



Neurophysiology

a.a 2018/19

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- Moodle web site for Neurophysiology:
 - Cohort 2016/semester 3

<http://cmb.i-learn.unito.it/course/view.php?id=146>

PROGRAM

01.10.18 - 02.10.18 : Cell membrane permeability: fluxes across the plasma membrane. Transporters classification

Fluxes and laws for neutral species and electrolytes

Fick

Nernst-Planck

Goldman-Hodgkin-Katz

08.10.18 - 09.10.18 - 15.10.18 : A modern classification of transporters and pumps. Functional roles. Ion channels: classification, structural and functional properties

16.10.17: Electric Excitability of the cells. Action Potential. Hodgkin and Huxley's analyses of the squid giant axon. Amplitude and frequency coding.

22 - 23.10.18: no teaching (out of Torino). Can we find a date to retrieve the class?

Electrophysiology: history and techniques. Patch clamp. Calcium imaging

Postsynaptic and receptor potentials.

29.10.18 - 30.10.18: Synaptic transmission: presynaptic mechanisms; Ca^{2+} and transmitters release; postsynaptic mechanisms

05- 06 - 07.11.18: teaching Prof Gkika

05.11.18 = 3h

06.11.18 = 3h

07.11.18 = 2h

Topics:

Role of ion channels in the sensory processes of cold sensation, nociception as well as hypersensitivity to cold and cold allodynia: introduction on main physio- and pathological components of thermosensation and nociception by presenting the different central and peripheral area involved in the production, transmission and regulation of the nervous signals (central brain areas, ascendant and descendant pathways, role of inflammation, neuropathic pain). Molecular basis of nociception by focusing: role of TRP, TRPK, K2P and ASIC channels in nociception.

12.11.18 - 13.11.18:

Ca^{2+} signals and Ca^{2+} indicators probes

Or

Genetic approaches to control neural living cells: OPTOGENETIC, CHEMOGENETIC and MAGNETOGENETIC

From 19.11.18 to 27.11.17:

I CFU Prof Buffo.

19.11.18

26.11.18

04.12.18

17.12.18

Topics:

Physiology of photoreceptors. Receptive fields of visual neurons. Retinotopic maps and columnar organization of the visual cortex. Principles of motion perception and color vision.

Exam evaluation

- **Research Essay:** This at-home assignment will refer to specific topics of the course. The essay (up to 2000 characters + figures, tables and references) will be prepared by groups of normally three students and presented orally by the end of the semester. The Research Essay will give rise to additional points to the final grade of final exam. Correspondence between vote to the Research Essay and additional points for final exams is as follows: **22-23, 0.5 - 1 points; 24-25, 3 points; 26-27, 4 points; 28-30, 6 points.**
- **Oral exam** based on the topics presented during the course. The maximum grade will be 26/30. Any additional points obtained by the Research Essay will be added to the final exam of the first exam session. Grading 31-33 will give rise to " 30 cum laude"

Research essays organization

- **By 15.11.18:** topic choice and group composition = by mail
- **By 26.11.18:** first meeting (30') to present the outline and work partitions within the groupwork
- **By 12.12.18:** second meeting (30') to check the work in progress
- **01.01.19:** Deadline for research essay
- **Week january 07-08 2019:** Mini workshops (10'+5' discussion). Research essay: (up to 2000 characters + figures, tables and references)