

V80.0210

Fall 2010
Cellular and Molecular Neuroscience

Instructors:

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Prof. Chiye Aoki, 1056 Meyer

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TA:

Hannah Seong

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:

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

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

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)

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

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

Exams and Grading:

The course is divided into two halves. For Dr. Carter's half, the grade will be based on 2 quizzes (each worth 10% of the total grade) and an exam (worth 30% of the total grade). For Dr. Aoki's half, the grade will be based on 2 quizzes (each worth 10% of the total grade), the exam (25%) and Student Presentations (5%).

V80.0210 Cellular & Molecular Neuroscience – Lecture Series

Date	Instructor	Description	Reading
Sept 8 W	Carter / Aoki	Introduction: The cell biology of neurons	Fain 1
Sept 13 M	Carter	Passive electrical membrane properties	Fain 2
Sept 15 W	Carter	The resting membrane potential	Fain 3
Sept 20 M	Carter	The action potential I: Hodgkin-Huxley experiments	Fain 5
Sept 22 W	Carter	The action potential II: Hodgkin-Huxley experiments	Fain 5
Sept 27 M	Carter	Ion channels I: recordings Quiz #1 – Covers material from Sept 13 to Sept 22	
Sept 29 W	Carter	Ion channels II: structure	Fain 6
Oct 4 M	Carter	Ion channels III: diversity	Fain 7
Oct 6 W	Carter	Axons and dendrites	Fain 2
Oct 11 M	Carter	<i>No Class – Columbus Day</i>	
Oct 13 W	Carter	Synaptic transmission I: connectivity Quiz #2 – Covers material from Sept 27 to Oct 6	
Oct 18 M	Carter	Synaptic transmission II: pre-synaptic mechanisms	Fain 8
Oct 20 W	Carter	Synaptic transmission III: ionotropic receptors	Fain 9
Oct 25 M	Carter	Synaptic transmission IV: metabotropic receptors	Fain 11
Oct 27 W	Carter	Exam #1 – Covers material from Sept 13 to Oct 25	
Nov 1 M	Aoki	Ultrastructure of the nervous system; Neuroanatomical techniques	http://synapses.clm.utexas.edu/ MQ4 and Brain Navigator (NYU Library subscription)
Nov 3 W	Aoki	EM demo for those not taking the lab section	http://synapses.clm.utexas.edu/
Nov 8 M	Aoki	Glutamate and diseases of the excitatory pathways - ALS, Huntington's disease	MQ7
Nov 10 W	Aoki	GABA, epilepsy and anxiety	MQ7 and MQ17
Nov 15 M	Aoki	Quiz #3 – covers material from Nov 1 to Nov 10	
Nov 17 W	Aoki	Dopamine and Parkinson's disease	MQ5
Nov 22 M	Aoki	Serotonin, hallucinogens and affective disorders	MQ 6 and MQ14, MQ 16
Nov 24 W	Aoki	Norepinephrine, acetylcholine, vigilance and sleep	MQ5, MQ6 & 12
Nov 29 M	Aoki	Opiates, pain and addiction Quiz #4 – covers material from Nov 15 to Nov 29	MQ 8 & 10; Koya et al., Nature Neurosci (2009) 12: 1069
Dec 1 W	Aoki	Students' Group Presentation Synapses associated with nicotine addiction	doi: 10.1371/journal.pone.0008616
Dec 6 M	Aoki	Students' Group Presentation: A neural circuit for Circadian regulation of arousal	Gary Aston-Jones et al., Nature Neurosci (2001) 4: 732
Dec 8 W	Aoki	Students' Group Presentation GABAergic regulation of the critical period	Fagioli & Hensch Nature (2000) 404: 183; Neuron 53 (2007) 805
Dec 13 M	Aoki	Students' Group Presentation Hormonal regulation of hippocampal plasticity	Cleveland Clinic J of Med 71 suppl 2 (2004): S4-10
Dec 15 W	Aoki	Review	
Dec 20 M 10 am	Aoki	Exam #2 – covers material from Nov 1 to Dec 13	