UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Pharmacology

2627-5-H4102D091-H4102D134M

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.
In details, the course contributes to the following objectives:

1. Knowledge and understanding:
   Knowledge of the key elements of pharmacology, with attention to sex/gender and population differences.
2. Applied knowledge and understanding:
   Ability to apply acquired knowledge.
3. Independent judgment:
   Demonstrate a critical approach, constructive skepticism, and a creative, research-oriented attitude. Build awareness of the importance and limitations of scientific thinking based on information obtained from various resources.
4. Learning skills:
   Collect, organize, and critically interpret new scientific knowledge and health/biomedical information from various resources and databases.

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)

Sustainable Development Goals

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