Testi del Syllabus

Resp. Did.	**STOCCO GABRIELE**	**Matricola: 011178**

Docenti	**FLORIO CHIARA, 2 CFU** **SGUBIN DONATELLA, 3 CFU** **STOCCO GABRIELE, 2 CFU**

Anno offerta:	**2020/2021**
Insegnamento:	**779SM - NEUROANATOMIA E NEUROFARMACOLOGIA**
Corso di studio:	**SM54 - NEUROSCIENZE**
Anno regolamento:	**2020**
CFU:	**7**
Settore:	**BIO/14**
Tipo Attività:	**B - Caratterizzante**
Anno corso:	**1**
Periodo:	**Primo Semestre**
Sede:	**TRIESTE**

🇮🇹 Testi in italiano

Lingua insegnamento	English
Contenuti (Dipl.Sup.)	The course is composed of three parts: PART 1 (Prof. Donatella Sgubin): NEUROANATOMY 1. Central Nervous System (references on embriology, neurons, glial cells) 2. Spinal Cord (surface, sections) 3. Midbrain (surface, sections) 4. Pons (surface, sections) 5. Medulla Oblongata (surface, sections) 6. Cerebellum (surface, nuclei, references on inputs and outputs) 7. Diencephalon (thalamus, subthalamus, epithalamus, ipothalamus, pituitary gland) 8. Cerebral emispheres (surface, gyri, scissures, lobes, areas, white matter, limbic system) 9. Basal ganglia and internal capsule 10. Motor pathways 11. Sensory pathways 12. Dura mater, arachnoid, pia mater 13. Ventricles 14. References on cerebral vasculature (Willis circle, venous sinuses) 15. References on cranial nerves PART 2 (Prof. Chiara Florio): NEUROPHARMACOLOGY PHARMACODYNAMIC: Drug molecular target: classification. Dose-effect relationship: Gradual and quantal dose-response curves. Affinity and intrinsic efficacy. Allosteric modulation. PHARMACOKINETIC: ADME (drug absorption, distribution, metabolism and excretion). Distribution volume, Renal clearance, Elimination half-time. Bioavailability and Bioequivalence. Pharmacokinetic models: linear and non-linear. THE AUTONOMIC NERVOUS SYSTEM: Anatomical and functional aspects. Cholinergic transmission: nicotinic and muscarinic receptors,

classification and pharmacological features. Adrenergic transmission: receptor classification and pharmacological features.
THE ENDOGENOUS OPIOIDS' SYSTEM: Endogenous opioids synthesis and degradation. Opioid receptors classification and pharmacological features
PART 3 (Prof. Gabriele Stocco): PHARMACOGENOMICS AND DRUGS OF THE CENTRAL NERVOUS SYSTEM
Elements of human genetic variation - basis on genetic variants affecting protein function and epigenetic effects of pharmacological relevance
OPIOIDS and opioid derivatives: pharmacogenomics aspects
ANTIDEPRESSANT DRUGS: ethiopathogenesis of depression. The monoaminergic, neuroendocrine and neurotrophic theories. Antidepressant drugs classifications and mechanisms of action
ANTIPSYCHOTIC DRUGS: ethiopathogenesis of psychosis. The dopaminergic and neurodevelopmental theories. Typical and atypical antipsychotic drugs and mechanisms of action. ANXIOLYTIC DRUGS. Neuronal circuits of anxiety. Anxiolytic drugs: classification and mechanisms of action
ANTI-EPILEPTIC DRUGS: ethiopathogenesis of epilepsy. Antiepileptic drugs: classification and mechanisms of action

Testi di riferimento	Part 1: Computer-aided teaching material will be supplied Parts 2 and 3: Rang, Ritter, Flower, Henderson "Rang & Dale's Pharmacology" Eighth Edition, Elsevier 2016
Obiettivi formativi	The aim of the part 1 is to provide students with a basic understanding of the structural organization of the human central nervous system in sufficient depth to form the basis for further clinical or research studies of the nervous system. The purpose of the parts 2 and 3 is to provide robust basis of Neuropharmacology, discussing the principles at the basis of the pharmacokinetic, pharmacodynamics and pharmacogenomics properties of drugs, particularly of those acting at the peripheral and central nervous system 1) Knowledge and understanding: at the end of the course, the students should have acquired the basic notions for the comprehension of the pharmacokinetic and pharmacodynamics properties of drugs and of their mechanism of action, with particular reference to drugs acting at the central nervous system. 2) Applying knowledge and understanding: at the end of the course, the students should be able to use the knowledges acquired (see point 1) for a proper use of drugs in experimental set-ups (in vivo as well as in vitro) as tools to validate hypothesis regarding the involvement of endogenous neurotransmitters in controlling physio-pathological conditions 3) Making judgements: at the end of the course, the students should be able to apply their pharmacokinetic and pharmacodynamics knowledges for a critical consideration of experimental results aimed at investigating the involvement of signaling molecules in physiological and pathological processes 4) Communication skills: at the end of the course, the students should be able to discuss clearly and with appropriate scientific terms pharmacological concepts 5) Learning skills: at the end of the course, the students should have a well-build background that should enable them to continue to enlarge autonomously and critically their knowledges about the pharmacokinetic and pharmacodynamics properties of drugs
Prerequisiti	Part 1: Knowledge of the fundamentals of cytology, biology, histology. Parts 2 and 3: Knowledge of principles of synaptic transmission and of mechanisms of intracellular signaling transduction pathways
Metodi didattici	Part 1: frontal lectures Parts 2 and 3: Computer-aided frontal lectures (slides with images and short texts reassuming the essential aspects of the lessons)

Altre informazioni	Part 1: Computer-aided teaching material will be supplied Part 2 and 3: Students are provided by the slides used during the frontal lessons thought Moodle. For further information, students are invited to contact dott. Florio by mail (florioc@units.it) using their institutional E-mail address Any necessary change in the course modalities due to COVID19 emergency will be published at the Department, Master Programme and Course websites.
Modalità di verifica dell'apprendimento	Part 1: Students are required to take a final oral examination. Parts 2 and 3: At the end of the course, students are required to take a final oral examination of 20-40 min consisting on three different topics covering the course program (1. Basic Pharmacology (pharmacokinetic and pharmacodynamics) or Autonomous nervous system, 2. Pharmacogenomics and 3. Drugs acting at the Central Nervous System). The student should demonstrate to be able to link together different topics of the program and to communicate the acquired knowledges in a precise and efficacious manner. The mark/30 must be equal or higher than 18. The final mark/30 is the arithmetic mean of Part 1 (Neuroanatomy) and Parts 2-3 (Neuropharmacology and Pharmacogenomics)
Programma esteso	The course is composed of three parts: PART 1 (Prof. Donatella Sgubin): NEUROANATOMY 1. Central Nervous System (references on embriology, neurons, glial cells) 2. Spinal Cord (surface, sections) 3. Midbrain (surface, sections) 4. Pons (surface, sections) 5. Medulla Oblongata (surface, sections) 6. Cerebellum (surface, nuclei, references on inputs and outputs) 7. Diencephalon (thalamus, subthalamus, epithalamus, ipothalamus, pituitary gland) 8. Cerebral emispheres (surface, gyri, scissures, lobes, areas, white matter, limbic system) 9. Basal ganglia and internal capsule 10. Motor pathways 11. Sensory pathways 12. Dura mater, arachnoid, pia mater 13. Ventricles 14. References on cerebral vasculature (Willis circle, venous sinuses) 15. References on cranial nerves PART 2 (Prof. Chiara Florio): NEUROPHARMACOLOGY PHARMACODYNAMIC: Drug molecular target: classification. Dose-effect relationship: Gradual and quantal dose-response curves. Affinity and intrinsic efficacy. Allosteric modulation. PHARMACOKINETIC: ADME (drug absorption, distribution, metabolism and excretion). Distribution volume, Renal clearance, Elimination half-time. Bioavailability and Bioequivalence. Pharmacokinetic models: linear and non-linear. THE AUTONOMIC NERVOUS SYSTEM: Anatomical and functional aspects. Cholinergic transmission: nicotinic and muscarinic receptors, classification and pharmacological features. Adrenergic transmission: receptor classification and pharmacological features. THE ENDOGENOUS OPIOIDS' SYSTEM: Endogenous opioids synthesis and degradation. Opioid receptors classification and pharmacological features PART 3 (Prof. Gabriele Stocco): PHARMACOGENOMICS AND DRUGS OF THE CENTRAL NERVOUS SYSTEM Elements of human genetic variation - basis on genetic variants affecting protein function and epigenetic effects of pharmacological relevance OPIOIDS and opioid derivatives: pharmacogenomics aspects ANTIDEPRESSANT DRUGS: etiopathogenesis of depression. The monoaminergic, neuroendocrine and neurotrophic theories. Antidepressant drugs classifications and mechanisms of action ANTIPSYCHOTIC DRUGS: ethopathogenesis of psychosis. The dopaminergic and neurodevelopmental theories. Typical and atypical antipsychotic drugs and mechanisms of action. ANXIOLYTIC DRUGS. Neuronal circuits of anxiety. Anxiolytic drugs: classification and

mechanisms of action
ANTI-EPILEPTIC DRUGS: etiopathogenesis of epilepsy. Antiepileptic drugs: classification and mechanisms of action

🇬🇧 Testi in inglese

	English

| | The course is composed of three parts:
PART 1 (Prof. Donatella Sgubin): NEUROANATOMY
1. Central Nervous System (references on embriology, neurons, glial cells)
2. Spinal Cord (surface, sections)
3. Midbrain (surface, sections)
4. Pons (surface, sections)
5. Medulla Oblongata (surface, sections)
6. Cerebellum (surface, nuclei, references on inputs and outputs)
7. Diencephalon (thalamus, subthalamus, epithalamus, ipothalamus, pituitary gland)
8. Cerebral emispheres (surface, gyri, scissures, lobes, areas, white matter, limbic system)
9. Basal ganglia and internal capsule
10. Motor pathways
11. Sensory pathways
12. Dura mater, arachnoid, pia mater
13. Ventricles
14. References on cerebral vasculature (Willis circle, venous sinuses)
15. References on cranial nerves
PART 2 (Prof. Chiara Florio): NEUROPHARMACOLOGY
PHARMACODYNAMIC: Drug molecular target: classification. Dose-effect relationship: Gradual and quantal dose-response curves. Affinity and intrinsic efficacy. Allosteric modulation.
PHARMACOKINETIC: ADME (drug absorption, distribution, metabolism and excretion). Distribution volume, Renal clearance, Elimination half-time. Bioavailability and Bioequivalence. Pharmacokinetic models: linear and non-linear.
THE AUTONOMIC NERVOUS SYSTEM: Anatomical and functional aspects. Cholinergic transmission: nicotinic and muscarinic receptors, classification and pharmacological features. Adrenergic transmission: receptor classification and pharmacological features.
THE ENDOGENOUS OPIOIDS' SYSTEM: Endogenous opioids synthesis and degradation. Opioid receptors classification and pharmacological features
PART 3 (Prof. Gabriele Stocco): PHARMACOGENOMICS AND DRUGS OF THE CENTRAL NERVOUS SYSTEM
Elements of human genetic variation - basis on genetic variants affecting protein function and epigenetic effects of pharmacological relevance
OPIOIDS and opioid derivatives: pharmacogenomics aspects
ANTIDEPRESSANT DRUGS: ethiopathogenesis of depression. The monoaminergic, neuroendocrine and neurotrophic theories. Antidepressant drugs classifications and mechanisms of action
ANTIPSYCHOTIC DRUGS: ethiopathogenesis of psychosis. The dopaminergic and neurodevelopmental theories. Typical and atypical antipsychotic drugs and mechanisms of action. ANXIOLYTIC DRUGS. Neuronal circuits of anxiety. Anxiolytic drugs: classification and mechanisms of action
ANTI-EPILEPTIC DRUGS: ethiopathogenesis of epilepsy. Antiepileptic drugs: classification and mechanisms of action |
| | Part 1: Computer-aided teaching material will be supplied
Parts 2 and 3: Rang, Ritter, Flower, Henderson "Rang & Dale's Pharmacology" Eighth Edition, Elsevier 2016 |

The aim of the part 1 is to provide students with a basic understanding of the structural organization of the human central nervous system in sufficient depth to form the basis for further clinical or research studies of the nervous system.

The purpose of the parts 2 and 3 is to provide robust basis of Neuropharmacology, discussing the principles at the basis of the pharmacokinetic, pharmacodynamics and pharmacogenomics properties of drugs, particularly of those acting at the peripheral and central nervous system

1) Knowledge and understanding: at the end of the course, the students should have acquired the basic notions for the comprehension of the pharmacokinetic and pharmacodynamics properties of drugs and of their mechanism of action, with particular reference to drugs acting at the central nervous system.

2) Applying knowledge and understanding: at the end of the course, the students should be able to use the knowledges acquired (see point 1) for a proper use of drugs in experimental set-ups (in vivo as well as in vitro) as tools to validate hypothesis regarding the involvement of endogenous neurotransmitters in controlling physio-pathological conditions

3) Making judgements: at the end of the course, the students should be able to apply their pharmacokinetic and pharmacodynamics knowledges for a critical consideration of experimental results aimed at investigating the involvement of signaling molecules in physiological and pathological processes

4) Communication skills: at the end of the course, the students should be able to discuss clearly and with appropriate scientific terms pharmacological concepts

5) Learning skills: at the end of the course, the students should have a well-build background that should enable them to continue to enlarge autonomously and critically their knowledges about the pharmacokinetic and pharmacodynamics properties of drugs

Part 1: Knowledge of the fundamentals of cytology, biology, histology.
Parts 2 and 3: Knowledge of principles of synaptic transmission and of mechanisms of intracellular signaling transduction pathways

Part 1: frontal lectures
Parts 2 and 3: Computer-aided frontal lectures (slides with images and short texts reassuming the essential aspects of the lessons)

Part 1: Computer-aided teaching material will be supplied
Part 2 and 3: Students are provided by the slides used during the frontal lessons thought Moodle. For further information, students are invited to contact dott. Florio by mail (florioc@units.it) using their institutional E-mail address

Any necessary change in the course modalities due to COVID19 emergency will be published at the Department, Master Programme and Course websites.

Part 1: Students are required to take a final oral examination.
Parts 2 and 3: At the end of the course, students are required to take a final oral examination of 20-40 min consisting on three different topics covering the course program (1. Basic Pharmacology (pharmacokinetic and pharmacodynamics) or Autonomous nervous system, 2. Pharmacogenomics and 3. Drugs acting at the Central Nervous System). The student should demonstrate to be able to link together different topics of the program and to communicate the acquired knowledges in a precise and efficacious manner. The mark/30 must be equal or higher than 18.
The final mark/30 is the arithmetic mean of Part 1 (Neuroanatomy) and Parts 2-3 (Neuropharmacology and Pharmacogenomics)

The course is composed of three parts:
PART 1 (Prof. Donatella Sgubin): NEUROANATOMY
1. Central Nervous System (references on embriology, neurons, glial

cells)
2. Spinal Cord (surface, sections)
3. Midbrain (surface, sections)
4. Pons (surface, sections)
5. Medulla Oblongata (surface, sections)
6. Cerebellum (surface, nuclei, references on inputs and outputs)
7. Diencephalon (thalamus, subthalamus, epithalamus, ipothalamus, pituitary gland)
8. Cerebral emispheres (surface, gyri, scissures, lobes, areas, white matter, limbic system)
9. Basal ganglia and internal capsule
10. Motor pathways
11. Sensory pathways
12. Dura mater, arachnoid, pia mater
13. Ventricles
14. References on cerebral vasculature (Willis circle, venous sinuses)
15. References on cranial nerves

PART 2 (Prof. Chiara Florio): NEUROPHARMACOLOGY
PHARMACODYNAMIC: Drug molecular target: classification. Dose-effect relationship: Gradual and quantal dose-response curves. Affinity and intrinsic efficacy. Allosteric modulation.
PHARMACOKINETIC: ADME (drug absorption, distribution, metabolism and excretion). Distribution volume, Renal clearance, Elimination half-time. Bioavailability and Bioequivalence. Pharmacokinetic models: linear and non-linear.
THE AUTONOMIC NERVOUS SYSTEM: Anatomical and functional aspects. Cholinergic transmission: nicotinic and muscarinic receptors, classification and pharmacological features. Adrenergic transmission: receptor classification and pharmacological features.
THE ENDOGENOUS OPIOIDS' SYSTEM: THE ENDOGENOUS OPIOIDS' SYSTEM: Endogenous opioids synthesis and degradation. Opioid receptors classification and pharmacological features

PART 3 (Prof. Gabriele Stocco): PHARMACOGENOMICS AND DRUGS OF THE CENTRAL NERVOUS SYSTEM
Elements of human genetic variation - basis on genetic variants affecting protein function and epigenetic effects of pharmacological relevance
OPIOIDS and opioid derivatives: pharmacogenomics aspects
ANTIDEPRESSANT DRUGS: etiopathogenesis of depression. The monoaminergic, neuroendocrine and neurotrophic theories. Antidepressant drugs classifications and mechanisms of action
ANTIPSYCHOTIC DRUGS: etiopathogenesis of psychosis. The dopaminergic and neurodevelopmental theories. Typical and atypical antipsychotic drugs and mechanisms of action. ANXIOLYTIC DRUGS. Neuronal circuits of anxiety. Anxiolytic drugs: classification and mechanisms of action
ANTI-EPILEPTIC DRUGS: etiopathogenesis of epilepsy. Antiepileptic drugs: classification and mechanisms of action