# Testi del Syllabus

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| Resp. Did. | **LORENZON PAOLA** | **Matricola: 005762** |

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| Docenti | **BERNAREGGI ANNALISA, 2 CFU**<br>**LORENZON PAOLA, 3 CFU**<br>**SCIANCALEPORE MARINA, 3 CFU** |
| Anno offerta: | **2016/2017** |
| Insegnamento: | **901SM - NEUROFISIOLOGIA MOLECOLARE** |
| Corso di studio: | **SM54 - NEUROSCIENZE** |
| Anno regolamento: | **2016** |
| CFU: | **8** |
| Settore: | **BIO/09** |
| Tipo Attività: | **B - Caratterizzante** |
| Anno corso: | **1** |
| Periodo: | **Primo Semestre** |
| Sede: | **TRIESTE** |

## Testi in italiano

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| **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 1: Signal transduction. Intracellular receptors. Receptor tyrosine kinases. G protein-coupled receptors. Signaling through second messengers. Regulation of the intracellular Ca2+ homeostasis. Spatial and temporal organization of intracellular Ca2+ signalling: oscillations and waves. Spatial organization of the intracellular cAMP signalling. Experimental approaches to study the signal transduction in living cells: fluorescent probes and imaging techniques. Part 2: 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. 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. |
| **Testi di riferimento** | B. Hille, “Ion Channels of Excitable Membranes”, Sinauer Associate Inc. Part I: Chapter 1-5 (third edition). L. R. Squire et al., “Fundamental Neuroscience”, Academic Press. Selected scientific papers or other didactical material could be provided. |

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| **Obiettivi formativi** | The purpose of this 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. |
| **Prerequisiti** | Knowledge of fundamental cell biology. |
| **Metodi didattici** | Lectures and practical experiences. |
| **Altre informazioni** | None. |
| **Modalità di verifica dell'apprendimento** | Oral discussion. |
| **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. Intracellular receptors. Receptor tyrosine kinases. G protein-coupled receptors. Signaling through second messengers. Regulation of the intracellular Ca2+ homeostasis. Spatial and temporal organization of intracellular Ca2+ signalling: oscillations and waves. Spatial organization of the intracellular cAMP signalling. Experimental approaches to study the signal transduction in living cells: fluorescent probes and imaging techniques. Part 2: 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. 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. |