

HUN4936/HUN6936
Nutritional Epigenomics and Metabolic Disease
Summer 2022 –Section EPGN (12417)/Section EPGE (12470)

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Office hours: Wednesdays 9:00 – 11:00 am or by appointment

Class location and meeting times: T/R: 9:30 AM - 12:15 PM, via Zoom

Attendance: Required
Credits: 3

Course Description and Prerequisites: This course discusses nutrient-gene interactions, and how the interactions regulate gene, protein expression, and metabolism. Specifically, the course covers the basis of epigenetics (i.e., DNA methylation, histone modification, and non-coding RNA), dietary and nutritional contributions to epigenetic programming, and epigenetic mechanisms underlying metabolic disease (e.g., obesity, diabetes, cardiovascular disease, and cancer).

Prerequisites for Undergraduates: Biochemistry (BCH 4024 or BCH 3025) and Genetics (AGR3303, PCB3063, or PCB 4522).; Pre-requisites for Graduate Students: M.S. or Ph.D. students in life sciences.

Course Learning Objectives: By the end of this course, students will be able to

1. Explain the molecular mechanisms of epigenetic programming.
2. Interpret the epigenetic roles of diets or nutrients.
3. Identify gaps and handle controversies in current literature.
4. Apply epigenetics knowledge and research evidence to real-life issues.
5. Design studies or projects to address research questions.
6. Justify scientific positions or research ideas.

This course uses the e-Learning (Canvas) system for postings of various class materials, and scores for quizzes and assignments. Access to e-Learning requires a Gatorlink account. To establish a Gatorlink account, go to <http://www.gatorlink.ufl.edu/>. Once you have created an account, access the e-learning homepage at <http://elearning.ufl.edu/>. Continue with e-Learning Login using your Gatorlink ID.

Textbook: None required. The required readings are enclosed at the end of this syllabus. In addition, Power Point slides and reading assignments from various sources (e.g. textbook chapters, current review articles, etc.) will be posted at Canvas.

Attendance and Make-Up Work: In accordance with the University of Florida's policy: <https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>, class attendance and participation are mandatory. Students will behave in an appropriate manner in class, taking care not to disrupt other students' learning activities. Students are asked to be punctual and submit assignments on time. Make-up work and assignments are consistent with university policies.

Student Evaluation:

The assessments will be comprised of 5 quizzes (24 points each), 3 assignments (40 points each), and a final project: position paper or research proposal (writing – 60 points, and oral presentation

-60 points). Quizzes and assignments will be administered in class. Quizzes will be 45-min timed and administered on Canvas. Each quiz (closed book) contains 8 'choose an answer among multiple choices' questions and 2 short-answer questions. Assignment instructions and grading rubrics will be posted at Canvas. Class participation is highly valued and will be graded according to class attendance, preparedness for the class (e.g., functional camera and audio for activities and discussions), and contribution to class activities and discussions (e.g., being relevant, specific, constructive, and insightful/thoughtful).

Quizzes must be taken when scheduled. The lowest quiz grade will be dropped and four quiz grades will be counted towards the final grade (%). A missed quiz will count as the dropped quiz. Any other missed quizzes will result in a grade of "0" unless there are unavoidable extenuating circumstances (subject to our discretion) that can be documented to our satisfaction. Extenuating circumstances include unavoidable, unplanned situations such as illness (chart note from physician or clinic; vague notes such as "was seen" are not acceptable); family death (dated obituary); accident (police report); or an interview at a professional school (official invitation), etc. An excused, documented absence from a quiz will result in the grade for the missed quiz being calculated as the average of the other quizzes.

Grade Breakdown	HUN4936 (Points)	HUN6936 (Points)
Quizzes (24 pts x 5)	120	120
Assignments: Research paper discussion (40 pts x 3)	N/A	120
Assignments: Research paper summary/snapshot (40 pts x 3)	120	N/A
Final - Position paper (60 pts)	60	N/A
Final - Research proposal (60 pts)	N/A	60
Final - Presentation/position paper or research proposal (60 pts)	60	60
Class participation (40 pts)	40	40
Total	400	400

Grading scale (Grades are not curved or negotiable):

A = 370-400 92.5-100%	A- = 358-369 89.5-92.25%	B+ = 346-357 86.5-89.25%	B = 330-345 82.5-86.25%	B- = 318-329 79.5-82.25%	C+ = 306-317 76.5-79.25
C = 290-305 72.5-76.25%	C- = 278-289 69.5-72.25%	D+ = 266-277 66.5-69.25%	D = 250-265 62.5-66.25%	D- = 238-249 59.5-62.25%	E = <238 <59.5%

Current UF Grading Policies

Please see the following link for information on grade point equivalencies:

<https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>

Instructor-Initiated Recording of Class: Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

In-class Recording by Students: Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded

lectures without the written consent of the instructor. A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third-party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

Lecture materials and other information are the property of the University of Florida and the course instructor and may not be used for any commercial purpose. Students found in violation may be subject to disciplinary action under the University’s Student Conduct Code. Only students formally registered for the course are permitted to attend lectures and take exams.

We the members of the University of Florida community pledge to hold ourselves and our peers to the highest standards of honesty and integrity.

Academic Honesty

As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: “*We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.*” You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: “*On my honor, I have neither given nor received unauthorized aid in doing this assignment.*”

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: <http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code>.

Software Use: All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

Email: Students are required to check their email account(s) daily (at least Monday through Friday) and respond to course/program related requests, inquiries, etc. in a timely manner.

Course Evaluation: Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard set of university and college criteria. Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at: <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens and can complete evaluations through the email they receive from GatorEvals, in their Canvas

course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at: <https://gatorevals.aa.ufl.edu/public-results/>.

Services for Students with Disabilities: The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation. Contact information: 0001 Reid Hall, 352-392-8565, www.dso.ufl.edu/drc/

Campus Helping Resources: Students experiencing crises or personal problems that interfere with their general wellbeing are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

University Counseling & Wellness Center: Counseling Services, Groups and Workshops, Outreach and Consultation, Self-Help Library, Wellness Coaching. 3190 Radio Road, 352-392-1575, www.counseling.ufl.edu/cwc/

U Matter We Care: If you or someone you know is in distress, please contact us at 352-392-1575 or visit www.umatter@ufl.edu to refer or report a concern and a team member will reach out to the student in distress.

Career Connections Center: First Floor JWRU, 352-392-1601, <https://career.ufl.edu/>

Student complaints: Residential Course: <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>. Online Course: <http://www.distance.ufl.edu/student-complaint-process>

Student Health Care Center: Call 352-392-1161 for 24/7 information to help you find the care you need or visit www.shcc.ufl.edu/.

University Police Department: Call 352-392-1111 (or 9-1-1 for emergencies) or visit www.police.ufl.edu/.

UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; www.ufhealth.org/emergency-room-trauma-center.

Field and Fork Food Pantry located behind the FSHN Bldg (520 Newell Dr) is available to assist members of the campus community who experience food insecurity.

Student Success Initiative <http://studentsuccess.ufl.edu>

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. Nighttime and weekend crisis counselors are available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Topics and Schedule: (subject to change)

Classes/Dates	Topics	Notes
1 (5/10, T)	Class overview and project initiation Introduction to Epigenomics	
2 (5/12, R)	Vitamins and epigenomics (I)	<ul style="list-style-type: none"> Quiz 1

3 (5/17, T)	Vitamins and epigenomics (II)	<ul style="list-style-type: none"> • Assignment 1a • 1-on-1 meeting with Dr. Cheng
4 (5/19, R)	Minerals and epigenomics (I)	<ul style="list-style-type: none"> • Quiz 2
5 (5/24, T)	Minerals and epigenomics (II)	<ul style="list-style-type: none"> • Assignment 1b
6 (5/26, R)	Macronutrients and epigenomics (I)	<ul style="list-style-type: none"> • Quiz 3
7 (5/31, T)	Macronutrients and epigenomics (II)	<ul style="list-style-type: none"> • Assignment 2a
8 (6/2, R)	Epigenomics in aging, diabetes, and obesity (I)	<ul style="list-style-type: none"> • Quiz 4
9 (6/7, T)	Epigenomics in aging, diabetes, and obesity (II)	<ul style="list-style-type: none"> • Assignment 2b • 1-on-1 meeting with Dr. Cheng
10 (6/9, R)	Epigenomics in CVD and cancer (I)	<ul style="list-style-type: none"> • Assignment 3a
11 (6/14, T)	Epigenomics in CVD and cancer (II)	<ul style="list-style-type: none"> • Quiz 5 • Assignment 3b
12 (6/16, R)	Position Paper/Research Proposal presentation	<ul style="list-style-type: none"> • Papers due 11:00 pm

Suggested reading materials

- [1] Epigenetics in Human Obesity and Type 2 Diabetes. *Cell Metab.* 2019, 29(5):1028-1044.
- [2] Epigenetic reprogramming in metabolic disorders: nutritional factors and beyond. *J Nutr Biochem.* 2018, 54:1-10.
- [3] The effects of bariatric surgery on clinical profile, DNA methylation, and ageing in severely obese patients. *Clin Epigenetics* 2020 Jan 20;12(1):14. doi: 10.1186/s13148-019-0790-2.
- [4] Gene-specific DNA methylation in newborns in response to folic acid supplementation during the second and third trimesters of pregnancy: epigenetic analysis from a randomized controlled trial. *Am J Clin Nutr.* 2018, 107(4):566-575.
- [5] Perinatal phthalate and high-fat diet exposure induce sex-specific changes in adipocyte size and DNA methylation. *J Nutr Biochem.* 2019, 65:15-25.
- [6] Metabolic reprogramming and epigenetic modifications on the path to cancer. *Protein Cell* 2021, doi: 10.1007/s13238-021-00846-7.
- [7] The intersection of epigenetics and metabolism in trained immunity. *Immunity* 2021, 54(1):32-43.
- [8] Epigenetic regulation of energy metabolism in obesity. *J Mol Cell Biol.* 2021, 13(7):480-499.
- [9] The evolving metabolic landscape of chromatin biology and epigenetics. *Nat Rev Genet.* 2020, 21(12):737-753.