HUN 4813C
Laboratory Techniques in Molecular Nutrition
Spring 2021 – Section 028B (14018)

Instructor:	Zhiyong Cheng, PhD
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Office hours:	Thursday 9:00 am – 11:00 pm (via Zoom) *If you cannot make my regularly scheduled office hours (or those of the TAs), you may e-mail me to schedule an appointment.
Teaching assistants: (and office hours)	Limin "Vincent" Shi (shi.limin@ufl.edu) Monday, 2:00-4:00 PM (via Zoom), Room 265 FSHN
Class location and meeting times:	Online Monday, Periods 2-3 (8:30 – 10:25 am) Wednesday, Periods 2-4 (8:30 – 11:30 am)
Attendance:	Required
Credits:	3

Course Description and Prerequisites: The course focuses on laboratory techniques relevant to the study of molecular nutrition, ranging from nutrition, biochemistry, molecular biology, genomics and bioinformatics. Due to the COVID-19 pandemic, the class will be administered online, where students will engage in (1) virtual lab training and simulation, (2) addressing real-life research questions regarding molecular nutrition, (3) discussing the principles and applications of the lab techniques, and (4) examining and interpreting published research.

Prerequisites: CHM 2211, CHM 2211L, BCH 3025 or BCH 4024

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

1. Explain and apply the principles of laboratory techniques to molecular nutrition research.
2. Design and plan feasible experiment to address research questions.
3. Interpret experimental data acquired with commonly used techniques.
4. Examine published research and methods.
5. Apply knowledge and critical thinking skills to real-life questions.

This course uses the e-Learning (Canvas) system for postings of various class materials, as well as 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.

Recommended Text: (Optional) There is no required textbook for this course. Power Point slides and reading assignments from various sources (e.g. textbook chapters and current articles, etc.) will be posted at Canvas.

Class/Laboratory 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 (visit the link sown above).

Student Evaluation:

The assessments will be comprised of 6 quizzes (25 points each), 10 research reflections (8 points each), 10 instruction-guided experiment simulations (8 points each), 1 paper - project design (50 points), and 1 oral presentation - project design (40 points). All assessments will be administered in class. Quizzes will be closed book and timed (30 min) and administered at Canvas. Each quiz will consist of 8 'choose an answer among multiple choices' questions and 2 short-answer question. Assignment instructions and grading rubrics will be posted at Canvas.

Quizzes must be taken when scheduled. The lowest quiz grade will be dropped and five 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	Points
Quizzes (25 pts x 6)	150
Research & Reflections (8 pts x 10)	80
Instruction-guided experiment simulations (8 pts x 10)	80
Project design - oral presentation (40 pts)	40
Project design - paper report (50 pts)	50
Total	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: http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html

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/honorcodes/honorcode.php.

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.

Service	Location	Phone	Web site	Services provided
University Counseling and Wellness Center	3190 Radio Road	352-392-1575	www.counseling.ufl.edu/cwc/	• Counseling Services - individual and group • Groups and Workshops • Outreach and Consultation • Self-Help Library • Wellness Coaching • Training Programs • Community Provider Database
U Matter We Care		352-294-CARE	www.umatter.ufl.edu	Care-related programs and resources for students and employees
Career Connections Center	Wayne Reitz Union (1st Floor)	352-392-1601	https://career.ufl.edu/	Career development assistance and counseling

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.

Student Complaints:
• Residential Course: https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/.
• Online Course: https://distance.ufl.edu/student-complaint-process/

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.

Other Information: 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.

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.

Topics and Schedule: (subject to change)

Classes/Dates	Topics	Notes
1 (1/11, M)	• Class overview • Logistics check for experiment simulation • Identifying your # 1 research questions	• Reflection 1
2 (1/13, W)	• Approvals needed to carry out your studies ✓ IRB (Institutional Review Board) ✓ IACUC (Institutional Animal Care and Use Committee) ✓ IBC (Institutional Biosafety Committee) ➢ Working with a fume hood/biosafety cabinet ➢ Preserving biological samples at low temperature	• Simulation 1
3 (1/18, M)	• Holiday (no class)	
4 (1/20, W)	• General lab techniques ✓ Sample transfer and handling ➢ Pipetting with micropiptettor ➢ Pipetting with serological pipettors ✓ Sample preparation with centrifuges	• Simulation 2
5 (1/25, M)	• Key factors to consider for project design ✓ Study design ✓ Sample size ✓ Sampling bias ✓ Variable control	• Reflection 2 • Sign up for reshaping-my-project meeting (1/27, 2/3)
6 (1/27, W)	• Project layout - meeting (I)	

7 (2/1, M)	• Overview of the parameters commonly measured ✓ Nutrients and metabolites ✓ Genes expression and variants ✓ Proteins (enzymes, transporters, signal molecules) ➢ Hormones and signaling pathways	• Reflection 3
8 (2/3, W)	• Project layout - meeting (II)	
9 (2/8, M)	• From nutrients to life: the roles of genes and proteins • Protein-centered lab techniques (I) ✓ Spectrophotometry (total protein analysis) ✓ Mass spectrometry (m/z) ➢ Proteomics	• Reflection 4
10 (2/10, W)	• Protein-centered lab (I) ✓ Spectrophotometry (Protein determination) ✓ Microplate reader ✓ HPLC	• Simulation 3
11 (2/15, M)	• Protein-centered lab techniques (II) ✓ Introduction to immuno-assays ✓ WB ✓ IHC/ICC/IF	• Quiz 1 • Reflection 5
12 (2/17, W)	• Protein-centered lab (II) ✓ WB ✓ IHC/ICC/IF	• Simulation 4 • Simulation 5
13 (2/22, M)	• Protein-centered lab techniques (III) ✓ IP ✓ ChIP and ChIPseq	• Quiz 2
14 (2/24, W)	• Protein-centered lab (III) ✓ IP ✓ ChIP	• Simulation 6
15 (3/1, M)	• Protein-centered lab techniques (IV) ✓ ELISA and Protein array	• Reflection 6
16 (3/3, W)	• Protein-centered lab techniques (IV) ✓ ELISA	• Simulation 7

17 (3/8, M)	• Gene-centered lab techniques (I) ✓ Spectrophotometry (total DNA, RNA) ✓ PCR (specific gene expression) ➢ RT-PCR, qPCR	• Reflection 7
18 (3/10, W)	• Gene-centered lab (I) ✓ RNA extraction ✓ PCR/qPCR	• Simulation 8 • Simulation 9
19 (3/15, M)	• Gene-centered lab techniques (II) ✓ Microarray (high-throughput gene analysis) ✓ Deep sequencing (high-throughput gene analysis) ➢ DNA sequencing ➢ RNA sequencing	• Quiz 3 • Reflection 8
20 (3/17, W)	• Gene-centered lab (II) ✓ RNA sequencing ✓ Expression profiling by microarray	• Simulation 10
21 (3/22, M)	• Hormone-centered lab techniques ✓ Nutrients and hormonal signaling ✓ Measuring methods ➢ Hormone level o PCR analysis of gene o ELISA/EIA o LC/MS or GC/MS ➢ Hormonal signaling pathways o WB, IHC, ICC, IF	• Quiz 4 • Reflection 9
22 (3/24, W)	• Spring Recharge Day (no class)	
23 (3/29, M)	• Nutrient and metabolite-centered lab techniques (I) ✓ PCR ✓ WB, ELISA ✓ Research examination	• Reflection 10 • Sign up for reshaping-my-project meeting (3/31, 4/7)
24 (3/31, W)	• Project reshaping - meeting (I)	
25 (4/5, M)	• Nutrient and metabolite-centered lab techniques (II) ✓ Spectrophotometry/spectrometry ✓ Metabolomics (MS, NMR, etc.) ✓ Research examination	• Quiz 5
26 (4/7, W)	• Project reshaping - meeting (II)	

27 (4/12, M)	• Omics approaches and personalized nutrition ✓ Personalized nutrition ✓ Omics in personalized nutrition ✓ Ongoing clinical trials of personalized nutrition	
28 (4/14, W)	• Project – final report (I)	
29 (4/19, M)	• Omics approaches and personalized nutrition ✓ Research examination	• Quiz 6
30 (4/21, W)	• Project – final report (II)	
31 (4/26, M)	• Exam week (no class)	• Final paper due at 11:59 pm.