

COURSE SYLLABUS

Semmelweis University Faculty of Dentistry, Dentistry

Name of the course: Pharmacology I.

Credit value: 4

Lessons (*in hours in the whole semester*): 56 from this, lectures: 28 practicals: 28 seminars:

Type of the course: compulsory obligatory elective elective

Semester in which it is announced according to the curriculum: 7th

Frequency of announcement (*per semester or year*): per year

The responsible educational and research organizational unit for teaching the subject:

Department of Pharmacology and Pharmacotherapy

Academic year: 2023/24 1st semester

Subject (Neptun) code: FOKOFRM254_1A

Lecturer of the course (tutor): Dr. Riba, Pál

Academic position: Deputy Head of Education of Department, associate professor

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Date of habilitation and reference number: April 24 2017., 29/2017 Hab.

The goals and place of the course in regards to the education of dental students:

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 poisonings.

Location of the course (*address of lecture hall, seminar room etc.*):

Nagyvárad téri Elméleti Tömb, 1089 Budapest, Nagyvárad tér 4.

Competences acquired by completion of the course:

Students understand the pharmacological terminology, learn the mechanism of action, therapeutic effects, adverse

effects, important interactions of drugs and the basics of dosing. Knowing the basics of prescribing drugs is of an utmost importance.

Pre-study requirements and prerequisites of course registration and completion, in case of a multi-semester subject, the standpoint of the educational-research unit on the concurrent subject registration and on the requirements of permission thereof :

Pathology, Medical and dental physiology II., Dental biochemistry II

Number of students required for announcement of course (*min.*, *max.*), method of selection:

Since it is a mandatory subject all the students in the fourth year of dentistry education must register.

Method of course registration:

Through NEPTUN system

Detailed course/lecture description¹: *(to facilitate credit recognition in other institutions)*

- 1st week
 - Lecture: Introduction to Pharmacology. (development, pharmacogenomics, basics of toxicology)
 - Practice: Pharmacodynamics I (drug receptors, receptor theories, drug-receptor interactions).
- 2nd week
 - Lecture: Basics of Pharmacokinetics (absorption, distribution, metabolism, excretion).
 - Practice: Pharmacodynamics II (quantal dose-response curves, therapeutic indices, tolerance, drug interactions).
- 3rd week
 - Lecture: Pharmacology of the cholinergic and adrenergic systems
 - Practice: Parasympathomimetics and parasympatholytics, centrally acting anticholinergic drugs
- 4th week
 - Lecture: Pharmacology of the skeletal muscles.
 - Practice: Sympathomimetics and sympatholytics
- 5th week
 - Lecture: Non-steroidal anti-inflammatory drugs (NSAIDs). Minor analgesics.
 - Practice: Drugs affecting uric acid metabolism. Drugs for headache syndromes. 1st midterm
- 6th week
 - Lecture: Drugs acting on opioid receptors
 - Practice: 1st midterm. The Summary of Product Characteristics
- 7th week
 - Lecture: Local anesthetics
 - Practice: Basic principles of prescription writing
- 8th week
 - Lecture: Antipsychotics
 - Practice: Sedative-hypnotics, anxiolytics
- 9th week
 - Lecture: Drugs acting on the extrapyramidal motoric system. Nootropic agents
 - Practice: Antidepressants, drugs against mania, mood stabilizers
- 10th week
 - Lecture: General anesthetics
 - Practice: Anticonvulsants (antiepileptics)
- 11th week
 - Lecture: Antiviral drugs
 - Practice: Cell wall synthesis inhibitor antibiotics. 2nd midterm
- 12th week
 - Lecture: Antifungal drugs. Antimycobacterial drugs.
 - Practice: Protein synthesis inhibitor antibiotics

- 13th week
 - Lecture: Antihelmintic and antiprotozoal agents. Antiparasitic drugs.
 - Practice: Inhibitors of nucleic acid synthesis and antibiotics with other mechanisms of action. Disinfectants, antiseptics.
- 14th week
 - Lecture: Biological Drugs. Orphan Drugs. Advanced Therapy Medicines
 - Practice: Nutrients, traditional plant medicines, vitamins, anorectic drugs.

Courses (*compulsory and obligatory elective*) which in part or entirely overlap the topics of above course:

Medical and dental physiology, Dental biochemistry, Molecular Cell Biology, Pathology, General and Oral Pathophysiology, Internal Medicine, Neurology, Psychiatry

Special academic work required for completion of the course²:

N/A

Attendance on practices and lectures, replacement in case of missed sessions:

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.

~~**Consequences of absence from sessions and exams: törölve**~~

Method of checking acquired knowledge during the study period³:

During the semester, we organise two compulsory midterm tests in weeks 6 and 11. These can be made up in weeks 7 and 12. Improvement attempt of the midterm tests (both) will be possible in week 13.

The course material for the first midterm test (study material from week 1 to 5): General Pharmacology. Pharmacology of cholinergic and adrenergic transmission. Skeletal muscle relaxants.

Second midterm test (study material from week 6 to 10): NSAIDs, Opioids, Neuropsychopharmacology

The midterm tests will count towards the semester semifinal exam results:

1. 5% of the students in the top 5% of the whole year will be awarded an excellent mark (5) and 5% of the students in the second top 5% will be awarded a good mark, provided that they achieve at least 2x75% in the midterm tests. If the number of these students is less than 10% of the whole year, only they will be offered a mark, if more than 10%, the top 10% will be offered a mark.
2. If the student scores better than 60% in both midterm tests, the drug recognition question will be waived and in case of a doubtful grade, the better one will be awarded.

If the student fails both midterm tests (even at the time of a retake), or fails to achieve 33% in either midterm test with a correction, the student will receive a grade penalty on the semifinal exam.

Requirements of an accepted semester (*signature of the lecturer*):

The number of absences must not be more than 25 percent of the number of practices in the semester

Type of the exam:

oral end-term semifinal exam

Requirements of the exam³:

In the oral semifinal exam, at first 5 active substances selected from the compulsory list of active substances must be identified and their mechanism of action explained. If the student does not recognize at least 3 of the active substances, he/she will not be allowed to continue and will receive a fail mark. After successful completion of one core-concept question and two topics of two lists of topics (one from each), an acceptable level of knowledge of pharmacology must be demonstrated.

Core concept topic list

1. Stages of drug development in brief.
2. Types of clinical trials.
3. History of the Hungarian pharmaceutical industry.
4. Molecular targets of drugs
5. Receptor theory - agonist, partial agonist, antagonist, inverse agonist
6. Efficacy, potency
7. Dose-effect relationships at population level
8. Adverse drug reactions
9. Therapeutic index
10. Tolerance, tachyphylaxis, dependence
11. Absorption of drugs
12. Membrane transport mechanisms.
13. Distribution of drugs
14. Bioavailability
15. Volume of distribution
16. Phases of drug biotransformation
17. Excretion of drugs
18. Linear and non-linear pharmacokinetics
19. Clearance
20. Half-life
21. Saturating and maintenance dose
22. Drug accumulation and cumulation
23. Enzyme inducers
24. Enzyme inhibitors
25. Pharmacodynamic interactions - synergism
26. Pharmacodynamic interactions - antagonism
27. Pharmacokinetic drug interactions - at the level of absorption
28. Pharmacokinetic drug interactions - at the level of distribution
29. Pharmacokinetic drug interactions - at the level of metabolism
30. Pharmacokinetic drug interactions - at the level of elimination
31. Characterisation of biological medicinal products
32. Orphan drugs
33. Advanced therapy medicinal products
34. Nutritional supplements
35. Traditional herbal active substances
36. Medical device
37. Principles of antimicrobial treatment - selective toxicity
38. Principles of antimicrobial treatment - empirical, targeted and prophylactic therapy
39. Principles of antimicrobial treatment - principles of bactericidal, bacteriostatic antibiotic and antibiotic combinations
40. Principles of antimicrobial treatment - time-, concentration- and exposure-dependent antibiotics
41. Narrow and broad spectrum antibiotics
42. Antibiotic selection considerations - pregnancy, childhood
43. Antibiotic selection considerations - infections affecting specific compartments
44. Considerations for antibiotic choice - comorbidities
45. Classification of drugs according to chemical structure and complexity
46. The Summary of Product Characteristics

Topic list "A"

1. Cholinergic and adrenergic transmission and its presynaptic modification.
2. Cholinomimetics
3. Muscarinic receptor blocking drugs
4. Catecholamines
5. Indirect sympathomimetics. Selective α_1 agonists
6. α_2 -agonists and drugs acting on the imidazoline receptors
7. α -receptor antagonists
8. β -receptor antagonists
9. Centrally and peripherally acting skeletal muscle relaxants
10. Local anesthetics
11. Opioids
12. NSAIDs.
13. Drugs used for treatment of gout. Drugs for headache syndromes
14. Inhalational anesthetics
15. Intravenous anesthetics. Perioperative medication
16. Benzodiazepines
17. Non benzodiazepine anxiolytics and non-benzodiazepine hypnotics.
18. Antipsychotics
19. Monoamine reuptake inhibitors.
20. Non-reuptake-inhibitor antidepressants. Agents used for treatment of manic phase of bipolar disorders.
21. Antiepileptics. Adjuvant analgesics.
22. Drugs of neurodegenerative diseases. (Drugs acting in the extrapyramidal motoric system. Nootropic drugs)

Topic list "C"

1. 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). Anti-influenza agents Drugs against Corona- and other viruses
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. Pleuromutilins
16. Clindamycin. Streptogramins. Oxazolidinones. Fusidans.
17. Glycopeptides. Lipopeptides. Bacitracin. Mupirocin.
18. Metronidazole. Fidaxomycine. Rifaximin. Nitrofurantoin. Phosphomycine.

Grading of courses⁴. The possibility and requirements of an offered grade:

The midterm tests will count towards the semester semifinal exam results:

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Detailed information on the compulsory and the full lists of active substances. If the candidate:

1. knows all the active substances to be studied in full detail, or knows all the active substances with some minor lacks and can mention names of active substances from the full drug list, – mark 5
2. knows all the active substances to be studied and the information to a varying degree and can mention the names of active substances from the full drug list to a varying degree - 2,3,4
3. knows all the active substances to be learned, but only the name and nothing else – unsatisfactory (failure)
4. does not know any active substance names – unsatisfactory (failure)
5. does not know all the active substances from the mandatory list, but knows the active substances from the full list of active substances in the given topic, then points 1,2 or 3 above are taken into consideration, the mark is awarded according to these points

Type of grade: five-mark scale (1=unsatisfactory, 2=satisfactory, 3=average, 4=good, 5=excellent)

Exam registration:

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

Rules of repeating exams:

According to the Study and Examination Policy of Semmelweis University

List of textbooks, lecture notes and recommended textbooks, online material:

Basic and Clinical Pharmacology (Ed. B. G. Katzung), 15th edition, McGraw-Hill Education, 2021. ISBN 978-1 260 45231 0

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

Signature of course lecturer:

Pál Riba

Pál Riba, MD., PhD
associate professor



Signature of head of department:



Péter Ferdinandy, MD, DSc, MBA
Head of Department

Date of submission:

June 23, 2023

Opinion of OKB:

Notes from the Dean's Office:

Signature of Dean:

¹ Detailed and numbered for each week of theoretical and practical lessons one by one. In an annex, cannot be attached appendix!

² Eg. homework, report, midterm exam etc. Topics, dates, method of retake and replacement

³ List of topics in case of theoretical exam, thematic and method in case of practical exam

⁴ Method of inclusion of theoretical and practical exams. Method of inclusion of midterm assessments.