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| **Ilam University of Medical Sciences** |
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| **Faculty:** | Medicine  |
| **Course Name:** | Endocrine physiology |
| **Students:** | Medical students  |
| **Teacher:** | Dr. Sajjad Salari |  |
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|  |  | ***Course plan*** |
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| **Date** | **Topics** | **Resources** |
|  | Introduction to Endocrinology | Guyton and Hall Textbook of Medical Physiology 14th Edition |
|  | Pituitary hormones | Guyton and Hall Textbook of Medical Physiology 14th Edition |
|  | Thyroid hormones | Guyton and Hall Textbook of Medical Physiology 14th Edition |
|  | Adrenocortical hormones | Guyton and Hall Textbook of Medical Physiology 14th Edition |
|  | Parathyroid hormone  | Guyton and Hall Textbook of Medical Physiology 14th Edition |
|  | Insulin, Glucagon, and Diabetes Mellitus | Guyton and Hall Textbook of Medical Physiology 14th Edition |
|  | Male reproductive hormones | Guyton and Hall Textbook of Medical Physiology 14th Edition |
|  | Female reproductive hormones | Guyton and Hall Textbook of Medical Physiology 14th Edition |
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| **Qualification:** | Active participation in the classroom: | 2 |
|  | Final exam: | 18 |
|  | Total score: | 20 |
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| **Lesson plan** |
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| **Lesson**  | **Objectives** |
| Introduction to Endocrinology | By the end of this lesson, the students should be able to:* Define hormone and endocrine system.
* Understand the chemical nature of different classes of hormones and how this determines their mechanism of action on target cells.
* Define how hormones are synthesized and secreted by cells of endocrine
* glands, including how peptide hormones are cleaved from longer precursors.
* Explain the relevance of protein carriers in the blood for hydrophobic
* hormones, and the mechanisms that determine the level of free circulating
* hormones.
* Understand the principles of feedback control for hormone release and its
* relevance for homeostasis.
* Describe hormones and their contribution to whole body homeostatic mechanisms.
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| Pituitary hormones | By the end of this lesson, the students should be able to:* Describe the anatomic connections between the hypothalamus and the pituitary gland.
* Describe the functional connection between hypothalamus and the pituitary gland
* Describe the structure of the pituitary hormones.
* Describe the physiological effects of growth hormone.
* Describe the regulation of growth hormone secretion
* Define the effects of the growth hormone in growth and metabolic function, and how insulin-like growth factor I (IGF-I) may mediate some of its actions in the periphery.
* List the stimuli that regulate growth hormone secretion and define their underlying mechanisms.
* Describe the synthesis, processing, storage, and secretion of the hormones of the posterior pituitary.
* Discuss the effects of vasopressin, the receptors on which it acts, and how its secretion is regulated.
* Discuss the effects of oxytocin, the receptors on which it acts, and how its
* secretion is regulated.
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| Thyroid hormones | By the end of this lesson, the students should be able to:* Describe the structure of the thyroid gland and how it relates to its function.
* Define the chemical nature of the thyroid hormones and how they are synthesized.
* Understand the critical role of iodine in the thyroid gland and how its transport is controlled.
* Describe the role of protein binding in the transport of thyroid hormones and peripheral metabolism.
* Identify the role of the hypothalamus and pituitary in regulating thyroid function.
* Define the effects of the thyroid hormones in homeostasis and development.
* Understand the basis of conditions where thyroid function is abnormal and how they can be treated.
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| Adrenocortical hormones | By the end of this lesson, the students should be able to:* Describe the general histology of the adrenal gland.
* Outline the steps involved in steroid biosynthesis in the adrenal cortex.
* Name the plasma proteins that bind adrenocortical steroids and discuss their physiologic role.
* Name the major site of adrenocortical hormone metabolism and the principal metabolites produced from glucocorticoids, adrenal androgens, and aldosterone.
* Describe the mechanisms by which glucocorticoids and aldosterone produce changes in cellular function.
* List and briefly describe the physiologic and pharmacologic effects of glucocorticoids.
* Contrast the physiologic and pathologic effects of adrenal androgens.
* Describe the mechanisms that regulate secretion of glucocorticoids and adrenal sex hormones.
* List the actions of aldosterone and describe the mechanisms that regulate aldosterone secretion.
* Describe the main features of the diseases caused by excess or deficiency of each of the hormones of the adrenal gland.
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| Parathyroid hormone | By the end of this lesson, the students should be able to:* Understand the importance of maintaining homeostasis of body calcium and phosphate concentrations, and how this is accomplished.
* Describe the body pools of calcium, their rates of turnover, and the organs that play central roles in regulating movement of calcium between stores.
* Delineate the mechanisms of calcium and phosphate absorption and excretion.
* Identify the major hormones and other factors that regulate calcium and phosphate homeostasis and their sites of synthesis as well as targets of their action.
* Define the basic anatomy of bone.
* Delineate cells and their functions in bone formation and resorption.
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| Insulin, Glucagon, and Diabetes Mellitus | By the end of this lesson, the students should be able to:* Classify the pancreatic secretions.
* Identify the principal hormones secreted from the endocrine pancreas, their cells of origin, and their chemical nature.
* Understand the nutrient, neural, and hormonal mechanisms that regulate pancreatic hormone release.
* List the principal target organs for insulin and glucagon action and their major physiologic effects.
* Identify the time course for the onset and duration of the biologic actions of insulin and glucagon.
* Identify the disease states caused by oversecretion, undersecretion, or decreased sensitivity to insulin, and describe the principal manifestations of each.
* Describe the physiologic effects of somatostatin in the pancreas.
* Understand the major differences between type 1 and type 2 diabetes
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| Male reproductive hormones | By the end of this lesson, the students should be able to:* Describe the anatomy of the male sex organ.
* Describe the general histology of testis
* Describe the H.P.G axis (hypothalamus, pituitary, gonad) in reproduction.
* Describe the spermatogenesis and their important steps.
* Describe the effective factors in sperm differentiation and development.
* Describe the synthesis and mechanism of action of androgens.
* Describe the physiological effects of testosterone.
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| Female reproductive hormones | By the end of this lesson, the students should be able to:* Describe the anatomy of the female sexual organ.
* Describe the follicular development in ovaries.
* Describe puberty process and its stages in females.
* Describe the ovarian-uterine cycle in females.
* Describe of physiological roles of female sex hormones.
* Describe menopause and mention its symptoms.
* Describe the fertilization, implantation and supportive function of placenta during pregnancy.
* Describe endocrine roles of placenta during pregnancy
* Define the phenomenon of and state the stages and factors involved in its regulation.
* Describe the hormonal function during childbirth and lactation
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