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Spring 2-1-2022

### BCH 294.01: Introductory Biochemistry Seminar

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## **BCH 294      Introductory Biochemistry Seminar Spring, 2022**

**Goal:** This course introduces biochemical research at the University of Montana in order to familiarize biochemistry majors with the 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 102

**Organizer:** Travis Hughes

**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 will present an explanation of an assigned method or experiment from the faculty chosen papers. Not all students will do an in-class presentation. Those who don't will be required to write a final paper described below.

### **Daily student class presentations and final papers:**

- Some students will be assigned a method or experiment from the faculty chosen biochemistry papers.
- 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, including the student presentation.
- 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.

**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 80% 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.

Month	Day	Topic
January	18	» <b>Discussion of course plan, independent research opportunities, Hughes lab research and introduction to Scientific Ethics, including the abstract/introduction of “Investigating the replicability of preclinical cancer biology”</b> Errington et al. eLife 2021;10:e71601. DOI: <a href="https://doi.org/10.7554/eLife.71601">https://doi.org/10.7554/eLife.71601</a> <b>Travis Hughes</b> , Biomedical and Pharmaceutical Sciences
January	25	» <b>Discussion of scientific ethics including discussion of the results and discussion sections of “Investigating the replicability of preclinical cancer biology”</b> Errington et al. eLife 2021 (see above for full citation) <b>Travis Hughes</b> , Biomedical and Pharmaceutical Sciences. <ul style="list-style-type: none"> <li>• Student presentation on Figure 2 of Errington paper.</li> </ul>
Feb.	1	» <b>Research presentation</b> by <b>Bruce Bowler</b> , Chemistry and Biochemistry <ul style="list-style-type: none"> <li>• Code breaking in biology and biochemistry</li> </ul> » Introduction to H. G. Khorana and the Genetic Code
	8	» <b>Discussion</b> of H. G. Khorana and the Genetic Code Reading: Morgan A.R.; Wells, R.D.; Khorana, H.G. <b>Studied on Polynucleotides, LIX. Further Codon Assignments from Amino Acid Incorporations Detected by Ribopolynucleotides Containing Repeating Trinucleotide Sequences.</b> <i>Proceeding of the National Academy of Sciences USA</i> (1966) <b>56</b> , 1899-1906.
	15	» <b>Research presentation</b> by <b>Steve Lodmell</b> , Division of Biological Sciences <ul style="list-style-type: none"> <li>• “Cellular response to Rift Valley fever virus infection.” A representative paper would be: Havranek KE, White LA, Bisom TC, Lanchy JM, Lodmell JS. The Atypical Kinase R1OK3 Limits RVFV Propagation and Is Regulated by Alternative Splicing. <i>Viruses</i>. 2021;13(3):367. doi: 10.3390/v13030367. PMID: 33652597; PMCID: PMC7996929.</li> <li>• Student presentation of Figure 2 of the Havranek et. al paper.</li> </ul>

- 22 » **Discussion** of Doudna/Charpentier CRISPR Cas9: Jinek, Martin; Chylinski, Krzysztof; Fonfara, Ines; Hauer, Michael; Doudna, Jennifer A.; Charpentier, Emmanuelle (17 August 2012). "A Programmable Dual-RNA–Guided DNA Endonuclease in Adaptive Bacterial Immunity". *Science*. 337 (6096): 816–821.  
by Steve Lodmell
- Student presentation of Figure 1 of Jinek et. al paper.
- March 1 » **Research presentation** by **Brent Ryckman**, Division of Biological Sciences
- Human Cytomegalovirus (HCMV) Replication
- » Introduction to the Hershey-Chase experiment
- March 8 » **Discussion** of the Hershey-Chase experiment  
Reading: Hershey, A. D.; Chase, M. **Independent Functions of Viral Protein and Nucleic Acid in Growth of Bacteriophage**. *Journal of General Physiology* (1952) 36, 39-56.
- 15 » **Research presentation** by **Katya Voronina**, Division of Biological Sciences
- Topic of research presentation TBA
- » Introduction to paper TBA
- 22 Spring Break: no class
- 29 » **Discussion** of paper from **Katya Voronina** TBA
- April 5 » **Research presentation** by **Pat Secor**, Division of Biological Sciences
- Topic TBA
- 12 » **Discussion** of paper TBD by **Pat Secor**
- 19 » **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
- Student presentation explaining the method of "whole-cell patch-clamp electrophysiology"
- 26 » **Discussion** of Clements' paper: Measurement of neurotransmitter decay  
Reading: Clements, J. D.; Lester, R. A.; Tong, G.; Jahr, C. E.; Westbrook, G. L.; **The time course of glutamate in the synaptic cleft**. *Science* (1992) 258, 1498-1501.
- May 3 **Research presentation** by **Beverly Piggott**
- Topic TBA
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May 10 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 10.

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COVID mitigation: Please follow current University of Montana COVID mitigation strategies. See [https://www.umt.edu/coronavirus/communications/jan\\_6\\_2022\\_comms.php](https://www.umt.edu/coronavirus/communications/jan_6_2022_comms.php) for a recent update on UM COVID policies. If you are unclear about whether you should come to class because of something related to COVID please contact Travis Hughes for help. If you need to miss class due to COVID related issues contact Travis Hughes before class.

Masks must be worn in class: See <https://www.umt.edu/coronavirus/campus-covid-plan/instruction/instruction-mask-compliance.php> for details.