

BIMM110

Molecular Basis of Human Disease

Spring quarter, 2023

Last Updated [April 4, 2023]

Important Note: *This syllabus, along with course assignments and due dates, are subject to change. It is the student's responsibility to check Canvas for corrections or updates to the syllabus. Any changes will be clearly noted in a course announcement or through email.*

Course Overview

Welcome to BIMM110, Molecular Basis of Human Diseases. The impact of COVID-19 has painfully reminded us of the persistent vulnerability of human society as we re-lived the devastating experience of the 1918 Spanish flu pandemic that occurred over 100 years ago. This time, however, the scientific triumph of generating effective vaccines at a record-making speed has saved and will save millions of human lives, the economy, and the infrastructure of our society, underscoring the importance of our continued efforts to investigate the biology of viruses other human diseases and to generate effective treatments or vaccines, will hold the key to the survival of the human race. We will briefly go over the logistics of this course during the first lecture.

Once we get started with the materials, we have a lot of interesting things to cover. This course will discuss 1) Genetic, biochemical, and molecular biological approaches used to identify the molecular basis of human diseases; 2) current understanding of selected major human diseases at the molecular and cellular levels; 3) successful and possible therapeutic treatments of these diseases. It is expected that students who take BIMM 110 already have a good background in molecular biology, metabolic biochemistry, and genetics.

Course Objectives

Cells in our body are doing amazing jobs to conduct all the processes that you have learned so far in Molecular Biology, Cell Biology, Structural Biology, Metabolic Biochemistry, and Neuroscience classes and even more, to sustain life. Over the last centuries, tremendous advances have been made to understand how each individual event occurs accurately, coordinately, properly, and timely manner. Researches in biology and medicine have made incredible progress over the past 50 years and sequence the entire human genome became a realistic tool for identification or diagnosis of diseases.

We are now in the era that the length of time that takes to translate basic research in molecular biology into development of new drugs and more effective treatments has been and will continue to be shortened. At the same time, we have witnessed tremendous growth in pharmacological and biotechnology industries over the past decades.

In this class, you will review how cellular processes coordinate with each other to sustain life and learn what happens if a specific process or cellular mechanisms fail to occur properly. As we progress more understanding of molecular mechanisms of cellular processes, we hope you to see how scientists can unveil mysteries of currently untreatable diseases or provide understanding for illness that lack information.

Instructional Team

Instructor

Maho Niwa, Ph.D.
 Professor, School of Biological Sciences
 NSB5328
mniwarosen@ucsd.edu

Lectures: Tues/Thurs. 11:00-12:20 pm

Office Hours: Virtual Office hour

Monday at 5:00-5:50 pm

Instruction Assistants

| | |
|------------------------|--|
| Taylor Ozbun (head IA) | tozbun@ucsd.edu |
| Michael Blanchard | mjblanchard@ucsd.edu |
| Victor Yu | vnyu@ucsd.edu |
| Zhou Sun | z6sun@ucsd.edu |
| Yufei Deng | y9deng@ucsd.edu |
| Sierra Adkins | sadkins@ucsd.edu |

Sections:

| | | | |
|-----|-----------|----------------|----------|
| A01 | Wednesday | 11:00-11:50 am | TM1021 |
| A02 | Wednesday | 1:00-1:50 pm | WLH2114 |
| A03 | Wednesday | 6:00-6:50 pm | SOLIS109 |
| A04 | Friday | 8:00-8:50 am | WLH2112 |
| A05 | Friday | 9:00-9:50 am | WLH2112 |
| A06 | Friday | 12:00-12:50 pm | WLH2112 |
| A07 | Friday | 3:00-3:50 pm | HSS2321 |

IA's Office Hour:

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|------------------------|---------------------------|
| Taylor Ozbun (head IA) | Tues & Thurs 2:00-2:50 pm |
| Michael Blanchard | Fri 10:00-10:50 am |
| Victor Yu | Wed 2:00-2:50 pm |
| Zhou Sun | TBA |
| Yufei Deng | Mon 9:00 -9:50 am |
| Sierra Adkins | Tues 2:30-3:20 pm |

Course Policies

Classroom conduct: Please refrain from all unnecessary use of electronics, side conversations, and multi-tasking including eating, newspaper reading. Computer use in the lecture hall should be strictly limited to consultation of course materials and composition of class notes. Please turn off or silence your cell phones in the classroom and be respectful of classmates. You are invited to participate in creating an environment of mutual respect and intellectual productivity by listening and speaking with an open mind.

Make up exams and lateness: A student may not take a make-up test unless she/he has an excused absence. Excused absences are given only with presentation of a valid medical or emergency excuse (for self or immediate family member) in writing (written by a medical doctor although no specific identifying information regarding the condition should be included). Any other failure to take an exam when it is scheduled will result in no credit for the exam. There are absolutely no makeups for the exam unless you meet the conditions set out in the undergraduate handbook.

Accommodations: Anyone in need of classroom or exam accommodations for a disability is encouraged to contact the Office for Students with Disabilities and should inform me as soon as possible.

Academic integrity: Absolutely no cheating will be tolerated. UCSD Policies on Academic integrity will be enforced. All suspicions of integrity violation will be reported to the Academic Integrity Office according to university policy. The Policy on Integrity of Scholarship (academicintegrity.ucsd.edu) list some of the standards by which you are expected to complete your academic work, but your good ethical judgment (or asking me for advice) is also expected as we cannot list every behavior that is unethical or not in the spirit of academic integrity.

Those students found to have committed academic misconduct will face administrative sanctions imposed by their college Dean of Student Affairs and academic sanctions imposed by me. Students can also face suspension and dismissal from the University; those sanctions are not at my discretion. Academic sanctions can range from an F on the assignment to an F in the class. The appropriate sanctions are determined by the egregiousness of the Policy violation. Students who assist in or are complicit with cheating could also be in violation of the Policy. Thus, students who become aware of their peers either facilitating academic misconduct or committing it should report their suspicions to me for investigation.

For further information:

https://academicintegrity.ucsd.edu/index_old.html

Communication Guidelines

As we move through the quarter, you might have questions about the course structure, content, or general inquiries for the instructional team.

If the question is related to course structure, please be sure to read the syllabus and announcements on Canvas before asking the instructional team. If you have a general course question (e.g. not confidential or personal in nature), please post it to the discussion site. We will announce the name of the discussion in the Canvas course site. I or one of the IAs will post answers to all general questions there (typically within 1 business day), so all students can access the response. You are also encouraged to answer each others' questions as well.

For all other questions, please contact me directly via Email. Please be sure to include a descriptive subject, with [BIMM110] at the front of the subject (e.g. [BIMM110] Request for individual meeting). As this is not a small course, I will respond to your inquiries, first come first serve bases, and typically within 1-2 business day.

Netiquette: Netiquette is a set of rules for behaving properly online. While lectures will be held in a class room (MOS 0114), some sections and office hours will take place remotely. Your instructor and fellow students wish to foster a safe online learning environment. All opinions and experiences, no matter how different or controversial they may be perceived, must be respected in the tolerant spirit of academic discourse. You are encouraged to comment, question, or critique an idea but you are not to attack an individual. Working as a community of learners, we can build a polite and respectful course community. The following netiquette tips will enhance the learning experience for everyone in the course:

- Do not dominate any discussion.
- Give other students the opportunity to join in the discussion.
- Do not use offensive language. Present ideas appropriately.
- Be cautious in using Internet language. For example, do not capitalize all letters since this suggests shouting.
- Popular emoticons such as ☺ or / can be helpful to convey your tone but do not overdo or overuse them.
- Avoid using vernacular and/or slang language. This could possibly lead to misinterpretation.
- Never make fun of someone's ability to read or write.
- Share tips with other students.
- Keep an "open-mind" and be willing to express even your minority opinion. Minority opinions have to be respected.
- Think and edit before you push the "Send" button.
- Do not hesitate to ask for feedback.
- Using humor is acceptable

Adapted from:

Mintu-Wimsatt, A., Kernek, C., & Lozada, H. R. (2010). *Netiquette: Make it part of your syllabus*. *Journal of Online Learning and Teaching*, 6(1). Retrieved from http://jolt.merlot.org/vol6no1/mintu-wimsatt_0310.htm

Textbook, Course Materials & Technology

All the lectures will be recorded by podcast which will be posted on UCSD Canvas within 48 hrs after the lecture. In addition, lecture notes will be posted on UCSD Canvas the night before the lecture. Students will read primary research papers prior to attending some of the sections and papers will be posted on UCSD Canvas ahead of time.

Canvas

Our course will be hosted on the Canvas learning management system (<https://canvas.ucsd.edu>). Once you login with your UC San Diego username and password, you will be able to access additional course materials, scheduled sessions, opportunities for interaction and more.

Zoom

We will make use of Zoom for office hours and/or discussion sections. Learn more and download the Zoom Client for Meetings, and/or the Zoom Mobile Apps at <https://ucsd.zoom.us/>

Course Technology Requirements

To participate in this course, you will need the following:

- We plan to use clicker during the class and will be counted towards the final grade. Details will be discussed during the first lecture and we will start from 3rd week of the quarter.
- A laptop or desktop with a current operating system and internet access (for office hours and sections).
- You will also need access to the following tools to fully participate in this course:
 - Webcam (for video conferencing through Zoom)
 - Microphone (for audio conferencing through Zoom)
 - A stable internet
 - Current browser

Grading Information

This course will have three exams but no final exam. Each exam will count 26% of the final grades. All three exams will be given during the normal lecture time (All the students enrolled in this class are expected that you are able to attend all the lectures on the specified date by the University. An inability to take any of the three exams for any reasons except those addressed above will not warrant requests for make-up exam.

All the exams will be closed book/closed computer/electronic devices. Questions will be derived from lectures and problem sets to test the understanding of the materials.

Final Grades will be determined by:

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|----------------------------------|------------------------|
| Midterm Exam #1 (in class) | 22% of the final grade |
| Midterm Exam #2 (in class) | 24% of the final grade |
| Final exam #3 (in class) | 28% of the final grade |
| Clicker participation | 13% of the final grade |
| Assignments & Section attendance | 13% of the final grade |

Overall course letter grades will be assigned based on the following:

| | |
|---------|---------------|
| 90-100% | A (A-, A, A+) |
| 78-89% | B (B-, B, B+) |
| 60-77% | C |
| 45-59% | D |
| 0-44% | F |

Policy on Late or Missing Work

Be sure to pay close attention to deadlines – there will be no make-up assignments or quizzes, or late work accepted without a serious and compelling reason and instructor approval.

Grading Scale

| A (A+, A, A-) | B (B+, B, B-) | C | D | F |
|---------------|---------------|--------|--------|-----------|
| 90-100% | 75-89% | 55-74% | 45-54% | 44%-below |
| (A+; 97-100% | (B+; 82-89% | | | |
| A; 92-96% | B; 78-81% | | | |
| A-; 90-91%) | B-; 75-77%) | | | |

Re-grade policy: Any re-grading request will have to be submitted in writing (typed) within a week after the midterm exams #1 and #2 are returned to you. (Specific dates will be announced in class).

Schedule:

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|--|---|
| Week 1 | |
| April 4, Lecture 1: | Human Disease History and Today |
| April 6, Lecture 2: | Down Syndrome |
| Week 2 | |
| April 11, Lecture 3: | Robertsonian Translocation |
| April 13, Lecture 4: | Hemophilia |
| Week 3 | |
| April 18, Lecture 5: | Cystic Fibrosis (CFTR) History, Lung, & Molecular Biology |
| April 20, Lecture 6: | Mystery Disease Video |
| Week 4 | |
| April 25, Lecture 7: | CFTR Treatments & Drugs, Discussion |
| April 27, Lecture 8: | Pathogens I: Cholera |
| Week 5 | |
| May 2, Exam #1 (in class) | |
| May 4, Lecture 9: | Pathogens II: Anthrax: RNA viruses |
| Week 6 | |
| May 9, Lecture 10: | Pathogens III: SARS-CoV2 Vaccine |
| May 11, Lecture 11: | Pathogens IV: Discussion |
| Week 7 | |
| May 16, Lecture 12: | Cancer I |
| May 18, Exam #2 (in class) | |
| Week 8 | |
| May 23, Lecture 15: | Cancer II |
| May 25, Lecture 16: | Epigenetic diseases, X-inactivation |
| Week 9 | |
| May 30, Lecture 17: | Neurodegenerative Disease: Alzheimer Disease 1 |
| June 1, Lecture 18: | Neurodegenerative Disease: Alzheimer Disease 2 |
| Week 10 | |
| June 6, Lecture 19: | Neurodegenerative Disease: Parkinson, ALS, |
| June 8, Exam #3 (in class) | |
| June 13, 11:30-2:29 pm | no comprehensive exam |

Student Resources

Academic Support

UC San Diego Library

- Ask a Librarian: <https://library.ucsd.edu/ask-us/>
- Library Help: <https://library.ucsd.edu/ask-us/triton-ed.html>

Teaching + Learning Commons

- Writing Hub: <https://writinghub.ucsd.edu/>
Improve writing skills and connect with a peer writing mentor
- Academic Achievement Hub: <https://aah.ucsd.edu/>
Supplemental instruction, content tutoring and learning strategy tutoring

Office of Academic Support & Instructional Services (OASIS): <https://oasis.ucsd.edu/>

Intellectual and personal development support

Student Success Coaching Program: <https://successcoaching.ucsd.edu/>

Peer mentor program that includes information, resources, and support in meeting your goals

Additional Student Resources for Your Personal Well-Being

The Hub Basic Needs

The Hub addresses basic needs insecurities you might face. They provide necessary resources, break stigma surrounding basic needs, and foster a sense of belonging for every student. The Hub builds community to help one another.

<https://basicneeds.ucsd.edu/> | basicneeds@ucsd.edu | (858) 246-2632

Counseling and Psychological Services (CAPS)

Services and programs that enhance the college experience, promote academic success, and help you develop effective coping skills.

<https://wellness.ucsd.edu/caps/> | (858) 534-3755

CARE at the Sexual Assault Resource Center

<https://care.ucsd.edu> | sarc@ucsd.edu | (858) 534-5793

Office for the Prevention of Harassment & Discrimination (for Students)

https://ophd.ucsd.edu/policies-procedures/polpro_student.html

Undocumented Student Services: <https://uss.ucsd.edu/>

Triton Concern Line: (858) 246-1111

<http://blink.ucsd.edu/go/students-of-concern>

Report students of concern

Student Accommodations

Students requesting accommodations for this course due to a disability must provide a current Authorization for Accommodation (AFA) letter issued by the Office for Students with Disabilities

(OSD) which is located in University Center 202 behind Center Hall. Students are required to present their AFA letters to Faculty (please make arrangements to contact me privately) and to the OSD Liaison in the department in advance so that accommodations may be arranged.

Office for Students with Disabilities (OSD)

<https://disabilities.ucsd.edu/> | osd@ucsd.edu | (858)534-4382

UC San Diego Principles of Community

The University of California, San Diego is dedicated to learning, teaching, and serving society through education, research, and public service. Our international reputation for excellence is due in large part to the cooperative and entrepreneurial nature of the UC San Diego community. UC San Diego faculty, staff, and students are encouraged to be creative and are rewarded for individual as well as collaborative achievements.

To foster the best possible working and learning environment, UC San Diego strives to maintain a climate of fairness, cooperation, and professionalism. These principles of community are vital to the success of the University and the well being of its constituents. UC San Diego faculty, staff, and students are expected to practice these basic principles as individuals and in groups. <https://ucsd.edu/about/principles.html>

Equity, Diversity and Inclusion

UC San Diego (as an institution) and I (as a human being and instructor of this course) are committed to full inclusion in education for all persons. Services and reasonable accommodations are available to students with temporary and permanent disabilities, to students with DACA or undocumented status, to students with health or other personal concerns, and to students with other kinds of support needs. Please feel free to let me know if there are circumstances affecting your ability to participate in class. Some resources that might be of use include:

Office of Equity, Diversity, and Inclusion

<https://diversity.ucsd.edu/> | diversity@ucsd.edu | (858) 822-3542

Equity and Inclusion During COVID-19:

<https://diversity.ucsd.edu/centers-resources/equity-and-inclusion-during-covid-19.html>

Student Life: Diversity

<https://students.ucsd.edu/student-life/diversity/>

UC San Diego Policies

Academic Integrity

Academic Integrity is expected of everyone at UC San Diego. This means that you must be honest, fair, responsible, respectful, and trustworthy in all of your actions. Lying, cheating or any other forms of dishonesty will not be tolerated because they undermine learning and the University's ability to certify students' knowledge and abilities. Thus, any attempt to get, or help another get, a grade by cheating, lying or dishonesty will be reported to the Academic Integrity

Office and will result sanctions. Sanctions can include an F in this class and suspension or dismissal from the University. So, think carefully before you act by asking yourself:

a) is what I'm about to do or submit for credit an honest, fair, respectful, responsible & trustworthy representation of my knowledge and abilities at this time and,

b) would my instructor approve of my action?

You are ultimately the only person responsible for your behavior. So, if you are unsure, don't ask a friend—ask your instructor, instructional assistant, or the Academic Integrity Office. You can learn more about academic integrity at <http://academicintegrity.ucsd.edu>

(Source: Academic Integrity Office, 2018)

UCSD Student Conduct Code

https://students.ucsd.edu/files/student-conduct/ucsandiego-student-conduct-code_interim-revisions1-16-18.pdf

University of California Diversity Statement

<https://regents.universityofcalifornia.edu/governance/policies/4400.html>

Religious Accommodation

[EPC Policies on Religious Accommodation, Final Exams, Midterm Exams](#)