Portal:Questions for final examination in Pharmacology (1. LF UK, GM)

Q1.

a. A new drug is being developed and its manufacturers want to know its oral bioavailability: - What clinical reasons are there for determining oral bioavailability? - Should bioavailability be tested with only fasted subjects? If the answer is no, explain why - How would you go about measuring bioavailability in a group of 12 healthy subjects?

b. The relevance of the autonomic nervous system to clinical pharmacology and therapeutics using clinical examples to illustrate your answers (agonist's antagonists, cholinergic receptors, adrenergic receptors, clinical use of adrenergic agonists and antagonists)

c. Describe drugs useful in the treatment and prophylaxis of migraine headache (asymptotic phase, prodromal phase and headache phase).

Q2.

a. An antihypertensive drug is given to 12 volunteers, the concentration of the drug is measured in the plasma, and its effect on blood pressure is recorded. The drug had a very short half-life (about 30 min) and was detectable for 2 hours. However, the effect on the diastolic blood pressure was maximal 30 min after dosing and returned to predose values after 12 hours. Give possible explanations for these findings

b. A slodier's unit has come under attack with a nerve agent. The symptoms exhibited are skeletal muscle paralysis, profuse bronchial secretions, miosis, bradycardia and convulsions. What do you think about the kind of exposure? Discuss possible antidote, and the concept of antidote in general in cases of poisoning.

c. Drugs affecting bone and mineral homeostasis, drug treatment of osteoporosis.

Q3.

a. Pharmacokinetic principles and use in clinical practice, calculation of pharmacokinetic parameters, bioavailability and optimization of dosage regimen.

b. The nonsteroidal anti-inflammatory drugs (NASIDs) and acetaminophen are often effective in controlling pain. Other treatment strategies applied to the reduction of inflammation are targeted at immune processes (e.g. glucucorticoids, disease modifying antirheumatic drugs DMARDs) or treatment of gout acute episodes or chronic form. Discuss the pharmacology of the mentioned groups.

c. Major groups of drugs used in heart failure describing various targets and actions

Q4.

a. Transport mechanisms of drugs across biomembranes, various processes, compartmental pharmacokinetic models, zero and first order kinetic of elimination, drug absorption and bioavailability, Clinical relevance.

b. Describe the uses, mode of action and adverse effects of the following in general anaesthesia: Thiopental, Nitrous oxide, Halothane, Pancuronium, Neostigmine.

c. A 51-yr-old woman presented to the emergency department with tachycardia, shortness of breath, and chest pain. She had had shortness of breath and diarrhea for the last 2 days and was sweating and anxious. A relative reported that the patient had run out of methimazole 2 w earlier and a diagnosis of thyroid storm was made. Which drug(s) is useful adjuvant in the treatment of thyroid storm? Describe the pharmacology of drugs used in both hypo- and hyperthyroidism.

Q5.

a. Active and passive transport across biomembranes (including transport of ions and organic compounds in kidney's tubules

b. A 56-year old overweight man complains of not sleeping well and feeling tired during the day. He tells his physician that his wife is the cause of the problem because she wakes him up several times during the night because of his loud snores. This appears to be a breathing-related sleep disorder, so you should probably write a prescription for, clorazepate, or flurazepam, or secobaerbital or triazolam or non of these agents. Comment and classify typical and atypical sedative hypnotic drugs.

c. Describe the appropriate drug treatment(s) for major common skin diseases; give major adverse effects of these drugs.

Q6.

a. Routes of drug administration (relationship between mode of administration to speed and duration of effect, and relation to drug pharmacokinetics). Give graphical illustrations.

b. Benzodiazepines, mode of action, molecular pharmacology, effect at organ level, adverse effects and therapeutic uses.

c. Anticoagulants and fibrynolytics, therapeutic indications.

Q7.

a. Main pharmacokinetic parameters affecting plasma drug level at steady state, rate constant of elimination, volumes of distribution, half-life time, total body clearance, renal and nonrenal clearance

b. Clinically important alcohols and their antagonists (drugs used to treat alcohol withdrawal, drugs to treat alcohol dependence, drugs used to treat acute methanol or ethylene glycol intoxication).

c. A 70-year-old woman is admitted to the emergency department because of a "fainting spell" at home. She appears to have suffered no trauma from her fall, but her blood pressure is 120/60 when lying down and 60/30 when she sits up. Neurologic examination and an ECG are within the normal limits when she is lying down. Questioning reveals that she has recently started taking "water pills" (diuretics) for a heart condition. Which drug(s) is the most likely cause of her fainting spell? Describe diuretic drug groups and various clinical uses.

Q8.

a. Drug distribution in the organism (volume of distribution and half life time, clearance etc., examples and significance for dosage adjustment)

b. Drugs used for treatment of epilepsy, mode of action, principles of antiepileptic administration, drug of choice and recent development in epilepsy drug treatment

c. Drugs used for the treatment of respiratory tract diseases; the modes of action, adverse effects and clinical use of drugs employed in the management of chronic asthma

Q9.

a. Drug biotransformation and significance for drug elimination, pharmacological and toxicological drug effects (types of biotransformation, enzyme induction and inhibition with examples).

b. Drug treatment for parkinsonism, potential drug use in other neurodegenerative diseases

c. Comment on the following drugs concerning receptor specificity and clinical uses advantages and disadvantages: propranolol, nidolol, timolol, pindolol, atenolol, acebutolol, carvedilol and labetalol.

Q10.

a. Drug elimination mechanisms (rate constants of elimination, half lifetime, total body clearance, renal and nonrenal clearance).

b. Discuss the difference in pharmacological profile between ACE inhibitors and AT1-receptor blockers. Prostaglandins, actions and their clinical uses.

c. Describe the pharmacology of drugs used in the treatment of angina pectoris including adverse effects.

Q11.

a. A dosage regimen is a plan for drug administration. An optimal dosage regimen results in the achievement of therapeutic levels of the drug in the blood without exceeding the minimum toxic concentration. Define maintenance dose, loading dose and how to calculate, therapeutic window and how to adjust the dose when elimination is altered by disease.

b. Centrally-acting skeletal muscle relaxants and neuromuscular blocking agents, therapeutic uses and side effects.

c. Major groups of drugs used in heart failure describing various targets and actions.

Q12.

a. A new drug is found to be eliminated entirely by renal excretion, with no prior metabolism. Its renal clearance (found from plasma and urine concentration data) in an experiment on six healthy subjects is found to be about 200 ml/min. What do these data tell you about the mode of excretion of the drug? Discuss various methods of drug elimination

b. Describe the probable mechanisms of action and major characteristics of tricyclic antidepressants, SSRIs, SNRIs, and serotonin 5-HT receptor antagonists.

c. Diabetes mellitus is treated with several parenteral formulations of insulin and oral or parenteral noninsulin antidiabetic agents. Outline these agents with mechanisms of actions and adverse effects.

Q13.

a. Significance of pharmacokinetic for optimizing drug dosage (relation between dose, concentration and drug effect, bioavailability, and therapeutic monitoring of blood levels)

b. Neuroleptics, antidepressants (including selective serotonin release inhibitors SSRI and selective noradrenaline release inhibitors SNRI)

c. Describe gonadal hormone agonists and antagonists: estrogens, antiesterogens SERMs (selective estrogen-receptor modulators), progestins, androgens and antiandrogens, hormonal contraceptives adverse effects

Q14.

a. Drug concentration-time course in the blood, single and multicompartmental model system for drug distribution.

b. An overview on drugs affecting behavior. Antianxiety drugs (molecular pharmacology and clinical uses)

c. Ms. Novotna has had myasthenia gravis for several years. She reports to the emergency department complaining of rapid onset of weakness of her hands, diplopia and difficulty swallowing. She may be suffering from a change in response to her myasthenia therapy, that is a cholinergic or myasthenic crisis. Which is the more appropriate drug for distinguishing between myasthenic crisis (insufficient therapy) and cholinergic crisis (excessive therapy)? Describe drugs appropriate for myasthenia gravis and therapeutic uses of cholinesterase inhibitors.

Q15.

a. Relationship between dose, plasma level of drug and effect (examples of monitoring drug plasma levels). Demonstrate with graphical presentations.

b. Within days of starting haloperidol treatment for a psychiatric disorder, a young male patient developed severe generalized muscle rigidity and a high temperature. In the emergency department, he was incoherent, with increased hearty rate, hypotension, and diaphoresis. He was diagnosed as suffering from Neuroleptic malignant syndrome. Outline drugs used for psychosis and bipolar disorders (classic and newer agents, adverse effects etc.).

c. Severe unwanted effects of antibiotic (allergic reactions, toxicity on nervous system, hematopoesis, cardiovascular and respiratory system with examples). Some strategies that can be adopted to reduce the risks of bacterial resistance to antibiotics development.

Q16.

a. From your pharmacodynamics and drug-receptor interactions define: Efficacy, potency, therapeutic index, graded dose response, quantal dose-response, spare receptors. Give examples and graphical representation whenever possible.

b. Outline pharmacologic strategies for dopaminergic therapy and other drugs used in Parkinson’s disease, mode of action, adverse effects.

c. Androgens and anabolic steroids, drugs used in prostatic hyperplasia.

Q17.

a. Signaling mechanisms and drug action

b. On the basis of opioids’ interaction with relevant receptor(s), classify these drugs with their mechanisms of action, pharmacodynamics, acute and chronic effects.

c. A newborn girl exhibited ambiguous genitalia, hyponatremia, hyperkalemia, and hypotension as a result of genetic deficiency of 21-hydroxylase activity. Treatments consisted of fluid and salt replacement and hydrocortisone administration. In this type of adrenal hyperplasia in which there is excess production of cortisol precursors, which of the follow describes the primary therapeutic effect of glucocorticoids administered (Increased adrenal estrogen synthesis, inhibition of the adrenal aldosterone synthesis, prevention of hypoglycemia, recovery of normal immune function or suppression of ACTH secretion). Describe corticosteroid agonists and antagonists.

Q18.

a. Quantitative aspect of drug-receptor interaction with graphical illustrations.

b. Nonopiate analgesics, and nonsteroidal anti-inflammatory compounds

c. Hormonal and nonhormonal drugs that are useful in the treatment of bone miniral disorders (e.g. Osteoporosis, rickets, osteomalacia, Paget’s disease).

Q19.

a. Define receptor-effector complex, graded dose response, quantal dose response relationships, antagonists and the difference between a pharmacologic antagonist and allosteric agonist/antagonist.

b. Discuss the concept of antidotes in he treatment of drug and heavy metal poisoning, giving examples.

c. Describe local and systemic antifungal agents in clinical applications.

Q20.

a. Drug treatment of DM. The management of hyperthyroidism

b. The sympathomimetic bronchodilators are drugs of choice in acute asthma. Compare the properties of direct- and indirect- acting sympathomimetics relative to the therapeutic goals in asthma. Outline drugs used in bronchial asthma and antitussive agents.

c. Effects of nitric oxide, and potential use of NO donors and inhibitors.

Q21.

a. The classic drug-receptor interactions and the involvement of signaling across the membrane with examples.

b. The adverse effects of corticosteroids

c. Classification of immunosuppressive and imunomodulating agents including cytokines and clinical uses

Q22.

a. Define intrinsic activity and affinity of a drug, competitive and noncompetitive antagonism and partial agonism (with graphical illustration)

b. A 47-year old man exhibited signs and symptoms of acromegaly. Radiologic studies indicated the presence of large pituitary tumor. Surgical treatment of the tumor was only partially effective in controlling his disease. Which drug is most likely to be used as pharmacologic therapy (somatotropin, desmopressin, leuprolide or octreotide). Outline drugs that mimic or block the effects o hypothalamic and pituitary hormones.

c. Antifungal and antiviral drugs

Q23.

a. The sympathomimetic bronchodilators are drugs of choice in acute asthma. Compare the properties of direct- and indirect- acting sympathomimetics relative to the therapeutic goals in asthma. Outline drugs used in bronchial asthma and antitussive agents.

b. Describe, giving examples, the mechanisms by which drugs used for cancer chemotherapy work. What adverse effects do the named drugs cause?

c. Uterotonics and tocolytics

Q24.

a. Metabolic pathway of NO biosynthesis, effects, potential use of NO donors and inhibitors.

b. A 56-year old man has hypertension and an enlarged prostate, which biopsy shows to be benign prostatic hyperplasia. Which drug would be the most appropriate initial therapy? Outline major drug groups used as antihypertensive medications.

c. Drugs used in the treatment of tuberculosis

Q25.

a. Receptor hypersensitivity and receptor desensitization (mechanisms, give examples)

b. A slodier’s unit has come under attack with a nerve agent. The symptoms exhibited are skeletal muscle paralysis, profuse bronchial secretions, miosis, bradycardia and convulsions. What do you think about the kind of exposure?, Discuss possible antidote, and the concept of antidote in general in cases of poisoning.

c. The gastrointestinal tract serves many important functions; digestive, excretory, endocrine, exocrine, and so on. These functions are the targets of several important classes of drugs. Describe drugs for acid-peptic disease, drugs for inflammatory bowel disease and antiemetics.

Q26.

a. Define receptor-effector complex, graded dose response, quantal dose response relationships, antagonists and the difference between a pharmacologic antagonist and allosteric agonist/antagonist.

b. Parasympathomimetics (direct and indirect acting compounds)

c. Classify beta-lactam antibiotics and other cell wall synthesis inhibitors: mode of actions and adverse effects.

Q27.

a. Main sites of drug actions (receptors, calcium channels, enzymes... etc.)

b. Local anesthetics, overview, uses, toxicity

c. Treatment of Helicobacter pylori infection, acid-suppressant drugs, drugs in the treatment of reflux oesophagitis

Q28.

a. Signaling mechanisms and drug action

b. The relevance of the autonomic nervous system to clinical pharmacology and therapeutics using clinical examples to illustrate your answers. (Agonists antagonists, cholinergic receptors, adrenergic receptors, clinical use of adrenergic agonists and antagonists)

c. Chemotherapy of cancer, classification of cytostatics, new development in anticancer drugs, resistance to the cytotoxic effects of anticancer agents

Q29.

a. Describe the stages of new drug development. Outline experimental and clinical research involved.

b. Antihypertensive agents, overview, ACE inhibitors (effect after chronic use, undesired effects)

c. A 56-year old overweight man complains of not sleeping well and feeling tired during the day. He tells his physician that his wife is the cause of the problem because she wakes him up several times during the night because of his loud snores. This appears to be a breathing-related sleep disorder, so you should probably write a prescription for, clorazepate, or flurazepam, or secobaerbital or triazolam or non of these agents. Comment and classify typical and atypical sedative hypnotic drugs.

Q30.

a. Relationship between dose and effect (define types of doses, therapeutic dose, toxic dose, therapeutic index. etc.). Illustrate your answer graphically

b. Skeletal muscle relaxants and clinical uses

c. Drug treatment for acid-peptic diseases; inflammatory bowel disease, laxatives, antispasmodics

Q31.

a. A dosage regimen is a plan for drug administration. An optimal dosage regimen results in the achievement of therapeutic levels of the drug in the blood without exceeding the minimum toxic concentration. Define maintenance dose, loading dose and how to calculate, therapeutic window and how to adjust the dose when elimination is altered by disease.

b. Congestive heart failure, cardiotonic drugs and other drugs with positive inotropic effect (importance, indications and risks), role of ACE inhibitors

c. Laxatives and antidiarrheal drugs

Q32.

a. Alteration in drug effects after chronic administration (tachyphylaxis, tolerance and drug dependence)

b. In spite of the fact that the drugs used for arrhythmias have very low therapeutic indices (and when feasible, non drug therapies are used), discuss major drug groups.

c. A 37-year old woman underwent segmental mastectomy for a breast tumor of 3-cm diameter. Lymph node sampling revealed 2 involved nodes. Because chemotherapy is of established value in her situation, she underwent postoperative treatment with antineoplastic drugs. Discuss various agents and adjunctive drugs of potential use and adverse effects. Outline various classes of anticancer drugs.

Q33.

a. Drug dependence (examples of drug abuse)

b. A 56-year old man has hypertension and an enlarged prostate, which biopsy shows to be benign prostatic hyperplasia. Which drug would be the most appropriate initial therapy. Outline major drug groups used as antihypertensive medications.

c. Tocolytics and uterotonics (compounds that stimulates uterine motility), classification and therapeutic uses.

Q34.

a. Describe adverse drug reactions and drug interactions

b. Describe the management of a patient presenting to his GP with a blood pressure 170/110 mmHg, with no other symptoms or signs of organ damage. Comment on adverse effects of prescribed drugs.

c. Immunosuppressive agents, relation between immunosuppressive therapy and cancer chemotherapy

Q35.

a. Relation between drug dose and clinical response with graphical illustrations

b. A 70-year-old man has a history of ulcer disease. He has recently experienced swelling and pain in the joints of his hands. His physician wants to begin therapy with an NSAID. Which drug might also be prescribed along with NSAID to reduce the risk of activating this patient's ulcer disease? Describe major adverse effects of NSAIDs

c. Two patients are found to have serum cholesterol of 6. mmol/l and total cholesterol to HDL ratio of 4.2. The first is a 52-year -old man who has angina and smokes. The second is a 36-year old woman who is normotensive (systolic blood pressure of 128 mmHg and a nonsmoker. She is not diabetic. How would you treat each of these two patients? . Outline the pharmacologic profiles of drugs used in the treatment of hyperlipidemias

Q36.

a. Teratogenic and carcinogenic effects of drugs

b. Inhibitors of calcium ion channels pharmacologic profile and clinical pharmacology.

c. Cancer chemotherapy produces high rates of cure of diseases. On the other hand, some types of cancers are barely affected by currently available drugs. Discuss this statement (alkylating agents, antimetabolites, antitumor antibiotics, natural products, hormonal, imatinib, cetuximab etc) including drug combinations, adverse effects.

Q37.

a. Drug use and special dosage adjustments for children and elderly. Changes in drug pharmacokinetics (absorption, bioavailability, distribution and elimination)

b. Diuretics and uses in edematous and nonedematous indications

c. Drugs in thrombosis, bleeding disorders, and anemia including glycoprorteins that regulate stem cells in bone marrow for patients with blood cell deficiences.

Q38.

a. Untoward and side effects of drugs (give examples)

b. Summarize drugs that modulate immune function (mechanism of action, clinical applications, pharmacokinetics and toxicities.

c. An antihypertensive drug is given to 12 volunteers, the concentration of the drug is measured in the plasma, and its effects on blood pressure are recorded. The drug had a very short half-life (about 30 min) and was detectable for 2 hours. However, the effect on the diastolic blood pressure was maximal 30 min after dosing and returned to predose values after 12 hours. Give possible explanations for these findings.

Q39.

a. Phases of new drug development including preclinical and clinical testing

b. Toxicity of some metals and their derivatives and relevant antidotes (Pb, Hg, As, Cd, Fe)

c. The modes of action, adverse effects and clinical use of drugs employed in the management of chronic asthma. Drug use in other respiratory diseases.

Q40.

a. Pharmacokinetics and other differences between children and adults. Polypharmacy in the elderly

b. Histamine and antihistamines, clinical uses and side effects

c. Chemotherapy of mycobacterial infections almost always involves the use of drug combinations to delay the emergence of resistance and to enhance antimycobacterial efficacy. Discuss these drugs pharmacological profiles. - Adverse effects of antibiotics

Q41.

a. A dosage regimen is a plan for drug administration. An optimal dosage regimen results in the achievement of therapeutic levels of the drug in the blood without exceeding the minimum toxic concentration. Define maintenance dose, loading dose and how to calculate, therapeutic window and how to adjust the dose when elimination is altered by disease.

b. Classification of antihypertinsive drugs, status of beta-blockers among these drugs, and various clinical usefulness of beta-blockers.

c. Fluoroquinolones and quinolones and other drugs used for treatment of urinary tract infections

Q42.

a. Clinical pharmacokinetics, monitoring of drug plasma level and dosage adjustment. Describe phases of drug biotransformation with important clinical consequences.

b. The use of ACE inhibitors in cardiovascular disease.

c. Antiviral drugs can exert their actions at several stages of viral replication including viral entry, nucleic acid synthesis, late protein synthesis and processing and in the final stage of viral packaging and virion release. Describe these drug events in case herpes viruses (HSV), HIV, influenza, HBV and , HCV.

Q43.

a. Sources of drug information and type of information about available drugs

b. Describe the pharmacology of drugs used in the treatment of angina pectoris including adverse effects.

c. Discuss Drug treatments of urinary tract infections (UTIs) with the appropriate mechanisms of action.

Q44.

a. Classify cholinergic receptors and subtypes, agonists and antagonists

b. Based on existing differences in ribosomal subunits and in the chemical composition and functional specificities of component nucleic acids and proteins in mammalian cells and bacteria, several bacterial protein synthesis inhibitors were prepared. Discuss this statement with emphasis on adverse effects of main drugs.

c. Describe drugs useful in the treatment and prophylaxis of migraine headache (asymptotic phase, prodromal phase and headache phase).

Q45.

a. Drug use and risks before and during pregnancy and during breast-feed feeding

b. A 56-year old overweight man complains of not sleeping well and feeling tired during the day. He tells his physician that his wife is the cause of the problem because she wakes him up several times during the night because of his loud snores. This appears to be a breathing-related sleep disorder, so you should probably write a prescription for, clorazepate, or flurazepam, or secobaerbital or triazolam or non of these agents. Comment and classify typical and atypical sedative hypnotic drugs.

c. Chemotherapy of mycobacterial infections almost always involves the use of drug combinations to delay the emergence of resisitance and to enhance antimycobacterial efficacy. Discuss these drugs pharmacological profiles. - Outline drugs acting on fungi with mechanisms of action.

Q46.

a. Types of immune reactions due to drug applications (drug allergy, idiosyncrasy etc.), demonstrate your answers with clear examples.

b. Thrombolytics (fibrinolytics and their antagonists)

c. A 40-year old patient is about to undergo cancer chemotherapy with a highly emetogenic (nausea and vomiting) drug combination. What antiemetic drug(s) most likely to be included in her regimen? Comment on the antiemetic drugs.

Q47.

a. Drug intoxication and general principles in patient treatment and specific antidotes

b. Ms. Novotna has had myasthenia gravis for several years. She reports to the emergency department complaining of rapid onset of weakness of her hands, diplopia and difficulty swallowing. She may be suffering from a change in response to her myasthenia therapy, that is a cholinergic or myasthenic crisis. Which is the more appropriate drug for distinguishing between myasthenic crisis (insufficient therapy) and cholinergic crisis (excessive therapy)?\ Describe drugs appropriate for myasthenia gravis and therapeutic uses of cholinesterase inhibitors.

c. Drugs used to combat malaria, amebiasis, toxoplasmosis and anthelmintic drugs (against nematodes, trematodes and cestodes).

Q48.

a. The pKa of bupivicaine is 8.3. In infected tissue at pH 6.3, calculate the percentage of the drug in the nonionised form. Outline characteristics of local anaesthetics (classification, mode of action, adverse effects etc.)

b. Outline pharmacologic strategies for dopaminergic therapy and other drugs used in Parkinson’s disease, mode of action, adverse effects.

c. Antimicrobial combinations, advantages and disadvantages, example of synergism and antagonism of individual combinations

Q49.

a. Pharmacotherapy during pregnancy and lactation

b. Drug treatment in hyperlipoproteinemias, classification, fibrates, statins etc.

c. Describe the appropriate drug treatments (s) for major common skin diseases; give major adverse effects of these drugs.

Q50.

a. A 25-year old man has a pheochromocytoma, blood pressure 190/120 mm Hg, and hematocrit of 50%. Pulmonary function and renal function are normal. His catecholamines are elevated, and he has a well-defined abdominal tumor on MRI. He has been scheduled for surgery. Which agent should not be included in anaesthesia protocol (desflurane, fentanyl, halothane, midazolam or thiopental). Try to outline major types of general anesthetics with administration techniques.

b. Describe the pharmacology of drugs used in the treatment of angina pectoris including adverse effects.

c. Classify and describe the pharmacological profiles of major drugs used in ophthalmology