

Molecular signaling pathways in synaptic plasticity
Course Information and Syllabus
Spring 2018

Course Organizer: Dr. Oliver Schlüter
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(e-mail works best)

Class Schedule: Tuesday/Thursday 8 - 9:15 am; A221 Langley Hall
Office consultations: contact by email as needed to schedule appointment. E.g. Wed. 9-10am

Course Objective: This class focuses on signaling mechanisms, which underlie long-term synaptic plasticity. It will address the molecular pathways, which regulate thresholds for synaptic plasticity, the synaptic machinery for induction and expression of long-term synaptic plasticity and how it is converted to structural changes of the neural network, which might underlie the consolidation of memory. The presentations will be guided by experimental approaches, which have influenced the conceptual framework.

Students completing this course should:

- understand the basic principles of signaling pathways in the synapse and neuron
- understand how these signaling pathways are linked to long-term synaptic plasticity and memory
- start to identify experimental questions addressing aspects of synaptic plasticity and formulate experimental approaches to test them

Course Website: Information and documents pertinent to the course can be found at <http://courseweb.pitt.edu>.

Organization of Course Content

Class will be organized by topics.

Tentative topics are: Introduction/Repetitorium of long-term synaptic plasticity
Synaptic tagging and memory correlates
Gating of long-term synaptic plasticity and the coincidence of three signals
The postsynaptic density as a hot spot for synaptic signaling
Local protein translation in dendrites
The CaMKII protein family and calcium signaling

G-protein coupled signaling
Metabotropic glutamate receptor signaling
Adenylyl Cyclase signaling
Growth hormone receptors
Receptor protein tyrosine kinases
Protein phosphatases in synaptic plasticity
Signalosomes and signaling specificity
Specifics and limitations of different experimental approaches to identify the function of proteins

Course Requirements

Weekly reading assignments:

posted on webcourse, 0-3 hrs/week time commitment outside of class

Lecture prerequisites:

Intro to Neuroscience
Synaptic Transmission
(Synaptic Plasticity, recommended)

Exams

Written exam at middle and end of course, based on course content
Example quizzes will be provided for lectures, which will be discussed at the beginning of the next class.

Grading Policy

Attendance and class discussion, including quizzes contribution 20% and exam 80%

Policy on late work and make-ups

Late work and make-ups are only available for special requests.