BCH 294.01: Introductory Biochemistry Seminar

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Goal: This course introduces some faculty research at the University of Montana in order to familiarize biochemistry majors with the scope and potential opportunities for independent research as part of their undergraduate studies. The course also acquaints students with the biochemical literature. Papers that mark significant advances in biochemistry over the last 50 years will be discussed.

When/Where: Tuesdays from 3:00 to 3:50 pm, Chemistry Building Room 204

Organizer: Stephen Lodmell. The class is led by several biochemistry professors who will share their research and lead discussion of a significant biochemistry paper for two class periods each.

Text: Selected articles from the biochemical literature

Website: http://umonline.umt.edu/: All papers are provided on Moodle.

Course Format: The course will alternate weekly between a presentation by a faculty member on their research and discussion of a paper from the biochemical literature. During the research presentation weeks, faculty will discuss their research. During the research paper weeks, the professor will lead the class in a discussion of the paper. On select weeks, a student can choose to present a short explanation of an assigned method or experiment from the faculty chosen papers. Those who don’t present will be required to write a final 1-page paper described below.

Final paper (students can give a short in-class presentation instead):

• You can choose to present a method or experiment from the faculty chosen biochemistry papers instead of writing the final paper (this option depends on presenting faculty agreeing to have the student present).
  o These select students will present an explanation of and lead discussion regarding one assigned method or experiment for approximately 15 minutes.

• Students who do not present in class will submit a final paper at the end of the semester with two parts. In part 1 you explain a figure from one of the papers discussed during the semester in your own words (1/2 to 1 page). In part two you briefly outline a research project that you would be interested in participating in that you have heard about during the class or talked to a professor about outside of class (1/2 to 1 page). Only actual ongoing projects at the University of Montana are eligible for this second part.

Written Assignments:

• At the end of each Research presentation class period, there will be a short quiz. The quiz question(s) may relate to anything discussed during that class period.
• The day before each Discussion class period, students will upload two or more questions about the reading assignment to the Moodle site for BCH 294. These questions will provide the starting point for the class discussion that day.
Evaluation:  Course is CR/NCR. A grade of CR requires an overall score of 6/10 on quizzes, submission of a minimum of two non-trivial questions for a minimum of 5 class discussions of assigned papers, attendance and participation in 75% of the class periods, and a satisfactory in-class presentation or final paper.

Notes:
- Late assignments will be given a grade of zero.
- See Cyberbear, Catalog, and/or Student Conduct Code for policies regarding incomplete grades, disability accommodations, definition and potential consequences of plagiarism, and late-drop requirements.

Accessibility, disabilities, and special accommodations:
The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and the Office for Disability Equity (ODE). If you anticipate or experience barriers based on disability, please contact the ODE at (406) 243-2243/Aber Hall - Room 116, ode@umontana.edu, or visit www.umt.edu/disability for more information. Retroactive accommodation requests will not be honored, so please, do not delay. As your instructor, I will work with you and the ODE to implement an effective accommodation, and you are welcome to contact me privately if you wish. If you would like to request reasonable accommodations, you are advised to provide your ODE verification letter to your instructor in the first week of class so appropriate arrangements can be made. If you decide after the semester begins to disclose your disability and request accommodations, you should provide documentation, if possible, at least 10 days before the upcoming assessment so I may prepare appropriately. It is the responsibility of students to make sure they understand the types of modifications available to them before assessments.

Use of ChatGPT and other Large Language Models (LLMs)
It is acceptable to use all relevant tools and resources, including LLMs, in this course. LLMs can be very useful tools, and using them with caution will serve you well in this course and in life. It is critical to recognize that LLMs/ artificial intelligence frequently include incorrect or biased information as part of their output. Using AI requires work on your part to determine what is useful/correct and what is not. It is never okay to use an LLM to produce text for your assignments, and it is almost always obvious to an expert when a non-expert does this. Do not do it.
For every assignment in this course, you must include a statement about how you used ChatGPT or other LLMs. If you use LLMs in ways that are not disclosed, you will fail the relevant assignment. See below for an example statement—at a minimum, you must include the statement in bold in every assignment:
“For this assignment I used ChatGPT to learn more about the history of the disease. For example, I asked ChatGPT to explain the causes of the disease. I also asked ChatGPT to outline what efforts have been used in the past to control the disease. This provided me with information that I further researched using google scholar and other databases. The specific papers I used in this assignment are cited in the “references section”. Everything I have submitted/presented is in my own words.”

Learning outcomes
Upon completion of this course:
1. Through directed readings, students will explore, reflect and write about **ethical issues** related to biochemical advances that have the potential to alter the ways human patients are treated for certain diseases.

2. Students will gain appreciation for the variety of experimental research ongoing by Biochemistry faculty and students at the University of Montana.

3. Students will study and gain appreciation for seminal and historical publications and research that have dramatically impacted the trajectory of Biochemical research.

4. Students will be provided opportunities for presenting data from directed readings to the class, which is valuable experience for developing presentation and public speaking skills.
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<th>Month</th>
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| January| 23  | Brief introduction to course *Stephen Lodmell*<br>Research presentation by Klara Briknarova  
- Structural biology research  
- Introduction to structural biology papers. |
| January| 30  | Discussion of Watson & Crick 1953 paper.  
| February| 6   | Research presentation by Bruce Bowler, Chemistry and Biochemistry  
- Code breaking in biology and biochemistry  
- Introduction to H. G. Khorana and the Genetic Code |
| February| 13  | Discussion of H. G. Khorana and the Genetic Code  
| February| 20  | Research presentation by Brent Ryckman, Division of Biological Sciences  
- Human Cytomegalovirus (HCMV) Replication  
- Introduction to the Hershey-Chase experiment |
| February| 27  | Discussion of the Hershey-Chase experiment  
| March  | 5   | Research presentation and introduction to discussion paper by Pat Secor, Division of Biological Sciences |
(March 19 Spring Break, no class) |
| April  | 2   | Discussion of paper led by Katya Voronina, Division of Biological Sciences. |

9  » Research presentation by Kasper Hansen, Biomedical and Pharmaceutical Sciences
  • Structure and function of ligand-gated ion channels
  » Introduction to Clements’ paper: Measurement of neurotransmitter decay

16  » Discussion of Clements’ paper: Measurement of neurotransmitter decay

23  » Research presentation by Steve Lodmell, Division of Biological Sciences
“Cellular response to Rift Valley fever virus infection.”

Discussion of ethical considerations of CRISPR by Steve Lodmell. Read Eissenberg 2021 paper.

May 7 All students who have not presented in class are required to submit a final paper. It should be uploaded to Moodle by 6 PM on Tuesday, May 9.

COVID mitigation: Please follow current University of Montana COVID mitigation strategies. If you are unclear about whether you should come to class because of something related to COVID please contact Stephen Lodmell for help. If you need to miss class due to COVID related issues contact instructor before class.