MUNI
PHARM

Advanced Master´s Proceedings
Topics for the Advanced Master´s State Examination
MEDICINAL CHEMISTRY

revision: 2024

Substances affecting the peripheral nervous system

- Sympathomimetics – mechanism of action, distribution, basic effects, indications and side effects
- Sympatholytics – mechanism of action, distribution, basic effects, indications and side effects
- Parasympathomimetics – mechanism of action, distribution, therapeutic uses and side effects
- Parasympatholytics – mechanism of action, distribution, clinical use and adverse effects

Substances affecting the central nervous system

- Drugs for neurodegenerative disorders - therapy of Alzheimer's and Parkinson's diseases
- General anaesthetics – inhalational and intravenous anaesthetics, mechanism of action and clinical use
- Local anaesthetics – distribution, mechanism of action, basic types of local anaesthesia
- Antiepileptic drugs – mechanisms of action, representatives and clinical use
- Hypnotics, sedatives and anxiolytics - distribution, mechanism of action and adverse effects
- Antipsychotics (neuroleptics) - mechanism of action, distribution, indications, adverse effects
- Antidepressants – mechanism of action, distribution, indications and adverse effects.
- Myorelaxants – mechanism of action, distribution and clinical use

Substances affecting the cardiovascular and renal systems

- Diuretics - mechanism of action, distribution, indications and side effects
- Drugs used in coronary artery disease – β-adrenergic receptor blockers, calcium channel blockers, nitrates and clinical use of drugs
- Antiarrhythmic drugs - distribution, mechanism of action and clinical use

- Arterial hypertension and its therapy – direct vasodilators, agents affecting the sympathetic, renin-angiotensin system
- Substances used in lipid metabolism disorders – distribution, mechanism of action and indications

Drugs affecting blood clotting

- Coagulants, anticoagulants, fibrinolytics, antifibrinolytics, antiplatelet agents and haemostatics – mechanism of action, distribution, clinical use and adverse effects.

Drugs affecting the nociceptive system and therapy of musculoskeletal disorders

- Opioid analgesics and their antagonists, weak analgesics and non-steroidal anti-inflammatory agents, antirheumatic agents and gout therapy – mechanism of action, distribution, clinical use and adverse effects.

Antihistamines, antiallergics, prostanoids, leukotrienes, antiserotonergics and migraine prophylaxis

- Individual representatives, mechanism of action and indications

Drugs of the digestive and excretory systém

- Drugs used in the therapy of peptic ulcer of the stomach and duodenum – antacids, H2-antihistamines, proton pump inhibitors, cytoprotective agents – distribution and mechanisms of action
- Drugs affecting nausea and vomiting – emetics and antiemetics
- Drugs affecting the motility of the digestive system – spasmolytics, laxatives and antidiabetics

Therapy of diseases of the respiratory systém

- Antiasthmatic drugs - pharmacodynamic effects, mechanisms of action, drugs used
- Antitussives, expectorants - distribution and clinical use

Drugs with an effect on the function of endocrine glands

- Pancreatic hormones, oral antidiabetics and other pancreatic hormones – distribution, individual groups and indications
- Thyroid hormones, disorders of function (hyperthyroidism and hypothyroidism) - clinical use and drugs used

- Substances affecting pituitary function (adenohypophysis and neurohypophysis) - their function and clinical use
- Adrenocortical hormones – glucocorticoids, mineralocorticoids, mechanism of action, clinical use
- Female and male sex hormones - importance of steroid sex hormones, mechanism of action, effects and synthetic derivatives

Chemotherapeutic agents - microbial, viral, parasitic and cancer diseases

- Antibacterial agents – β-lactams, amphenicol, tetracyclines, macrolides, lincosamines, aminoglycosides and glycopeptides - mechanism of action, clinical uses
- Antibacterial agents – sulfonamides, quinolones, imidazoles and other chemotherapeutics - mechanism of action and uses
- Antituberculosis drugs – overview of drugs, mechanism of action and therapeutic procedures
- Antifungals – polyene, antimetabolites, azole and others – mechanism of action and clinical use
- Chemotherapeutics against viral infections – herpes viruses, influenza viruses, anti-HIV and retroviral antivirals
- Antiprotozoal agents – therapy of protozoal infection and antimalarials.
- Helminthiasis and their therapy - individual groups
- Chemotherapy of cancer – classification by mechanism of action and individual cytostatics used in therapy

The study of the physicochemical properties of molecules, and other general questions

- Significance, methods of evaluation of pharmacokinetic parameters of drugs and potential drugs (lipo-hydrophilic properties, acid-base properties, adsorption at phase interfaces, ability to precipitate colloids, surface tension, volatility etc.)
- Drug metabolism – 1st and 2nd stages of biotransformation
- Non-specific and specific drug action – importance of physicochemical properties, binding of drug to target endogenous structure
- Methods of structure determination of organic molecules - drugs, potential drugs
- Quantitative relationships between chemical structure and biological activity and molecular modelling in drug development
- Separation methods – basic procedures for isolation of individual components, methods of qualitative and quantitative analysis