ZOS454: COMPARATIVE PHYSIOLOGY

Teaching hours **10hrs /Unit**

COURSE OUTCOME

1. The teaching session is involved in making students to understand different physiological systems and their functional role in human and other animals.
2. Students are also taught about various disorders due to functional and cellular defect in different physiological pathways.
3. The complete gastrointestinal physiology is dealt in great details to make students aware of molecular and physiological aspects of gut functions and its abnormality.
4. The studies on respiratory, reproductive and osmoregulation physiology are discussed.
5. The reproductive physiology of both invertebrates and vertebrates are discussed.
6. Importance of hormones and their functions.

UNIT I

Gastrointestinal physiology:

Organization of gastro-intestinal tract- process of digestion, Digestive enzymes, Digestion and absorption of carbohydrates, proteins and lipids, Digestion in Ruminants and non-ruminants.

Regulatory mechanisms of digestion, Gastro-intestinal hormones, Gastro-intestinal motility.

Gastro-intestinal disorders- Dyspepsia, Achalasia, peptic ulcer, Appendicitis, Inflammatory Bowel's disease, Crohn's disease, Hernia, Malrotation.

UNIT II

Respiratory physiology:

Organization of respiratory system- Types of respiratory surfaces, Ventilation, Tidal volume, Dead space, Comparative study of aquatic and terrestrial respiration, Respiration in birds and insects.

Diffusion of gases- Transport of O_2 and CO_2, Oxygen-Haemoglobin Dissociation curve, Haldane effect, Bohr Effect, Role of blood as buffer, Haemodynamics.

Regulation of respiration.

UNIT III

Osmoregulation:

Osmoregulation in aquatic, amphibious and terrestrial animals.

Patterns of N_2 excretion- Urea, Uric acid, Ammonia

Formation of urine by kidney- Physiological anatomy of kidney, Structure of nephron, Formation of urine in nephrons, Normal, Inorganic and abnormal constituents of urine, Factors affecting urine formation, Factors controlling volume of urine.

Regulation of renal function- Hormones, Renin angiotensin-Aldosterone system (RAAS), Homeostatic regulation of kidney.

UNIT IV

Endocrinology:

Nature of Hormones, Classification of hormones, Storage and secretion of hormones.

Hormone-receptor interactions- Mechanism of water and lipid soluble hormone action.

Overview of important endocrine glands and their hormones- Pituitary hormones and their control by the Hypothalamus.

Oestrous cycle and its hormonal basis.

Endocrine regulation of insect metamorphosis.

UNIT V

Reproductive physiology:

Reproductive and hormonal functions of the male- Spermatogenesis, Testosterone and other hormones, Pineal gland and its function in controlling seasonal fertility.

Oogenesis, Fertilization, Molecular mechanisms of fertilization in mammals.

Chemical, mechanical and immunological methods of controlling fertility.

Insect reproductive systems- Male and female reproductive systems, types of sperms, types of ovarioles.

REFERENCES

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2. Hadley, M.E. and Levine J.E. (2007) Endocrinology, 6th edition. (Indian edition) Pearson Education, Inc., Delhi.
3. Jones, T.C., Mohr U., Hunt R.D. (1986) Urinary system, Springer Verlag Heidelberg, New York.
4. Kalsi, P.S. (2015) Hawk's Physiological Chemistry, 14th edition (Indian edition). MedTec, New Delhi.
5. Randall, D.J., Burgrenn W., French K. (2001) Animal Physiology, Mechanisms and Adaptations, 5th edition. Library of Congress Cataloguing, USA.
6. Rockstein, M. (1974) The Physiology of Insecta, 2nd edition. Academic Press, New York and London.
7. Schmidt-Nilsen, K. (1995) Animal Physiology, Adaptation and environment. Cambridge University Press.
8. Shepherd, G.M. (1994) Neurobiology, 3rd edition. Oxford University Press, USA.
9. Silverthorn, D.U. (2016) Human Physiology, An Integrated Approach, 6th edition (Indian edition). Pearson Education, Limited, Tamil Nadu.
10. Wison, I.A. (1979) Principles of Animal Physiology, 2nd edition. Macmillan Pub. Co. Inc. New York.