

***DENTAL PHARMACOLOGY
EXAMINATION #II***

March 2, 2009

You have one (1) hour and 15 minutes to complete this examination. The examination contains 50 questions, each worth 2 points.

Answer all questions on the computer sheet provided; use a soft lead pencil. Be sure that you have correctly identified your answer sheet by **PRINTING** your name and TU id number and correctly filling in the grid spaces. You may keep your exam booklet. Answers and grades will be posted on Blackboard.

This examination is being administered under the Honor Code of Temple University Dental School

All Questions: Select the single, most appropriate answer.

1. An 8-year-old girl is brought in by her mother for evaluation of allergies. Each year in the spring the child develops a runny nose; itchy, watery eyes; and sneezing. She has been treated in the past with diphenhydramine, but the child's teacher says that she is very drowsy during school. Which one of the following drug should you suggest?
 - A. Flutamide
 - ☒ B. Loratadine
 - C. Chlorpheniramine
 - D. Promethazine
 - E. Diphenhydramine

2. Which of the following is true?
 - A. Helicobacter pylori causes itch but not peptic ulcer
 - B. Peptic ulcer is caused by viral infection
 - C. Epinephrine is not a physiologic antagonist of histamine
 - D. Diphenhydramine can block H₂ receptors and treat peptic ulcer
 - ☒ E. Fexofenadine has lower potential to induce drowsiness than the first generation H₁ blockers

- ☒ 3. Many antihistamines (H₁ blockers) have additional non-histamine receptor-related effects; these are likely to include all the following EXCEPT:
 - ☒ A. Anti-cholinergic effects
 - B. Local anesthetic effects
 - C. Sedation
 - ☒ D. Anti-motion sickness effect
 - ☒ E. Increase in histamine release

- ☒ 4. All of the following are attributes of digoxin when used in the treatment of congestive heart failure EXCEPT:
 - ☒ A. Increase in cardiac automaticity
 - B. Prolongation of the PR-interval of the ECG
 - ☒ C. Increased cardiac output
 - ☒ D. Increased heart rate
 - ☒ E. Visual disturbances with higher doses

5. Following a dental procedure with a 13 year old male patient, you are considering the use of aspirin to reduce the pain and inflammation. You have concerns about adverse reactions. The most serious adverse reaction to consider is:
- A. Reduced blood uric acid levels
 - B. Delayed blood clot formation
 - C. Heightened sensitivity to painful stimuli
 - D. Delayed hypersensitivity reactions
 - E. Reye's syndrome
6. Which of the following most directly describes the mechanism of action of digitalis?
- A. Inhibits the sodium-potassium ATPase
 - B. Decreases the intracellular sodium concentration
 - C. Increases the intracellular level of ATP
 - D. Stimulates the production of cAMP
 - E. Decreases release of calcium from the sarcoplasmic reticulum
7. A well-nourished elderly patient with renal failure begins to show signs of anemia. Which of the following agents would be most likely to relieve the anemia?
- A. Cyanocobalamin
 - B. Erythropoietin
 - C. Ferrous sulfate
 - D. Folic acid
 - E. Leucovorin
8. Before beginning folate therapy for megaloblastic anemia, one should consider using which of the following to prevent neurological disease?
- A. Erythropoietin
 - B. Iron
 - C. Vitamin B6
 - D. Vitamin B12
 - E. Zinc
9. Absence of intrinsic factor leads to which of the following?
- A. Erythropoietin deficiency
 - B. Folic acid deficiency
 - C. Iron deficiency
 - D. Porphyria
 - E. Vitamin B12 deficiency

- 9 10. The mechanism of action of nitroglycerin involves the release of nitric oxide (NO) followed by:
- A. Activation of adenylyl cyclase and increase in cAMP
 - B. Inhibition of adenylyl cyclase and decrease in cAMP
 - C. Activation of guanylyl cyclase and increase in cGMP
 - D. Activation of phospholipase C and increase in IP_3
 - E. Inhibition of fatty acid oxidation
11. Which of the following effects of nitrates will be most likely prevented by combined therapy with beta-blockers?
- A. Venodilation
 - B. Hypotension
 - C. Arteriodilation
 - D. Headache
 - E. Tachycardia
12. Which of the following antianginal drugs can induce gingival inflammation in long-term therapy?
- A. Verapamil
 - B. Atenolol
 - C. Isosorbide dinitrate
 - D. Propranolol
 - E. Metoprolol
13. Which of the following is a drug that may cause renal damage in the fetus if given during pregnancy?
- A. Captopril
 - B. Diazoxide
 - C. Guanethidine
 - D. Hydralazine
 - E. Minoxidil
14. Which one of the following drugs is an angiotensin-receptor blocker that will have the same beneficial effects as an ACE inhibitor but will not produce a cough?
- A. Nifedipine
 - B. Prazosin
 - C. Propranolol
 - D. Hydrochlorothiazide
 - E. Losartan

15. Which of the following patients is most suited for primary therapy with hydrochlorothiazide?
- A. Patients with gout
 - B. Patients with hyperlipidemia
 - C. Young hypertensive patients with rapid resting heart rate
 - D. Black patients and elderly patients with hypertension
 - E. Patients with impaired renal function
16. Which one of the following analgesics has agonist properties at kappa opioid receptors and antagonist actions at mu opioid receptors?
- A. Nalbuphine
 - B. Naloxone
 - C. Oxycodone
 - D. Propoxyphene
 - E. Tramadol
17. You have been treating a patient with rheumatoid arthritis for several years. Recently she has begun to receive treatment with Etanercept (Enbrel). Which of the following statements about this drug is true?
- A. Can induce adverse dermatologic reactions at the site of injection.
 - B. Is a selective inhibitor of DNA synthesis in proliferating T cells.
 - C. Is an inhibitor of CTLA-4 function.
 - D. Is a selective inhibitor of TNF production.
 - E. Is an inhibitor of CD20 and blocks the activation of B cells in most arthritis patients.
18. Which one of the following drugs has a metabolite that produces CNS excitation?
- A. Buprenorphine
 - B. Fentanyl
 - C. Meperidine
 - D. Methadone
 - E. Oxycodone
19. Which one of the following drugs has a side effect of increased heart rate and blood pressure?
- A. Codeine
 - B. Fentanyl
 - C. Morphine
 - D. Oxycodone
 - E. Pentazocine

Morphine

20. Opioid analgesics can have adverse interactions with all of the following classes of drugs **EXCEPT**:

- ☒ A. Antiarrhythmics
- B. Antipsychotics
- ☒ C. Local anesthetics
- ☒ D. MAO inhibitors
- ☒ E. Oral anticoagulants

21. All of the following statements about beta-endorphin are true **EXCEPT**:

- ☒ A. It is an endogenous ligand for mu opioid receptors
- B. It produces analgesia
- ☒ C. It is released in response to stress
- D. It is derived from a common precursor with adrenocorticotropin hormone (ACTH)
- ☒ E. It has anti-opiate properties

22. You have prescribed acetaminophen to your patient following a root canal procedure. Overdose of this widely used drug may lead to which of the following potential adverse reactions:

- A. Potent anti-inflammatory activity and impairment of acquired immune responses
- B. Significantly reduced blood clot formation
- ☒ C. Liver necrosis
- D. Ocular toxicity
- E. Greater risk of myocardial infarction

23. Flumazenil is an appropriate treatment for an acute overdose of which one of the following drugs?

- A. Cocaine
- B. Dextromethorphan
- C. Fentanyl
- ☒ D. Flunitrazepam
- E. Methylene-dioxy-methamphetamine

24. Which one of the following statements is TRUE with regard to gamma hydroxybutyrate (GHB)?

- A. GHB is an analog of phenobarbital.
- ☒ B. GHB has a high therapeutic index.
- ☒ C. GHB is most often self-administered by the intravenous route.
- ☒ D. The depressant effects of GHB are enhanced when taken with ethanol.
- ☒ E. An overdose of GHB can be successfully treated with naloxone. *good analogy*

25. Which of the following drugs may cause cutaneous flushing or itching; decreases VLDL by inhibiting its liver excretion?

- A. Ezetimibe
- B. Clofibrate
- C. Gemfibrozil
- D. Lovastatin
- E. Niacin

26. Antiarrhythmic drugs are divided in four major classes. A major problem that is common to each of the major classes is:

- ☐ A. They are all active as pro-arrhythmic agents.
- ☒ B. They all prolong the QT interval leading to torsade de pointes
- ☒ C. They all have anti-muscarinic activity.
- ☒ D. They all have a negative inotropic effect on the heart.
- ☒ E. They all broaden the QRS complex.

27. Which of following drugs directly interferes with fibrinogen binding to platelets?

- A. Amicar (epsilon-aminocaproic acid)
- B. Clopidogrel
- C. Warfarin
- D. Aspirin
- E. Abciximab

28. The main mechanism by which gemfibrozil lowers plasma triglycerol levels is it:

- A. Binds bile acids in the gastrointestinal tract preventing reabsorption.
- B. Inhibits lipolysis in adipose tissue
- C. Increases the number of LDL receptors on liver cells.
- D. Inhibits lipoprotein lipase activity
- E. Stimulates lipoprotein lipase activity

29. The mechanism by which simvastatin lowers LDL levels is it:

- A. Increases the number of LDL receptors on liver cells.
- B. Binds bile acids in the gastrointestinal tract preventing reabsorption.
- C. Inhibits lipolysis in adipose tissue
- D. Stimulates lipoprotein lipase activity
- E. Inhibits lipoprotein lipase activity

30. Which of the following chemicals requires biotransformation to make it a platelet ADP receptor antagonist?
- A. ATP
 - B. Clopidogrel
 - C. Aspirin
 - D. Warfarin
 - E. ε-Aminocaproic acid (Amicar)
31. Aspirin should be used cautiously in a patient receiving heparin because
- A. Aspirin inhibits vitamin K absorption
 - B. Aspirin has antithrombin activity
 - C. Aspirin inhibits the metabolism of heparin
 - D. Aspirin increases the risk of bleeding
 - E. Aspirin blocks the interaction of heparin and antithrombin III
32. All of the following statements concerning anticoagulants are true EXCEPT:
- A. Heparin overdose can be reversed by protamine.
 - ~~B~~ Parental administration of heparin provides immediate anticoagulation
 - ~~C~~ Oral administration of warfarin provides delayed anticoagulation
 - D. Heparin directly interacts with and inhibits coagulation factors
 - ~~E~~ Low molecular weight heparins have fewer side effects.
33. Which of the following drugs is an adjunct in antitussive therapy, and can be lifesaving in cases of acetaminophen toxicity?
- A. Potassium iodide
 - B. Ipecac
 - C. Terpin hydrate
 - D. Acetylcysteine
 - E. Guaifenesin
34. Following an overdose of amphetamine, which of the following symptoms are most likely to occur?
- A. Respiratory depression, miosis, and convulsions
 - B. Hypertension, convulsions, and tachycardia
 - C. Cardiac arrhythmias, anuria, and miosis
 - D. Bradycardia and hyperthermia
 - E. Tachycardia, respiratory depression, and miosis

35. After overdosing on medication, a patient has the following symptoms: nausea, vomiting, tinnitus, lethargy, and abdominal pain. Which of the following drugs is most likely responsible?
- A. Acetaminophen
 - B. Diazepam
 - C. Verapamil
 - ☒ D. Aspirin
 - E. Theophylline
36. A hypertensive patient was put on diuretic therapy. Laboratory studies obtained during a follow-up in one month revealed hypokalemia, hyperglycemia, hyperuricemia and hypocalciuria. Which of the following was she taking?
- A. Spironolactone
 - B. Theophylline
 - C. Furosemide
 - D. Acetazolamide
 - ☒ E. Hydrochlorothiazide
37. All of the following would characterize an effect of acetazolamide therapy **EXCEPT**:
- ~~A.~~ Improvement of glaucoma
 - ~~B.~~ Increased bicarbonate in urine
 - ~~C.~~ Formation of an alkaline urine
 - ☒ D. Development of metabolic alkalosis
 - ~~E.~~ Carbonic anhydrase inhibition
38. Which of the following is a most effective carbonic anhydrase inhibitor useful in the treatment of glaucoma?
- A. Furosemide
 - ☒ B. Acetazolamide
 - C. Bumetanide
 - D. Amiloride
 - E. Chlorothiazide

For questions 39-40

A 70-year-old man is admitted with a history of heart failure and acute left ventricular myocardial infarction. He has severe pulmonary edema.

39. Which of the following drugs given IV would give a rapid diuretic effect thus would be useful in the treatment of his acute pulmonary edema?
- A. Furosemide
 - B. Spironolactone
 - C. Triamterine
 - D. Hydrochlorothiazide
 - E. Acetazolamide
40. Many classes of diuretics were ultimately evaluated, one of which resulted in the development of hypokalemia, hyperglycemia, hyperuricemia, hypercalcemia, and, with prolonged therapy, caused increases in plasma concentration of cholesterol, most accurately described by:
- A. An osmotic diuretic
 - B. A xanthine diuretic
 - C. A potassium sparer
 - D. A loop diuretic
 - E. A thiazide diuretic
41. Hydroxychloroquine (Plaquenil) is a potent anti-inflammatory drug which is used to treat patients with rheumatoid arthritis. Which of the following are characteristics of hydroxychloroquine?
- A. Selectively inhibits immunoglobulin production by B cells in inflamed joints.
 - B. Is a reversible inhibitor of TNF receptor activity in inflammatory leukocytes.
 - C. Is a reversible inhibitor of cyclooxygenase-1 activity
 - D. Inhibits DNA and RNA synthesis
 - E. Is a potent inhibitor of platelet aggregation
42. The effects of theophylline in humans include all of the following **EXCEPT**:
- A. Tachycardia
 - B. Competitive antagonism of adenosine
 - C. Increased gastric acid secretion
 - D. CNS depression
 - E. Smooth muscle relaxation

43. Which of the following is a centrally-acting antitussive with essentially no analgesic or addictive properties that may release histamine:

- A. Codeine
- B. Acetylcysteine
- C. Guaifenesin
- D. Dextromethorphan
- E. Morphine

44. Which of the following drugs has the greatest beta2 adrenergic receptor selectivity?

- A. Isoproterenol
- B. Norepinephrine
- C. Ephedrine
- D. Epinephrine
- E. Albuterol

45. The therapeutic effect of cromolyn in a patient with bronchial asthma is due primarily to the drug's action on which of the following?

- A. Muscarinic receptors
- B. Beta 1 adrenergic receptors
- C. Histamine H₁ receptors
- D. Mast cell membranes
- E. Beta2 adrenergic receptors

7. ~~46.~~ You are treating a 22 year-old patient who has been diagnosed with rheumatoid arthritis. He has been treated with a number of non-steroidal anti-inflammatory drugs, as well as steroid therapy. His therapy has been adjusted recently, and he is currently being treated with a combination of drugs which includes methotrexate. Which of the following statements is correct in describing this drug?

NSAID?

- A. It is a potent alkylating agent which destroys proliferating lymphoid cells.
- B. It is a dihydrofolate reductase inhibitor and exhibits strong nonspecific immunosuppressive activity.
- C. It causes proliferation of lymphocytes
- D. It decreases adenosine release by neutrophils.
- Ⓔ E. It is a strong irreversible inhibitor of cyclooxygenase activity.

47. Which of the following drug prevents leukotriene synthesis by inhibiting 5-lipoxygenase:
- A. Zileuton
 - B. Zafirlukast
 - C. Montelukast
 - D. Aminophylline
 - E. Formoterol
48. Which of the following agents is an endogenous ligand for cannabinoid receptors?
- A. Beta-endorphin
 - B. Dronabinol
 - C. Dynorphin
 - D. Anandamide
 - E. Met-enkephalin
49. Drugs that are considered schedule V by the FDA are:
- A. Substances with no (FDA defined) therapeutic value and high abuse potential
 - B. Substances with therapeutic utility (but high abuse potential)
 - C. Substances with therapeutic utility (but moderate abuse potential)
 - D. Substances with therapeutic utility (but limited abuse potential)
 - E. Substances with therapeutic utility (but very low abuse potential)
50. Which of the following is a synthetic preparation that is used to control nausea and vomiting caused by anticancer chemotherapy and stimulates appetite in AIDS patients
- A. Marijuana
 - B. Fentanyl
 - C. Dronabinol
 - D. Heroin
 - E. Pentazocin

END OF EXAM