### NEURL-UA 211 (formerly V80.0210) Fall 2013 Cellular and Molecular Neurobiology

#### Instructors:

Prof. Alex Reyes, 1057A Meyer Phone: 212-998-3994 <u>alex.reyes@nyu.edu</u> Office hours: By Appointment

Prof. Chiye Aoki, 1056 Meyer Phone: 212-998-3929 <u>ca3@nyu.edu</u> Office hours: By Appointment

# <u>TA:</u>

TBA Recitations: Tuesdays, 12:30-1:45 and 4:55-6.10

## Schedule:

Lectures will be held in room 815, Meyer, Mon and Wed, 11-12:15 Laboratories will be held in room 612 Silver Bldg, Wed, 2-6

The following books are recommended and on reserve:

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

**MQ:** Meyer and Quenzer, <u>Psychopharmacology: Drugs, the Brain and Behavior</u>, 2<sup>nd</sup> Edition (Sinauer, 2012)

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

Cooper, Bloom & Roth, <u>The Biochemical Basis of Neuropharmacology</u> (Oxford 1995)

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

Articles will be assigned at a later date.

## Exams and Grading:

There will be two 2-hour exams and one 1-hr quiz. The first exam will cover material taught through September and October and will count for 50% of the final grade. The one-hour quiz will count for 20% of the final grade and the final exam will count for 25% of the final grade. Another 5% of the final grade will be based on class participation during the months of November and December.

Nov 11 MAokiReview of ultrastructure of the nervous systemhttp://synapses.clm.utexas.edNov 13 WAoki <i>Quiz on materials from Oct 28 to Nov 11 (20%)</i> Nov 18 MAokiDopamine: receptors, Parkinson's disease, and schizophreniaMQ 5, 12 and 20 (suggested) ArticlesNov 20 WAokiNorepinephrine: receptors, vigilance, and stressMQ 5 (suggested) ArticlesNov 25 MAokiSerotonin: receptors, depression, and aggression ArticlesMQ 6, 19 and 15 (suggested) ArticlesNov 27 WAokiOpiates: receptors, peptides, and painMQ 8 and 9 (suggested) ArticlesDec 2 MAokiHormones, mood swings and the hippocampusArticlesDec 4 WAokiReview: Excitatory synapses. Synaptogenesis, LTP, LTD, excitotoxicityArticlesDec 9 MAokiReview: Cellular and molecular biological techniques that reveal connectivityArticles	Date	Instructor	Description	Reading
Sept 11 W     Reyes     The resting membrane potential Problem Set #1     Fain 3       Sept 18 M     Reyes     The action potential I: Hodgkin-Huxley experiments     Fain 5       Sept 18 W     Reyes     The action potential I: Hodgkin-Huxley experiments     Fain 6       Sept 28 M     Reyes     Ion channels I: physiology     Fain 6       Sept 28 W     Reyes     Ion channels II: structure Problem Set #2     Fain 7       Oct 2 W     Reyes     Ion channels II: structure Problem Set #2     Fain 7       Oct 2 W     Reyes     Synaptic transmission I: pre-synaptic mechanisms     Fain 8       Oct 1 W     Reyes     Synaptic transmission II: post-synaptic mechanisms     Fain 9       Oct 14 M     Reyes     Synaptic transmission III: integration     Articles       Oct 14 M     Reyes     Synaptic transmission III: integration     Articles       Oct 14 M     Reyes     Review     Fain 9       Oct 20 K     Reyes     Molterm - Covers material from Sept 4 to Oct 21       Oct 20 K     Review     MO 8 a 18 articles       Oct 30 W     Aoki     Glutamate I: receptors, incoline/addiction and moleciels	Sept 4 W	Reyes	Introduction: The cell biology of neurons	Fain 1
Problem Set #1Problem Set #1Sept 18 WReyesThe action potential II: Hodgkin-Huxley experimentsFain 5Sept 18 WReyesIon channels I: physiologyFain 6Sept 23 MReyesIon channels II: structureFain 6Problem Set #2Problem Set #3Fain 7Sept 25 WReyesIon channels III: structureFain 7Oct 2 WReyesIon channels III: drugstlyFain 7Oct 2 WReyesAxons, dendrites and synapsesFain 2Oct 7 MReyesSynaptic transmission I: post-synaptic mechanismsFain 8Oct 7 MReyesSynaptic transmission I: post-synaptic mechanismsFain 9Oct 14 MReyesSynaptic transmission II: post-synaptic mechanismsFain 9Oct 14 MReyesReviewFain 9Oct 14 MReyesReviewFain 9Oct 21 MReyesReviewMoclass – Fail BreakOct 23 WReyesMidterm – Covers material from Sept 4 to Oct 21Oct 24 WReyesMidterm – Covers material from Sept 4 to Oct 21Oct 23 WReyesMidterm – Covers material from Sept 4 to Oct 21Oct 24 WAokiGaBA: receptors, anxiety, and epilepsyMQ 8 a18 ArticlesNov 4 MAokiAcetylcholine: receptors, factines diction and ArticlesMQ 7 and 13 ArticlesNov 11 MAokiDepamine: receptors, Parkinson's disease, and ArticlesMQ 5 (12 and 20 (suggested) ArticlesNov 13 WAokiSerotonin: receptors, parkinson's disease, a	Sept 9 M	Reyes	Passive electrical membrane properties	Fain 2
Sept 16 M     Reyes     The action potential I: Hodgkin-Huxley experiments     Fain 5       Sept 18 W     Reyes     The action potential II: Hodgkin-Huxley experiments     Fain 5       Sept 23 M     Reyes     Ion channels I: physiology     Fain 6       Sept 25 W     Reyes     Ion channels II: structure     Fain 6       Sept 30 M     Reyes     Ion channels II: structure     Fain 7       Oct 2 W     Reyes     Axons, dendrites and synapses     Fain 7       Oct 7 M     Reyes     Synaptic transmission I: pos-synaptic mechanisms     Fain 8       Oct 7 W     Reyes     Synaptic transmission II: post-synaptic mechanisms     Fain 9       Oct 14 M     Reyes     No Class – Fall Break     Fain 9       Oct 14 M     Reyes     Synaptic transmission III: integration     Articles       Oct 23 W     Reyes     Review     MO     Articles       Oct 30 W     Aoki     Glutamate I: receptors, excitation, and signaling Articles     MQ 8 A18 Articles       Nov 4 M     Aoki     Acetylcholine: receptors, incotine/addiction and neuromuscular disease, and Articles     MQ 5 12 and 20 (suggested) Articles       <	Sept 11 W	Reyes		Fain 3
Problem Set #2     Problem Set #2       Sept 25 W     Reyes     Ion channels I: physiology     Fain 6       Sept 25 W     Reyes     Ion channels II: structure     Fain 6       Sept 30 M     Reyes     Ion channels III: diversity     Fain 7       Oct 2 W     Reyes     Axons, dendrites and synapses     Fain 2       Oct 7 M     Reyes     Synaptic transmission I: pre-synaptic mechanisms     Fain 8       Oct 9 W     Reyes     Synaptic transmission II: post-synaptic mechanisms     Fain 9       Oct 14 M     Reyes     Synaptic transmission III: integration     Articles       Oct 16 W     Reyes     Review     Fain 9       Oct 17 M     Reyes     Review     Fain 9       Oct 16 W     Reyes     Synaptic transmission III: integration     Articles       Oct 23 W     Reyes     Midterm – Covers material from Sept 4 to Oct 21     Oct 23 W       Oct 28 M     Aoki     Glutamate I: receptors, excitation, and signaling neuromuscular disease     MO 8 a18 Articles       Nov 4 M     Aoki     Acetylcholine: receptors, nicothe/addiction and neuromuscular disease, and Articles     MO 7 and 13 Articles <td>Sept 16 M</td> <td>Reyes</td> <td></td> <td>Fain 5</td>	Sept 16 M	Reyes		Fain 5
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techniques that reveal connectivity	Dec 9 M	Aoki	Review: Amblyopia, ocular dominance plasticity and	Articles
Dec 16 M Aoki Final - covers material from Oct 28 to Dec 11	Dec 11 W	Aoki		Articles
	Dec 16 M	Aoki	Final – covers material from Oct 28 to Dec 11	

(25%)
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