

CBPH 852 Experimental Physiology of Human Health and Disease (Formerly PHYI 702; Fall 2016)

M,W,F, 9-10:30 AM, 7002 Marsico Hall (7th floor conference room)

This course is ideal for first or second-year graduate students with an interest in physiology and its application to human disease. The emphasis is on animal models (mouse, drosophila, and zebrafish), as used to study human diseases. Students will learn the principles of cell, organ, and systems physiology and pathophysiology required to identify important areas of current translational biomedical research, and will be introduced to experimental approaches that address cutting edge biomedical research questions. The course covers all of the major organ systems, and a variety of common diseases, including chronic pain, autism spectrum disorders, amblyopia, hypertension, diabetes, heart failure, atherosclerosis, cardiac arrhythmias, inflammatory bowel disease, obstructive pulmonary diseases, and cystic fibrosis.

- Lecture sessions emphasize experimental approaches using animal models
- Background readings enhance your understanding of physiology
- Journal club sessions focus on use and interpretation of key models and methods
- Fulfills course requirements for the “Med into Grad” Translational Medicine Program
- Three take-home, open-book exams

A NOTE ABOUT AUDIO RECORDINGS OF CLASS SESSIONS: For the most part, it is fine to record class sessions, but you must obtain *prior* permission from each individual instructor to do so for their session(s). Any lecture recordings are strictly for your own personal use, and may not be posted for public distribution or shared with anyone who is not taking the class.

GRADING:

(a) Class attendance is expected. Because we have no textbook, most of your learning will be based on material that is delivered in class. In addition, the class environment is meant to be highly interactive so that your learning can be targeted to topics that are most interesting/relevant to you. This can't happen if you don't attend. Therefore, poor attendance will impact negatively on your grade. Obviously, exceptions can be made for illness, meeting attendance, crucial experiments, exceptional opportunities, etc.... but please contact the course director about this in advance.

(b) Everyone starts the course with a P. A student will earn a low P (or, in the worst-case, an F) if their attendance or performance in class and on exams indicates to the course faculty that they are performing at a level that is unsatisfactory for a trainee who intends to follow a career in the biological sciences. This, in general, will be an extreme situation, and must be agreed to by the course director and a majority of the block directors. A grade of H will be given to students whose test scores and in-class contributions consistently rank them at or near the top of the class. The three exams will be weighted equally, and a mean score and standard deviation will be calculated at the end of the semester. To earn honors, a student's mean score must be at least one standard deviation above the mean. Strong class participation or frequent unexcused absences can move a student up or down, respectively, if they are near the P/H border.

(c) Exams may include any of 3 types of questions: we may ask you to (i) summarize and reframe key lecture concepts in your own words, as a test of your understanding and a mechanism to help you solidify your learning, (ii) design experiments or critically evaluate data, as a test of your logical thinking and your mastery of key information provided in class, or (iii) answer questions that are based on the journal club readings, as a way to give you practice with a format that is used by several departments for their qualifying exams.

(d) Your feedback is critical for the development of this course; consequently, grades won't be released until all course evaluation forms have all been turned in at the end of the course. You can find a course evaluation form in the “Resources” section of Sakai.

Date	Faculty	Unit	Topic	Notes
Model Systems Block				
F 8/26	K Caron	MS	Rodents as a model system – history, strengths, weaknesses, and experimental techniques	
M 8/29	K Caron	MS	“	
W 8/31	K Caron	MS	“	
F 9/2	K Caron	MS	“	
M 9/5	Labor Day- No class			
W 9/7	D Cowley	MS	CRISPR gene editing	
F 9/9	S Crews	MS	Drosophila as a model system – history, strengths, weaknesses, and experimental techniques	
M 9/12	Jiandong Liu	MS	Zebrafish as a model system – history, strengths, weaknesses, and experimental techniques – example: congenital heart defects	

Neuroscience Block				
W 9/14	Eva Anton	NS	Introduction to developmental signaling and brain malformations	
F 9/16	M Zylka	NS	Chronic pain: molecular basis	
M 9/19	S Gupton	NS	Axon guidance and branching	
W 9/21	B Philpot	NS	Autism spectrum disorders	
F 9/23	B Philpot	NS	Paper discussion – Basic science contributions to the development of autism therapeutics	
M 9/26	Flavio Frohlich	NS	Brain Rhythms	
Endocrine Block				
W 9/28	C Otey	Endo	Thyroid hormone deficiency and mental retardation	
F 9/30	C Otey	Endo	Diabetes Mellitus and stem cell repair of islets	Hand out Model Systems/Neuro/Endo exam

M 10/3	Reading day			
Cardiovascular Block				
W 10/5	K Caron	CV	Introduction to cardiovascular system	EXAM DUE noon
F 10/7	K Caron	CV	Hemodynamics – hypertension (1) – systemic vascular resistance/Heart failure-cardiomyopathy	
M 10/10	L Qian		Cardiac ischemia and cardiac repair mechanisms	
W 10/12	L Qian	CV	Paper discussion – reprogramming approaches to repair the ischemic heart	
F 10/14	M Bressan	CV	Live Imaging Approaches to Cardiac Electrophysiology	
M 10/17	J Guidice		Gene expression and splicing networks in striated muscle development	
W 10/19 F 10/21	Fall Break			
M 10/24	C Mack	CV	Smooth muscle cell dysfunction	

W 10/26	K Caron	CV	Preeclampsia (hypertension, endocrinology and spiral artery remodeling)	
Renal Block				
F 10/28	B Arendshorst	Renal	Introduction to kidney function	
M 10/31	B Arendshorst	Renal	Hypertension (2) – angiotensin infusion model	
W 11/2	L. O'Brien	Renal	Renal Progenitor Cells	
F 11/4	E Chang	Renal	Paper discussion – Hypertension induced renal injury	Hand out Cardio/Renal exam
M 11/7	Reading day			
GI Block				
W 11/9	N Snider	GI	GI intro: liver and pancreas	EXAM DUE noon
F 11/11	J Hansen	GI	Intestinal tract-IBD-Colitis	
M 11/14	N Snider	GI	Paper discussion – GI injury/disease	
Pulmonary Block				

W 11/16	R Tarran/ S Randell	Resp	Introduction to Airway Innate Defense	
F 11/18	S Randell/ R Tarran	Resp	Smoke Induced Lung Disease (COPD)	
M 11/21	S Randell/ R Tarran	Resp	Cystic Fibrosis	
W 11/23 F 11/25	Thanksgiving			
M 11/28	S Randell/ R Tarran	Resp	Asthma	
W 11/30	R Tarran/ S Randell	Resp	Idiopathic Pulmonary Fibrosis	
F 12/2	R Tarran/ S Randell	Resp	Gender Differences in Lung Disease	
M 12/5				Hand out Resp/GI exam
W 12/7	Last day of classes UNC			EXAM DUE noon