**Course book (Advanced Endocrinology) (Ph. D Students ) 2019-2020**

**University of Salahaddin-Erbil**

**College of Science**

**Biology Department**

**Instructor**

**Prof. Dr. Almas M.R Mahmud**

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| **No.** | **Lecture Topics** |
| 1 | Introduction to Endocrinology  Coordination of Body Functions by Chemical Messengers  Chemical Structure and Synthesis of Hormones  Hormone Secretion, Transport, and Clearance from the Blood  Feedback Control of Hormone Secretion  Transport of Hormones in the Blood  “Clearance” of Hormones from the Blood |
| 2 | Mechanisms of Action of Hormones  Signal Transduction pathways |
| 3 | Pituitary Hormones and Their Control by the Hypothalamus  Pituitary Gland and Its Relation to the Hypothalamus  Hypothalamus Controls Pituitary Secretion  Hypothalamic-Hypophysial Portal Blood  Vessels of the Anterior Pituitary Gland |
| 4 | Physiological Functions of Growth Hormone  Growth Hormone Promotes Growth of Many Body Tissues  Growth Hormone Has Several Metabolic Effects  Growth Hormone Stimulates Cartilage and Bone Growth  Regulation of Growth Hormone Secretion  Abnormalities of Growth Hormone Secretion  Posterior Pituitary Gland and Its elation to the Hypothalamus  Chemical Structures of ADH and Oxytocin  Physiological Functions of ADH  Oxytocic Hormone |
| 5 | Thyroid Metabolic Hormones  Synthesis and Secretion of the Thyroid Metabolic Hormones 931  Iodine Is Required for Formation of Thyroxine  Iodide Pump (Iodide Trapping)  Thyroglobulin, and Chemistry of Thyroxine and Triiodothyronine Formation  Release of Thyroxine and Triiodothyronine from the Thyroid Gland  Transport of Thyroxine and Triiodothyronine to Tissues |
| 6 | Physiologic Functions of the Thyroid Hormones  Thyroid Hormones Increase the Transcription of Large Numbers of Genes  Thyroid Hormones Increase Cellular Metabolic Activity  Effect of Thyroid Hormone on Growth  Effects of Thyroid Hormone on Specific  Bodily Mechanisms  Regulation of Thyroid Hormone Secretion  Anterior Pituitary Secretion of TSH Is Regulated by Thyrotropin-Releasing  Hormone from the Hypothalamus  Feedback Effect of Thyroid Hormone to Decrease Anterior Pituitary Secretion of TSH |
| 7 | Diseases of the Thyroid  Hyperthyroidism  Symptoms of Hyperthyroidism  Hypothyroidism  Cretinis |
| 8 | Adrenocortical Hormones  Synthesis and Secretion of Adrenocortical Hormones  Functions of the Mineralocorticoids- Aldosterone  Renal and Circulatory Effects of Aldosterone  Cellular Mechanism of Aldosterone Action  Regulation of Aldosterone Secretion |
| 9 | Functions of the Glucocorticoids  Effects of Cortisol on Carbohydrate Metabolism  Effects of Cortisol on Protein Metabolism  Effects of Cortisol on Fat Metabolism  Cortisol Is Important in Resisting Stress and Inflammation  Cellular Mechanism of Cortisol Action  Regulation of Cortisol Secretion by Adrenocorticotropic Hormone from the  Pituitary Gland |
| 10 | Adrenal Androgens  Abnormalities of Adrenocortical Secretion  Hypoadrenalism-Addison’s Disease  Hyperadrenalism-Cushing’s Syndrome  Primary Aldosteronism (Conn’s Syndrome)  Adrenogenital Syndrome |
| 11 | Insulin, Glucagon, and Diabetes Mellitus  Insulin and Its Metabolic Effects  Effect of Insulin on Carbohydrate Metabolism  Effect of Insulin on Fat Metabolism  Effect of Insulin on Protein Metabolism and on Growth  Mechanisms of Insulin Secretion  Control of Insulin Secretion  Other Factors That Stimulate Insulin Secretion  Role of Insulin (and Other Hormones) in “Switching” Between Carbohydrate and  Lipid Metabolism  Glucagon and Its Functions  Effects on Glucose Metabolism  Regulation of Glucagon Secretion  Somatostatin Inhibits Glucagon and Insulin Secretion |
| 12 | Diabetes Mellitus  Type I Diabetes—Lack of Insulin Production  by Beta Cells of the Pancreas  Type II Diabetes—Resistance to the Metabolic Effects of Insulin  Physiology of Diagnosis of Diabetes Mellitus  Treatment of Diabetes  Insulinoma—Hyperinsulinism |
| 13 | Parathyroid Hormone, Calcitonin,  Calcium and Phosphate  Overview of Calcium and Phosphate  Regulation in the Extracellular Fluid and Plasma  Calcium in the Plasma and Interstitial Fluid  Absorption and Excretion of Calcium and Phosphate  Bone and Its Relation to Extracellular Calcium and Phosphate  Vitamin D  Actions of Vitamin D  Parathyroid Hormone  Effect of Parathyroid Hormone on Calcium and Phosphate Concentrations in the  Extracellular Fluid  Control of Parathyroid Secretion by Calcium Ion Concentration  Calcitonin |
| 14 | Reproductive and Hormonal Functions of the Male (and Function  of the Pineal Gland)  Physiologic Anatomy of the Male Sexual Organs  Testosterone and Other Male Sex Hormones  Secretion, Metabolism, and Chemistry of the Male Sex Hormone  Functions of Testosterone  Basic Intracellular Mechanism of Action of Testosterone  Control of Male Sexual Functions by  Hormones from the Hypothalamus and Anterior Pituitary Gland  Pineal Gland—Its Function in Controlling  Seasonal Fertility in Some Animals |
| 15 | Female Physiology Before Pregnancy  and Female Hormones  Physiologic Anatomy of the Female Sexual Organs  Female Hormonal System  Monthly Ovarian Cycle; Function of the  Gonadotropic Hormones  Gonadotropic Hormones and Their Effects on the Ovaries  Ovarian Follicle Growth—The “Follicular”  Phase of the Ovarian Cycle  Corpus Luteum—“Luteal” Phase of the Ovarian Cycle Functions of the Ovarian Hormones—Estradiol and Progesterone  Feedback Oscillation of the Hypothalamic- Pituitary-Ovarian System |