# COURSE OF MEDICINE AND SURGERY
# 2015-2016

## PHARMACOLOGY I

**IV year**

| SSD | DISCIPLINE | TUTOR |
|---|---|---|
| BIO/14 | Pharmacology and Toxicology | Barbaccia Maria Luisa |
| BIO/14 | Pharmacology and Toxicology | Marco Trabucchi |
| BIO/14 | Pharmacology and Toxicology | Grazia Graziani |
| BIO/14 | Pharmacology and Toxicology | Angelo Aquino |
| BIO/14 | Pharmacology and Toxicology | Fiorenzo Battaini |
| BIO/14 | Pharmacology and Toxicology | Ornella Franzese |

**ECM 10**
Coordinator:
**M L Barbaccia**

**Specific aims**

The course of pharmacology will cover the most important topics of modern pharmacology through formal lectures, seminars and lectures on specific topics, such as pediatric clinical pharmacology (by prof. Gregory Kearns), that will be accessed by students of the course through the IAD platform.
At the end of the course, the students should demonstrate knowledge on: a) the principles of pharmacokinetics, pharmacodynamics and pharmacogenetics; b) the molecular/cellular mechanisms of action of different classes of therapeutic drugs, c) their therapeutic indications and d) their adverse effects/contraindications. Students should also learn the principles of toxicology, the major and clinically important drug-drug interactions, the methodology of clinical pharmacological research and of pharmacovigilance and how to critically read clinical study reports.

**PROGRAM**

Legend: **D** = deep knowledge of the topic is required; **G** = general knowledge of the topic is required **PHARMACOKINETICS** Routes of drug administration, dynamics of drug absorption and distribution; drug metabolism; drug elimination; drug kinetics after single or repeated administration; bioavailability and bioequivalence. **D PHARMACODYNAMICS** Mechanisms of drug action and relationships between drug concentration and effect; on-target and off -target effects of drugs; drug-receptor interaction, structure-activity relationship (agonist, antagonist, partial agonist, allosteric modulator); receptor modulation by drug exposure. **D PHARMACOGENETICS** Genetically determined variability of response to drugs. **D DRUG SIDE EFFECTS AND BASIC PRINCIPLES OF TOXICOLOGY** Risk/benefit ratio of drugs – therapeutic index; adverse drug reactions (ADRs), suspected unexpected serious adverse reactions (SUSARs); tolerance and physical dependence; mechanisms of drug-drug interactions. **D** Evaluation of drug and xenobiotic toxicity (dose-effect and time-effects relationships) **G DRUGS ACTING AT THE AUTONOMIC NERVOUS SYSTEM** Cholinergic- (muscarinic and nicotinic) agonists and antagonists; anticholinesterase agents; catecholamines, sympathomimetic drugs and adrenergic antagonists **D** Agents active at autonomic ganglia **G DRUGS ACTING AT THE CENTRAL AND PERIPHERAL NERVOUS SYSTEM** Drugs acting at the neuromuscular junction **G** Neurotransmitters, neuromodulators and neurohormones and their *receptors* ***D*** Drugs for: migraine; emesis; anxiety; hypnosis/sedation psychosis; mood disorders (depression/bipolar disorder); epilepsy; Parkinson disease; Alzheimer's and non-Alzheimer's dementia; pain (opiates); spasticity; **D** histamine antagonists; drug dependance (alcohol, opiates, barbiturates, psychostimulants). **D** General and local anestetics; drugs for appetite control; psychostimulants and hallucinogens **G DRUGS FOR PAIN, INFLAMMATION AND FEVER** Prostaglandins, thromboxanes, prostacyclins **G** Non steroidal anti-inflammatory drugs (NSAIDs) COX-1 and COX-2 selective; steroidal anti-inflammatory drugs (glucocorticoids); drugs for gout; anti-rheumatics (symptomatic, DMARDs, biologics). **D CARDIOVASCULAR DRUGS** Renin-angiotensin inhibitors; antihypertensives; drugs for shock; drugs for myocardial infarction; drugs for heart failure (acute and chronic/pulmonary edema); drugs for coronary artery disease (CAD); drugs for dyslipidemia; inhibitors of platelet aggregation; thrombolitics; anti-hemorragics; anticoagulants; drugs for anemia (erythropoietin, iron, folic acid, vitamin B12) **D** Antiarrhythmic drugs **G DRUGS FOR GI TRACT, LUNG, KIDNEY and BILIARY TRACT DISEASES** Drugs for gastric acid control (anti-H2, antacids, proton pump inhibitors); prokinetics, drugs to treat constipation and diarrhea; drugs for ulcerative colitis, Crohn disease, irritable bowel syndrome; drugs for gallstones; drugs for asthma. **D**

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**DRUGS ACTING ON THE ENDOCRINE SYSTEM** Oral and implantable contraceptives; androgens, estrogens, progestins and their antagonists/synthesis inhibitors and receptor modulators; adrenal hormones and their antagonists/synthesis inhibitors; drugs for the thyroid; insulin, oral and parenteral hypoglycemic drugs; drugs for uterine motility. **D** Anabolic steroids. **G IMMUNOPHARMACOLOGY** Leukocytes stimulating factors; immunosuppressive drugs. **G ANTIMICROBIAL AGENTS** General Principles of anti-microbial therapy (classification; drug resistance; pharmacokinetics; mechanisms of action; rational basis for drug selection and drug association; empirical, definitive and prophylactic therapy). **D ANTI-BACTERIAL AGENTS** Penicillins; cephalosporins; monobactam; carbapenems; β-lactamase inhibitors; glycopeptides; lipoglycopeptides; lipopeptides; cycloserine; fosfomycin; aminoglycosides; tetracyclines and glycylcyclines; macrolides and ketolides; lincosamides; streptogramins; c**ANTI-MYCOBACTERIAL AGENTS. D ANTIFUNGAL AGENTS. D ANTIVIRAL DRUGS** Anti-herpesvirus, anti-influenza, anti-hepatitis virus, anti-HIV agents. **D ANTIPROTOZOAL DRUGS**. **G ANTIHELMINTHIC DRUGS**. **G ANTI-CANCER CHEMOTHERAPY** General Principles of anti-cancer chemotherapy (classification, drug resistance, pharmacokinetics mechanisms of action; rational basis for drug selection and drug association) **CYTOTOXIC AGENTS** Alkylating and platinum agents; antimetabolites: folic acid analogues, purine and pyrimidine analogues; microtubule damaging agents: vinca alkaloyds, taxanes, epothilones, estramustine; camptothecin analogues; antibiotics: dactinomycin, anthracyclines, mitoxantrone; bleomycin; mitomycicn C; epipodophyllotoxins; bleomicin; mitomycin; trabectedin; l-asparaginase; hydroxyurea. **D DIFFERENTIATING AGENTS** Retinoids; arsenic trioxide; histone deacetylase inhibitors. **G TARGETED THERAPIES AND OTHER ANTICANCER DRUGS** Tyrosine kinase inhibitors, monoclonal antibodies; proteasome inhibitors; mTOR inhibitors; thalidomide and lenalidomide; DNA repair inhibitors. **D HORMONAL AGENTS FOR CANCER TREATMENT** Selective estrogen-receptor modulators and downregulators, aromatase inhibitors, gonadotropin-releasing hormone agonists and antagonists; anti-androgens. **G** hloramphenicol; oxazolidinones; sulfonamides and trimethoprim; fluoroquinolones; polymyxins; bacitracin; metronidazole. **D**

**PROGRAM**

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**Textbooks**

The Goodman and Gilman The Pharmacological Basis of Therapeutics, 12th edition (or updated edition), Laurence L Brunton, Bruce A. Chabner, Björn C. Knollmann, McGraw Hill.

**EXAM METHOD**

The knowledge acquired by each student will be assessed through an oral examination. According to the student's preference, the exam can be taken in one session or may be divided in two parts concerning: part 1, general pharmacology, antimicrobial agents and

**EXAM COMMISSION**

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| **Maria Luisa Barbaccia (President)** |
| **Marco Trabucchi** |
| **Grazia Graziani** |
| **Angelo Aquino** |
| **Fiorenzo Battaini** |
| **Ornella Franzese** |

**Tutor**

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