinal Hormones : Endocrine cells, Gastrin, CCK and Secretin

c) Invertebrate Endocrinology :

Structure, functions and molecular actions of insect and crustacean hormones with special reference to reproduction.

Tutorials. ---------- 16X2 = 32 Hrs.

REFERENCES

1) Bolander .Jr F.F. (2004) Molecular Endocrinology Third Edition. Academic press. SanDiego.
2) Goodman. H.M (2003). Basic Medical Endocrinology. Third Edition. Academic press. SanDiego.
3) Negi. C.S. (2009). Introduction to Endocrinology. PHI learning Pvt Lted. New Delhi.
4) Norris. D.O. (2006). Vertebrate Endocrinology. Third Edition. Academic press. SanDiego.