

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:

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

09.10.18– 15.10.18

Ion channels: classification, structural and functional properties.

16.10.17: Calcium imaging. Ca²⁺ indicators probes

22 – 23. 10. 18: no teaching

25.10.18 (3h) – 29.10.18 – 30.10.18: Postsynaptic and receptor potentials. Synaptic transmission neuro-muscular junction: presynaptic mechanisms; Ca²⁺ and

transmitters release; postsynaptic mechanisms.

Synaptic transmission integration in the CNS

05– 06 – 07. 11. 18: Prof Gkika

05. 11. 18 = 2h (Aula Monod)

06. 11. 18 = 3h (Aula 5)

07.11.18 = 3h (Aula 5)

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, TREK, K2P and ASIC channels in nociception.

12.11.18 - 13.11.18 : Genetic approaches to control neural living cells: OPTOGENETIC, CHEMOGENETIC and MAGNETOGENETIC

From 19.11.18 to 27.11.18: 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 Assay:** This at-home assignment will refer to specific topics of the course. The essay (up to 2000 words + 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 **maximum 11 points** to the final grade of final exam.
- **Final exam** - This exam will be an oral exam based on the topics presented during the course. The **maximum grade will be 20 points.** Any additional points obtained by the Research Assay will be added to the final exam of the first exam session. Grading 3 I will give rise to " 30 cum laude"