

PHARMACOLOGY TAKE AWAY CAT

SUBMISSION DEADLINE: 06TH MARCH, 2023 AT 1.00 PM.

ANSWER ALL QUESTIONS.

1. Botulinum toxin is a very large protein molecule and does not diffuse readily when injected into tissue. In spite of this property, it is able to enter cholinergic nerve endings from the extracellular space and inhibit the release of acetylcholine. How might it cross the lipid membrane barrier? (2 marks)
2. The pKa of atropine, a weak base, is 9.7. What fraction of atropine (an amine) is in the lipid-soluble form in urine of pH 7.7? (5 marks)
3. Patients with pheochromocytoma may have this tumor for several months or even years before symptoms or signs lead to a diagnosis. Predict the probable compensatory responses to a chronic increase in blood pressure caused by a tumor releasing large amounts of norepinephrine? (6 marks)
4. Draw a concentration-response graph showing the effect of increasing concentrations of albuterol on airway diameter (as a percentage of maximum) in the presence of a large concentration of pindolol. On the same graph, draw the curves for the percentage of receptors bound to albuterol and to pindolol at each concentration. (5 marks)
5. Based on your understanding of the receptors affected by drugs used in Parkinson's disease, what types of autonomic side effects can you anticipate? (10 marks)
6. Antipsychotic drugs to varying degrees act as antagonists at several receptor types, including those for acetylcholine, dopamine, norepinephrine, and serotonin. What are the second-messenger systems for each of the following receptor subtypes that are blocked by antipsychotic drugs?
 1. D2 (1 mark)
 2. M3 (1 mark)
 3. Alpha1 (1 mark)
 4. 5-HT2A (1 mark)
7. A 12-year-old girl has her first tonic-clonic seizure while at school. Her seizure was preceded by lip smacking and lasted about 1 minute during which she lost consciousness.
 - a) What seizure type is this patient exhibiting? (1 mark)
 - b) Should antiseizure medication be started immediately in this patient? (2 marks)

- c) Provide three drugs that can be used? (3 marks)
8. A 75-year-old woman with endogenous depression is treated with amitriptyline. After three weeks, she appears to be responding, but then seems to become increasingly drowsy and confused. She is brought to the accident and emergency department following a series of convulsions.
- a) What is the likely cause of her drowsiness, confusion and convulsions? (1 mark)
 - b) Comment on the answer in (a) above (3 marks)
9. A 21-year-old woman was treated with an anti-emetic because of nausea and vomiting secondary to viral labyrinthitis. She received an initial intramuscular dose of 10 mg of metoclopramide and then continued on oral metoclopramide 10 mg three times a day, which relieved her nausea and vomiting. Two days later she was brought into the local Accident and Emergency Department because her husband thought she was having an epileptic fit. Her arms and feet were twitching, her eyes were deviated to the left and her neck was twisted, but she opened her mouth and tried to answer questions. Muscle tone in the limbs was increased. What is the diagnosis here and what is the most appropriate and diagnostic acute drug treatment? (6 marks)
10. A 24-year-old woman whose secondary generalized tonic-clonic seizures have been well controlled with carbamazepine for the previous four years develops confusion, somnolence, ataxia, vertigo and nausea. Her concurrent medication includes the oral contraceptive, Loestrin 20 (which contains norethisterone 1 mg and ethinylestradiol 20 µg) and erythromycin, which was started one week earlier for sinusitis. She has no history of drug allergy.
- a) What is the likely cause of her symptoms? (2 marks)
 - b) Is the oral contraceptive preparation appropriate? (3 marks)