USCDornsife

HBIO 409 – Metabolic Diseases

4 Units

Spring 2021 – M, W – 2:00 PM – 3:20 PM

Location: **ONLINE**

Instructor: Lindsey A. Schier, Ph.D
Office Hours: via Zoom**,** by appointment
Contact Info: lschier@usc.edu, (213) 740-6633

There will be a Wellness day that falls on Wednesday during the spring semester and the class will not meet on that day (April 7).

Course Description

This course is focused on the metabolic dysfunctions associated with obesity and diabetes. Students will read primary research papers aimed at understanding the causes and consequences of these two conditions and exploring the basic science paving avenues for treatment. Additionally, this class includes a Capstone project. For this project, all students will participate in an "in class" experiment to analyze primary data that builds upon the background literature, write up these data in an original scientific-style report and give a short presentation of the findings in class. This will offer "hands-on" experience with the research process, from experimental design to data analyses to scientific writing and presentation.

Prerequisite(s): BISC 220L

Learning Objectives

- To identify and describe structure-function relationships in different cells and tissue systems related to nutrient assimilation and metabolic processing.
- To read about and discuss the evolutionary bases for metabolic diseases, like obesity and diabetes.
- To analyze gene-environment interactions underlying metabolic dysfunction.
- To read and critique primary research articles and discuss key gaps in knowledge and formulate new testable hypotheses.
- To discuss research design.
- To discuss the ethics of research models and their utility for understanding metabolic function and dysfunction.
- To discuss the influence of genetics and sociocultural factors on feeding, obesity and related disease.
- To integrate these skills and knowledge to analyze, interpret, orally present and defend the project in class.

Course Notes

This semester this course will take place online. Readings will be posted on Blackboard approximately 1 week prior to class discussion. Course slides will be posted to blackboard just prior to each lecture to enhance note-taking.

Technological Proficiency and Hardware/Software Required

Required Readings and Supplementary Materials

Empirical papers and review articles will be provided as PDFs on blackboard (see schedule).

Grading Breakdown

Points earned on each of the following assignments/modules will be tallied and divided by the total number of possible points (100) to calculate a final grade (as percentage). That percentage will be given a letter grade according to the traditional scale shown below.

Assignments/Modules

- 35 pts for in class/lab participation
- 25 pts for the midterm exam
- 15 pts for the Capstone Project: lab report & presentation
- 5 pts for the seminar report
- 20 pts for the final

Grading Scale

93-100 = **A**, 90-92 = **A-**, 87-89 = **B+**, 83-86 = **B**, 80-82 = **B-**, 77-79 = **C+**,
73-76 = **C**, 70-72 = **C-**, 67-69 = **D+**, 63-66 = **D**, 60-62 = **D-**, 0-59 = **F**

Participation. Research is an interactive process that includes discussion of primary literature, data, methodologies, and ideas found in the background literature. While we will not perform an in lab experiment this semester, due to COVID-19, we will analyze data collected in lab and write those up in a scientific-style paper. Thus, a significant portion of the grade will be based on participation in these various activities. Students are expected to read the assigned articles before class, attend each class, and contribute to class discussion based on the reading material. In some cases, there will be a short pop participation quiz, based on concepts found in the readings, at the beginning of the lecture.

Midterm. The midterm exam will include a combination of short answer and multiple choice questions based on the materials covered in weeks 1-5. Midterms must be taken on the date listed on the schedule below, unless you have a documented, university-sanctioned excuse. Students with an excused absence are required to take a make-up exam. Make-up exams, which will differ from the in-class exam, must be arranged ahead of the scheduled exam and accompanied by legitimate documentation for absence (e.g., doctor's letter, athletic release). Make-up exams may be proctored by someone who is not familiar with the test material.

Capstone, Lab report/Presentation. The lab report will be a detailed write up of the methods and results, including statistics and data figures, from the in-class data analyses. Details regarding content and format will be provided in class. Lab reports are due by 5 pm on April 5; late reports will receive a grade deduction of 2 points per day. Presentations will take place during the last two weeks of the class. Details will be provided in class.

Seminar Report on Human Biology/Obesity-related Research. Students will be expected to attend one virtual research seminar related to human biology and metabolic disease and write up a short summary and reflection.

Final. The final exam will include a combination of short answer and multiple choice questions based on the materials covered in the weeks after the midterm. The exam must be taken on the date listed on the schedule below, unless you have a documented, university-sanctioned excuse. Students with an excused absence will be required to take a make-up exam. Make-up exams, which will differ from the in-class exam, must be arranged ahead of the

scheduled exam and accompanied by legitimate documentation for absence (e.g., doctor's letter, athletic release). Make-up exams may be proctored by someone who is not familiar with the test material.

Additional Policies

Blackboard:
Reading assignments will be periodically posted on blackboard. However, the information posted on blackboard is not the only material that will be on the exams. Material may come from class discussions and lab activities.

Electronic Devices:
Please turn off or disable all cell phones or other electronic communication devices during class time. Using a laptop in class to take lecture notes is permitted. However, please turn off your browser, email, messaging and any other programs that do not involve the course material.

Course Schedule: A Weekly Breakdown. Dates subject to change.

Date	Topic	Location	Readings (TBA)
Jan 18	Course Overview		N/A
Jan 20	Obesity, Diabetes: Definitions, Etiologies, Comorbidities		
Jan 25	Sensory and Metabolic Signals Linked to Appetite Control I		
Jan 27	Sensory and Metabolic Signals Linked to Appetite Control II		
Feb 1	Neural Control of Appetite I		
Feb 3	Neural Control of Appetite II		
Feb 8	HBIO Seminar		
Feb 10	Peripheral Regulation of Glucose Homeostasis		
Feb 15	Central Regulation of Glucose Homeostasis I		
Feb 17	Central Regulation of Glucose Homeostasis II		
Feb 22	Review for Midterm Exam		
Feb 24	Midterm Exam		
Mar 1	Primary Literature Review: Organization of Central Circuits involved in Sugar Appetite and Glucoregulation		
Mar 3	Primary Literature Review: Organization of Central Circuits involved in Sugar Appetite and Glucoregulation		
Mar 8	Primary Literature Review: Organization of Central Circuits involved in Sugar Appetite and Glucoregulation		
Mar 10	Experimental Design/Plan		
Mar 15	Overview of Data Analyses		
Mar 17	Data Analyses		
Mar 22	Data Analyses; Scientific Writing: Methods and Results; Lab Report Overview		
Mar 24	Implications for Treating Diabetes and Obesity I: Diet		
Mar 29	Implications for Treating Diabetes and Obesity II: Pharmacology		

Mar 31	Implications for Treating Diabetes and Obesity III: Surgery		
Apr 5	Lab report review		
Apr 7	HBIO Seminar		
Apr 12	Lab report due; Overview of Presenting Your Research		
Apr 14	TBD		
Apr 19	Presentations & Discussion		
Apr 21	Presentations & Discussion		
Apr 26	Presentations & Discussion		
Apr 28	Review for Final Exam		
TBD	Final Exam		

Statement on Academic Conduct and Support Systems

Academic Conduct:

Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, "Behavior Violating University Standards" policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, policy.usc.edu/scientific-misconduct.

Support Systems:

Student Health Counseling Services - (213) 740-7711 – 24/7 on call
engemannshc.usc.edu/counseling
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call
suicidepreventionlifeline.org
Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-4900 – 24/7 on call
engemannshc.usc.edu/rsvp
Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED) | Title IX - (213) 740-5086
equity.usc.edu, titleix.usc.edu
Information about how to get help or help a survivor of harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants. The university prohibits discrimination or harassment based on the following protected characteristics: race, color, national origin, ancestry, religion, sex, gender, gender identity, gender expression, sexual orientation, age, physical disability, medical condition, mental disability, marital status, pregnancy, veteran status, genetic information, and any other characteristic which may be specified in applicable laws and governmental regulations.

Bias Assessment Response and Support - (213) 740-2421
studentaffairs.usc.edu/bias-assessment-response-support
Avenue to report incidents of bias, hate crimes, and microaggressions for appropriate investigation and response.
The Office of Disability Services and Programs - (213) 740-0776
dsp.usc.edu
Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

USC Support and Advocacy - (213) 821-4710
studentaffairs.usc.edu/ssa
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC - (213) 740-2101
diversity.usc.edu
Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call
dps.usc.edu, emergency.usc.edu
Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call
dps.usc.edu
Non-emergency assistance or information.