



**BSC597.02W/.CRW: CASE STUDIES IN ENDOCRINE PHYSIOLOGY
COURSE SYLLABUS: SPRING 2013**

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COURSE INFORMATION

Materials – Textbooks, Readings, Supplementary Readings

Textbook(s) Required: Gardner, D. and D. Shoback. *Greenspan's Basic and Clinical Endocrinology, Ninth Edition*. ISBN-13: 978-007162431

Course Description:

This advanced course in physiology focuses on the human endocrine (hormonal) system.

Student Learning Outcomes (SLOs):

At the end of this web-based course, the student should be able to sufficiently address each of the following objectives. I have made the list comprehensive since this is a web-based course, and I prefer to have all outcomes in a single document.

The student understands the general principles of endocrinology. Specific objectives include:

- Contrast the terms endocrine, paracrine, and autocrine.
- Define the terms hormone, target cell, and receptor.
- Understand the major mechanisms of action of peptides, steroid, and thyroid hormones.
- Compare and contrast hormone actions exerted via plasma membrane receptors with those mediated via intracellular receptors.
- Understand the role of hormone-binding proteins.
- Understand the feedback control mechanisms of hormone secretion.
- Explain the effects of secretion, degradation, and excretion on plasma hormone concentrations.
- Understand the basis of hormone measurements (eg, radioimmunoassay, immunometric assay) and their interpretation.

The student understands the role of the hypothalamus and posterior pituitary gland in maintaining homeostasis. Specific objectives include:

- Describe the physiologic and anatomic relationships between the hypothalamus and the anterior and the posterior pituitary.

- Understand the integration of hypothalamic and pituitary function and identify the 2 different pathways used for hypothalamic-pituitary interactions.
- Identify the appropriate hypothalamic releasing and inhibitory factors controlling the secretion of each of the anterior pituitary hormones.
- Differentiate between the routes of transport of hypothalamic neuropeptides to the posterior and anterior pituitary.
- Identify the mechanisms that control the release of oxytocin and arginine vasopressin.
- Understand the physiologic target-organ responses and the cellular mechanisms of oxytocin and arginine vasopressin action.

The student understands the role of the anterior pituitary gland in maintaining homeostasis.

Specific objectives include:

- Identify the 3 families of anterior pituitary hormones and their main structural differences.
- Understand the mechanisms that regulate anterior pituitary hormone production and describe the actions of tropic hormones on target organs.
- Diagram the short- and long-loop negative feedback control of anterior pituitary hormone secretion.
- Predict the changes in secretory rates of hypothalamic anterior pituitary and target gland hormones caused by oversecretion or undersecretion of any of these hormones or receptor deficit for any of these hormones.
- Explain the importance of pulsatile and diurnal hormone secretion.

The student understands the role of the thyroid gland in maintaining homeostasis. Specific objectives include:

- Identify the steps and control factors of thyroid hormone biosynthesis, storage, and release.
- Describe the distribution of iodine and the metabolic pathway involved in thyroid hormone synthesis.
- Explain the importance of thyroid hormone binding in blood for free and total thyroid hormone levels.
- Understand the significance of the conversion of tetraiodothyronine (T₄) to triiodothyronine (T₃) and reverse T₃ (rT₃) in extrathyroidal tissues.
- Understand how thyroid hormones produce their cellular effects.
- Describe their effects on development and metabolism.
- Understand the causes and consequences of excess and deficiency of thyroid hormones.

The student understands the role of the parathyroid gland in maintaining homeostasis. Specific objectives include:

- Identify the origin, target organs and cell types, and physiologic effects of parathyroid hormone.
- Describe the functions of osteoblasts and osteoclasts in bone remodeling and the factors that regulate their activities.

- Describe the regulation of parathyroid hormone secretion and the role of the calcium-sensing receptor.
- Identify the sources of vitamin D and describe the biosynthetic pathway involved in modifying it to its biologically active form.
- Identify the target organs and cellular mechanisms of action of vitamin D.
- Describe the causes and consequences of excess or deficiency of parathyroid hormone and of vitamin D.
- Describe the regulation of calcitonin release and the cell of origin and target organs for calcitonin action.

The student understands the role of the adrenal gland in maintaining homeostasis. Specific objectives include:

- Identify the functional anatomy and zones of the adrenal glands and the principal hormones secreted from each zone.
- Describe and contrast the regulation of synthesis and release of the adrenal steroid hormones (glucocorticoids, mineralocorticoids, and androgens) and the consequences of abnormalities in their biosynthetic pathways.
- Understand the cellular mechanism of action of adrenal cortical hormones and identify their major physiologic actions, particularly during injury and stress.
- Identify the major mineralocorticoids, their biologic actions, and their target organs or tissues.
- Describe the regulation of mineralocorticoid secretion and relate this to the regulation of sodium and potassium excretion.
- Identify the causes and consequences of oversecretion and undersecretion of glucocorticoids, mineralocorticoids, and adrenal androgens.
- Identify the chemical nature of catecholamines and their biosynthesis and metabolic fate.
- Describe the biologic consequences of sympatho-adrenal medulla activation and identify the target organs or tissues for catecholamine effects along with the receptor types that mediate their actions.
- Describe and integrate the interactions of adrenal medullary and cortical hormones in response to stress.
- Identify diseases caused by oversecretion of adrenal catecholamines.

The student understands the role of the endocrine pancreas in maintaining homeostasis. Specific objectives include:

- Identify the principal hormones secreted from the endocrine pancreas, their cells or 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.

The student understands how the endocrine system is involved with energy and electrolyte balance. Specific objectives include:

- Identify the normal range of plasma glucose concentrations and the hormonal regulation of its metabolism, storage, and mobilization.
- Identify the specific roles of insulin, glucagon, glucocorticoids, catecholamines, growth hormone, and thyroid hormone in the regulation of energy substrate utilization, storage, and mobilization.
- Describe the hormonal regulation of energy substrate metabolism during the fed and fasted states and understand the consequences of its dysregulation.
- Identify the mechanisms involved in the maintenance of long-term energy balance.
- Identify the normal range of dietary sodium intake, its body distribution, and routes of excretion. Explain the roles of antidiuretic hormone, aldosterone, angiotensin, and atrial natriuretic hormone in the regulation of sodium balance.
- Identify the normal range of dietary potassium intake, its body distribution, and routes of excretion. Explain the hormonal regulation of plasma potassium concentration, distribution, and balance in the acute and chronic settings.
- Identify the normal range of dietary calcium intake, its body distribution, and routes of excretion. Explain the hormonal regulation of plasma calcium concentration through bone resorption, renal excretion, and intestinal absorption.
- Identify the normal range of dietary phosphate intake, its body distribution, and routes of excretion. Explain the hormonal regulation of plasma phosphate concentration through exchange with bone, renal excretion, and dietary intake and absorption.

COURSE REQUIREMENTS

Instructional Methods / Activities / Assessments

This course consists of a series of activities and assessments to assist you in achieving the outcomes for the course and instructional units.

Your entire course grade is based on your performance on various assignments. Some assignments will require you to answer a set of multiple choice questions (MCQs) whereas other assignments (case studies, CS) will require you to write short answers and/or mini essays. Each assignment will therefore not be worth the same number of points.

Grading

The total number of points possible for each assignment will vary. At the end of the semester, the student's grade is determined by calculating the percentage of the total possible points received by the student. Percentages are then converted to letter grades using the following rubric:

Percentage of Total Possible Points Received by Student	Letter Grade
Greater than or equal to 89.5	A
Greater than or equal to 79.5 , but less than 89.5	B
Greater than or equal to 69.5 , but less than 79.5	C
Greater than or equal to 59.5 , but less than 69.5	D
Less than 59.5	F

TECHNOLOGY REQUIREMENTS

This course is web-based, and will therefore be administered via eCollege (see "ACCESS AND NAVIGATION). All course announcements, which mainly include news about assignments, are posted through eCollege (usually via email). In addition to reading the announcements (my emails), you will be uploading your assignments to the Dropbox. As grades are updated, I update the Gradebook. Thus, the three major components used in eCollege are Announcements, Dropbox, and Gradebook.

The following information has been provided to assist you in preparing to use technology successfully in this course.

- Internet access/connection – high speed recommended (not dial-up)
- Word Processor (Microsoft Word, OpenOffice Writer, et cetera) and Slide Program (Microsoft PowerPoint, OpenOffice Impress, et cetera)

Our campus is optimized to work in a Microsoft Windows environment. This means our courses work best if you are using a Windows operating system (XP or newer) and a recent version of Microsoft Internet Explorer (6.0, 7.0, 8.0, or 9.0). Your courses will also work with Macintosh OS X and most Linux distributions. To launch a browser test within any operating system, login in to eCollege, click on the 'myCourses' tab, and then select the "Browser Test" link under Support Services.

ACCESS AND NAVIGATION

eCollege Access and Log in Information

This course will be facilitated using eCollege, the Learning Management System used by Texas A&M University-Commerce. To get started with the course, go to: <https://leo.tamuc.edu/>. You will need your CWID and password to log in to the course. If you do not know your CWID or have forgotten your password, contact Technology Services at 903.468.6000 or helpdesk@tamuc.edu.

Being a Successful Student

- [What Makes a Successful Online Student?](#)
- [Self-Evaluation for Potential Online Students](#)
- [Readiness for Education at a Distance Indicator \(READI\)](#)
 - o *Login Information: Login = **tamuc**; password = **online***

COMMUNICATION AND SUPPORT

Interaction with Instructor Statement

I will communicate with you primarily through your college email address (MyLeo email address). If you email me, expect a response within 24 hours; if I email you, I'll expect a response within 48 hours.

COURSE AND UNIVERSITY PROCEDURES/POLICIES

Course Specific Procedures

Academic Honesty Policy

Texas A&M University-Commerce does not tolerate **plagiarism** and other forms of academic **dishonesty**. Conduct that violates generally accepted standards of academic honesty is defined as academic dishonesty. "Academic dishonesty" includes, but is not limited to, plagiarism (the appropriation or stealing of the ideas or words of another and passing them off as one's own), cheating on exams or other course assignments, collusion (the unauthorized collaboration with others in preparing course assignments), and abuse (destruction, defacing, or removal) of resource material.

Assignment Policy

Official due dates for each assignment will be announced through eCollege or directly by email. Assignments must be uploaded to the eCollege Dropbox. The format of the file may vary, depending on the assignment. Please note that for every file you submit, you must have your last name included in the filename as well as in the header.

Late Work

Late work will not be accepted.

Drop a Course

A student may drop a course by logging into their myLEO account and clicking on the hyperlink labeled 'Drop a class' from among the choices found under the myLEO section of the Web page.

Incompletes

Incomplete grade ("I") may be granted under extreme circumstances.

University Specific Procedures***ADA Statement***

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

Office of Student Disability Resources and Services

Texas A&M University-Commerce

Gee Library- Room 132

Phone (903) 886-5150 or (903) 886-5835

Fax (903) 468-8148

StudentDisabilityServices@tamuc.edu

Student Conduct

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. (See *Code of Student Conduct from Student Guide Handbook*).

COURSE OUTLINE / CALENDAR

Week	Topics	Textbook Chapter	Assessment
1	Enrollment and Pretest		
2	General Principles of Endocrinology	1, 2	MCQ
3	General Principles of Endocrinology	1,2	
4	Pheochromocytoma: Effects of Catecholamines	11	CS
5	Growth Hormone-Secreting Tumor: Acromegaly	4, 6	CS
6	Hyperthyroidism: Graves' Disease	7	CS
7	Hyperthyroidism: Graves' Disease	7	
8	Adrenocortical Excess: Cushing's Syndrome	4, 9	CS
9	Adrenocortical Excess: Cushing's Syndrome	4, 9	
10	Adrenocortical Insufficiency: Addison's Disease	4, 9	CS
11	Adrenocortical Insufficiency: Addison's Disease	4, 9	
12	Hyperglycemia: Type I Diabetes Mellitus	17	CS
13	Hyperglycemia: Type I Diabetes Mellitus	17	
14	The Posterior Pituitary	5	
15	The Posterior Pituitary	5	CS
16	Final Examination	1-20	MCQ

*MCQ = Multiple Choice Questions; CS = Case Study

Please note the above schedule is flexible, and can change at my discretion.