

Room: MCDB A1B16

Instructor: Alison Vigers, PhD

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Office: A1B27

Office hours: Come by my office any time or email me to make an appointment

Course Objectives

The overall MCDB 3140 course objectives are very broad but I hope that by the end of the semester you will

1. Have more appreciation for what laboratory research entails. This means that you will hopefully experience the joys and you will likely experience the frustrations of scientific research.
2. Learn problem-solving skills (iterative processes) and analytical skills like observation and recording.
3. Develop the ability to engage in ethical and responsible research. This includes setting up appropriate controls, no cherry-picking of data, using duplicates or triplicates, and using appropriate statistics to draw conclusions.
4. Understand how your research fits into the broad context of scientific literature.
5. Communicate your research progress both orally and in writing.

Course Overview

Welcome and get to know your lab partners

Reading scientific papers - Introduction to autophagy and diseases

Introduction to our model organism - *Tetrahymena thermophila*

Seeing cells – microscopy and microscopes

Bioinformatics to study autophagy-related genes

Design primers

Perform PCR to measure gene expression

Analyze results

Design new experiment based on results

Group presentation in class

Present results as a poster at a CURE symposium

Recommended Pre- or Co-requisite

Either MCDB 3135 or MCDB 3145 are recommended co-requisites.

Required Materials

You are not required to purchase any materials for this course, but you will need a computer or alternate electronic device for the bioinformatics and primer design labs, and to access Canvas for lab materials and online quizzes. All reading materials will be provided at no cost on Canvas and hard copies of lab methods will be available to use in the lab. Safety equipment, reagents, and disposables are purchased by the course.

Teaching Assistant (TA) Contact Information [Name (section) - Email]

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Evaluation

Grading is calculated based on assignments submitted throughout the semester, laboratory work, and presentation and defense of research.

Lab participation (50 pts) 10%

Evaluation of participation is based on qualities that make a student a desirable lab member. These qualities include: showing up to lab on time, paying attention during TA lectures, being well-prepared by reading and understanding the protocols prior to lab, using the laboratory materials carefully, working well with your group and being respectful to everyone at all times. Cell phone use is prohibited in lab, so use of cell phones will reduce the participation grade by a considerable amount.

Quizzes (100 pts) 20%

In-class quizzes will be given at the beginning of labs 1 – 8, 10 & 11. Quizzes will be open notebook and each is worth 10 points. **If you are late to lab, you will lose points on your quiz.** There will also be extra quizzes posted on Canvas that are optional but you can score extra points for the quiz category if you answer these quizzes.

Midterm Exam (50 pts) 10%

One midterm exam will be given in week 9 (October 23 – October 25). The exam will cover weeks 1 – 8 and will consist of multiple choice and short answer questions. If extra time is required, prior arrangements must be made with the instructor. If an exam in another course conflicts with this lab (especially in evening labs), you will need to reschedule exam times or drop the lab. If your exams are immediately after lab, you will not be excused early, and you will lose points for studying for the exam instead of actively engaging in lab.

Midterm Paper (50 pts) 10%

A mid-term paper is required from all students. Students will research a disease where autophagy is affected. The papers will be 400 – 500 words and will be submitted on Canvas. More details about this paper will be given in the first class.

Lab notebook (50 pts) 10%

Your lab notebook should be written up during every lab. **You will be expected to keep your notebook current by completing your writeup by the end of every lab.** See Notebook Guidelines on Canvas. Notebooks will be spot graded – i.e not everything will be graded every week and you will not be told what will be graded.

Poster Session (75 pts) 15%

Students will present their research in groups at the CURE Symposium from 5pm – 9 pm on Monday December 10 in the UMC Ballroom. Grading is based on complete preparation of the poster (25%) and instructor/TA/peer assessment (75%).

Presentation in class (50 pts) 10%

Students will present their research as a group using powerpoint slides. Oral presentations will be 15 minutes during class. Points will be given for clear slides and explanations of the research performed. A more detailed rubrick of grading will be available later in the semester.

Final Exam (75 pts) 15%

The final exam will be cumulative and cover material from the whole semester.

Extra Credit (5pts) : One extra credit assignment (5 pts) is available to students who attend an MCDB seminar (Thursdays 4pm – 5pm) or MMB (Fridays 3.30pm – 4.30pm) and write a paragraph summarizing the talk(s). Extra credit paragraphs can be hand-written or typed, but must be submitted as a hard copy to Alison or to the TAs, no later than 7 days after the seminar attended. If you wish to attend a Friday MMB, let Alison know by noon the

Thursday before you plan to attend so that your name can be added to the attendance list. You will need to show a Driver's License or other government issued ID at the door. No exceptions can be made.

	Points
Lab participation	50
Quizzes	100
Midterm Exam	50
Mid-term paper	50
Notebook	50
Poster and Poster Session	75
In class presentation	50
Final Exam	75
Total	500

Calculating the final grade

Standard rounding practices will be used. Grades with a tenth decimal place equal to or above 5 will be rounded to the next whole number. There is NO CURVE at any time in this course, and no grades will be dropped.

Late assignments

You will be given a due date for all assignments. If an assignment is received after the due date/time, a zero will be entered in the grade book. There will be no credit for late assignments.

Attendance policy

Attendance in lab is mandatory. Because lab courses are participatory, your physical presence is required at all times. Excused absences are allowed due to illness or emergency; documentation must be provided upon request. In order to have an absence excused and be able to make up work, students need to Dr. Vigers ASAP; waiting until the next lab section will result in the absence being treated as unexcused. Any unexcused absence will have 10 points deducted from the grade plus all points associated with the missed lab (eg quizzes). Three unexcused absences will result in a grade of **F** in the course due to insufficient participation. An unexcused absence will be defined as failure to notify the course instructor or teaching assistant prior to your absence. Notification can be in the form of personal communication, email, or contact by cell phone (text or voice mail). However, the onus will be on the student to inform the instructor that he or she will be absent. This includes potential conflicts with other courses that schedule exams during the time our class meets.

Make-up Policy

Because much of this course is research-based, most of the laboratory work cannot be made up. If you anticipate an excused absence, be sure to inform other people in the lab so they can do the work for you. An unexcused absence results in last-minute reassignment of work, which is disruptive to the research. Please be respectful of the lab and plan accordingly. To arrange for later assignment due dates, contact the instructor.

Accommodation for Disabilities

If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the [Disability Services website](#). Contact Disability Services at 303-492-8671 or dsinfo@colorado.edu for further assistance. If you have a temporary medical condition or injury, see [Temporary Medical Conditions](#) under the Students tab on the Disability Services website.

Classroom Behavior

Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. For more information, see the policies on classroom behavior and the Student Code of Conduct.

Honor Code

Do not cheat! All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the Honor Code. Violations of the policy may include: plagiarism, cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. All incidents of academic misconduct will be reported to the Honor Code (honor@colorado.edu; 303-492-5550). Students who are found responsible for violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code as well as academic sanctions from the faculty member. Additional information regarding the Honor Code academic integrity policy can be found at the Honor Code Office website.

Plagiarism and Copyrights

As commonly defined, plagiarism consists of passing off as one's own, the ideas, words, or writings that belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you have the permission of that person. Plagiarism is one of the most serious forms of academic misconduct.

Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation

The University of Colorado Boulder (CU Boulder) is committed to fostering a positive and welcoming learning, working, and living environment. CU Boulder will not tolerate acts of sexual misconduct (including sexual assault, exploitation, harassment, dating or domestic violence, and stalking), discrimination, and harassment by members of our community. Individuals who believe they have been subject to misconduct or retaliatory actions for reporting a concern should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127 or cureport@colorado.edu. Information about the OIEC, university policies, anonymous reporting, and the campus resources can be found on the OIEC website. Please know that faculty and instructors have a responsibility to inform OIEC when made aware of incidents of sexual misconduct, discrimination, harassment and/or related retaliation, to ensure that individuals impacted receive information about options for reporting and support resources. The Cell Biology Lab is considered a LGBTQ Safe Zone and aims to provide an inclusive, non-discriminatory environment for all.

Religious Holidays

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. In this class, you will be able to drop one lab class, but please contact the Dr. Vigers within the first 2 weeks of classes to make arrangements. See the campus policy regarding religious observances for full details.

Lab Schedule

Lab #	Dates	Topics
No lab	8/28 – 8/30	
Lab 1	9/4 – 9/6	Cell Biology Lab Basics. Introduction to autophagy & reading a scientific paper
Lab 2	9/11 – 9/13	Introduction to Microscopy
Lab 3	9/18 – 9/20	<i>Tetrahymena</i> Microscopy
Lab 4	9/25 – 9/27	Bioinformatics and Online Research Resources
Lab 5	10/2 – 10/4	PCR and Primer Design
Lab 6	10/9 – 10/11	Run initial PCR using gDNA
Lab 7	10/16 – 10/18	Run gels and analyze results
Lab 8	10/23 – 10/25	Lab Midterm Exam in class. Finish mid-semester paper. Papers due on Canvas 10/29, 9am
Lab 9	10/30 – 11/1	Recap results, plan and run PCRs using cDNAs from <i>Tetrahymena</i> under different conditions
Lab 10	11/6 – 11/8	Run gels and plan next experiment. Run new PCR with cDNA
Lab 11	11/13 – 11/15	Run last gels. Work on presentations and posters.
	THANKSGIVING!	Rest, relax, sleep & eat good food
Lab 12	11/27 – 11/29	PowerPoint Research Presentations in lab Poster Critiques/Peer Review
Lab 13	12/4 – 12/6	Lab Final Exam
Lab 14	12/10 5pm – 9 pm	CURE Symposium Monday December 10 UMC Glenn Miller Ballroom

Changes to the schedule

I will endeavor to adhere to the schedule outlined above, but I do reserve the right to make changes to the course, should circumstances arise that force me to do so. These changes may include grading policies, assignments, exam formats or dates and/or any other course requirements.