

V80.0210

Fall 2007
Cellular and Molecular Neuroscience

Faculty:

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Office hours: By Appointment

T.A. to be announced

Prof. Eric Klann 1006 Meyer

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Office hours: By appointment

Schedule:

All lectures will be held in room 815, Meyer, Mon and Wed, 11-12:15.

All laboratories will be held in room 612 Silver Bldg, Wed. 2-6.

Reading Material:

The required text readings appear as 'Fain' and 'MQ' in the syllabus. Articles will be assigned at a later date.

Fain: Molecular and Cellular Physiology of Neurons, (Academic Press 1999)

MQ: Meyer and Quenzer, Psychopharmacology: Drugs, the Brain and Behavior (Sinauer, 1997)

PPW: Fine Structure of the Nervous System, Peters, Palay and Webster

For supplemental reading, the following books are recommended and will be on reserve:

The Biochemical Basis of Neuropharmacology, JR Cooper, FE Bloom & R.H. Roth (Oxford UP. 1995)

Fundamental Neuroscience, Zigmond, Bloom, Landis, Roberts & Squire, (AP 1999)

Introduction to Molecular Neurobiology, Z. Hall (Sinauer, 1992)

Exams and Grading:

There will be two 70-minute exams and a 2-hour final exam. The first exam will cover material taught through early October and will count for 25% of the final grade. The second exam will cover material taught through the first week of November and will also count for 25% of the final grade. Material taught in November and December will be included in the comprehensive, cumulative Final Exam, which will count for 50% of the final grade. Exams will ask mostly for essay-type answers.

Term Paper:

One 5-10 page term paper may be used to substitute for a low grade on Exam 1 or Exam 2. The paper must be written on a mutually agreed-upon topic, based on one or more articles selected by the instructors. The due date for the term paper is the first week of December. The paper should contain the following sections: hypothesis or question addressed by the scientist(s), background and significance of the topic chosen, description of the experimental design and results, YOUR critique of the design and results presented in the paper (e.g., whether the results strengthen or weaken the hypothesis, whether any more experiments are needed to further test the hypothesis, your suggestion for a revised hypothesis, what new questions emerge as a consequence of the results obtained from the experiments). In order to assure a grade B or better for the paper, a best-effort rough draft should be submitted no later than November 27 and a one-to-one meeting with either Dr. Klann or Dr. Reyes subsequent to that submission is advised. Plagiarism in the term paper will lead to a grade, F, for the course and will be reported to the Dean's Office.

V80.0210 Cellular & Molecular Neuroscience Lecture Series

Sept 5 W	Cellular and molecular neuroscience and its importance (Reyes and Klann)	Fain 1
Sept 10 M	Synaptic structure and function (Ostroff)	QM p 33 - 40
Sept 12 W	EM Demo for those not taking the lab section (Ostroff)	PPW
Sept 17 M	Passive electrical membrane properties of neurons (Reyes)	Fain 2
Sept 19 W	Ion-selective conductances: resting membrane potential (Reyes)	Fain 3
Sept 24 M	Action potentials:Hodgkin Huxley equations (Reyes)	Fain 5
Sept 26 W	Voltage-gated ion channels: fast potassium and sodium channels (Reyes) LK 4	Fain 6
Oct 1 M	Voltage-gated ion channels: diversity and effects on firing (Reyes) LK 6	Fain 7
Oct 3 W	Class Presentation of Ultrastructural Observations (Ostroff)	PPW
Oct 8 M	Review Session	
Oct. 10 W	Exam 1: topics covered up to Oct 16	
Oct. 15 M	Conduction of Action potentials	Fain 5, handout
Oct 17 W	Synaptic transmission I: presynaptic mechanisms (Reyes)	Fain 8
Oct 22M	Synaptic transmission I: postsynaptic mechanisms (Reyes)	Fain 9
Oct 24 W	Coupling between transducers and ion-selective channels: Mechanoreception (Reyes)	Fain 15
Oct. 29 M	Coupling between transducers and ion-selective channels: photo- and olfactory receptors	Fain 16
Oct. 31 W	Neural Networks	handout
Nov. 5 M	Review	
Nov. 7 W	Exam 2: Cumulative of material covered up to Oct. 31	
Nov. 12 M	Glutamate I: Excitation memory and excitotoxicity (Klann)	MQ 7
Nov. 14 W	Glutamate II: Diversity of cellular responses (Klann)	MQ 7
Nov 19 M	GABA: Epilepsy and anxiety (Klann)	MQ 7,17
Nov 21 W	Noradrenergic and cholinergic system: vigilance and attention deficit disorder (Klann)	MQ 5,6,12, articles
Nov 26 M	Dopamine, Parkinson's disease & Schizophrenia (Klann)	MQ 5,11,18,articles
Nov 28 W	Serotonin and affective disorders (Klann)	MQ 6,14,16
Dec 3 M	Neuroactive peptides: Opiates, pain and addiction (Klann)	MQ 8,10
Dec 5 W	Review: Neurotransmitters and synaptic plasticity (Klann) articles	
Dec 10 M	Review: Neurotransmitters and diseases (Klann) articles	