

Brain Energy Metabolism in Health and Diseases
Gulcin Pekkurnaz, Ph.D.

GENERAL INFORMATION:**Contact:****Instructor:** Gulcin Pekkurnaz (gpekkurnaz@ucsd.edu)**Class meeting time and location:** Wednesdays 10:00-11:20am YORK 3010**Office Hours:** Fridays 2:00-3:00pm and strongly encouraged for the presenter group, Pacific Hall building, Room 1100CThe best way to contact me is by e-mail (gpekkurnaz@ucsd.edu). Please remember to include **BIPN194/BGGN 284** in the subject line of the emails concerning this class.

Course description: The underlying causes of metabolic and neurodegenerative disorders are complex, though these conditions have recently been attributed to changes in brain energy metabolism dysregulation. In this course, we will explore the principles of brain energy metabolism in health and diseases through a critical reading of primary research literature.

Prerequisites: This upper-division course is intended for junior/senior undergraduate students and MSc. students. Prior to enrollment BIPN 100(Physiology I) and BIPN 140 (Cellular Neurobiology) must be completed. BIBC 102 (Metabolic Biochemistry) is also strongly recommended preparation for this class.

Syllabus: *(subject to change)*

DATE		LECTURE TOPIC	GROUP
October	2	Introduction to Brain Energy Metabolism	
	9	Advances in Brain Metabolism Imaging	1
	16	Neuronal Activity and Metabolism Coupling	2
	23	Brain Regulation of Appetite and Satiety	3
	30	The Gut-Brain Connection	4
November	6	No Lecture – final assignment discussion	
	13	Diabetes and the Nervous System	5
	20	Energy Utilization in the Ischemic Brain	6
	27	Brain Metabolism Failure in Neurodegenerative Diseases	7
December	4	Poverty and the Developing Brain	8
	10	Final Assignment due	

Course format:

The first introduction lecture will be given by Dr. Pekkurnaz. All other lectures will be student-led discussions of the primary research literature. A primary research article will be assigned for the entire class to read. PDFs of the required reading material will be posted on the TritonEd. Additional recommended reading material will also be available on TritonEd to provide background information about the lecture topic. Students will be graded based on their preparation for the topic covered in each class. Each week students should expect to spend at least 4.5 hours for course material reading, in-class discussion and assignment preparation.

Presenters: Students will take turns to present the assigned primary research literature in small groups. Each student will present only once as part of one group. The presentation should be a single file and in projector-compatible slide format (i.e. powerpoint, keynote, google slides). Each group member is required to contribute equally to the oral presentations. Each group will have 45-50 minutes for presentation and 20-30 minutes for discussions. Presentations should include background knowledge, discussion of the key scientific question, critical analysis of the methods and data. Grades will be based on the overall presentation/slide quality and each student's ability to answer questions posed by the instructor and the students. Please use the following link to sign up for the group presentations.

https://docs.google.com/spreadsheets/d/1vjISnMRUa2OgWqrNZPXsQleHjfCsolfhktkkn_KSiaM/edit?usp=sharing

Non-presenters: Prior to each class, students are required to read and write a one-page summary of the primary research article covered in the class. These assignments are due at the beginning of the class. Late or email submissions will cause students to lose points. Each assignment should end with 3 key questions that will be part of the in-class discussion. Please use 1" margin, single space, Arial/Times or similar font and font size 11 for the writing assignment. Review articles are additional material for you to read – like textbook.

Evaluation: Attendance is mandatory for this course. The students will be heavily evaluated based on their presentations, writing assignments and participation in discussions. The final exam will be a 5-6 pages review article writing assignment (including references and a summary figure/table) based on the topics covered in the course.

In addition to the final assignment, MSc. students are also required to write up a research article critique (one-page summary - and when you are selecting the research article, imagine that research article will be discussed as part of this class next year).

Grading:

Attendance	9%
In-class discussion participation	6%
Research article summary	30%
Group presentation	30%
Final exam (review writing)	25%

Presentation guidelines and resources:

<https://www.ibiology.org/professional-development/scientific-presentations/>

<https://career.ucsf.edu/sites/career.ucsf.edu/files/UCSF%20CPD%20Scientific%20Presentation%20Rubric.pdf>

<https://www.ncbi.nlm.nih.gov/pubmed/>