

PHP 403
Cell and Molecular Physiology
3 Credit hours

Lectures: Mondays, Wednesdays, and Fridays, 1:00 – 2:00 pm
 Room 4-6912 (Anders Room)

This course is aimed to provide an introduction to the fundamental principles of modern cell and molecular physiology – the basic concepts in the field, the principal research questions, and common methodologies. Emphasis will be on a quantitative approach wherever possible, and the implications of the cellular and molecular principles addressed to the overall physiology of the body, in both healthy and diseased states, will be discussed. Course content will particularly focus on basic cellular physiology, neurobiological, and cardiovascular systems.

Course Co-Director	Room	Phone	E-Mail
Dr. Trevor J. Shuttleworth	4-5512	5-2076	trevor_shuttleworth@urmc.rochester.edu
Course Lecturers			
Dr. Paul Brookes	4-7412	3-1626	paul_brookes@urmc.rochester.edu
Dr. Robert T. Dirksen	4-6423	5-4824	robert_dirksen@urmc.rochester.edu
Dr. Andrei I. Ivanov	5-6131	6-4067	andrei_ivanov@urmc.rochester.edu
Dr. Paul J. Kammermeier	4-5408A	5-5606	paul_kammermeier@urmc.rochester.edu
Dr. Ingrid H. Sarelius	4-8531	5-7729	ingrid_sarelius@urmc.rochester.edu
Dr. Trevor J. Shuttleworth	4-5512	5-2076	trevor_shuttleworth@urmc.rochester.edu
Dr. Victor Yarotsky	4-5412	6-3070	victor_yarotsky@urmc.rochester.edu
Dr. David I. Yule	4-5314	3-2154	david_yule@urmc.rochester.edu

Faculty may be contacted directly, or by making an appointment through Linda Fullington, the course coordinator, in room 4-6441 (phone: 5-0447). Linda can also assist you with any administrative problems related to the course.

BOOKS:

There is no required text for this course – many of the faculty will have handouts specific to their material. It is recommended that students consider a textbook covering basic cell physiology. One such book is "Cellular Physiology" by Mordecai P. Blaustein, Joseph P.Y. Kao, and Donald R. Matteson – 2004, published in the Mosby Physiology Monograph Series by Elsevier/Mosby. This text will be available at the Medical Center Book Store.

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Fall 2010 Schedule – 3 credit hours

All classes are held in the Anders Room (4-6912)

Basic Cellular Physiology

Day/Date	Time	Lecture Title	Instructor
Wednesday September 8, 2010	1:00-2:00	Transport across membranes	Shuttleworth
Friday September 10, 2010	1:00-2:00	Carriers and Pumps	Shuttleworth
Monday September 13, 2010	1:00-2:00	Electrical gradients and ion channels	Shuttleworth
Wednesday September 15, 2010	1:00-2:00	Ion channel selectivity and permeation (+ patch clamp technique)	Yarotskyy
Friday September 17, 2010	1:00-2:00	Epithelial transport I	Ivanov
Monday September 20, 2010	1:00-2:00	Epithelial transport II	Ivanov
Wednesday September 22, 2010	1:00-2:00	Regulated exocytosis of proteins	Yule
Friday September 24, 2010	1:00-2:00	Endocytosis	Ivanov
Monday September 27, 2010	1:00-2:00	Anion channels and Cystic fibrosis	Shuttleworth
Wednesday September 29, 2010	1:00-2:00	Mitochondrial Physiology and Cell Energetics	Brookes
Friday October 1, 2010	1:00-2:00	Mitochondrial Physiology and Cell Energetics	Brookes
Monday October 4, 2010	1:00-3:00	EXAM I	

Nerve/Muscle Excitability

Wednesday October 6, 2010	1:00-2:00	Neuronal channels	Kammermeier
Friday October 8, 2010	1:00-2:00	Action potentials	Kammermeier
Monday October 11, 2010	1:00-2:00	Nerve conduction	Kammermeier
Wednesday October 13, 2010	1:00-2:00	Neuromuscular junction	Kammermeier
Friday October 15, 2010	1:00-2:00	Excitation-contraction coupling	Dirksen
Monday October 18, 2010	1:00-2:00	Muscle contraction and molecular motors	Dirksen

Wednesday October 20, 2010	1:00-2:00	Myotonia/periodic paralyses	Dirksen
Friday October 22, 2010	1:00-2:00	Central synapses	Kammermeier
Monday October 25, 2010	1:00-2:00	Synaptic channels	Kammermeier
Wednesday October 27, 2010	1:00-2:00	Synaptic plasticity	Kammermeier
Friday October 29, 2010	1:00-2:00	Local Anesthetics	Dirksen
Monday November 1, 2010	1:00-3:00	EXAM II	

Cardiovascular Microphysiology

Wednesday November 3, 2010	1:00-2:00	Cardiac ion channels	Dirksen
Friday November 5, 2010	1:00-2:00	Cardiac action potential	Dirksen
Monday November 8, 2010	1:00-2:00	The EKG	Dirksen
Wednesday November 10, 2010	1:00-2:00	Neuronal control of cardiac excitability	Dirksen
Friday November 12, 2010	1:00-2:00	Cardiac EC coupling and Contractility	Dirksen
Monday November 15, 2010	1:00-2:00	Smooth Muscle Contractility	Dirksen
Wednesday November 17, 2010	1:00-2:00	Regulation of Smooth Muscle Contractility	Dirksen
Friday November 19, 2010	1:00-2:00	Microcirculatory physiology I: Endothelial cell function	Sarelius
Monday November 22, 2010	1:00-2:00	Microcirculatory physiology II: Vascular smooth muscle - endothelial cell communication	Sarelius
Wednesday November 24, 2010		NO CLASS	
Friday November 26, 2010		THANKSGIVING HOLIDAY	
Monday November 29, 2010	1:00-2:00	Microcirculatory physiology III: Mechanotransduction	Sarelius
Wednesday December 1, 2010	1:00-2:00	Microcirculatory physiology IV: Regulation of permeability	Sarelius
Friday December 3, 2010		NO CLASS	
Monday December 6, 2010	1:00-3:00	EXAM III	