# PHYI 703: Experimental Approaches to Human Disease (spring 2017)

**MWF, 9-10:30 AM**

**Room 7002 Marsico Hall**

This course is ideal for first- or second-year graduate students with an interest in physiology, experimental medicine, and translational approaches aimed at understanding and treating human diseases. The course takes an organ system-based approach, emphasizing selected diseases that affect specific organs while also considering fundamental processes, such as inflammation and fibrosis, or emerging areas, such as stem cells, that are relevant to multiple organ systems. Class sessions will highlight research techniques, protocols, ethical issues, data analysis methods, and drug development strategies that are relevant to studies in human subjects, human tissue samples, and translational research.

- Background readings enhance your understanding of physiology
- Lecture sessions emphasize experimental approaches and mechanisms of disease
- Journal club sessions focus on use and interpretation of key methods
- Fulfills course requirements for the “Med into Grad” Translational Medicine Program
- Three take-home 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, or family emergencies, but please contact the course director about this as soon as is feasible.

(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** | **Block** | **Topic** | **Exams, Block Director** |
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| ***Research ethics / drug development issues*** | | | | | Otey |
| | | | | | |
| F | 1/13 | Eric Juengst | Ethics | Henrietta Lacks: Historical and contemporary research using human tissues | |
| M | 1/16 | MLK holiday | | | |
| W | 1/18 | Don Rose (Carolina Kickstart | Ethics | Drug development – patenting your invention and partnering with Biotech to bring it to market | |
| F | 1/20 | Richard Cheney | | Failed Translation: A Hard Look at Hard Science - Journal Article | |
| ***Cancer / fibrosis / inflammation*** | | | | | Otey |
| M | 1/23 | Carol Otey | fibrosis | Fibrosis | |
| W | 1/25 | Carol Otey | cancer | Tumor microenvironments - metastasis | |
| F | 1/27 | Yuliya Pylayeva-Gupta | cancer | Tumor microenvironment – immune system | |
| M | 1/30 | Kathleen Caron | cancer | Lymphatic development, function, and metastatic disease | |
| W | 2/1 | Yuliya Pylayeva-Gupta | cancer | Journal Article | |
| | | | | ***Gastrointestinal disease*** | Snider |
| F | 2/3 | Natasha Snider | GI | Gastrointestinal Physiology and Pathophysiology Overview | |
| M | 2/6 | Natasha Snider | GI | Disorders of the liver | |
| W | 2/8 | Scott Magness | GI | Intestinal stem cells and intestinal repair | |
| F | 2/10 | Dept. retreat | GI | No class – please attend CBP retreat | |
| M | 2/13 | Tope Keku | GI | Microbiome and colon cancer | |
| W | 2/15 | Natasha Snider | GI | Journal Club | |
| F | 2/17 | Reading Day | GI | | |
| M | 2/20 | Exam Day | GI | | |
| | | | | ***Neurological disease*** | Smith |

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| W | 2/22 | Todd Cohen | Neuro | Neurodegenerative disease | EXAM 1 (ethics/cancer / GI) DUE Wednesday at 8AM |
| F | 2/24 | Mark Zylka | Neuro | New pain treatments | |
| M | 2/27 | Steve Gray | Neuro | Gene therapy of the brain using AAV | |
| W | 3/1 | Garret Stuber | Neuro | Reward, motivation, and addiction | |
| F | 3/3 | Damaris Lorenzo | Neuro | Axonal transport deficits in neurological disorders | |
| M | 3/6 | Shawn Hingtgen | Neuro | Stem cells | |
| W | 3/8 | Tom Kash | Neuro | Studying addiction | |
| F | 3/10 | Stephanic Gupton | Neuro | Journal Article | |
| M | 3/13 | Spring Break | | | |
| W | 3/15 | Spring Break | | | |
| F | 3/17 | Spring Break | | | |
| | | | | ***Cardiovascular disease / obesity*** | Faber |
| M | 3/20 | Brian Jensen | CV | Cardiac hypertrophy | |
| W | 3/22 | Xuming Dai | CV | Coronary Circulation | |
| F | 3/24 | Sean Mclean | CV | Pulmonary vascular development, pulmonary hypertension, congenital diaphragmatic hernia | |
| M | 3/27 | Daniel Pomp | CV | Genetic basis of physiologic variation | |
| W | 3/29 | Jim Faber | CV | Genetic and genomic approaches to studying vascular physiology (1) | |
| F | 3/31 | Jim Faber / | CV | Genetic and genomic approaches to studying vascular physiology (2) | |
| M | 4/3 | TBN | CV | Embryonic vascular and collateral development; Journal Article | |
| W | 4/5 | Reading Day | CV | | |
| | | | | ***Renal disease*** | Arendshorst |
| F | 4/7 | Lori O'Brien | | TBN | |
| M | 4/10 | Bill Arendshorst | Renal | Control of Renal Sodium Excretion by the Renin-Angiotensin-Aldosterone System | EXAM 2 – neuro, CV; due Monday at 8AM |
| W | 4/12 | Emily Chang | Renal | Pathways of renal fibrosis | |
| F | 4/14 | University Holiday | Renal | | |
| M | 4/17 | Bill Arendshorst | Renal | Role of Angiotensin AT1 Receptors in the Regulation of Arterial Pressure; Journal Article | |
| | | | | ***Respiratory disease*** | Randell |
| W | 4/19 | Scott Randell | Respir | CFTR Directed Therapies as a Paradigm for Translational Research | |
| F | 4/21 | Scott Donaldson | Respir | Developing Novel Mucus Clearance Therapies for Lung Diseases | |
| M | 4/24 | Wayne Anderson | Respir | Genetics in Drug Discovery and Development | |

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| W | 4/26 | Rob Tarran | Respir | Bringing a Lung Drug to Market | |
| F | 4/28 | READING DAY | | | |
| M | 5/1 | EXAM DAY | | | |
| W | 5/3 | | | | EXAM 3 (renal / resp)<br>DUE WED at 8 am |