



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## COURSE SYLLABUS

### Pharmacology

2425-5-H4102D032-H4102D125M

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#### Aims

To learn the following aspects of the drugs acting on the main diseases of the peripheral and central nervous system: (1) cellular and molecular mechanisms of action; (2) pharmacokinetic properties; (3) therapeutic, side, and toxic effects; (4) drug-drug interactions; (5) pharmacogenetics determinants of drug responses; (5) the peculiarities of the pharmacological treatment of special subjects: pregnant and lactating women, elders, children; (6) the neurobiological basis of drug abuse and dependence.

#### Contents

- (1) Centrally acting analgesics (opioids)
- (2) Cannabinoids
- (3) Drugs and substances of abuse
- (4) Local and general anesthetics
- Drugs for the treatment psychiatric diseases:
  - (1) Anxiolytics and hypnotics
  - (2) Antidepressants and mood stabilizers
  - (3) Antipsychotics
- Drugs for the treatment of the main neurological diseases:
  - (1) Drugs for the treatment of neurodegenerative diseases
  - (2) Anti-seizure drugs
  - (3) Drugs for headache and migraine

#### Detailed program

Drug Addiction and dependence: overview of the effects of chronic drug use on the CNS and the adaptive responses that underlay withdrawal and dependence; key concepts include drug withdrawal and dependence, synapses and cell signalling and the modulation of neurotransmitters and biochemical pathways contributing to drug addiction; drug treatments of drug addiction.

Pain and analgesia in the CNS: overview of the peripheral and central nervous system mechanisms of pain and analgesia; nociceptive and neuropathic pain; modulatory mechanisms in nociceptive pathways, neurotransmitters involved in nociception, chemical signalling and the pharmacology of drugs such as opioids and cannabinoids which modulate pain.

Drug Addiction and dependence: overview of the effects of chronic drug use on the CNS and the adaptive responses that underlay withdrawal and dependence; key concepts include drug withdrawal and dependence, synapses and cell signalling and the modulation of neurotransmitters and biochemical pathways contributing to drug addiction; drug treatments of drug addiction.

Local and general anaesthetics: overview of the different types of local and general anaesthetic agents; mechanisms of action of a number of different commonly used anaesthetics; central nervous system effects; sites of action; adverse effects; effects on axonal and synaptic transmission.

Neurotransmitter and receptor systems in the peripheral and central nervous systems

Serotonin / Noradrenaline / Dopamine / Acetylcholine / GABA / Glutamate: synthesis and metabolism; main pathways in the CNS; receptor types; agonists and antagonists; general overview of therapeutic uses of drugs affecting neurotransmitter systems.

Neurological and psychiatric disorders – and drugs used to treat them

Parkinson's and Alzheimer diseases: mechanisms of action, efficacy and side-effects of commonly used pharmacological treatments.

Epilepsy: mechanisms of action, efficacy and side-effects of commonly used antiepileptics.

Cephalea and migraine: mechanisms of action, efficacy and side-effects of drugs used for prevention and treatment.

Anxiety and insomnia: mechanisms of action, efficacy and side-effects of anxiolytics and hypnotics.

Major depression and bipolar disorder: mechanisms of action, efficacy and side-effects of antidepressants and mood stabilizers.

Psychoses and schizophrenia: mechanisms of action, efficacy and side-effects of antipsychotic drugs.

## **Prerequisites**

Previous knowledge of the basic principles of chemistry, biochemistry, anatomy, physiology and pathology of peripheral and central nervous systems is required.

## **Teaching form**

8 frontal lessons (2 h each)

2 interactive lessons: work in groups preparation and discussion

## **Textbook and teaching resource**

Goodman and Gilman's The pharmacological basis of therapeutics, 13th ed. (2018) McGraw-Hill Education.

Stahl's Essential Psychopharmacology, 7th ed. (2021) Cambridge Medicine.

## **Semester**

First semester

## **Assessment method**

Oral examination on the topics covered in class.

## **Office hours**

On appointment (write to: [laura.musazzi@unimib.it](mailto:laura.musazzi@unimib.it))

## **Sustainable Development Goals**

GOOD HEALTH AND WELL-BEING | QUALITY EDUCATION | GENDER EQUALITY

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