

**UZO-481**

**General and Comparative Endocrinology-II**

**Cr. (2)**

**Course Objectives:**

1. To discuss the definition of hormone in terms of its general properties.
2. To differentiate among endocrine, paracrine and autocrine system.
3. To describe different classes and chemical structure of hormone.
4. To explain the roles of the endocrine system in maintain homeostasis, integrating growth and development, responding to environmental insult and promote successful reproduction.

5. To identify the glands, organs, tissues and cell that synthesize and secrete hormones, hormone precursors and associated compounds.
6. To describe synthesis and mode of secretion of hormone, regulation of hormone secretion of hormone, including the principles of negative and positive feedback mechanism.
7. To explain the importance of patterns of hormone secretion such as pulsatile, diurnal, cyclic and how hormones are transported in the blood and consequences of reversible binding of many hormones by plasma proteins
8. To explain the basis of hormone assays and assessment of biological activity
9. To discuss the metabolism, clearance and excretion of hormones and their metabolic derivatives
10. To define and discuss the physiological actions of hormone relating them whenever possible to human disorders
11. To explain the consequences of under and overproduction of hormones to determine the pathophysiological basis and consequences of specific endocrine disorders.
12. To compare and contrast the different mechanism of action of hormones: i.e. those exerted by modulation of gene expression, those activated by changes in protein activity.

### **Course Learning Outcome**

At the end of course the students are able to:

1. Explain the roles of the endocrine system in maintain homeostasis, integrating growth and development, responding to environmental insult and promote successful reproduction.
2. Discuss the definition of hormone in terms of its general properties.
3. Differentiate among endocrine, paracrine and autocrine system.
4. Describe different classes and chemical structure of hormone.
5. Identify the glands, organs, tissues and cell that synthesize and secrete hormones, hormone precursors and associated compounds.
6. Describe synthesis and mode of secretion of hormone.
7. Explain how the secretion of hormone is regulated, including the principles of negative and positive feedback mechanism.
8. Explain the importance of patterns of hormone secretion such as pulsatile, diurnal and cyclic.
9. Explain how hormone are transported in the blood and consequences of reversible binding of many hormones by plasma proteins
10. Explain the basis of hormone assays and assessment of biological activity
11. Describe how hormone are metabolism, clearance and excretion of hormones and their metabolic derivatives.
12. Explain the consequences of under and overproduction of hormones to determine the pathophysiological basis and consequences of specific endocrine disorders.
13. Compare and contrast the different mechanism of action of hormones: i.e. those exerted by modulation of gene expression, those activated by changes in protein activity.
14. Evaluate and assess scientific literature about endocrine function and pathology.

### **Course Contents:**

**Pancreatic Hormones and Regulatory Peptides of the Gut:** Anatomy and histology for sources of the hormones; Chemistry, physiological roles and mechanism of action of insulin and glucagon; Physiological roles of gut peptides.

**Adrenal Medulla and Catecholamines:** Chromaffin cell and organization; Structure of adrenal medulla; Biosynthesis, storage, release and metabolism; Adrenergic receptors.

**Adrenal Cortex:** Steroid biochemistry; Physiological actions of corticoid hormones; Regulation and metabolism of glucocorticoids, mineralocorticoids and adrenal sex steroids.

**Testes:** Androgenic tissue: Structure and chemistry; Transport, metabolism and mechanism of action.

**Ovaries:** Ovarian hormones: Steroid biochemistry and biosynthesis; Transport, metabolism and mechanism of action.

**Endocrinology of Pregnancy:** Hormones in conception and implantation; Hormonal actions and adaptation in pregnancy and parturition.

**Endocrinology of Lactation:** Hormones in lactation.

**Endocrinology of Heart, Kidney, Immune system:** Growth and pineal gland.

**Functional Diversity of Hormones in Vertebrates.**

**Overview of Endocrine Mechanisms in Invertebrates.**

**Teaching-Learning Strategies**

Teaching will be a combination of class lectures, class discussions, and group work. Short videos /films will be shown on occasion.

**Assignments**

The sessional work will be a combination of written assignments, class quizzes, presentation, and class participation/attendance.

**Assessments and Examination**

Sessional Work: 25 marks

Midterm Exam: 35 marks

Final term Exam: 40 marks

**Books Recommended:**

1. Greenspan, F.S. and Stewler, G.J., 2011. Basic and clinical endocrinology, 10<sup>th</sup> Ed.. Prentice Hall International Inc., London.
2. Shomo, M., Richard, J.,; Goldfine Etal 2020. Williams textbook of endocrinology, 14<sup>th</sup> Ed.. W.D. Saunders Company, Philadelphia.
3. DeGroot, L.J., Jameson, J.L. *et al.*, 2006. Endocrinology, Vol.I, II and III, 5<sup>th</sup> Ed.. W.B. Saunders, Philadelphia.
4. Giffin, J.E. and Ojeda, S.R., 2000. 4<sup>th</sup> Ed.. Textbook of Endocrine Physiology. Oxford University Press, Oxford.
5. Neal, J.M., 2000. Basic Endocrinology: An interactive approach. Blackwell Science Inc., London.

**UZO-482**

**General andComparative Endocrinology–II(Lab)**

**Cr. (1)**

**Course Objectives:**

1. To discuss the definition of hormone in terms of its general properties.
2. To differentiate among endocrine, paracrine and autocrine system.
3. To describe different classes and chemical structure of hormone.
4. To explain the roles of the endocrine system in maintain homeostasis, integrating growth and development, responding to environmental insult and promote successful reproduction.
5. To identify the glands, organs, tissues and cell that synthesize and secrete hormones, hormone precursors and associated compounds.
6. To describe synthesis and mode of secretion of hormone, regulation of hormone secretion of hormone, including the principles of negative and positive feedback mechanism.
7. To explain the importance of patterns of hormone secretion such as pulsatile, diurnal, cyclic and how hormones are transported in the blood and consequences of reversible binding of many hormones by plasma proteins
8. To explain the basis of hormone assays and assessment of biological activity
9. To discuss the metabolism, clearance and excretion of hormones and their metabolic derivatives
10. To define and discuss the physiological actions of hormone relating them whenever possible to human disorders
11. To explain the consequences of under and overproduction of hormones to determine the pathophysiological basis and consequences of specific endocrine disorders.
12. To compare and contrast the different mechanism of action of hormones: i.e. those exerted by modulation of gene expression, those activated by changes in protein activity.

## **Course Learning Outcome**

At the end of course the students are able to:

1. Explain the roles of the endocrine system in maintain homeostasis, integrating growth and development, responding to environmental insult and promote successful reproduction.
2. Discuss the definition of hormone in terms of its general properties.
3. Differentiate among endocrine, paracrine and autocrine system.
4. Describe different classes and chemical structure of hormone.
5. Identify the glands, organs, tissues and cell that synthesize and secrete hormones, hormone precursors and associated compounds.
6. Describe synthesis and mode of secretion of hormone.
7. Explain how the secretion of hormone is regulated, including the principles of negative and positive feedback mechanism.
8. Explain the importance of patterns of hormone secretion such as pulsatile, diurnal and cyclic.
9. Explain how hormone are transported in the blood and consequences of reversible binding of many hormones by plasma proteins
10. Explain the basis of hormone assays and assessment of biological activity
11. Describe how hormone are metabolism, clearance and excretion of hormones and their metabolic derivatives.
12. Explain the consequences of under and overproduction of hormones to determine the pathophysiological basis and consequences of specific endocrine disorders.
13. Compare and contrast the different mechanism of action of hormones: i.e. those exerted by modulation of gene expression, those activated by changes in protein activity.
14. Evaluate and assess scientific literature about endocrine function and pathology.

## **Course Contents:**

Experiments to demonstrate physiological roles of hormones of different endocrine glands; Experiments to demonstrate regulation of hormones' releases. Experiments to demonstrate functional diversity of hormones in different vertebrates. Experiments on endocrine mechanism in vertebrates.

## **Teaching-Learning Strategies**

Teaching will be a combination of class lectures, class discussions, and group work. Short videos /films will be shown on occasion.

## **Assignments**

The sessional work will be a combination of written assignments, class quizzes, presentation, and class participation/attendance.

## **Assessments and Examination**

Sessional Work:	25 marks
Midterm Exam:	35 marks
Final term Exam:	40 marks