

GRADUATE COURSE ANNOUNCEMENT

Department of Physiology

MEMBRANE CARRIERS AND CHANNELS

GPLS 625 – Spring 2009

A 4-credit course to prepare students for advanced study and laboratory research on the mechanisms by which ions and small molecules are transported across biological membranes. This course reflects the amalgamation of two well established courses: MPHY 625 (Ion Channels) and 626 (Carriers). The course is composed of two sections. The first deals with the biochemistry and molecular biology of common plasma membrane active transport systems for ions, nutrients and neurotransmitters. The transport section also covers the relationships and interactions between transport proteins in the plasma membrane and intracellular membranes. The second section deals with the structure and function of ion channels, including coverage of the classical work of Hodgkin and Huxley as well a description of our current understanding of the molecular structure of ion channels as deduced from sequence analysis of the channel proteins and high resolution x-ray crystallography, and current hypotheses about the structural basis of channel selectivity and gating. The course will end with a discussion of the diverse roles played by ion channels in a wide range of human diseases.

Grades will be determined by four exams each of which will account for 25% of the overall grade. The course will start on **Friday, January 23rd at 10:30am**. Lectures will be presented each **Monday, Wednesday and Friday from 10:30am to noon in Room 450 Howard Hall**. Lecturers will include faculty from Biochemistry, Pharmacology, Physiology, Pharmacy, UMBI and the NIH.

Prerequisites: GPLS core course or equivalent or consent of the course director.
Minimum of five students required.

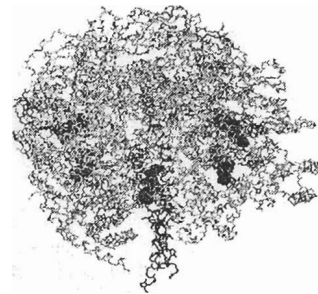
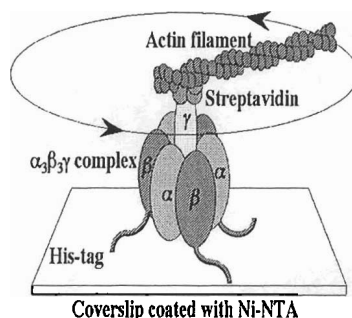
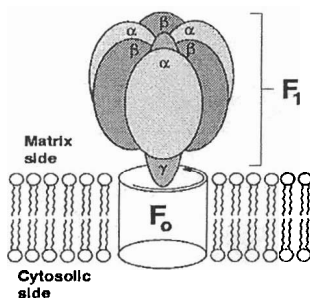
Credits: 4

For Further Information Contact:

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AMINO ACIDS, DRUGS, IONS, NEUROTRANSMITTERS, STEROIDS, SUGARS,
PUMPS and CHANNELS

ELECTRICALLY EXCITABLE MEMBRANES

3/23	Goldman	Origin of the Action Potential I
3/25	Goldman	Origin of the Action Potential II
3/27	Goldman	Origin of the Action Potential III
3/30	Goldman	Origin of the Action Potential IV
4/1	Goldman	Origin of the Action Potential V
4/3	Staff	Computer Simulation

ION CHANNEL DIVERSITY

4/6	Matteson	Ca Channels
4/8	Krueger	K Channels

GATING MECHANISMS

4/10	Matteson	Introduction to Voltage-Dependent Gating
4/13	Matteson	Gating Currents
4/15	Matteson	Gating Modifiers

4/17 EXAM 3

4/20	Matteson	Noise Analysis
4/22	Matteson	Single Channel Gating

PERMEATION AND SELECTIVITY

4/24	Krueger	Permeation and Selectivity I
4/27	Krueger	Permeation and Selectivity II
4/29	Krueger	Permeation and Selectivity III
5/1	Krueger	Permeation and Selectivity IV

STRUCTURE-FUNCTION RELATIONSHIPS/CHANNELOPATHIES

5/4	Matteson	Structure-Function Relationships I: Gating
5/6	Krueger	Structure-Function Relationships II: Permeation
5/8	Krueger	Channelopathies

5/11 EXAM 4