

V80.0210

Fall 2009
Cellular and Molecular Neuroscience

Instructors:

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Office hours: Tuesday, 12:30-1:45 and 4:55-6:10

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', 'MQ' and 'PPW' in the syllabus:

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

MQ: Meyer and Quenzer, Psychopharmacology: Drugs, the Brain and Behavior (Sinauer, 2005)

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

Articles will be assigned at a later date.

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

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

Hille, Ion Channels of Excitable Membranes (Sinauer, 2001)

Cooper, Bloom & Roth, The Biochemical Basis of Neuropharmacology (Oxford 1995)

Exams and Grading:

There will be two 60-minute exams and a 2-hour final exam. The first exam will cover material taught through September and will count for 25% of the final grade. The second exam will cover material taught through October and will also count for 25% of the final grade. Material taught in November and December will be included in the final exam, which will count for 50% of the final grade. Exams will involve short essay-type answers.

V80.0210 Cellular & Molecular Neuroscience – Lecture Series

Date	Instructor	Description	Reading
Sept 9 W	Carter / Aoki	Cellular and molecular neuroscience and its importance	Fain 1
Sept 14 M	Aoki	Neuronal structure and function	PPW
Sept 16 W	Carter	Passive electrical membrane properties of neurons	Fain 2
Sept 21 M	Carter	Ion channels, pumps and resting membrane potential	Fain 3 & 4
Sept 23 W	Carter	The action potential: Hodgkin-Huxley experiments & equations	Fain 5
Sept 28 M	Carter	Voltage-gated ion channels: potassium and sodium channels	Fain 6
Sept 30 W	Carter	Voltage-gated ion channels: diversity and effects on firing	Fain 7
Oct 5 M	Carter / Aoki	Review Session	
Oct 7 W		Exam 1: topics covered up to Sept 30	
Oct 12 M	Carter	Synaptic transmission I: pre-synaptic mechanisms	Fain 8
Oct 14 W	Carter	Synaptic transmission II: post-synaptic mechanisms	Fain 9 & 10
Oct 19 M		SFN Meeting - No class	
Oct 21 W	Carter	Conduction of action potentials in axons and dendrites	Fain 2 & Articles
Oct 26 M	Carter	Coupling between transducers and ion-selective channels: Mechanoreception	Fain 15
Oct 28 W	Carter	Coupling between transducers and ion-selective channels: photoreception and olfaction	Fain 16
Nov 2 M	Aoki	EM Demo for those not taking the lab section	
Nov 4 W	Aoki	Class Presentation of EM Data	
Nov 9 M	Carter / Aoki	Review Session	
Nov 11 W		Exam 2: Cumulative of material covered up to Nov 4	
Nov 16 M	Aoki	Glutamate I: Excitation, memory and excitotoxicity	MQ 7
Nov 18 W	Aoki	Glutamate II: Diversity of cellular responses	MQ 7
Nov 23 M	Aoki	GABA: Epilepsy and anxiety	MQ 7 & 17
Nov 25 W	Aoki	Noradrenergic and cholinergic systems: vigilance and attention deficit disorder	MQ 5, 6 & 12 Articles
Nov 30 M	Aoki	Dopamine, Parkinson's disease and schizophrenia	MQ 5, 11 & 18 Articles
Dec 2 W	Aoki	Serotonin and affective disorders	MQ 6, 14 & 16
Dec 7 M	Aoki	Neuroactive peptides: Opiates, pain, and addiction	MQ 8 & 10
Dec 9 W	Aoki	Review: Neurotransmitters and synaptic plasticity	Articles
Dec 14 M	Aoki	Review: Neurotransmitters and diseases	Articles