Course Title: Cellular and Molecular Mechanisms of Learning and Memory (NS191C)

Instructor: Cui-Wei (Tracy) Xie, M.D., Ph.D.
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Guest Speakers: Dr. Bruce Kagan (bkagan@npih.mednet.ucla.edu)
Dr. James A. Waschek (jwaschek@npih.mednet.ucla.edu)

Prerequisite: M101C preferred, but not an absolute request.

Credits: 4
3 hr class, plus one hr per week for student preparation.

Enrollment: 15

Format: Introductions by the instructor and guest speakers for each topic,
Student presentations and group discussions of selected articles from current literatures

Grading: Letter grades* will be determined as follows:
33% paper reading and participation in the group discussion
33% oral presentation
34% term paper
* Only one integrated grade will be given at the end of quarter.

Course Web site: http://www.lsic.ucla.edu/

Class rooms: MRL Rm 2740

Office hour: Monday, 1-3 pm, NPI 78-168
Weekly Schedule: *, lectures by the instructor or guest speakers, the rest is for student presentation and discussion.

Wk 1. Course Introduction *
Wk 2. Long-term potentiation (LTP): induction and expression*  
   Student presentations: early-phase LTP
Wk 3. Late-phase LTP
Wk 4. Long-term depression (LTD)
Wk 5. Neurogenesis and structural changes during synaptic plasticity and learning
Wk 6. The role of local protein synthesis in synaptic plasticity and memory
Wk 7. Professor James A. Waschek: Genetic and Molecular Approaches to Learning and Memory*  
   Student presentation
Wk 8. Student presentations
Wk 9. Professor Bruce Kagan: Alzheimer dementia *
   Student presentation
Wk 10. Student presentations

Reading Assignment:

Students can choose a research article from the following list or from current literature for their oral presentations. Review articles in each section (A-C) are required reading materials but not for presentations. Course Reader that includes all the papers listed below is available at COURSE READER MATERIAL, 1141 Westwood Blvd, (310) 443-3303.

A. LTP and LTD Models (Week 1-6)

Review Articles


Research Articles

LTP: induction, expression and early phase


**LTP: late phase**


**LTD and depotentiation**


**Neurogenesis and structural changes during synaptic plasticity and learning**


**Local protein synthesis: role in synaptic plasticity and memory**
dendritic translation of CaMKIIalpha impairs stabilization of synaptic plasticity and memory
2. Vickers CA, Dickson KS, Wyllie DJ (2005) Induction and maintenance of late-phase long-
term potentiation in isolated dendrites of rat hippocampal CA1 pyramidal neurons. J Physiol
568, 803-813.
dependent LTP in isolated dendrites of CA1 pyramidal cells. Hippocampus 15, 551-556.

B. Genetic and Molecular Approaches to Learning and Memory

Review Article


Research Articles

CaMKII translocation requires local NMDA receptor-mediated Ca2+ signaling. Embo J 25,
5873-5883.
3. Chang, EH, Savage, MJ, Flood, DG, Thomas, JM, Levy, RB, Mahadomrongkul, V, Shirao,
T, Aoki, C., Huerta, PT (2006) AMPA receptor downscaling at the onset of Alzheimer's
disease pathology in double knockin mice. Proc Natl Acad Sci USA 103, 3410-3415.

C. Learning, Memory and Behavioral Disorders

Review Articles

20-25.

Research Articles

3. Lacor, PN, Buniel, MC, Chang, L, Fernandez, SJ, Gong, Y, Viola, KL, Lambert, MP,

Books or Book Chapters for References: