REQUIREMENTS

Semmelweis University, Faculty of Medicine
Department of Pharmacology and Pharmacotherapy

Name of the subject: Pharmacology and Pharmacotherapy II.

Credits: 5

Total number of hours: 70 lectures: 35 practices: 35

Type of the course (mandatory/elective):mandatory

Academic year: 2019/2020

Code of the course[1]: AOKFRM034_2A

Course director (tutor): Dr. Ferdinandy, Péter

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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 an essential subject in the medical education. It provides strong fundamentals for further clinical subjects since pharmacological therapies have a crucial role in treating diseases. Pharmacology draws upon previously acquired knowledge of biochemistry, physiology, pathophysiology as well as the basics of clinical subjects. The subject includes general pharmacology, detailed pharmacology, clinical pharmacology and toxicology as well as the basics of drug prescriptions. General pharmacology (pharmacodynamics, pharmacokinetics) is important for understanding the basic pharmacological terminology, how medicines act and what is their fate in the body. Detailed pharmacology describes the mechanisms of actions, main effects, adverse effects of the drugs and the most important drug interactions as well as the logics of dosage and prescribing. Clinical pharmacology and pharmacotherapy connect the drugs to diseases dealing with the indications, contraindications and warnings regarding their use. The diseases which have the greatest impact on public health are further detailed and their complex pharmacological treatment strategies are discussed. Medical students gain knowledge from simple case reports that show the logic of pharmacological treatment. Toxicology covers the most important poisons, intoxications, their symptoms and management thereby providing theoretical basics for emergency medicine of poisoning and drug overdoses. During pharmacological education the students will also learn the basics of prescription writing.

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 learn the mechanisms of action of the most important poisons, as well as the symptoms and management of intoxications/poisoning. That provides theoretical basics for emergency medicine of poisoning and drug overdoses. Knowing the basics of prescribing drugs is of an outmost importance.
Medical students gain knowledge from simple case reports that show the logic of pharmacological treatment. They learn the pharmacological treatment strategies of the most important diseases with the highest public health interests. This knowledge is based on the actual therapeutic guidelines.
They get insight in the development, applications and the whole lifecycle of drugs and medical devices. They understand the principles and importance of pharmacovigilance and how to report adverse events.

Prerequisite(s) for admission to the subject:
Pharmacology and pharmacotherapy 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 course[2]:

- 1st week
  - Lecture: Basic pharmacology of analgesics
  - Practice: Opiods. Adjuvant analgesics
- 2nd week
  - Lecture: Immunopharmacology
  - Practice: NSAIDs. Drugs for gout
- 3rd week
  - Lecture: Treatment strategy of autoimmune diseases (CP). Treatment strategy of pain
  - Practice: Antidepressants and antimanic drugs – case reports (CP)
- 4th week
  - Lecture: Pharmacology of the central noradrenergic and serotonergic systems. Pharmacotherapy of mood disorders (CP)
  - Practice: General anesthetics
- 5th week
  - Lecture: Pharmacology of the central GABA-ergic system. Pharmacotherapy of anxiety and sleep disorders (CP)
  - Practice: Antipsychotics – case reports (CP)
- 6th week
  - Lecture: Pharmacology of the central dopaminergic systems. Pharmacotherapy of neurodegenerative diseases (CP)
  - Practice: Antiepileptics
- 7th week
  - Lecture: Agents used for treatment of peptic ulcer
  - Practice: Antiemetics. Laxatives. Drugs against diarrhea. Pharmacology of liver and bile.
- 8th week
  - Lecture: Antiviral drugs and pharmacotherapy of viral infections (CP)
  - Practice: Cell Wall Synthesis Inhibitors & Membrane-Active Antibiotics
- 9th week
  - Lecture: Antituberculotics. Antifungal, Antiprotozoal and Antihelmintic Drugs.
  - Practice: Antibiotics Inhibiting Bacterial Protein Synthesis.
- 10th week
  - Lecture: Pharmacotherapy of bacterial infections (CP)
  - Practice: Antibiotics Inhibiting Bacterial Nucleic Acid Synthesis. Miscellaneous Other Antibiotics.
- 11th week
  - Lecture: Drugs affecting smooth muscles. Drugs of Abuse (CP)
  - Practice: Cytotox antitumor agents
- 12th week
  - Lecture: Basics of toxicology
  - Practice: Cytostatic and other anticancer drugs.
- 13th week
  - Lecture: Treatment strategy of cancer (CP)
  - Practice: Toxicology
- 14th week
  - Lecture: Pharmacological aspects of emergency care (CP)
  - Practice: Contrast agents. Disinfectants

CP: clinical pharmacology/pharmacotherapy material
Potential overlap(s) with other subjects: Physiology, biochemistry, molecular biology, pathology, internal medicine, cardiology, pulmonology, neurology, psychiatry, pediatrics, microbiology, infectology, oncology, immunology
Special training activities required[3]: **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 semester[4]: 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 and lectures in the semester.
Type of the examination: Final exam has three parts. 1. Preceding exam from toxicology. 2. Written test from clinical pharmacology. 3. Oral exam.

Exam requirements[5]:
Acceptable knowledge of toxicology and the basics of prescription writing. On the day of the final exam acceptable written clinical pharmacology/pharmacotherapy test exam. During the oral exam 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). The process of drug development.
3. Drug absorption, distribution and bioavailability. Membrane transport mechanisms.
4. Drug biotransformation, linear and non-linear kinetics. Enzyme inhibition and induction. Clearance, half-life, loading and maintenance dose. Elimination. Pharmacokinetic drug interactions
5. Local anesthetics
6. Glucocorticoids for oral and parenteral use
7. Mineralocorticoids. Topically applied glucocorticoids
8. Androgens, anabolic steroids, antiandrogens. Agents affecting the sexual activity
9. Estrogens and antiestrogens
10. Progestins and antiprogestins
11. Contraceptives
12. Thyroid and antithyroid drugs. Hypothalamic and pituitary hormones
13. Pancreatic hormones and parenterally applied antidiabetic drugs. Pharmacotherapy of IDDM.
14. Oral antidiabetics. Pharmacotherapy of non-insulin dependent diabetes mellitus.
15. Agents affecting bone mineral homeostasis (calcium, vitamin D, parathyroid hormone, calcitonin, etc.). Pharmacotherapy of osteoporosis.
16. Drugs used in coagulation disorders I: Antiplatelet agents
17. Drugs used in coagulation disorders II: Anticoagulant drugs
18. Drugs used in coagulation disorders III: Fibrinolytic drugs. Drugs used in bleeding disorders
19. Agents used in anemias
20. Special aspects of pediatric and geriatric pharmacology
21. Biological Drugs. Orphan Drugs (CP) Advanced Therapy Medicines
22. Pharmacovigilance (reporting adverse effects), drug registration, ATC code, generics, biosimilar drugs). Drug formulations. Inhalational anesthetics
23. Intravenous anesthetics. Perioperative medication
24. Benzodiazepines
25. Non benzodiazepine anxiolytics and non-benzodiazepine hypnotics. Pharmacotherapy of anxiety disorders.
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. Pharmacotherapy of affective 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 used for treatment of neurodegenerative disorders. Nootropic drugs
34. Smooth muscle relaxants used for relief GI and UG spasms. Drugs influencing uterus functions.
35. Antiemetic drugs. Prokinetic agents. Drugs for irritable bowel disease (IBS).

36. Drugs used in constipation (laxatives) and diarrhea. Drugs promoting digestion. Pharmacology of liver and biliary tract
37. Drugs used in peptic ulcer diseases. Pharmacotherapy of peptic ulcer diseases.

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_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. Pharmacotherapy of bronchial asthma and COPD.
12. Antiinflammatory agents used in bronchial asthma. Antitussive agents and expectorants
13. Drugs used for the treatment of peripheral vascular diseases. Therapy of migraine
14. Drugs used for treatment of heart failure I: Drugs decreasing the load on the heart. Drugs of acute cardiac failure. Pharmacotherapy of chronic heart failure.
15. Drugs used for treatment of heart failure II: Positive inotropic agents. Pharmacotherapy of acute heart failure.
16. Antiarrhytmic agents
17. Drugs used for the treatment of hypertension I: Classification of antihypertensive agents and their mechanisms of action. Pharmacotherapy of hypertension.
18. Drugs used for the treatment of hypertension II: Ca^{++}-channel blockers and other vasodilators
19. Drugs used for the treatment of hypertension III: Drugs acting on the renin-angiotensin-aldosterone system
20. Drugs used for treatment of angina pectoris. Pharmacotherapy of ischemic heart disease.
21. Agents used in dyslipidaemias.
22. Potassium excreting (wasting) diuretics
23. Potassium sparing diuretics, ADH antagonists, osmotic diuretics
24. Histamine and antihistamines.
25. Natural opiates, opioid receptors
26. Semisynthetic and synthetic opiates
27. General properties of NSAIDs. Acetylsalicylic acid.
28. NSAIDs, except acetylsalicylic acid. Non-opioid and adjuvant analgesics. Drugs used for treatment of gout. Treatment strategy of pain.
29. Immunopharmacology I. (cytotoxic agents, retinoids). Pharmacotherapy of autoimmune diseases.
30. Immunopharmacology II. (Inhibitors of cytokine gene expression, 5-ASA derivatives)
31. Immunopharmacology III. (Antibodies and fusion proteins)
32. Cancer chemotherapy I (antimetabolites)
33. Cancer chemotherapy II (alkylating agents)
34. Cancer chemotherapy III (Topisomerase inhibitors. Inhibitors of mitotic spindle)
35. Cancer chemotherapy IV. (Hormonal agents)
36. Cancer chemotherapy V. (Small molecule signal transduction inhibitors)
37. Cancer chemotherapy VI. (Large molecule signal transduction inhibitors.

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. Pharmacotherapy of respiratory infections.
11. Chloramphenicol. Polymyxins. Antifolate drugs
12. Tetracyclines and glycylcyclines
13. Aminoglycosides
14. Quinolones and fluoroquinolones
15. Macrolides. Ketolides
16. Clindamycin. Streptogramins. Oxazolidinones
17. Glycopeptides. Fusidans. Lipopeptides. Bacitracin. Mupirocin. Pharmacotherapy of skin and soft tissue infections.
18. Metronidazole. Fidaxomycine. Rifaximin. Pharmacotherapy of abdominal infections.
19. Nitrofurantoin. Phosphomycine. Pharmacotherapy of urinary tract infections.

Type and method of grading[6]:
Written test: according to the scores.
Final exam consists of three parts. The grade will be decided after the oral part of the exam (three questions), taken into consideration the results of the preceding two parts, toxicology exam and written clinical pharmacology/pharmacotherapy 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.