

MEDICAL PHARMACOLOGY
UNIT EXAMINATION I
SEPTEMBER 15, 2000

Each of the questions or incomplete statements below is followed by suggested answers or completions. Select the **ONE** that is best in each case.

1. Which of the following statements are **FALSE** regarding histamine H1 receptor antagonists?

- A. Second generation H1 antagonists do not cross blood brain barrier to any appreciable extent.
- B. ✓ Terfenadine (Seldane) is an H1 receptor antagonist that lacks appreciable sedative properties.
- C. (C) Astemizole (Hismanal) is a H1 receptor antagonist that has appreciable sedative properties.
- D. ✓ Loratidine (Claritin) is a competitive antagonist of histamine binding to H1 receptors.
- E. Both B and D are False.

2. Which statements are **TRUE** concerning serotonin (5-HT) receptors?

- A. All serotonin (5-HT) receptors are G-protein coupled receptors. *5-HT₃ vs ligand-gated ion channel*
- B. ✓ Odansetron (Zofran) is used principally in the treatment of migraine headaches. *also nausea*
- C. (C) Buspirone (Buspar) is used to treat anxiety. ✓
- D. Odansetron (Zofran) is a 5-HT_{2A} receptor agonist. *-5-HT₃*
- E. Both A and D are TRUE.

3. Which statement is **FALSE**?

- A. ✓ Nizatidine (Axid) is a histamine H2 receptor antagonist.
- B. (B) H2 antagonists are noncompetitive antagonists of histamine binding to H2 receptors.
- C. ✓ The side effects of treatment with H2 receptor antagonists include: diarrhea, dizziness, rash, and headaches.
- D. H2 antagonists are competitive antagonists of histamine binding to H2 receptors.
- E. H2 antagonists block histamine induction of acid secretion mediated by the parietal cell H, K-ATPase (proton pump).

4. Which assignment of a given eicosanoid (autacoid) and a physiological effect(s) is **INCORRECT**?

- A. (A) TXA2: inhibition of platelet aggregation
- B. PGE2: vasodilation, pain sensitization, gastric cytoprotection
- C. PGF2a: bronchoconstriction, uterine contraction
- D. LTC4, D4, E4: bronchoconstriction.
- E. None, all are correct.

5. Which of the following statements are **TRUE**?

- ~~A.~~ The cyclooxygenase enzyme (COX) is the first enzyme in the biosynthetic pathway of leukotrienes such as LTD₄.
- ~~B.~~ Nonsteroidal anti-inflammatory drugs (NSAIDs) like aspirin inhibit the production of prostaglandins by inhibiting the enzyme 5-lipoxygenase.
- C. Prostaglandins, thromboxanes, and leukotrienes have functions that are limited to conditions of inflammation.
- D. Aspirin is an example of a cyclooxygenase type 2 (COX-2) selective antagonist.
- E. Nonsteroidal anti-inflammatory drugs (NSAIDs) like aspirin inhibit the production of prostaglandins by inhibiting the enzyme cyclooxygenase (COX).

6. Which statements are **CORRECT** with respect to Misoprostol (Cytotec)?

- A. It is an antagonist of platelet activating factor (PAF) binding.
- ~~B.~~ Inhibits the cyclooxygenase (COX) enzyme
- C. It is an analog of the prostaglandin PGE₁ and is used to treat gastric ulceration, especially that associated with nonsteroidal anti-inflammatory drug (NSAID) usage.
- D. It is an analog of the leukotriene LTD₄ and is used to treat bronchoconstriction associated with seasonal rhinitis.
- E. Inhibits the 5-lipoxygenase enzyme.

7. Morphine displays a prominent first-pass effect, and also undergoes enterohepatic circulation. The glucuronide conjugate of morphine is involved in this process. This metabolite

- ~~A.~~ is formed in the intestine.
- ~~B.~~ requires hepatic mixed function oxidase for its formation.
- C. is excreted into the bile.
- D. binds avidly to plasma proteins.
- E. is sequestered in fat.

8. After repeated administration of phenobarbital, the anticoagulant effect of warfarin is decreased because phenobarbital

- A. enhances the renal tubular secretion of warfarin.
- B. enhances the biliary secretion of warfarin.
- C. displaces warfarin from plasma protein binding sites.
- D. enhances the hepatic metabolism of warfarin.
- E. directly stimulates the mechanism for clotting.

9. As a result of activation of Phospholipase C,

- A. IP₃ stimulates the intracellular release of stored calcium.
- B. diacylglycerol stimulates protein kinase A activity.
- C. protein kinase C inhibits protein kinase A.
- D. G_s stimulates adenylyl cyclase activity.
- E. membrane integrity is destroyed.

10. After specific binding of an agonist that stimulates adenylyl cyclase activity via a G protein-linked receptor,
- G_i binds GDP in place of GTP.
 - G_s binds GDP in place of GTP.
 - G_i binds GTP in place of GDP.
 - G_s binds GTP in place of GDP.
 - G_i binds GDP and G_s binds GTP
11. Pharmacogenetics is concerned with genetic differences in drug metabolism. Genetic differences in levels of certain important drug-metabolizing enzymes have been identified. Genetic differences in the levels of what hepatic enzyme underlie population differences in the metabolism of the anti-tuberculosis drug isoniazid?
- cytochrome P450
 - catechol-O-methyltransferase (COMT)
 - alcohol dehydrogenase
 - N-acetyl transferase
 - glucuronosyl transferase
12. A typical agonist dose-effect curve is sigmoidal or "S-shaped". When the dose-effect curve for a typical agonist is redetermined in the presence of a fixed dose of a competitive antagonist, how is the curve changed?
- shifted to the left along x-axis with no change in maximum response
 - shifted to the right along x-axis with no change in maximum response
 - shifted to the left along x-axis with a decrease in maximum response
 - shifted to the right along x-axis with a decrease in maximum response
 - none of the above
13. Elimination of a certain drug follows first-order kinetics. After steady-state plasma concentrations are maintained within the therapeutic window for several weeks, oral administration of the drug is terminated. Your patient asks how quickly her plasma drug levels will now decline. Because the plasma $t_{1/2} = 6$ hr for this drug, you inform your patient that in 24 hr the plasma level will have declined to a concentration that is approximately equal to _____ of the therapeutic steady-state value.

- 75%
- 50%
- 25%
- 15%
- 5%

50	1	1	33
25	2	2	20
12	3	3	13
6	4	4	6
			<hr/>

14. In an emergency, you decide to begin intravenous infusion of a new cardiac "wonder-drug," which accumulates according to first-order kinetics. The plasma clearance (CL) of this drug is 300 ml/min. You must achieve and maintain a plasma concentration (C) = 0.3 mg/ml. What infusion rate will accomplish this goal?
- A. 0.001 mg/min
B. 0.3 mg/min
C. 90 mg/min
D. 300 mg/min
E. 1000 mg/min
15. Which of the following is NOT a Phase II hepatic metabolic reaction?
- A. acetylation
B. glucuronidation
C. methylation
D. hydrolysis
E. amino acid conjugation
16. Drug X accumulates according to First-Order kinetics. If it is given at a constant dose at intervals of its elimination half-life, what will best describe its plasma concentration vs. time profile?
- A. Plasma levels will climb in a linear manner for as long as the dosing schedule is maintained.
B. The plasma level will peak after the first dose, and tolerance will prevent further accumulation.
C. Plasma levels will approach a steady-state after 5 doses.
D. There will be no accumulation under this dose schedule.
E. A bell-shaped curve
17. When a patient is taking two or more drugs at the same time, one must be aware of possible pharmacokinetic and pharmacodynamic interactions between the drugs. An example of a pharmacodynamic interaction between two drugs is when
- A. they compete for the same G protein-coupled receptor.
B. they form a complex with each other in the gut to prevent absorption.
C. they compete for binding to plasma proteins.
D. they are both substrates for hepatic MFO.
E. they compete for the renal tubule acid transporter.
18. Mr. James Beam gulps a drink of whiskey at hourly intervals starting at 8 pm. It takes one hour for his liver to metabolize the alcohol in 1 ounce of this drink. His first four drinks are 3/4 ounce each, and then he triples his hourly dose. What effect will this change in dose have on his plasma level of ethanol, which is measured shortly after each dose?
- A. After about four drinks at the higher dose, the measured plasma level will reach a plateau.
B. The measured plasma level of ethanol will not change in response to the higher dose but toxic metabolite levels will rise exponentially.
C. After increasing the dose, the measured plasma level will increase continuously.
D. With a change to the higher dose, plasma level will decline gradually due to induction of metabolic enzymes.
E. None of the above.
- $300 \times 3 = 900$
- drug-drug interaction*

19. A forensic toxicologist, Dr. Quinn See, reminds you that some acidic or basic drugs may accumulate in body compartments depending on the pH of the compartment. This is something you vaguely remember having heard years ago in Medical School. Because you saved all your notes, you decide it would be great fun to review an example of the effect of pH/pK_a interactions on drug ionization: Drug X is a weak acid (pK_a = 4.0). The percentage of drug that is ionized in gastric juice (pH 2) is about

- A. 1%
B. 10%
C. 50%
D. 90%
E. 99%

A

A

$pH - pK_a = 2 - 4 = -2$
 $10^{-2} = 0.01$

20. Which statement best describes an original premise of classical receptor occupancy theory?

- A. The magnitude of effect is directly proportional to the fraction of drug receptors occupied.
B. Drug responses represent the result of a series of post-receptor amplification events.
C. The maximum effect may occur without all drug receptors being occupied.
D. R_T (total receptor concentration) changes with dose of the drug.
E. All of the above apply equally well to the theory.

21. The apparent volume of distribution (V_d) of a drug provides an indication of its pharmacokinetic behavior. The anti-arrhythmic drug digitoxin has a V_d of 42 L. This suggests that

- A. digitoxin is preferentially sequestered in tissue reservoirs such as fat.
B. digitoxin has a high renal clearance.
C. digitoxin is distributed evenly in total body water.
D. digitoxin is confined largely to the plasma fluid compartment.
E. digitoxin undergoes first-order accumulation kinetics.

22. A drug that is a weak base (pK_a = 8.5) enters the tubular urine (pH 6.4). Thus, the drug now

- A. exists predominantly in its protonated form, which favors reabsorption into plasma.
B. exists predominantly in its protonated form, which does not favor reabsorption into plasma.
C. exists predominantly in its nonprotonated form, which favors reabsorption into plasma.
D. exists predominantly in its nonprotonated form, which does not favor reabsorption into plasma.
E. will display a prominent first-pass effect.

23. Which of these routes of drug administration is NOT parenteral?

- A. subcutaneous
B. intrathecal
C. intravenous
D. intramuscular
E. sublingual

24. In general, body fat is an important reservoir for what type of drugs?
- A. lipid-soluble
 - B. strong acids
 - C. strong bases
 - D. glucuronide-conjugated
 - E. large molecular weight
25. The renal clearance of a drug is 700 ml/min. This suggests that at the kidney, the drug is
- A. efficiently filtered, not secreted, not reabsorbed.
 - B. not filtered, not secreted, efficiently reabsorbed.
 - C. not filtered, efficiently secreted, efficiently reabsorbed.
 - D. efficiently filtered, efficiently secreted, not reabsorbed.
 - E. efficiently filtered, efficiently secreted, efficiently reabsorbed.
26. Drugs with a high liver extraction ratio
- A. are used to treat liver disease.
 - B. cause bile depletion.
 - C. display a prominent first-pass effect.
 - D. do not bind to plasma proteins.
 - E. should be administered orally.
27. A Scatchard plot (B/F vs. F) derived from a drug-receptor binding study provides which of the following?
- A. B_{max} and K_d
 - B. C_o and V_d
 - C. therapeutic index and bioavailability
 - D. loading dose and maintenance dose
 - E. $t_{1/2}$ and k_e
28. Two acidic drugs compete for binding to the plasma protein albumin. What general type of drug interaction is this?
- A. pharmacodynamic
 - B. pharmacogenetic
 - C. pharmacokinetic
 - D. pharmacopathologic
 - E. pharmacotherapeutic
29. In general, the most important site of absorption for orally ingested drug is
- A. mouth.
 - B. esophagus.
 - C. bile duct.
 - D. intestines.
 - E. stomach.

30. A 42-year old male, C.J., is diagnosed with mild hypertension. He has a 2-year history of depression that is managed with imipramine. Dietary consultation and an exercise program are initiated to treat the hypertension. Which of the following over-the-counter (medicines sold without prescription) medications might aggravate the hypertension and should therefore be avoided?
- A. aspirin
 - B. acetaminaphen (Tylenol[®])
 - C. phenylephrine (Neo-Synephrine[®]) α_1 Ag
 - D. calcium-based antacid (Tums[®])
 - E. topical antibiotic
31. S.C. is a 55-year old female with a blood pressure of 160/95 (normal is \leq 140/90). She has no other known pathologies. Which of following might be prescribed to lower her blood pressure?
- A. yohimbine
 - B. phenoxybenzamine (Dibenzyl[®]) α_1
 - C. methoxamine (Vasoxyl[®]) α_1
 - D. salmeterol (Serevent[®])
 - E. clonidine (Catapres[®])
32. F.K. is a 73-year old male with chronic bronchitis. He has a history of smoking 3 packs of cigarettes a day but successfully stopped smoking 1 year ago. Administration of albuterol (Proventil[®]) may be appropriate. Which of the following is a co-morbidity for which F.K. should be tested because of potential contraindications of albuterol?
- A. benign prostatic hypertrophy
 - B. coronary artery disease CAD
 - C. depression
 - D. ischemic renal disease
 - E. retinopathy
33. J.C., is 56-year old female with a diagnosis of moderate hypertension (current blood pressure is 160/95). She has 32-year history of smoking, a 6-year history of chronic bronchitis. She continues to smoke and uses albuterol (Proventil[®]) as needed. While it would still need to be used with caution, why is metoprolol (Lopressor[®]) a better choice than propranolol (Inderal[®]) in this situation for treatment of the hypertension?
- A. intrinsic sympathomimetic activity
 - B. receptor subtype selectivity
 - C. membrane-stabilizing activity
 - D. lipid solubility
 - E. elimination half-life
- meto B 1
proprano B 2

34. S.H. is a 28-year old female who is 28 weeks pregnant. Labor has begun and other attempts to stop the contractions have been unsuccessful. She has no known pathologies and the baby's vital signs appear to be normal for a 28-week old fetus. Ritodrine (Yutopar[®]) is initiated. Which of the following is a potential serious fetal adverse effect that is due to a direct adrenergic action of this drug?

- A. arrhythmia
- B. hepatic failure
- C. kidney failure
- D. cerebral hemorrhage
- E. blindness

↓
anti-adrenergic

35. R.H., a 62-year old male, is diagnosed with wide-angle glaucoma. There are no other known significant pathologies. Which of the following could be prescribed to treat the glaucoma?

- A. guanethidine (Ismelin[®])
- B. esmolol (Brevibloc[®])
- C. isoproterenol (Isuprel[®])
- D. epinephrine (Sus-Phrine[®])
- E. phentolamine (Regitine[®])

WAG

36. C.M. is a 35-year old female with a severe bradycardia. Isoproterenol (Isuprel[®]) is given and the heart rate is increased to within the normal range. Which of the following would be expected?

- A. decreased diastolic pressure
- B. increased total peripheral resistance
- C. increased bronchoconstriction
- D. increased GI longitudinal contractions
- E. decreased pulse pressure

↑ HR
↓
B₁, B₂

37. An experiment is being done to study the action of G_q in a cell line known to contain a single cell type. This cell type contains adrenergic receptors and G_q. Stimulation of the receptors is capable of stimulating G_q. Which of the following drugs would be most appropriate to use as an agent to stimulate the adrenergic receptor to interact with G_q?

B

- A. amphetamine
- B. phenylephrine (Neo-synephrine[®])
- C. tamsulosin (Flomax[®])
- D. ritodrine (Yutopar[®])
- E. pindolol (Visden[®])

Adrenergic

38. D.K., a 42-year old male, is in cardiac failure which has been refractory to intervention and has progressed into shock. High dose dopamine (Intropin®) is given by intravenous administration. As the shock is resolved, the heart is stimulated, and the dopamine infusion is continued. Which of the following is a response to be expected?

- ~~A.~~ decreased renal blood flow
- ~~B.~~ increased bronchoconstriction
- ~~C.~~ increased skeletal muscle blood flow
- D. decreased heart rate *Reflex*
- ~~E.~~ decreased blood glucose

↑ PR

↓ PR

39. L.T. is a 19-year old female with seasonal allergic rhinitis (hay fever). She has no other pathologies and reports taking no medications except an occasional pain reliever as needed. Administration of an antihistamine in combination with which of the following is appropriate?

- A. metyrosine (Demser®)
- B. nadolol (Corgard®)
- C. dobutamine (Dobutrex®)
- D. pseudoephedrine
- E. brimonidine (Alphagen®)

40. A.T. is a 54-year old male diagnosed with benign prostatic hyperplasia. He is experiencing nocturia. Which of the following would be most appropriate to prescribe?

- A. atenolol (Tenormin®)
- ~~B.~~ timolol (Timoptic®)
- C. tamsulosin (Flomax®)
- D. phentolamine (Regintine®)
- E. labetalol (Normodyne®)

41. N.S., a 42-year old male, has been prescribed prazosin (Minipress®). After taking the first dose of the drug, his wife found him lying unconscious next to his favorite chair after failing to answer the telephone (which is located in the next room). Why might the drug have caused this situation?

- A. orthostatic hypotension
- B. tachycardia
- C. ventricular fibrillation
- D. vertigo
- E. fragility of bone

42. V.D., a 76-year old female, is hospitalized due to unstable cardiac rhythm. She is being treated with esmolol (Brevibloc®). Why is esmolol a better choice than metoprolol (Lopressor®) for this situation?

- ~~A.~~ intrinsic sympathomimetic activity
- ~~B.~~ receptor subtype selectivity
- C. membrane-stabilizing activity
- D. lipid solubility
- E. elimination half-life

43. D.A., a 59-year old male, presents with a blood pressure of 160/95 (normal \leq 140/90). He has a history of 14-year high blood pressure that has been controlled previously with a diuretic. Recently he has recovered from a mild myocardial infarction. Since the infarction he has experienced dyspnea (labored breathing) with mild exertion. Which of the following would be most appropriate to add to the treatment regime as an out-patient therapy?

- A. dopamine (Intropin[®])
- B. carvedilol (Coreg[®])
- C. isoproterenol (Isuprel[®])
- D. talmsulosin (Flomax[®])
- E. reserpine (Serpasil[®])

44. Which of the following drugs requires metabolism by aromatic L-amino acid decarboxylase for the active form of the drug to be formed?

- A. dopamine (Intropin[®])
- B. atenolol (Tenormin[®])
- C. guanethidine (Ismelin[®])
- D. methyl dopa (Aldomet[®])
- E. metyrosine (Demser[®])

45. T.M. is a 58-year old female who presents with moderately elevated blood pressure. She has evidence of mild coronary artery disease. She is prescribed propranolol (Inderal[®]). What warning should be given to T.M. about the use of propranolol?

- A. She should not abruptly stop taking the drug.
- B. She may experience hyperglycemia.
- C. She may develop crystals in her urine that would be painful.
- D. She may experience orthostatic hypotension.
- E. She should not take the drug with food.

46. Ephedrine is given by intravenous injection to a test subject. The following changes in the individual's physiology are observed: bronchodilation, tachycardia, increased systolic blood pressure, decreased diastolic blood pressure, local vasoconstriction at the site of the injection, and decreased blood flow to the kidney. Which of these changes is due to a combination of both direct target organ response(s) and reflex response(s)?

- A. bronchodilation
- B. tachycardia
- C. decreased diastolic blood pressure
- D. local vasoconstriction at injection site
- E. decreased renal blood flow

B

↑ HR

↑ SBP

↓ DBP

B1 next
R2 Branch

47. The parasympathetic (PS) and sympathoadrenal (SAS) divisions of the autonomic nervous system (ANS) differ
- A. anatomically.
 - B. according to the neurotransmitter released from their postganglionic nerve terminals.
 - C. because only the PS has its own neurohormone.
 - D. because only the SAS is essential to life.
 - E. because only the PS innervates smooth muscle of arterioles.
48. The cholinergic drug of choice for treatment of wide angle glaucoma is
- A. atropine.
 - B. scopolamine.
 - C. bethanechol (Urecholine[®]).
 - D. methacholine (Provocholine[®]).
 - E. pilocarpine.
49. All of the following physiological responses might be expected to occur during a "fight or flight" situation **EXCEPT**
- A. an increase in blood flow to skeletal muscle.
 - B. bronchodilation.
 - C. miosis.
 - D. an increase in heart rate and force of contraction.
 - E. a decrease in gastrointestinal activity.
50. An asthmatic tennis player is continually experiencing skeletal muscle weakness shortly after the onset of his matches. A physician administers edrophonium (Tensilon[®]) and an immediate improvement in muscle strength occurs. The individual is scheduled for a surgical procedure which is unrelated to his asthma or skeletal muscle weakness. Halothane is selected as the general anesthetic. To produce safe and effective skeletal muscle relaxation in this patient during surgical anesthesia, administer
- A. the standard dose of d-tubocurarine (Tubarin[®]).
 - B. the standard dose of succinylcholine (Anectine[®]).
 - C. the standard dose of cyclobenzaprine (Flexeril[®]).
 - D. a reduced dose of vecuronium (Norcuron[®]).
 - E. the standard dose of dantrolene (Dantrium[®]).
51. To treat the skeletal muscle weakness of the tennis player described above, administer
- A. pyridostigmine (Mestinon[®]).
 - B. edrophonium (Tensilon[®]).
 - C. echothiophate (Phospholine[®]).
 - D. methacholine (Provocholine[®]).
 - E. succinylcholine (Anectine[®]).

52. Select the **TRUE** statement.

- A. The SAS dominates over the PS in controlling heart rate.
- B. Only the SAS influences accommodation.
- C. The PS and SAS oppose each other physiologically in controlling ventricular contraction.
- D. Both divisions of the ANS influence sexual functioning.
- E. Only the SAS innervates bronchiole smooth muscle.

53. Select the **FALSE** statement.

- A. Slow infusion of a low dose of norepinephrine (NE) would be expected to cause a reflex bradycardia.
- B. Infusion of a low dose of acetylcholine (ACh) would be expected to cause a reflex tachycardia.
- C. Release of epinephrine from the adrenal medulla acts on adrenoceptors in skeletal muscle beds to cause vasodilatation.
- D. NE has little if any action on B₂ adrenoceptors.
- E. A high concentration of ACh at muscarinic receptor sites typically causes receptor desensitization.

54. For treatment of gastric atony in the absence of an obstruction, administer

- A. bethanechol (Urecholine[®]).
- B. hexamethonium (C₆).
- C. echothiophate (Phospholine[®]).
- D. atropine.
- E. methacholine (Provocholine[®]).

55. Select the **FALSE** statement.

- A. The action of acetylcholine (ACh) at postjunctional receptor sites is mainly terminated by the enzyme acetylcholinesterase (AChE).
- B. The action of norepinephrine (NE) at postjunctional receptor sites is mainly terminated by reuptake into the prejunctional nerve terminal.
- C. The plasma membrane carrier responsible for NE reuptake is identical to the carrier that transports NE into synaptic vesicles.
- D. Tyrosine hydroxylase (T-OH) is the rate limiting step in prejunctional NE metabolism.
- E. The prejunctional α_2 receptor on those postganglionic sympathetic nerve terminals which release NE helps to regulate NE release.

56. A young male begins to routinely experience gastric distress after his morning cup of coffee. His physician prescribes methantheline (Banthine[®]). All of the following effects might be expected to occur during treatment with this drug **EXCEPT**

- A. a decrease in gastrointestinal motility.
- B. orthostatic hypotension.
- C. impotence.
- D. a decrease in HCl secretion.
- E. miosis.

57. For retinal examination in young children, administer

- A. bethanechol (Urecholine®).
- B. atropine
- C. echothiophate (Phospholine®).
- D. pilocarpine.
- E. physostigmine (Eserine®).

58. Which drug antidote would be most suitable for atropine intoxication?

- A. pyridostigmine (Mestinon®).
- B. physostigmine (Eserine®).
- C. echothiophate (Phospholine®).
- D. edrophonium (Tensilon®).
- ~~E. succinylcholine (Anectine®).~~

atropine - muscarinic antagonist
donepezil

59. Which of the following drugs would be safe to use in a patient with narrow angle glaucoma?

- ~~A. atropine~~
- ~~B. scopolamine~~
- C. physostigmine
- ~~D. homatropine~~
- ~~E. succinylcholine (Anectine®)~~

60. In a peptic ulcer patient, all of the following drugs would be suitable for treatment of reflux esophagitis **EXCEPT**

- A. bethanechol (Urecholine®).
- B. sodium bicarbonate (Alda Seltzer®).
- C. ranitidine (Zantac®).
- D. metoclopramide (Reglan®).
- E. omeprazole (Prilosec®).

61. A farm worker begins to feel nauseous and experiences breathing difficulties while spraying an insecticide. A blood sample is taken and reveals that plasma pseudocholinesterase is inhibited to a greater extent (100%) than is red blood cell AChE (50%). What drug or combination of drugs would benefit this individual?

- A. neostigmine (Prostigmin®)
- B. methacholine (Provocholine®)
- C. echothiophate (Phospholine®)
- D. cyclobenzaprine (Flexeril®)
- E. atropine plus pralidoxime (2-PAM®)

62. Which skeletal muscle relaxant is most likely to cause CNS side effects?
- A. succinylcholine (Anectine[®])
 - B. d-tubocurarine (Tubarin[®])
 - C. pancuronium (Pavulon[®])
 - D. vecuronium (Noruron[®])
 - E. cyclobenzaprine (Flexeril[®])
63. For treatment of malignant hyperthermia, administer
- A. dantrolene (Dantrium[®]).
 - B. succinylcholine (Anectine[®]).
 - C. cyclobenzaprine (Flexeril[®]).
 - D. apomorphine.
 - E. metoclopramide (Reglan[®]).
64. For treatment of blepharospasm, administer
- A. botulinium toxin.
 - B. neostigmine (Prostigmin[®]).
 - C. physostigmine.
 - D. pilocarpine.
 - E. guanidine.
65. To induce vomiting in a patient who has taken a drug overdose, administer
- A. syrup of ipecac.
 - B. metoclopramide (Reglan[®]).
 - C. scopolamine.
 - D. ondansetron (Zofren[®]).
 - E. diphenhydramine (Benadryl[®]).
66. For treatment of motion sickness, administer
- A. atropine.
 - B. hexamethonium.
 - C. bethanechol (Urecholine[®]).
 - D. apomorphine.
 - E. scopolamine (Transderm Scop).
67. For treatment of diarrhea, administer
- A. apomorphine.
 - B. neostigmine (Prostigmin[®]).
 - C. bethanechol (Urecholine[®]).
 - D. carboxy methylcellulose.
 - E. diphenoxylate-atropine (Lomotil[®]).

68. For treatment of an H. pylori induced duodenal ulcer, administer

H. pylori

- A. bismuth, ranitidine (Zantec[®]), tetracycline and metronidazole (Flagyl[®]).
- B. syrup of ipecac.
- C. misoprostol (Cytotec[®]).
- D. pilocarpine.
- E. mineral oil.

NO CORRECT ANSWER

wrong

69. Misoprostol (Cytotec) is used clinically to

- A. prevent the development of ulcers caused by non-steroidal antiinflammatory drugs.
- B. treat diarrhea.
- C. prevent nausea associated with certain anticancer drugs.
- D. diagnose achlorhydria.
- E. induce vomiting.

70. For treatment of xerostomia caused by head and neck irradiation, administer

- A. atropine.
- B. scopolamine.
- C. pilocarpine.
- D. propantheline (ProBanthine[®]).
- E. trimethaphan (Arofonad[®]).

71. An individual is experiencing intense gastrointestinal pain. A breath test reveals that the population of H. pylori in the individual's G.I. tract is normal. It is then discovered that the individual has a tumor of the pancreas which is resulting in tremendous levels of gastrin release. Which of the following drugs would be the most appropriate for treatment of this patient's condition?

- A. sodium bicarbonate (Alka Seltzer[®]).
- B. misoprostol (Cytotec[®]).
- C. sucralfate.
- D. bismuth (Pepto Bismo[®]).
- E. omeprazole (Prilosec[®]).

72. An overdose of the drug pancuronium (Pavulon) is producing serious breathing problems in a patient. Which drug would be most suitable to administer to this patient?

- A. succinylcholine (Anectine[®]).
- B. d-tubocurarine (Tubarin[®]).
- C. physostigmine (Eserine[®]).
- D. neostigmine (Prostigmin[®]).
- E. atropine plus pralidoxime (2-PAM[®]).

either

either

73. Cholestyramine reduces plasma cholesterol levels by which of the following mechanisms?
- A. reduces cholesterol production in the liver
 - B. inhibits HMG CoA reductase
 - C. inhibits cholesterol and bile salt reabsorption
 - D. inhibits peripheral lipase activity, thus reducing fatty acids
74. Muscle pain and rhabdomyolysis is sometimes seen with certain HMG CoA reductase inhibitors due to which of the following mechanisms?
- A. Calcium channels are inhibited producing muscle cell atrophy.
 - B. inhibits HMG CoA reductase activity in peripheral muscle cells as well
 - C. inhibits internalization of cholesterol into the muscle cell
 - D. inhibits glucose uptake by the muscle cell
75. While treating patients with high doses of Nicotinic acid, please be sure to do which of the following?
- A. check urine BUN
 - B. check liver alkaline phosphatase
 - C. check liver transaminases
 - D. check urine bilirubin
76. Atherosclerosis and hypertension are the disease states for which the public self-medicates with which herb?
- A. Gingko biloba
 - B. Garlic
 - C. Arnica
 - D. St. John's Wort
 - E. none of the above
77. Which herb is correctly paired with one of its active ingredients?
- A. St. John's Wort: Hypericin
 - B. Ginseng: Ginsengoids
 - C. Arnica: Allicin
 - D. A and B
 - E. none of the above
78. Which herb has been shown to have some (mild to moderate) antibiotic activity?
- A. Garlic
 - B. Ginseng
 - C. Echinacea
 - D. Arnica
 - E. A, C, and D

E

79. Name the mechanism of action for the anti-asthma drug Zileuton.

- A. It acts as a bronchodilator.
- B. It acts as an inhibitor of 5-lipoxygenase.
- C. It acts as a stabilizer of mast cell membranes.
- D. It acts as an adenosine receptor antagonist.
- E. It acts as a long-acting beta-2 (β_2)-selective adrenergic agonist.

80. Name from the list below the β_2 -selective adrenergic agonist that is not suitable for treatment of acute bronchospasm.

- A. albuterol ✓
 - B. terbutaline ✓
 - C. salmeterol
 - D. bitolterol mesylate ✓
 - E. pirbuterol ✓
- All β_2

81. Beclomethasone is a glucocorticoid used during treatment of persistent asthma. One of the statements below about beclomethasone is not true. Name the statement below that is not true.

- A. ✓ Beclomethasone acts by binding to and activating an intracellular transcription factor that regulates gene expression.
- B. ✓ Long-term Beclomethasone use can reduce the hallmark bronchial hyperreactivity of asthma.
- C. Beclomethasone is administered by inhalation.
- D. Beclomethasone acts as a bronchodilator.
- E. Beclomethasone is relatively free of serious toxicity, even at the highest dosages used to treat asthmatics

82. Select the biochemical change measurable in the liver and a corresponding biochemical change measurable in blood or serum that results from the hepatic metabolism of ethanol.

- A. an increase in the NAD/NADH ratio that results in hyperlacticacidemia
- B. an increase in the NAD/NADH ratio that results in ketosis
- C. an increase in the NADP/NADPH ratio that results in hypoglycemia
- D. an increase in the NADH/NAD ratio that results in hypouricemia
- E. an increase in the NADH/NAD ratio that results in hyperlipidemia

83. One of the conditions listed below is a medical contraindication for alcohol consumption and warrants termination of its use? That condition is

- A. hyperlipidemia.
- B. depression.
- C. hypotension.
- D. gastrointestinal ulcers.
- E. generalized anxiety.

84. The mechanism of action of the immunosuppressant drug tacrolimus is

- A. to bind to an intracellular protein and inhibit calcineurin phosphatase.
- B. to inhibit inosine monophosphate dehydrogenase.
- C. to alkylate DNA, particularly in proliferating cells.
- D. to potentiate the stimulation of lymphocytes, granulocytes and macrophages by antigens, mitogens, lymphokines and chemotactic factors.
- E. to inhibit viral replication and modulate immune responses.

85. Name the glucocorticoid that is commonly used during acute organ rejection.

- A. dexamethasone
- B. medrysone
- C. methylprednisolone
- D. prednisone
- E. fludrocortisone

86. Select the statement below about mycophenolate mofetil that is not true.

- A. It is metabolized in the blood to mycophenolic acid (MPA).
- B. It inhibits recruitment of leukocytes to inflammatory sites.
- C. It is approved for use following renal transplantation.
- D. It suppresses antibody formation by B cells.
- E. It is a potent inhibitor of the enzyme dihydrofolate reductase.

87. During thyroid storm it is important to delay potassium iodide treatment until the first dose of propylthiouracil because

- A. iodide inhibits the uptake of propylthiouracil by the thyroid.
- B. iodide causes an initial release of thyroxine that can be countered by propylthiouracil.
- C. the high doses of iodide used during thyroid storm management will delay the onset of action of propylthiouracil.
- D. propylthiouracil requires iodide to act within the thyroid.
- E. it is important to inhibit the peripheral conversion of T4 to T3 by iodothyronine 5'-deiodinase-1 prior to iodide exposure.

88. Levothyroxine (T4) is the agent of choice for thyroid replacement therapy because

- A. it is more potent than Liothyronine and Liotrix.
- B. it has a long half-life and is easily measured in serum.
- C. T4 is the active thyroid hormone.
- D. its shorter half-life makes it easier to control its serum levels.
- E. desiccated thyroid powder is more difficult to obtain.

89. What mechanism of action does propylthiouracil possess that methimazole does not?
- A. inhibition of thyroid peroxidase
 - B. inhibition of iodide uptake by the thyroid
 - C. inhibition of the peripheral conversion of T4 to T3
 - D. inhibition of T4 and T3 release
 - E. inhibition of organification
90. Which of the following antibiotics is useful in treating testicular tumors but may produce pulmonary fibrosis, an often fatal effect in elderly patients?
- A. dactinomycin (Actinomycin D^R)
 - B. plicamycin (formerly Mithramycin)
 - C. doxorubicin (Adriamycin^R)
 - D. bleomycin (Blenoxane^R)
 - E. mitomycin (Mutamycin^R)
91. Which of the following antineoplastic agents must be converted (metabolized) to an active drug before it has any effect on cancer cells?
- A. methotrexate (MTX; Mexate^R)
 - B. 6-Mercaptopurine (6-MP; Purinethol^R)
 - C. vinblastine (Velban^R)
 - D. etoposide (VP-16^R; VePesid^R)
 - E. taxol (Paclitaxel^R)
92. Which of the following antineoplastic agents must be metabolized by the cytochrome P₄₅₀ system in liver to become an active alkylating agent?
- A. Mechlorethamine (Mustargen^R)
 - B. Chlorambucil (Lukeran^R)
 - C. Cyclophosphamide (Cytosan^R)
 - D. BCNU (Carmustine^R)
 - E. Busulfan (Myleran^R)
93. 5-Fluorouracil (5-FU; Adrucil^R)
- A. inhibits thymidylate (dTMP) synthesis.
 - B. prevents spindle formation because of affinity for microtubules.
 - C. inhibits topoisomerase II.
 - D. binds DNA and thus prevents DNA synthesis (The presence of guanine and helical configuration is required for binding).
 - E. inhibits conversion of IMP (inosinic monophosphate) to AMP (adenine monophosphate) and GMP (guanine monophosphate).

94. The citrovorum factor, a derivative of folic acid (folinic acid) is used to antagonize the toxic actions of

- A. flutamine.
- B. tamoxifen (Nolvadex^R).
- C. hydroxyurea (Hydrea^R).
- D. Procarbazine^R.
- E. methotrexate (MTX; Mexate^R).

95. Which of the following statements is FALSE?

- A. Cancer cell growth is exponential.
- B. One cancer cell is potentially fatal.
- C. The number of cancer cells inoculated into an animal determines the time of survival.
- D. A given dose of a drug will kill a constant number of the cells per unit time. 70
- E. Cyclophosphamide (Cytosan^R) causes alopecia and hemorrhagic cystitis. 70

Use the following vitamins one, more than once, or not at all to answer the following questions (96-100).

- A. Vitamin A
- B. Niacin (vitamin B₃)
- C. Riboflavin (vitamin B₂)
- D. Thiamine (vitamin B₁)
- E. Pyridoxine (vitamin B₆)

D 96. A deficiency leads to beriberi (abnormalities in pyruvate metabolism). B₁

B 97. A deficiency leads to pellagra (deficiency in pyridine nucleotides, NAD, NADP). Niacin

E 98. A deficiency may result when the tuberculosis patient is being treated with isoniazid and/or cycloserine. B₆

E 99. May interfere with the treatment of Parkinsonism by accelerating the peripheral metabolism of levodopa. B₆

A 100. A deficiency may lead to night blindness (nyctalopia) and keratinization of the epithelium particularly in the eye and skin. A

TEST FORM ANSWER SHEET

TEXAS TECH UNIVERSITY

DO NOT WRITE BELOW THIS LINE

TEST NO.										
DEPT. NO.										
COURSE										
SECTION										
	0	0	0	0	0	0	0	0	0	0
	1	1	1	1	1	1	1	1	1	1
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OPTIONS A B C D E F G H

FORM 1 2 3 4 5 6 7 8

SHEET TYPE A W

USE BLACK LEAD PENCIL ONLY
(NO. 2^{1/2} OR SOFTER)

GIVE ONLY ONE ANSWER FOR EACH QUESTION

- 1 A B C D E 21 A B C D E 41 A B C D E 51 A B C D E
 - 2 A B C D E 22 A B C D E 42 A B C D E 52 A B C D E
 - 3 A B C D E 23 A B C D E 43 A B C D E 53 A B C D E
 - 4 A B C D E 24 A B C D E 44 A B C D E 54 A B C D E
 - 5 A B C D E 25 A B C D E 45 A B C D E 55 A B C D E
 - 6 A B C D E 26 A B C D E 46 A B C D E 56 A B C D E
 - 7 A B C D E 27 A B C D E 47 A B C D E 57 A B C D E
 - 8 A B C D E 28 A B C D E 48 A B C D E 58 A B C D E
 - 9 A B C D E 29 A B C D E 49 A B C D E 59 A B C D E
 - 10 A B C D E 30 A B C D E 50 A B C D E 60 A B C D E
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- 61 A B C D E 81 A B C D E 101 A B C D E 111 A B C D E
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 - 69 A B C D E 89 A B C D E 109 A B C D E 119 A B C D E
 - 70 A B C D E 90 A B C D E 110 A B C D E 120 A B C D E