

# Neuronal Plasticity: 2011

Biology 23.1001.001

4 Credits Tuesday-Thursday

Professor Efrain Azmitia

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## I. Introduction, Cell Cytoskeleton

1/25: Introduction: Did Ramon y Cajal predict it all 100 years ago?

1/27 Cytoskeleton, Shape, Microtubules, Mitosis

2/1 Growth Cone, Actin-Myosin, Attachment Factors, Transport

2/3 ASTROCYTES & NGF, BDNF A Neuronal trophic Factor: binding to Trk-B

## II. Neuronal Systems

2/8 Point to Point: Cholinergic Specificity

2/10 Glutamate, GABA Apoptosis is the end, isn't it? Necrosis Mechanical, Anoxia, Antioxidants

2/15 Test 1, Discussion of Readings

2/17 Global Systems ; Projections and Sprouting Receptors; Trophic Role of Neurotransmitters

## III. Development and Aging

2/22 Patterns of Development: Differentiation & Determination

2/24 Developmental Disorders: FAS, Autism, Phenylketonuria

3/1 Hippocampus neurogenesis & Synaptic Plasticity

3/3 Spines and Synapses Memory; PSP

3/8 Cortical neurogenesis

3/10 Stem Cells Adult mitosis, BrdU, Neuroprogenitor

3/14-3/19 Spring Break

3/22 Test 2, Discussion of Readings.

## IV. Clinical

3/24 Dementia; Microglial Cells; Inflammation, Cytokines

3/29 Homeostasis & Rhythms

3/31 Anxiety & Stress

4/5 Depression

## V. Drugs

4/7 Drugs Addiction

4/12 Marijuana

4/14 Mind Expanding Drugs

4/19 Test 3 and Discussion of readings

## VI. Independent Work

4/21 Email Assignment: Choose topic and Papers

4/26 Student Presentations

4/28 Student Presentations

5/3 Student Presentations

5/5 Student Presentations

TBA Final Paper Due Final Examination

## Grades

Tests 1-3	30%
Final Exam	20 %
Presentation	20 %
Paper	30 %

Test will be detailed and cover material presented on the PowerPoint presentation. All question formats will be used including True/False, multiple choice, fill in the blank and short essay. The test mean will be a "B" and 1 standard deviation above this an "A" and one below a "C." The final will consist of a selection of the questions from test 1-3 as well as material from the student presentations.

## Presentation (20%)

The presentation will consist of a PowerPoint talk to the class of 10-15 min with no more than 10 slides. The slides should be brought to class using USB memory stick.

- (1) The organization will be to first choose a topic and submitted for approval by the professor by email. The topic must be an area of plasticity covered in class!
- (2) In addition the student is to summarize the specific area historically using a time line.
- (3) Name the current leading laboratories in the area.

- (4) Highlight 1-2 papers and discuss why they are important and critique them.
- (5) Propose an important question that remains to be addressed and propose an experiment to answer this specific question.

## **Term Paper Brain Papers (30 % of Grade)**

You are required to hand in a term papers for this course which will count for 30% of your grade. The paper are to be 5000 words in length, double space, 12 pt. Arial font with 0.5 margins and submitted on line to your T.A. The paper is due the day of the final examination.

The paper will follow the same outline as your presentation.

Please refer to specific information garnered in the course and how this has led to your interest and knowledge in this area. The paper should make frequent reference to *Neuronal Plasticity* material and it must be clear to the professor reading this paper that the ideas are yours and based on information presented in class. Please list and discuss articles from the WEB, scientific papers, newspaper articles and books that have shaped your thinking. **Make sure all referenced material used in the paper is in quotes.**

**Submitting unedited detailed academic accounts copied verbatim from the WEB or other sources is not allowed and proven cases of plagiarism, no matter how brief, will result in loss of all 30% of your grade and submission of your name to the graduate school director in Biology.**