

Human Physiology in Medicine (MSBS 5081S)
Molecular Basis of Physiology (Rutgers 16:761:580)
Spring 2018 (3 credits)
Course Syllabus

Course Times: Mondays and Wednesdays, 3:30 – 5:00 pm

Room: V10, RWJMS Research Tower, 675 Hoes Lane, Piscataway, NJ

Course Director:

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Co-Director

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Course Description: This is a lecture/research paper discussion course covering the molecular basis of human physiological systems and related methodologies used in modern physiological and medical research. Designed to further extend and supplement areas covered in the companion course *Physiological Basis of Disease* (and courses in the core MBS/MSBS curriculum), this course is subdivided into six parts including: 1) Nerve, Muscle and Bone Physiology, 2) Hormones, Signal Transduction, and Regulation of Gene Expression, 3) Sensory Physiology (hearing, taste, vision, smell, pain), 4) Cellular and Physiological Homeostasis, 5) Pathophysiology of Metabolic Diseases, and 6) Regenerative Medicine. A total of 24 lectures will be given by a diverse group of expert scientists and physicians from across the Rutgers, CINJ and RWJMS research communities. Given the interdisciplinary nature of the course, no single textbook will be used. Rather, clinically relevant research papers, review articles or specific book chapters (assigned by each lecturer) will be available for downloading at the RWJMS AMP website or via the Rutgers RWJMS Library website.

Grading: Master's students will take three **multiple-choice type question** exams each worth 25% of final grade. Ph.D. students will take three **essay type question** exams each worth 25% of final grade. Class participation is 25% of final grade.

Lecturer Contact Information:

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Lecture and Exam Schedule:

<u>Topic</u>	<u>Lecturer</u>	<u>Date</u>
Course Introduction	Fondell and Fan	Mon. Jan. 22
I. Nerve, Muscle and Bone Physiology		
a. Membrane potentials/action potentials	Runnels	Mon. Jan. 22
b. Neurons and synaptic transmission	Zhang	Wed. Jan. 24
c. Ca ²⁺ signaling and muscle contraction	Weiss	Mon. Jan. 29
d. Minerals and bone	Wang	Wed. Jan. 31
II. Hormones, Signal Transduction and Gene Expression		
a. Opioid Signaling	Pintar	Mon. Feb. 5
b. Growth factors/ <i>research paper discussion</i>	Fan	Wed. Feb. 7
c. mTOR signaling/ <i>research paper discussion</i>	Jacinto	Mon. Feb. 12
d. Nuclear Hormone Receptors/ <i>research paper discussion</i>	Fondell	Wed. Feb. 14
<i>EXAM I</i>		Mon. Feb. 19
III. Sensory Physiology		
a. TRP channels as cellular sensors	Runnels	Wed. Feb. 21
b. Taste	Runnels	Mon. Feb. 26
c. Audition/Hearing	Kwan	Wed. Feb. 28
d. Vision	Cai	Mon. Mar. 5
IV. Cellular and Physiological Homeostasis		
a. Lysosomal storage diseases and molecular therapies <i>spring recess</i> <i>spring recess</i>	Sleat	Wed. Mar. 7 Mon. Mar. 12 Wed. Mar. 14
b. Autophagy	Jin	Mon. Mar. 19
c. DNA repair/cell survival	Bunting	Wed. Mar. 21
d. Microbiome <i>self study</i>	Fan	Mon. Mar. 26 Wed. Mar. 28
<i>EXAM II</i>		Mon. Apr. 2
V. Pathophysiology of Metabolic Diseases		
a. Pathophysiology of Acid-Base disorders	Zachow	Wed. Apr. 4
b. Diabetes Mellitus	Zachow	Mon. Apr. 9
c. Diabetes Mellitus and Metabolic Syndrome	Zachow	Wed. Apr. 11
d. <i>research paper discussion</i>	Zachow	Mon. Apr. 16
VI. Regenerative Medicine		
a. Immunotherapy and cancer	Sant'Angelo	Wed. Apr. 18
b. Neuronal stem cells	Pang	Mon. Apr. 23
c. Stem cell regenerative medicine for disease	Cai	Wed. Apr. 25
d. Tissue engineering using biosynthetic materials <i>self study</i>	Olabisi	Mon. Apr. 30 Wed. May 2
<i>EXAM III</i>		Wed. May 9