



# UNIVERSITÀ DEGLI STUDI DI PALERMO

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| DEPARTMENT              | Biomedicina, Neuroscienze e Diagnostica avanzata                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                      |                  |
| ACADEMIC YEAR           | 2023/2024                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                      |                  |
| MASTER'S DEGREE (MSC)   | NEUROSCIENCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                      |                  |
| INTEGRATED COURSE       | NEUROPATHOLOGY AND NEUROLOGY - INTEGRATED COURSE                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                      |                  |
| CODE                    | 21878                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                      |                  |
| MODULES                 | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |                  |
| NUMBER OF MODULES       | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                      |                  |
| SCIENTIFIC SECTOR(S)    | MED/04, MED/26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                      |                  |
| HEAD PROFESSOR(S)       | DIELI FRANCESCO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Professore Ordinario | Univ. di PALERMO |
| OTHER PROFESSOR(S)      | LA BELLA VINCENZO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Professore Ordinario | Univ. di PALERMO |
|                         | DIELI FRANCESCO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Professore Ordinario | Univ. di PALERMO |
| CREDITS                 | 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                      |                  |
| PROPAEDEUTICAL SUBJECTS |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                      |                  |
| MUTUALIZATION           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                      |                  |
| YEAR                    | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                      |                  |
| TERM (SEMESTER)         | 2° semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |                  |
| ATTENDANCE              | Mandatory                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                      |                  |
| EVALUATION              | Out of 30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                      |                  |
| TEACHER OFFICE HOURS    | <p><b>DIELI FRANCESCO</b><br/> Wednesday 12:00 - 14:00 Central Laboratory of Advanced Diagnosis and Biomedical Research (CLADIBIOR) c/o Policlinico Universitario, Via del Vespro 129, Palermo. Il docente riceve soltanto per appuntamento, per cui è necessario contattare il docente per e.mail con un certo anticipo.</p> <p><b>LA BELLA VINCENZO</b><br/> Wednesday 11:00 - 12:00 stanza di studio del docente Centro Esperto SLA Via G La Loggia 1 - 90129 Palermo 1° piano c/o Laboratorio Neurochimica</p> |                      |                  |

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| <b>PREREQUISITES</b>      | In order to understand the content and learning objectives of the course, the student must have basic knowledge of the anatomical, biochemical, and immunological foundations of the nervous system. It is also important to have a good background on the cellular and molecular biology of the neuron and glia.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>LEARNING OUTCOMES</b>  | <p>Knowledge and understanding of the fundamental concepts of the disciplines of the module, of the pharmacological bases of therapies, of the pathological, etiopathogenic and clinical foundations of the main diseases of the nervous system. Knowledge and understanding of genetics, neurochemistry and neuroimaging correlates of the main neurological disorders.</p> <p>Autonomy of judgment in the critical evaluation of the scientific literature in the neuropathological and neurological fields and acquisition of communication skills with professionals in the sector and related disciplines. Ability to apply knowledge and understanding in the development of an original research hypothesis.</p> <p>Ability to learn the neuropharmacological foundations of nervous system therapy. Learning the pathological bases, the etiopathogenetic and clinical foundations of diseases of the nervous system.</p> <p>The student must demonstrate a good ability to use the notions learned to orient himself in the context of understanding and recognizing the foundations that allow him/her to frame the neurological diseases in the context of a clinical-pathogenetic, pathological and therapeutic standpoint</p> <p>The student must demonstrate technical skills in immunology laboratory (flow cytometry, microscopy, confocal microscopy).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>ASSESSMENT METHODS</b> | <p>The evaluation will be made through an oral test with a top score of 30/30. The test will consist of a minimum of 3/6 questions, spanning the courses of the module, which will cover the fundamental concepts of immune response and inflammation, neuroimmunology, cancer biology and pathological, etiopathogenic and clinical foundations of the main diseases of the nervous system (with reference to the textbooks recommended by the teachers). The answers should highlight the student's ability to master the topics of the module and the ability to interpret concrete cases. The following is the evaluation scheme.</p> <p>30-30 and praise: excellent knowledge of the contents of the lesson, the student demonstrates high analytical-synthetic skills and is able to apply knowledge to solve complex problems.</p> <p>27-29: excellent knowledge of teaching content and excellent language skills, the student demonstrates analytical-synthetic skills and is able to apply knowledge to solve problems of medium/high complexity.</p> <p>24-26: good knowledge of the content of teaching and good language skills, the student is able to apply knowledge to solve medium complexity problems.</p> <p>21-23: sufficient knowledge of the content of teaching, in some cases limited to the main topics, acceptable ability to use the specific language of the discipline and to apply the acquired knowledge independently.</p> <p>18-20: minimum/limited knowledge of the content of the teaching, often limited to the main topics, modest ability to use the specific language of the discipline and apply the acquired knowledge independently.</p> <p>Insufficient: the student does not have an acceptable knowledge of the main contents of the teaching, very little or no ability to use the specific language of the discipline and to apply the acquired knowledge independently.</p> |
| <b>TEACHING METHODS</b>   | Lectures. To critically read and analyze both reviews and scientific papers in high impact journals. Immunopathology and neuropathology laboratory activities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

## MODULE NEUROPATHOLOGY

*Prof. FRANCESCO DIELI*

### SUGGESTED BIBLIOGRAPHY

Robbins & Cotran - Pathologic Basis of Disease. Kumar, Abbas, Aster. Tenth Edition, 2020. ISBN: 978-0-323-53113-9.

|                               |                                        |
|-------------------------------|----------------------------------------|
| <b>AMBIT</b>                  | 50505-Discipline del settore biomedico |
| <b>INDIVIDUAL STUDY (Hrs)</b> | 98                                     |
| <b>COURSE ACTIVITY (Hrs)</b>  | 52                                     |

### EDUCATIONAL OBJECTIVES OF THE MODULE

The aim of the module I of the General Pathology is the understanding of the causes and the mechanisms that alter the health status, leading to the disease. It will be both from a molecular and a cellular point of view, with particular regard to the mechanisms responsible for main pathologies of the nervous system. After examining the mechanisms and the cellular and molecular mediators involved in the onset of the disease, some models of pathologies will be used to provide concrete examples of the pathophysiological processes underlying it. Furthermore, the concept of positive biology will be introduced, mentioning the main tools useful in the prevention of cell damage. Another fundamental objective will be to transmit to students the importance of the acquisition of concrete and certain scientific evidence, obtained from a careful and deep study of the literature.

## SYLLABUS

| Hrs | Frontal teaching                                                                                                                                                                                         |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4   | Variation of blood count during inflammation: normal values and their alteration. Cytometric diagnosis of haematological diseases. Anemias: physiopathological and laboratory classification.            |
| 4   | Acute inflammation: definition and biological significance, the mediators of inflammation. Proinflammatory cytokines and chemokines, and interferons. Various types of exudates.                         |
| 2   | Chronic inflammation: principal causes of chronic inflammation, cells and mediators of chronic inflammation, phases of the process, causes and phases of granuloma formation and related human diseases. |
| 2   | The systemic effects of inflammation: acute phase proteins, erythrocyte sedimentation rate, leukocytosis, fever and the effect of the cytokines on the hypothalamus.                                     |
| 8   | The immune system: overview, innate and adaptive immunity.                                                                                                                                               |
| 4   | Hypersensitivity reactions, immunological tolerance and autoimmune diseases.                                                                                                                             |
| 4   | Neuroimmunology: general concepts and neurodegenerative diseases.                                                                                                                                        |
| 8   | Cancer: etiology, pathogenesis, classification, metastasis.                                                                                                                                              |
| 4   | Aging and longevity: epidemiology of aging, theories of aging, stem cells, autophagy, biological and chronological age.                                                                                  |
| Hrs | Workshops                                                                                                                                                                                                |
| 6   | Immunology laboratory.                                                                                                                                                                                   |
| 6   | Applications of molecular biology and bioinformatics in clinical diagnostics                                                                                                                             |

## MODULE NEUROLOGY

*Prof. VINCENZO LA BELLA*

### SUGGESTED BIBLIOGRAPHY

Dispense, reviews, scientific papers, fornite dal Docente

libri: Hendelman WJ, Humpheys P, Skinner C: The integrated Nervous System. A systematic diagnostic approach. CRC Press

Edizione 2010 - ISBN 978-1-4200-4597-0 hardcover

|                               |                                               |
|-------------------------------|-----------------------------------------------|
| <b>AMBIT</b>                  | 20879-Attività formative affini o integrative |
| <b>INDIVIDUAL STUDY (Hrs)</b> | 51                                            |
| <b>COURSE ACTIVITY (Hrs)</b>  | 24                                            |

### EDUCATIONAL OBJECTIVES OF THE MODULE

The educational objective of the Neurology Course is to provide students with theoretical tools for i) understanding neurological diseases; (ii) Identification of the etiopathogenetic mechanisms involved in neurological disorders, iii) the aetiological theories and of the biological basis for therapy. Particular importance will be given to topics relating to the biological mechanisms that determine the various diseases of the nervous system. The student will learn how to transfer the acquired knowledge into experimental practice.

## SYLLABUS

| Hrs | Frontal teaching                                                                                                                                                                                                                                                               |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2   | Opening Lecture. The clinical history in neurology. The clinical method in neurology. The main neurological disorders. Major neurological syndromes (eg, pyramidal, extrapyramidal, ataxia, spinal cord syndromes, somatosensory deficits)                                     |
| 2   | Higher nervous functions. The memory. Disorders of consciousness. The locked-in syndrome. Basics of neurological examination. Biological and antibody diagnostic workup. Instrumental work-up (EMG / ENG, Evoked Potentials, EEG, TC, RMN, PET, SPECT, special investigations) |
| 2   | Stroke and Cerebrovascular diseases. Extrapyramidal Disorders I (Parkinson's Disease and parkinson-plus diseases). Synucleinopathies                                                                                                                                           |
| 2   | Extrapyramidal Disorders II: non parkinsonian movement disorders: dyskinesias, dystonias, tics, myoclonus, restless leg syndrome; Huntington's disease; syndrome of Gilles de la Tourette*                                                                                     |
| 2   | Neuromuscular disorders I: motor neuron diseases                                                                                                                                                                                                                               |
| 2   | Neuromuscular disorders II: myasthenia syndromes, muscular diseases, neuropathies                                                                                                                                                                                              |
| 2   | Demyelinating Diseases and Multiple Sclerosis. Autoimmune encephalitis. Paraneoplastic syndrome                                                                                                                                                                                |
| 2   | Neurogenetic diseases: dominant and recessive hereditary ataxias. Hereditary spastic paraparesis; The genetic counselling and workup in Neurology                                                                                                                              |
| 2   | Epilepsy. Sleep disorders                                                                                                                                                                                                                                                      |
| 2   | Dementia : mild cognitive impairment and Alzheimer's Disease; Frontotemporal degeneration and Dementia – Tauopathies - Lewy's Dementia and Cognitive Disorders in Extrapyramidal Diseases                                                                                      |
| 2   | Biology of the malformative diseases of Nervous System Disorders and neural tube defects                                                                                                                                                                                       |
| 2   | Prion encephalopathies                                                                                                                                                                                                                                                         |