

REQUIREMENTS

Semmelweis University, Faculty of Medicine Department of Pharmacology and Pharmacotherapy
Name of the subject: Pharmacology II. Credits: 5 Total number of hours: 63 lectures: 28 practices: 35 Type of the course (mandatory/elective): mandatory
Academic year: 2021/2022
Code of the course¹: AOKFRM678_2A
Course director (tutor): Dr. Ferdinandy, Péter Contact details: Department of Pharmacology and Pharmacotherapy, 1089 Budapest, Nagyvárad tér 4. Tel: +36-1-2104416, e-mail: ferdinandy.peter@med.semmelweis-univ.hu Position: Head of Department, full professor Date of habilitation and reference number: June 2 2001., 26/2001 Hab.
Aim of the subject and its place in the curriculum: Pharmacology is a synthesizing subject, building on what has been learned in the past, especially physiology, biochemistry, pathology, and translational medicine, and is essential for the later acquisition of clinical knowledge. The subject includes: general pharmacology, detailed pharmacology, toxicology and basics of prescription writing. General pharmacology (pharmacodynamics, pharmacokinetics) aims to acquire the basic concepts and knowledge needed for pharmacological thinking, while in detailed pharmacology the student learns the main principles of the mechanism of action, therapeutic effects, adverse effects, major interactions, and partly dosing of medicines. The basics of toxicology describe the mechanisms and targets of major intoxications and thus provide a theoretical background for toxicology education. All of these competencies form the grounds to study clinical pharmacology and prepare students for the skill-level application of pharmacotherapeutic knowledge essential to clinical subjects.
Location of the course (lecture hall, practice room, etc.): Nagyvárad téri Elméleti Tömb, 1089 Budapest, Nagyvárad tér 4.
Competencies gained upon the successful completion of the subject: Students understand the pharmacological terminology, learn the mechanism of action, therapeutic effects, adverse effects, important interactions of drugs and the basics of dosing. They understand the mechanisms and targets of the most important poisonings, as well as the knowledge of the basic rules of prescription writing.
Prerequisite(s) for admission to the subject: Pharmacology I, Medical Microbiology I, Pathology I OR Pharmacology I, Medical Microbiology II, Internal medicine - propedeutics

Minimum and maximum number of students registering for the course: Since it is a mandatory subject all the students in the fourth year of medical education must register.

Student selection method in case of oversubscription:

N/A

How to register for the course:

Through the NEPTUN system

Detailed thematic of the course²:

- 1st week
 - Lecture: Local anaesthetics
 - Practice: Minor analgesics. Non-steroidal anti-inflammatory drugs (NSAIDs). Drugs affecting uric acid metabolism
- 2nd week
 - Lecture: Basics of central nervous system neurotransmission.
 - Practice: Drugs acting on opioid receptors
- 3rd week
 - Lecture: Antipsychotics
 - Practice: Sedative-hypnotics, anxiolytics
- 4th week
 - Lecture: Drugs acting on the extrapyramidal motoric system. Nootropic agents
 - Practice: Antidepressants, drugs against mania, mood stabilizers
- 5th week
 - Lecture: General anesthetics
 - Practice: Anticonvulsants (antiepileptics)
- 6th week
 - Lecture: Drugs influencing gastric acid secretion, drugs protecting gastric mucosa
 - Practice: Appetizers, drugs promoting digestion, antiemetics, prokinetic agents. Laxatives, drugs against diarrhea. Pharmacology of liver and bile. 3rd midterm.
- 7th week
 - Lecture: Antiviral drugs
 - Practice: Cell wall synthesis inhibitor antibiotics
- 8th week
 - Lecture: Antifungal drugs. Antimycobacterial drugs.
 - Practice: Protein synthesis inhibitor antibiotics
- 9th week
 - Lecture: Anthelmintic and antiprotozoal agents. Antiparasitic drugs.
 - Practice: Inhibitors of nucleic acid synthesis and antibiotics with other mechanisms of action.
- 10th week
 - Lecture: Summary of characteristics of antimicrobial agents
 - Practice: Cytotoxic anticancer drugs I.
- 11th week
 - Lecture: Immunopharmacology (cytotoxic agents, inhibitors of intracellular signaling, cytokine and cytokine receptor inhibitors)
 - Practice: Cytotoxic anticancer drugs II. Retinoids. 4th midterm
- 12th week
 - Lecture: Small molecule cytostatic, signal transmission inhibitor anticancer drugs. Anticancer drugs with hormonal mechanisms
 - Practice: Toxicology I.
- 13th week
 - Lecture: Anticancer antibodies. Immunostimulant anticancer agents. Other drugs used in therapies of cancer
 - Practice: Toxicology II. Basics of prescription writing
- 14th week
 - Lecture: Pharmacodynamic and pharmacokinetic basics of drug interactions
 - Practice: Contrast agents. Disinfectants, antiseptics.

Potential overlap(s) with other subjects: Physiology, biochemistry, molecular biology, pathology, microbiology, translational medicine, internal medicine, neurology, psychiatry, clinical pharmacology
Special training activities required³: N/A
Policy regarding the attendance and making up absences: Maximum number of absences is 25 percent of the number of practices in the semester. In the case of absence the student can attend another class the same week.
Means of assessing the students' progress during the semester⁴: There are no mandatory midterm tests during the semester.
Requirement for acknowledging the semester (signature): The number of absences must not be more than 25 percent of the number of practices in the semester.
Type of the examination: oral final exam

Exam requirements⁵:

One question is given from three topic lists each. Acceptable knowledge must be proven.

Topic list "A"

1. Pharmacodynamics I (Molecular targets of drugs. Drug receptors. Receptor theory.)
2. Pharmacodynamics II (relation between drug dose and clinical response, therapeutic index, tolerance, pharmacodynamic drug interactions).
3. Drug absorption, distribution and bioavailability. Membrane transport mechanisms.
4. Drug biotransformation and excretion, linear and non-linear kinetics. Enzyme inhibitors and enzyme inducers. Clearance, half-life, loading and maintenance dose. Pharmacokinetic drug interactions
5. Drugs acting on gastrointestinal and urogenital smooth muscles. Drugs influencing uterine function.
6. Histamine and antihistamines.
7. Glucocorticoids for oral and parenteral use
8. Mineralocorticoids. Topically applied glucocorticoids. Adrenocortical antagonists, inhibitors of corticosteroid synthesis.
9. Androgens, anabolic steroids, antiandrogens. Agents affecting the sexual activity
10. Estrogens and antiestrogens
11. Progestins and antiprogestins
12. Contraceptives
13. Thyroid and antithyroid drugs. Pituitary hormones. Hypothalamic hormones, hormonanalogs and antagonists.
14. Pancreatic hormones and parenterally applied antidiabetic drugs.
15. Oral antidiabetics.
16. Agents affecting bone mineral homeostasis (calcium, vitamin D, parathyroid hormone, calcitonin, etc.).
17. Drugs influencing blood coagulation I: Antiplatelet agents
18. Drugs influencing blood coagulation II: Anticoagulant drugs
19. Drugs influencing blood coagulation III: Fibrinolytic drugs. Drugs inhibiting bleeding
20. Agents used in anemias
21. Local anesthetics
22. Inhalational anesthetics
23. Intravenous anesthetics. Perioperative medication
24. Benzodiazepines
25. Non benzodiazepine anxiolytics and non-benzodiazepine hypnotics.
26. 1st generation ("typical") antipsychotic agents
27. 2nd generation ("atypical") antipsychotic agents
28. Tricyclic, tetracyclic and unicyclic antidepressants. MAO-inhibitors
29. Selective serotonin and/or norepinephrine reuptake inhibitors.
30. Norepinephrine and serotonin receptor antagonist antidepressants. Agomelatine. Tianeptine. Agents used for treatment of manic phase of bipolar disorders.
31. Antiepileptics used in partial seizures and generalized tonic-clonic seizures except for the "broad spectrum" agents.
32. Antiepileptics used in absence seizures. "Broad spectrum" antiepileptic drugs. Drugs used for treatment of status epilepticus
33. Drugs acting in the extrapyramidal motoric system. Nootropic drugs
34. Drugs influencing gastric acid secretion, protective drugs of gastric mucosa
35. Antiemetic drugs. Prokinetic agents.
36. Drugs used in constipation (laxatives) and diarrhea. Drugs promoting digestion. Pharmacology of liver and biliary tract

Topic list "B"

1. Cholinergic transmission and its presynaptic modification.
2. Adrenergic transmission and its presynaptic modification

3. Cholinomimetics
4. Muscarinic receptor blocking drugs
5. Catecholamines
6. Indirect sympathomimetics. Selective α_1 and α_2 -agonists and drugs acting on the imidazoline receptors
7. α -receptor antagonists
8. β -receptor antagonists
9. Centrally acting skeletal muscle relaxants (spasmolytics). Dantrolene. Botulinum toxin
10. Skeletal muscle relaxants acting on the neuromuscular junction
11. Selective β_2 -stimulants and other bronchodilators.
12. Antiinflammatory agents inhibiting bronchial inflammatory processes. Antitussive agents and expectorants
13. Positiv inotropic drugs
14. Drugs influencing cardiac electrophysiology.
15. Drugs acting on the renin-angiotensin-aldosterone-system (RAAS)
16. Ca^{++} -channel blockers and other vasodilators
17. Drugs influencing the oxygen demand and oxygen supply of the heart.
18. Drugs improving microcirculation.
19. Drugs affecting lipid metabolism.
20. Potassium excreting (wasting) diuretics
21. Potassium sparing diuretics, ADH antagonists, osmotic diuretics
22. Natural opioids, opioid receptors
23. Semisynthetic and synthetic opioids
24. General properties of NSAIDs. Acetylsalicylic acid. Drugs used for treatment of gout.
25. NSAIDs, except acetylsalicylic acid. Non-opioid and adjuvant analgesics. Drugs for headache syndromes
26. Immunopharmacology I. (cytotoxic agents).
27. Immunopharmacology II. (Inhibitors of cytokine gene expression, 5-ASA derivatives)
28. Immunopharmacology III. (Antibodies and fusion proteins)
29. Drugs used in cancer treatment I (antimetabolites)
30. Drugs used in cancer treatment II (alkylating agents)
31. Drugs used in cancer treatment III (Topoisomerase inhibitors. Inhibitors of mitotic spindle)
32. Drugs used in cancer treatment IV. (Hormonal agents)
33. Drugs used in cancer treatment V. (Small molecule signal transduction inhibitors. Retinoids)
34. Drugs used in cancer treatment VI. (Large molecule signal transduction inhibitors. Immunostimulant anticancer drugs.)

Topic list "C"

1. General considerations of antimicrobial therapy. Disinfectants and antiseptics
2. Antimycobacterial drugs
3. Antiprotozoal and antihelminthic drugs.
4. Antifungal agents
5. Agents to treat Herpes simplex (HSV), varicella-zoster (VZV) virus, cytomegalovirus (CMV) and respiratory syncytial virus (RSV) infection. Anti-influenza agents
6. Antiretroviral agents.
7. Agents against hepatitis viruses
8. Penicillins
9. Cephalosporins
10. Carbapenems. Monobactams. Beta-lactamase inhibitors.
11. Chloramphenicol. Polymyxins. Antifolate drugs
12. Tetracyclines and glycylicyclines
13. Aminoglycosides
14. Quinolones and fluoroquinolones
15. Macrolides. Ketolides

16. Clindamycin. Streptogramins. Oxazolidinones
17. Glycopeptides. Fusidans. Lipopeptides. Bacitracin. Mupirocin.
18. Metronidazole. Fidaxomycine. Rifaximin. Nitrofurantoin. Phosphomycine.

Type and method of grading⁶:

One question is given from three topic lists each. According to the knowledge proven at the exam.

How to register for the exam:

Registration must be done through the NEPTUN system for the days set by the department up to the limits.

Opportunities to retake the exam:

According to the Study and Examination Policy of Semmelweis University

Literature, i.e. printed, electronic and online notes, textbooks, tutorials (URL for online material):

Basic and Clinical Pharmacology (Ed. B. G. Katzung), 14th edition, McGraw-Hill Education, 2018. ISBN 978-1-260-28817-9

Materials discussed during lectures and seminars: <http://semmelweis.hu/pharmacology>, Moodle (<https://itc.semmelweis.hu>)

Signature of the tutor:

Signature(s) of the head(s) of the Institute(s):

Date:

Credit Transfer Committee's opinion:

Comment of the Dean's Office:

Signature of the Dean:

¹ Dékáni Hivatal tölti ki, jóváhagyást követően.

² Az elméleti és gyakorlati oktatást órákra (hetekre) lebontva, sorszámozva külön-külön kell megadni, az előadók és a gyakorlati oktatók nevének feltüntetésével. Mellékletben nem csatolható!

³ Pl. terepgyakorlat, kórlapelemzés, felmérés készítése stb.

⁴ Pl. házi feladat, beszámoló, zárthelyi stb. témaköre és időpontja, pótlásuk és javításuk lehetősége.

⁵ Elméleti vizsga esetén kérjük a tételsor megadását, gyakorlati vizsga esetén a vizsgáztatás témakörét és módját.

⁶ Az elméleti és gyakorlati vizsga beszámításának módja. Az évközi számonkérések eredményeink beszámítási módja.