Semester-IV

Core VIII **Endocrinology & Reproductive Biology**

Programme Outcome:

- Insights on the history of endocrinology, study endocrine glands, hormones, control and regulation
- Acquire knowledge on the various facets of the reproductive system and their endocrine aspects.

Course Outcome:

- Essential clarity on endocrine gland structures, hormones, functions and their regulation.
- Scientific knowledge base on reproductive health and endocrine control.

Learning Outcome:

- Acquire information on the history of endocrinology, endocrine glands, and hormones.
- Gain an understanding of the Hypothalamo-hypophysial axis and regulation of hormone action.
- Understand the endocrine aspects of reproductive system.
- Recognize different aspects of reproductive health and Assisted Reproductive Technology.

Unit 1: Introduction to Endocrinology

A brief history of endocrinology, Types of endocrine glands (Pituitary, Pineal, Thyroid, Parathyroid, Adrenal, Pancreas), their histology, hormones, functions and disorders; General characteristics of Hormones, Classification, Hormone receptors, Mechanism of hormone action (steroidal and non-steroidal hormones) and tansduction .

Unit 2: Hypothalamo-hypophysial Axis and Regulation of Hormone Action

Structure of hypothalamus, Hypothalamic nuclei, Neurosecretions, Neurohormones and their functions, Hypothalamo-hypophysial portal system, Hypothalamic-pituitary-gonadal axis,

Hormone action at cellular and molecular level, Genetic control of hormone action. Regulation-Feedback mechanisms.

Unit 3: Reproductive System-endocrine aspects

Testis: Histology; Spermatogenesis: kinetics and hormonal regulation; Androgen synthesis and metabolism; Epididymal function and sperm maturation; Sperm transportation in male tract; Ovary: Histology, folliculogenesis, ovulation, corpus luteum formation and regression; Steroidogenesis and secretion of ovarian hormones; Reproductive cycles and their regulation, Ovum transport in the fallopian tubes; Sperm transport in the female tract, fertilization, prevention of polyspermy; Hormonal control-implantation and gestation, foeto-maternal relationship; Parturition and Lactation.

Unit 4: Reproductive Health

Infertility in male and female: causes, diagnosis and management; Assisted Reproductive Technology: sex selection, sperm banks, frozen embryos, in vitro fertilization, ET, EFT, IUT, ZIFT, GIFT, ICSI, PROST; Modern contraceptive technologies; Demographic terminology used in family planning.

Text Books:

- ✓ *C. Donnell Turner (2012) General Endocrinology Pub- Affiliated East-West press Pvt. Ltd.-New Delhi; 6th Edition*
- ✓ *Hadley, M.E. and Levine J.E. (2007). Endocrinology, 6th Edition. Pearson Prentice-Hall, Pearson Education Inc., New Jersey*
- ✓ *Austin, C.R. and Short, R.V. (1982) Reproduction in Mammals. Cambridge University Press.*
- ✓ *C. Donnell Turner (2012) General Endocrinology Pub- Affiliated East-West pressPvt. Ltd.-New Delhi; 6th Edition*
- ✓ *Tandulwadkar Sunita R (2015) The Art & Science Of Assisted Reproductive Technology, Jaypee Brothers Medical Publishers*

Suggested Readings:

- ✓ *Stephen Nussey and Saffron Whitehead (2001). Endocrinology: An Integrated Approach; Oxford: BIOS Scientific Publishers*
- ✓ *Tony M. Plant and Anthony J. Zeleznik (2015) Knobil and Neill's Physiology of Reproduction, Academic Press*

Endocrinology & Reproductive Biology

Practical:

1. Dissect and display of Endocrine glands in laboratory bred rat*.
2. Study of the permanent slides of all the endocrine glands.
3. Study and identification of endocrine disorders through images.
4. Compensatory ovarian/ adrenal hypertrophy in vivo bioassay in laboratory bred rat*.
5. Demonstration of Castration/ ovariectomy in laboratory bred rat*.
6. Estimation of plasma level of any hormone using ELISA.
7. Designing of primers of any hormone.
8. Examination of vaginal smear from live animals and examination of Human vaginal exfoliate cytology.
9. Surgical techniques: principles of surgery in endocrinology. Ovarectomy, hysterectomy, castration and vasectomy in rats. (*Subject to UGC guidelines)

10. Sperm count and sperm motility in rat.
11. Study of modern contraceptive devices.
12. Report on endocrine disorders in human.
13. Paper chromatographic separation of hormones.
14. Hypophysectomy in fish (Tilapia/catfish/ locally available fish)