



Mechanisms of Disease: Type 2 Diabetes Mellitus

HAPS Institute Graduate Credit Course
BI 698 offered in conjunction with Alverno College

2 Credits

Instructor:

Dr. Brian R. Shmaefsky
Professor of Biology
Lone Star College – Kingwood
20000 Kingwood Drive
Kingwood, TX 77339
281-312-1609
Brian.r.shmaefsky@lonestar.edu

Description of this Course:

The last two decades has seen ground-breaking advances in basic and medical research, from the sequencing of the human genome to the identification of over 15 million human DNA variations, to the use of those variations to track down elusive disease genes and epigenetic factors. The wealth of genomic, proteomic, and epigenetics information combined with cutting-edge technologies has changed our past understanding of human disease. This course will examine the cellular, molecular, epigenetic basis of endocrine diseases as a model disease that connects the cellular processes with the physiology and pathophysiology at the tissue and whole organ level. The spectrum of disorders that produces type 2 diabetes will be the focus of the course. Type 2 diabetes is globally growing in incidence and is showing up in a younger population. This course uses case studies and current literature reviews in an asynchronous virtual format and will require an online coursework. The ability to interact in formal discussions will be available at the annual HAPS conference. The content of the course is directly applicable to those teaching classes ranging from introductory nutrition, human anatomy and physiology, and upper level courses in physiology. This course is designed to facilitate your teaching as well as updating your content knowledge. This course will follow a completely on-line format and will require 20 hours of coursework.

Course Objectives:

Upon completion of this course, participants should be able to:

1. Create a detailed model explaining the molecular mechanisms involved in normal blood glucose regulation, including:
 - a. insulin production, modification, and release
 - b. Control of insulin release and production
 - c. Receptor proteins and Intracellular communication mechanisms
 - d. Mechanisms affecting glucose entry through the cell membrane
 - e. Other intracellular pathways affected by insulin and its receptor protein cascade
 - f. Intracellular events caused by increased glucose entry into cells
2. Apply this knowledge to disease models, including:
 - a. Use of open-source internet resources to identify specific mutations leading to Diabetes mellitus
 - b. Relations of specific mutations to disease etiology and pathogenesis
3. Compare and evaluate hypotheses about the development of insulin resistance and metabolic syndrome
 - a. Interpret primary scientific literature and employ scientific communication skills.
 - b. Describe the role of epigenetics in the regulation of cell function.
4. Write a case study or review article appropriate for A&P faculty teaching undergraduate courses which enhances their understanding of key molecular and cellular concepts as they relate to the physiology of Diabetes mellitus.
5. Design a learning tool, appropriate for undergraduate A&P students, that enhances the understanding of key molecular and cellular concepts as they relate to physiology and human disease.

Required Course Materials:**Texts:****Required:**

Type 2 Diabetes, Pre-Diabetes, and the Metabolic Syndrome (Current Clinical Practice). Edition: 2nd ed. 2011

Ronald A. Codario

Humana Press

ISBN-10: 1603274405

Optional:

Comprehensive Patient Treatment Strategies for Type 2 Diabetes Mellitus

Fernando Ovalle MD, Mark W. St Anne Peters

Asante Communications, LLC (October 25, 2012)

[Kindle Edition with Audio/Video]

(Download free from Amazon for Kindle and Smartphones)

Synchronous Communication:

Four times during the course we will have synchronous communication via Google Hangout or Skype to review a special reading. We will do an on-line poll to select a time we all can communicate.

On-line Course Management System:

Course materials will be available on <https://www.coursesites.com>. Sign in for free as a student and proceed to the "2. Search for Instructor / Course" window. Then search for HAPS Institute BI 698 Type 2 Diabetes. Push the Request Enrollment icon and then fill out the form.

Evaluation:

Participants may earn a total of 100 points in the course, which will be graded on a pass/fail basis, with a "pass" grade requiring 65% of total points. Assignment questions will be assigned after each topic covered. Points will be assigned on the basis of the following criteria:

Completion of background readings and assignments	30
Contribution to on-line asynchronous discussions	30
Final Project	40
	100

All HAPS-I courses follow grading policies on a "credit / no credit" basis. Like many progressive graduate programs, HAPS-I does not use letter grades in our courses. However, a "credit" grade is equivalent to a letter grade of B or better.

A "credit" grade is earned by satisfactorily accomplishing a set of specific goals (at a "B" level or better) as outlined in this course syllabus and in the online course material as determined by the course faculty.

Course Schedule

Week	Topic and Activitites	Materials
February 22	Pathophysiology and Types of Diabetes	Book Reading
March 1	Type II diabetes and Metabolic Disorder	Book Reading
March 8	Special Topic – Current Issues in Type II Diabetes	Posted Literature
March 15	Obesity and Metabolic Disorder	Book Reading
March 22	Macrovascular Disorders	Book Reading
March 29	Microvascular Disorders	Book Reading
April 5	Special Topic – Current Issues in Type II Diabetes	Posted Literature
April 12	Dyslipidemia	Book Reading
April 19	Hypertension	Book Reading
April 26	Pathophysiology of Metabolic Disorder	Book Reading
May 3	Special Topic – Current Issues in Type II Diabetes	Posted Literature
May 10	Risk Factors	Book Reading