Testi in italiano

**Lingua insegnamento**

English

**Contenuti (Dipl.Sup.)**

Contents of the course will be discussed in the light of recent theoretical concepts and experimental data about mechanisms regulating signal transduction, electrical membrane properties of excitable cells and the organization of central and peripheral synapses. The course consists of three Parts and the contents are illustrated hereafter.


Part 2 (Prof. Annalisa Bernareggi): Basic principles of synaptic transmission. The neuromuscular junction: anatomic organization, role of trophic factors in neuromuscular junction development (agrin, MusK and rapsyn), properties of neromuscular nicotinic cholinergic receptors (fetal and adult). Disorders in the neuromuscular junction: myasthenia gravis, the Lambert-Eaton myasthenic syndrome, the congenital myasthenic syndrome and the muscular dystrophies.

### Testi di riferimento

- Selected scientific papers or other didactical material could be provided.

### Obiettivi formativi

1) **Knowledge and understanding**
   
   The purpose of the course is to provide a sound basis of membrane biophysics, ion channels and receptors to understand the fundamental molecular processes responsible for chemical and electrical cell communication. In particular, the course will focus on the mechanisms responsible for cellular excitability, in both central and peripheral nervous systems. The students will also learn the principal experimental methods for in vitro studies at the single cell level.

2) **Applying knowledge and understanding**
   
   The students will acquire the ability to design the most appropriate experimental plan to investigate molecular mechanisms involved in cell signalling in excitable cells.

3) **Making judgements**
   
   The students will develop abilities for the critical reading of scientific publications, analysis and interpretation of scientific data in the field of cell communication in neurobiology.

4) **Communication skills**
   
   The written test and the oral examination encourage the students to develop scientific writing abilities and oral communication skills.

5) **Learning skills**
   
   At the end of the course the students will possess knowledge and critical reading abilities to continue their training independently, adapting themselves to new knowledge and technologies in cell signalling in neurobiology.

### Prerequisiti

Knowledge of fundamental cell biology.

### Metodi didattici

Lectures and practical experiences.

### Altre informazioni

None.

### Modalità di verifica dell'apprendimento

One written test is organised during the course. It consists in writing the abstract of a scientific paper related to the topics of the course. The scientific paper is provided to the students in the classroom with Abstract and Discussion hidden to stimulate their understanding and critical skills and scientific writing abilities.

At the end of the course, students are required to take a final oral examination consisting in a discussion of 30 min, during which the students are invited to describe and comment on topics covered in the course.

The final mark is decided also considering the results of the written test (+ max 1.5/30).

### Programma esteso

Contents of the course will be discussed in the light of recent theoretical concepts and experimental data about mechanisms regulating signal transduction, electrical membrane properties of excitable cells and the organization of central and peripheral synapses.

The course consists of three Parts and the contents are illustrated hereafter.

**Part 1: Signal transduction.**

**Part 2: Basic principles of synaptic transmission.**
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Part 2 (Prof. Annalisa Bernareggi): Basic principles of synaptic transmission. The neuromuscular junction: anatomic organization, role of trophic factors in neuromuscular junction development (agrin, MusK and rapsyn), properties of neuromuscular nicotinic cholinergic receptors (fetal and adult). Disorders in the neuromuscular junction: myasthenia gravis, the Lambert-Eaton myasthenic syndrome, the congenital myasthenic syndrome and the muscular dystrophies.


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At the end of the course the students will possess knowledge and critical reading abilities to continue their training independently, adapting themselves to new knowledge and technologies in cell signalling in neurobiology.

Knowledge of fundamental cell biology.

Lectures and practical experiences.

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Part 2: Basic principles of synaptic transmission.
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Part 3: Synaptic transmission in CNS.
Characterization of ion channels, intrinsic membrane electrical properties of neurons, pacemaker mechanisms. Principles of chemical and electrical synaptic transmission: quantal release, neurotransmitters, synaptic receptors, integration of synaptic potentials, synaptic plasticity, dendritic spines and their remodelling.