

USC Dornsife
College of Letters,
Arts and Sciences

HBIO302L – Nutrition and Metabolism (4 units)

Fall 2024

Lectures: Tuesday/Thursday; 5:30-6:50 pm

Location: WPH B27

Labs: Monday; 12:00-2:50 pm

Tuesday, 8:00-10:50 am

Wednesday, 8:00-10:50 am

Wednesday, 11:00-1:50 pm

Thursday, 11:00-1:50 pm

Thursday, 2:00-4:50 pm

Location: ZHS 460

•Instructor: Tito Borner, PhD, Assistant Professor (he/him/his)

Office: AHF 253

Office Hours: Tuesdays, 11:30 am -1:00 pm & by appointment

Tuesday office hours: A Google Calendar sign-up sheet will be set up for students who want to sign up for Tuesday office hour slots. These office hours will be held in **AHF 251**. Please be on time for office hours and wait outside the room in the waiting room.

By appointment: Special office hour appointments should be organized in advance via email correspondence with Dr. Borner. These office hours will be on Zoom.

Contact Info: tborner@usc.edu

I will respond to all emails within 48 hours either individually via email or as a group in class (if the topic is relevant for all students attending the class). For answers to complex questions, the student may be encouraged to schedule a visit during office hours.

•Lab Instructor: Charles (Kiki) Crawford, PhD (he/him/his)

Office: PED 109

Office Hours: TBA

Contact Info: charles.crawford@usc.edu

I will respond to all emails within 48 hours either individually via email or as a group in class

•Lab Instructor: Gudrun Floyd, MS (she/her/hers)

Office: PED 109

Office hours: TBA

Contact Info: gbfloyd@usc.edu

I will respond to all emails within 48 hours either individually via email or as a group in class.

Course Description

- Gastrointestinal physiology and energy metabolism as it relates to macronutrient intake. Theories and principles of nutrition and their impact on metabolic regulation. This course is a pre-requisite for HBIO 407L.
- This course is intended to introduce HBIO majors to the physiological principles associated with the digestion and absorption of macronutrients as well as the chemical basis of the major catabolic and anabolic pathways associated with carbohydrate and lipid metabolism. Food digestion and absorption as well as cellular metabolism are the foundation of life; food intake dictates energy intake and cellular metabolism regulates energy output. Upon completion of this course, students should be able to think about energy intake and output at the cellular level and be able to assess the impact of dysregulation on disease development.

Learning Objectives

- to describe the structure/function of selected cells, tissues, organs and organ systems of the gastrointestinal tract
- to describe the metabolic pathways associated with lipid and carbohydrate metabolism
- to relate the knowledge of nutrition and metabolism to a healthy lifestyle
- to correlate circulating metabolic markers with dietary intake
- to develop and execute research hypothesis related to nutrition and health
- to use research articles to defend a scientific argument
- to complete a research experiment using biological instrumentation, perform statistical analysis and report data
- to recommend ways by which dietary and physical activity interventions in different socioeconomic environments could help resolve the obesity epidemic
- to discover and discuss the impact of human diversity as manifested by age, disability, gender, ethnicity and social status on nutritional deficits

Prerequisite:

- BISC 220L or BISC 221L

Technological proficiency and Hardware/Software required

- Because the possibility always exists that we will have to go back to virtual classes, you should have an internet-enabled device with browser capabilities, such as a tablet or laptop/desktop computer.
 - This course requires the use of Brightspace. Brightspace will be your gateway to access Zoom (if we have to give lectures virtually) and to view your grades. Brightspace will also be the repository of lecture slides.
 - This course also requires the use of Microsoft Word, Excel and Powerpoint.
- USC Technology Rental Program (<https://itservices.usc.edu/spaces/laptoploaner/>): Students who are in need of resources to participate in this class can apply to the university's equipment rental program. The Student Basic Needs team will work with you to distribute equipment (if you are eligible). Please visit <https://studentbasicneeds.usc.edu/resources/technology-assistance/> to apply and for more information.

Required Readings and Supplementary Materials

- When ordering books online from the bookstore, please go to usctext.com and you can either select in-store pick-up or have them shipped to their home.

- 1) **The Science of Nutrition**, 5th edition, Thompson, J.L., Manore, M,M, and Vaughan, L.A. Benjamin Cummings, San Francisco, CA, 2016.

The Science of Nutrition textbook is available at the Bookstore, on Amazon or if you go directly to the publisher's website. Amazon has this book available as e-text for rent or download.

- 2) **Biochemistry (Illustrated Review)**, 7th edition, Ferrier, D. Wolters Kluwer/Lippincott Williams & Wilkins, United Kingdom.

The Biochemistry (Illustrated Review) textbook can be purchased at the bookstore, on Amazon or if you go directly to the publisher's website. Amazon has this book available as e-text for rent or download. This book can also be found

under the “View Online” option of the link below which is linked to the USC library. Before access is provided, you will be prompted for your USC credentials.

https://uosc.primo.exlibrisgroup.com/permalink/01USC_INST/hs9vaa/alma991043480725303731

3) Lab Manual; available in the bookstore

- 4) Some class information** will be posted on Brightspace usually the night before class. When needed, further resources including research articles will be provided via Brightspace.

Sharing of Course Materials Outside of the Learning Environment is Strictly Prohibited

•USC has a strict policy (SCampus Section 11.12[B]) that prohibits sharing of **any** synchronous and asynchronous course content outside of the learning environment. Any student who violates this policy will be prosecuted to the maximum extent allowable by the USC Student Conduct Code, including failure of the course and suspension from the University.

Distribution or use of notes or recordings based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study is a violation of the USC Student Conduct Code. This includes, but is not limited to, providing materials for distribution by services publishing class notes. This restriction on unauthorized use also applies to all information, which had been distributed to students or in any way had been displayed for use in relationship to the class, whether obtained in class, via email, on the Internet or via any other media. (See Section C.1 Class Notes Policy).

Description and Assessment of Assignments

- Class material will be evaluated via three exams (two midterms & one final) and one lab grade.
- Grades will be recorded in the Brightspace gradebook except for the final exam.

Exams

•Exams will be a combination of multiple-choice, true or false, short-answer response, and problem-solving questions. There will be three exams; two midterms and one final exam. The exams will provide a summative assessment of your understanding of the material covered in class. The final exam will be cumulative.

- Class notes and textbook information will form the basis of the material that will be on the exams. If you attend class regularly, you will be updated on the status of lecture notes and course material/announcements.
- A midterm exam can be taken after the specified date **ONLY** if the student has a **documented** excuse. A request to take a make-up exam must be accompanied by evidence of necessity (illness, travel with a USC team). Make-up exams will be different from the scheduled exam and will be proctored by different personnel.
- The final exam is **cumulative**. The final exam will not be available for review. Final grades will NOT be posted on Brightspace.

Labs

- The lab grade will be calculated from lab reports and exams, which will be explained in detail by your lab TA or lecturer.

Grading Breakdown

Assignment	% of Final Grade
Midterm 1	20
Midterm 2	20
Lab Grade	25
Final Exam	35
	100

Grading Timeline

- All graded work will be returned no later than one week after the submission deadline.

Grading Scale

- A grade of zero will be applied to submitted work that does not comply with the USC standards of academic conduct. Such work may not be resubmitted for a new grade.
- Exams and lab grades will not be given a letter grade. **Only the final grade will be given a letter grade.**
- Grades are NOT rounded or curved.** A grade of 86.99 is a B grade. A final grade of 89.99 will **NOT** be reflected as an A-. It is always difficult to miss a grade boundary by a small amount. But to round up would defeat the purpose of having an objective grading scale and it would also mean that announcing a specific grade boundary is not accurate. That would be unfair. Therefore, I make the grade boundary objective and sharp. **There are NO exceptions.**
- Course final grades will be determined using the following scale:

A	94-100
A-	90-93.99
B+	87-89.99
B	83-86.99
B-	80-82.99
C+	77-79.99
C	73-76.99
C-	70-72.99
D+	67-69.99
D	63-66.99
D-	60-62.99
F	≤59.9%

Technology in the classroom

- You may use personal electronic devices (laptops, ipads) for academic purposes directly related to the class. Students using a device for purposes not directly related to the class will be required to put the device away. There are times that I will request that all devices are put away to ensure focus on class activities.
- Please turn off or disable all cell phones or other electronic communication devices during class time.

Classroom Norms

- To promote a respectful, professional, and productive classroom environment, the following expectations will be maintained during all class sessions.
 - Do not interrupt when someone else is speaking
 - You can criticize ideas, but not people
 - Avoid inflammatory language
 - Either support assertions with evidence, or speak from personal experience
 - Do not dominate the discussion
 - Make a single point each time you speak, rather than making a series of statements at once

Academic Integrity

The University of Southern California is foremost a learning community committed to fostering successful scholars and researchers dedicated to the pursuit of knowledge and the transmission of ideas. Academic misconduct is in contrast to the university's mission to educate students through a broad array of first-rank academic, professional, and extracurricular programs and includes any act of dishonesty in the submission of academic work. (either in draft or final form).

This course will follow the expectations for academic integrity as stated in the [USC Student Handbook](#). All students are expected to submit assignments that are original work and prepared specifically for the course/section in this academic term. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s). Students suspected of engaging in academic misconduct will be reported to the Office of Academic Integrity.

Other violations of academic misconduct include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity see the [student handbook](#) or the [Office of Academic Integrity's website](#), and university policies on [Research and Scholarship Misconduct](#).

Tentative Course Schedule: A Weekly Breakdown

Date	Lecture Topic	Lab	Reading Chapters	
			Thompson	Ferrier
Aug 27	Course Overview; Digestion	Lab Introduction & Statistics	3	
Aug 29	Digestion/Absorption		3	
Sept 3	Digestion/Absorption	Journal Club	3	
Sept 5	Digestion/Absorption of Carbohydrates		4	7
Sept 10	Digestion/Absorption of Carbohydrates		4	7
Sept 12	Digestion/Absorption of Proteins		6	19
Sept 17	Digestion/Absorption of Lipids		6	15, 17
Sept 19	Digestion/Absorption of Lipids		5	15, 17
Sept 24	Digestion/Absorption of Lipids		5	15, 17, 18
Sept 26	Glycolysis/Glycogenolysis			8, 9, 11
Oct 1	Glycolysis/Glycogenolysis			8, 9, 11
Oct 3	Midterm I			
Oct 8	Introduction to metabolic pathways			16
Oct 10	FALL RECESS			
Oct 15	Glucose uptake/glycolysis			16
Oct 17	Glycogenolysis/beta oxidation			6, 9
Oct 22	Beta oxidation/lipolysis			10, 11
Oct 24	Lipolysis/fructose/E shuttles/KC			16
Oct 29	ATP counts/GS/Gluconeogenesis			
Oct 31	Gluconeogenesis/FAS/TGS			
Nov 5	Regulation: Carbohydrate Pathways			
Nov 7	Regulation: Lipid Pathways			
Nov 12	Midterm II			
Nov 14	Healthful Diet		2, 4, 5, 6	24, 27
Nov 19	Healthful Diet		2, 4, 5, 6	24, 27
Nov 21	Central control of feeding and energy homeostasis			
Nov 26	Central control of feeding and energy homeostasis			
Nov 28	THANKSGIVING			
Dec 3	Sensing the fuels: glucose signaling in the CNS			
Dec 5	Sensing the fuels: lipid signaling in the CNS			
Dec 12	4:30 – 6:30 PM - Final Exam			

Statement on Academic Conduct and Support Systems

Academic Integrity:

The University of Southern California is a learning community committed to developing successful scholars and researchers dedicated to the pursuit of knowledge and the dissemination of ideas. Academic misconduct, which includes any act of dishonesty in the production or submission of academic work, compromises the integrity of the person who commits the act and can impugn the perceived integrity of the entire university community. It stands in opposition to the university's mission to research, educate, and contribute productively to our community and the world.

All students are expected to submit assignments that represent their own original work, and that have been prepared specifically for the course or section for which they have been submitted. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s).

Other violations of academic integrity include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), collusion, knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university. All incidences of academic misconduct will be reported to the Office of Academic Integrity and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity see [the student handbook](#) or the [Office of Academic Integrity's website](#), and university policies on [Research and Scholarship Misconduct](#).

Please ask your instructor if you are unsure what constitutes unauthorized assistance on an exam or assignment, or what information requires citation and/or attribution.

Students and Disability Accommodations:

USC welcomes students with disabilities into all of the University's educational programs. [The Office of Student Accessibility Services](#) (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

Support Systems:

[Counseling and Mental Health](#) - (213) 740-9355 – 24/7 on call

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

[988 Suicide and Crisis Lifeline](#) - 988 for both calls and text messages – 24/7 on call

The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline is comprised of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

[Relationship and Sexual Violence Prevention Services \(RSVP\)](#) - (213) 740-9355(WELL) – 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking).

[Office for Equity, Equal Opportunity, and Title IX \(EEO-TIX\)](#) - (213) 740-5086

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

[Reporting Incidents of Bias or Harassment](#) - (213) 740-5086 or (213) 821-8298

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

[The Office of Student Accessibility Services \(OSAS\)](#) - (213) 740-0776

OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

[USC Campus Support and Intervention](#) - (213) 740-0411

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

[Diversity, Equity and Inclusion](#) - (213) 740-2101

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

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) 442-1200 – 24/7 on call

Non-emergency assistance or information.

[Office of the Ombuds](#) - (213) 821-9556 (UPC) / (323-442-0382 (HSC)

A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

[Occupational Therapy Faculty Practice](#) - (323) 442-2850 or otfp@med.usc.edu

Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.