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**DENTAL PHARMACOLOGY  
EXAMINATION # 2**

**March 17, 2003**

You have ONE (1) hour 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 social security number and correctly filling in the grid spaces. Please turn in your exam booklet and answer sheet at the end of the exam. The exam booklet will be returned to you.

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

Questions 1 – 45: Select the single, most appropriate answer.

1. Before beginning therapy for megaloblastic anemia, a physician should check for which of the following deficiencies to prevent neurological disease?

- (A) Vitamin B<sub>12</sub> deficiency
- B. Zinc deficiency
- C. Iron deficiency
- D. Vitamin B<sub>6</sub> deficiency

2. The antianginal actions of nitroglycerin include all of the following EXCEPT:

- A. Coronary vasodilation ↑
- B. Relaxation of veins ↑
- (C) Increase in cardiac wall stress ↑
- D. Reduction in ventricular volume ↓
- E. Decreased afterload ↓

3. Which of the following drugs is a calcium channel blocker that is highly potent, fast-acting and most frequently causes large swings in blood pressure?

- A. Prazosin
- B. Captopril
- C. Hydrochlorothiazide
- (D) Nifedipine
- E. Methyldopa

4. All of the following are attributes of digoxin EXCEPT:

- (A) Inhibition of carbonic anhydrase
- B. Increased intracellular calcium ↓
- C. Prolongation of the P-R interval of the electrocardiogram ↑
- D. Increase in cardiac contractility ↑
- E. Increase in cardiac automaticity ↑

5. An antihypertensive drug that acts by alpha adrenoceptor blockade is

- A. Hydrochlorothiazide
- B. Clonidine
- C. Atenolol
- (D) Prazosin
- E. Reserpine

6. According to the classification of controlled substances, all of the following statements are true **EXCEPT**:

- A. Schedule I drugs would have the greatest potential for abuse
- B. Prescriptions for Schedule II drugs must be in the pharmacy before the drug is dispensed
- ☒ C. Prescriptions for Schedule II drugs may not be refilled
- D. Prescriptions for Schedule III drugs may be telephoned and dispensed, the prescription being subsequently forwarded to the pharmacy
- E. Prescriptions for Schedule IV drugs may be automatically refilled up to five times within a six-month period

7. Following a dental procedure, a patient was instructed to use a tablespoonful of liquid medication diluted in a glass of water as an oral rinse once daily for seven days. The total amount of the liquid medication used was

- A. 15 mL
- B. 35 mL
- C. 70 mL
- ☒ D. 105 mL
- E. 210 mL

15 mL

$$\begin{array}{r} 15 \\ \times 7 \\ \hline 105 \end{array}$$

8. Each of the following drugs is correctly matched with its proposed mechanism and renal site of action **EXCEPT**:

- A. Amiloride -  $K^{+}H_2O$  Inhibition of sodium channel; distal convoluted tubule
- ☒ B. Ethacrynic acid -  $\uparrow$  potassium-chloride cotransporter and chloride channel; descending limb of Loop of Henle
- C. Furosemide -  $\uparrow$  sodium-potassium-chloride cotransporter; ascending limb of Loop of Henle
- D. Hydrochlorothiazide - sodium-chloride cotransporter; early distal tubule
- E. Spironolactone -  $\uparrow$  competitive mineralocorticoid antagonism; distal convoluted tubule

Diuretic therapy is known to result in some serious problems. However, they have been found to be very useful in other situations. All of the following diuretics are appropriately matched with a therapeutic action **EXCEPT**:

- A. Acetazolamide -  $\uparrow$  useful in treatment of glaucoma ✓  $\uparrow$
- B. Triamterene -  $\uparrow$  useful in treatment of hypokalemia  $\uparrow$
- C. Furosemide -  $\uparrow$  could be life-saving in congestive heart failure -  $\uparrow$   $\uparrow$
- D. Hydrochlorothiazide  $\uparrow$  effective antihypertensive action  $\uparrow$
- E. Amiloride -  $\uparrow$  useful to correct severe pulmonary edema  $\uparrow$

10. Prolonged therapy with which of the following drugs may result in the development of hypokalemia, hyperglycemia, hyperuricemia, hypercalcemia and hypocalciuria?

D

- A. Acetazolamide
- B. Ethacrynic acid
- C. Furosemide
- ☒ D. Hydrochlorothiazide
- E. Torsemide

11. All of the following are actions of xanthines EXCEPT:

D

- A. Stimulation of cardiac muscle
- B. Diuresis
- C. Relaxation of bronchial smooth muscle
- D. Decrease in cerebral vascular resistance
- E. Central nervous system stimulation

12. Characteristics of dextromethorphan include all of the following EXCEPT:

C

- A. May be abused
- B. Has antitussive action
- C. Is a natural opium alkaloid
- D. Is centrally active
- E. May cause histamine release

13. Which of the following drugs is an effective bronchodilator, has little cardiac stimulation at therapeutic doses, causes tremor with oral use, and has the greatest amount of beta-2 adrenergic receptor selectivity?

A

- A. Albuterol
- B. Aminophylline
- C. Beclomethasone
- D. Phenylephrine
- E. Zileuton 5-Lipo inhib.

14. Which of the following agents is most likely to cause systemic alkalosis?

B

- A. Calcium carbonate
- B. Sodium bicarbonate
- C. Basic aluminum carbonate
- D. Aluminum hydroxide
- E. Magnesium hydroxide

HCTZ, Mecliz., ETA, Furo.

15. The mu opioid receptors in the gastrointestinal tract are at least partly responsible for the antidiarrheal action of all of the following drugs **EXCEPT**:

- D
- A. Codeine
  - B. Loperamide
  - C. Morphine
  - ☒ D. Atropine
  - E. Diphenoxylate

16. Each of the following drugs is paired correctly with its action **EXCEPT**:

- E
- A. Magnesium hydroxide - saline laxative, also used as a non-systemic antacid
  - B. Lactulose - osmotic laxative found to be useful in portal systemic encephalopathy associated with chronic liver disease; reduces the concentration of ammonia in blood
  - C. Cascara sagrada - contains anthraquinone derivatives responsible for its laxative action
  - D. Castor oil - ricinoleic acid is its active component
  - ☒ E. Mineral oil - action depends on its being hydrolyzed subsequent to its absorption

17. Which of the following pharmacologic agents activates plasminogen after binding to fibrin?

- B
- ☒ A. Streptokinase
  - B. Alteplase
  - C. Urokinase
  - D. Amicar
  - E. Heparin

18. The major untoward effect of heparin is

- A
- ☒ A. Bleeding
  - B. Fetal deformities resulting from its crossing the placenta N
  - C. Elevation of hepatic transaminases
  - D. Allergic reactions
  - E. Inhibition of aldosterone synthesis

19. Which of the following statements about lidocaine is true?

- A. Like quinidine, is used against a wide spectrum of cardiac arrhythmias
- B. Is orally active
- C. Is a calcium channel antagonist
- D. Is more cardiotoxic than flecainide
- ☒ E. Is very selective for abnormal cardiac tissue

20. All of the following antiarrhythmic drugs are correctly matched to their effects or side effects EXCEPT:

- ☒ A. Propranolol - torsade de pointes - DIGITOXIN
- B. Verapamil - calcium channel blockade effective in treating atrial arrhythmias - ventricular arrhythmias
- C. Quinidine - cinchonism (blurred vision, tinnitus, etc.) ✓
- D. Amiodarone - end organ deposition ✓
- E. Phenytoin - gingival hyperplasia ✓

- 21. Prior to elective surgery patients should be told to avoid aspirin, and to use other drugs such as ibuprofen for minor aches and pains. The reason for this is that unlike aspirin, ibuprofen

- A. Does not disturb acid-base balance -
- B. Does not induce nausea and vomiting -
- C. Does not cause hyperthermia -
- D. Is a reversible inhibitor of cyclooxygenase + NO
- E. Has first order elimination kinetics

22. A 36-year-old female with a history of peptic ulcer disease came home from work with a fever of 101 degrees. Which of the following is most appropriate for the relief of fever in this patient?

- A. Acetylsalicylic acid
- B. Ibuprofen
- C. Codeine
- ☒ D. Acetaminophen
- E. Morphine

23. All of the following statements are true EXCEPT:

- A. Most drugs cross the placenta by simple diffusion
- B. Lipid soluble, non-ionized drugs readily enter the fetal blood from the maternal circulation
- C. Lipophilic substances can readily pass through the blood brain barrier
- D. A single intrauterine exposure to a drug can affect the fetal structures undergoing rapid development at the time of exposure
- E. Drugs administered to women during lactation cannot reach pharmacologically significant levels in the nursing infant

24. Important effects of aspirin include all of the following EXCEPT:

- A. Reduction of bleeding tendency F
- B. Reduction of fever
- C. Reduction of prostaglandin synthesis in inflamed tissues
- D. Analgesic action in headache
- E. Irritation of the gastrointestinal tract

25. Physiological changes in elderly patients, compared to young adults, which must be considered in drug administration include all of the following EXCEPT:

- A. Increase in body fat
- B. Increase in blood volume
- C. Decrease in cardiac output
- D. Decrease in kidney function
- E. Decrease in plasma proteins

26. Which of the following statements is true with regard to naloxone? EV

- A. It has low affinity for mu opiate receptors
- ☒ B. It is effective only by the intravenous route
- C. It is an effective analgesic for mild pain
- D. It will worsen the respiratory depression caused by barbiturates
- E. It has a significantly longer half-life than morphine

27. Which of the following adverse effects are LEAST likely to result from the administration of an opioid analgesic?

- A. Respiratory depression
- B. Nausea and vomiting
- ☒ C. Diarrhea
- D. Dysphoria
- E. Sedation

28. Which of the following agents has the lowest analgesic efficacy?

- A. Pentazocine → prec. w withdrawal syndrome; not reverse  
B. Morphine severe pain  
C. Methadone Tx of heroin dep.  
D. Oxycodone F severe pain  
E. Fentanyl
- opioid induced resp. depression  
mild → mod pain

29. Following withdrawal of amphetamine in an addicted individual, which of the following symptoms are most likely to occur?

- A. Prolonged sleep terminating in severe convulsions  
B. Rapid onset of convulsions  
C. Prolonged sleep, hyperphagia and depression  
D. Anorexia, restlessness and tremor  
E. Insomnia, excessive yawning and diarrhea
- promotes serotonin, dopamine release

30. Which of the following statements correctly describes the mechanism of action of cocaine?

- A. Is a direct dopamine receptor agonist  
B. Potentiates dopaminergic neurotransmission by causing the release of stored dopamine  
C. Reduces dopaminergic neurotransmission by inhibiting the dopamine transporter  
D. Is an antagonist at dopamine autoreceptors  
E. Potentiates dopaminergic neurotransmission by inhibiting the re-uptake of dopamine

31. Which of the following drugs protects against NSAID-induced ulcers by stimulating secretion of mucus by the gastric mucosa?

- A. Bismuth subsalicylate  
B. Esomeprazole  
C. Misoprostol  
D. Cimetidine  
E. Sucralfate



32. Many antacids are marketed as combinations of magnesium and aluminum hydroxides because

- A. Aluminum hydroxide alone tastes bad
- B. Magnesium minimizes the absorption of aluminum
- C. The "acid rebound" induced by aluminum hydroxide can be minimized
- ☒ D. The laxative effect of magnesium is counteracted by the constipating effect of aluminum
- E. Magnesium hydroxide alone neutralizes gastric acid too slowly

33. Which of the following compounds is FDA-approved as therapy in maintenance programs for heroin addiction?

- A. Diazepam
- B. Fentanyl
- C. Methadone
- ☒ D. Dextropropoxyphene
- E. Oxycodone

34. The primary property of buprenorphine made use of in detoxifying heroin addicts is

- A. Partial agonism at delta opioid receptors
- B. Inhibition of the agonist action of anandamide
- ☒ C. Full agonism at mu opioid receptors
- D. Competitive antagonism at kappa opioid receptors
- E. Partial agonism at mu opioid receptors

*Partial  $\delta$   
buprenorphine  
Butorphanol*

*(+K)- $\mu$*

35. Which of the following statements regarding antiarrhythmic drugs is correct?

- A. Most antiarrhythmic agents have a positive inotropic effect
- B. Lidocaine is mainly used to treat atrial arrhythmias
- ☒ C. Quinidine must be given parenterally
- D. Procainamide is associated with a reversible lupus-like phenomenon
- E. Propranolol increases the rate of phase 4 depolarization

36. Anemia due to iron deficiency is typically

- A. Megaloblastic
- B. Hemolytic
- ☒ C. Hypochromic
- D. Aplastic

*B<sub>12</sub>, M-*

37. Which of the following drugs is commonly given in combination with nitroglycerin in the chronic treatment of angina?

- A. Diltiazem  
B. Hydrochlorothiazide  
C. Clonidine  
D. Digoxin  
E. Epinephrine

38. The sublingual route in administering nitroglycerin for an acute attack of angina is used because

- A. Many patients experience nausea by the oral route  
B. It is low in potency  
C. Side effects, such as headache, are lessened in intensity  
D. This route bypasses the liver  
E. This route produces higher levels in the brain

39. Toxic effects of digoxin include all of the following EXCEPT:

- A. Nausea  
B. Visual disturbances  
C. A-V nodal block  
D. Cardiac arrhythmias  
E. Renal insufficiency

40. Severe electrolyte depletion and ototoxicity would most likely result from rapid intravenous administration of which group of diuretics?

- A. Xanthines  
B. Thiazides  
C. Loop diuretics  
D. Carbonic anhydrase inhibitors  
E. Potassium sparingers

41. Which of the following is a mucolytic that, in addition to its usefulness in liquefying the sputum, has gained fame because of its ability to treat acetaminophen overdose?

- A. Acetylcysteine  
B. Glycerylguaiacolate  
C. Ipecac  
D. Potassium iodide  
E. Terpin hydrate

42. All of the following drugs manifest bronchodilating action **EXCEPT**:

- A. Salmeterol
- B. Formoterol
- C. Cromolyn
- D. Isoproterenol
- E. Epinephrine

43. Which of the following drugs has the most effective antidiarrheal action?

- A. Kaolin
- B. Loperamide
- C. Atropine
- D. Bismuth subcarbonate
- E. Activated charcoal

44. Warfarin

- A. Raises the plasma level of factor IX
- B. Inhibits thrombin
- C. Inhibits the synthesis of prothrombin
- D. Binds the calcium ion cofactor
- E. Inhibits platelet aggregation

45. All of the following statements about drug abuse are true **EXCEPT**:

- A. Ketamine is an antagonist at NMDA receptors
- B. Toxicity associated with gamma hydroxybutyrate is low due to its high therapeutic index
- C. Psychological dependence on a drug can occur in the absence of physical dependence
- D. Physical dependence on a drug can occur in the absence of psychological dependence
- E. Lysergic acid diethylamide produces equal effects after oral and parenteral administration

**Questions 46 thru 50; Match Type**

For questions 46 and 47:

For each of the numbered statements, select the single most appropriate lettered drug. You may use each letter once, or not at all.

- A. Vitamin A (Retinol)
- B. Vitamin M (Folic acid)
- C. Vitamin K
- D. Vitamin C (Ascorbic acid)
- E. Vitamin B<sub>3</sub> (Niacin)

46. Deficiency of this vitamin leads to a condition called scurvy, indicated by soft bleeding gums, loose teeth, joint pain, dry scaly skin and blood vessel damage

47. The vitamin which is necessary for the production of clotting factors II, VII, IX and X

For questions 48 thru 50:

For each of the numbered statements, select the single most appropriate lettered drug. You may use each letter once, or not at all.

- A. Gemfibrozil
- B. Lovastatin
- C. Niacin
- D. Neomycin
- E. Cholestyramine

48. Inhibits synthesis of cholesterol by inhibiting HMG-CoA reductase

49. Binds bile acids in the intestine preventing their return to the liver

50. Causes cutaneous flushing and itching; decreases VLDL by multiple mechanisms including decreased VLDL secretion

NIACIN C

**END OF EXAM**