

NAME _____
Please Print

**DENTAL PHARMACOLOGY
EXAMINATION # 1**

February 2, 2006

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.

Questions 1-50: Select the single, most appropriate answer.

1. Stimulation of the sympathetic nervous system, as during exercise, can produce all of the following responses EXCEPT:

Sym
pre Ach → N
post Ach → M
post epi → α, β

B

(A) Bronchial dilation antichol *β*
constrict *bronch* *Miosis* *chol*, *α blocker*
 C. Increased heart rate and force of contraction ✓ *α* *antichol*
 D. Decreased intestinal motility *antichol* ✓
 E. Increased glucose production *α* ✓

- C*
2. A drug with a half-life of 4 hrs and a clearance of 100 ml/min is infused intravenously at the rate of 500 mcg/min. Which of the following is the expected steady-state plasma concentration?

A. 0.5 mcg/ml
 B. 1.0 mcg/ml
 (C) 5.0 mcg/ml
 D. 100 mcg/ml
 E. 500 mcg/ml

t_{1/2} = 4 *Cl = 100* $\frac{\text{Rate}}{\text{Cl}} = \frac{C_{ss} \text{Cl}}{\text{Cl}}$
500 mc/min *Rate*
 $C_{ss} = \frac{500}{100} = 5$

3. For the drug in question 2, approximately how long does it take to reach 95% of the steady-state plasma concentration level?

E

A. 2 hrs
 B. 4 hrs
 C. 9 hrs
 D. 13 hrs
 (E) 17 hrs

4.3
x 4
17.2

4. The maximum therapeutic effect of a drug is a measure of which of its attributes?

A

(A) Efficacy
 B. Clearance
 C. Potency
 D. Affinity
 E. Therapeutic index

- C*
5. A 36-year-old man is treated with pilocarpine for xerostomia. Which of the following statements best describes the drug's mechanism of action?

A. Stimulation of beta-1 adrenergic receptors
 B. Inhibition of alpha-1 adrenergic receptors
 (C) Stimulation of muscarinic receptors *chol*
 D. Inhibition of beta-2 adrenergic receptors
 E. Stimulation of nicotinic receptors

6. Which of the following drugs is most useful for the treatment of myasthenia gravis?

- B
- A. Carbachol
 - ☒ B. Pyridostigmine
 - C. Pralidoxime
 - D. Nicotine
 - E. Propranolol

7. Which of the following drugs is most useful in preventing the symptoms of motion sickness?

- D
- A. Mecamylamine
 - B. Clonidine
 - C. Bethanechol
 - ☒ D. Scopolamine
 - E. Albuterol

B

8. All of the following are potential uses of muscarinic receptor blockers EXCEPT:

- use causes brady not tach causes tach*
- A. To produce mydriasis and cycloplegia for eye examinations ✓
 - ☒ B. To treat cardiac tachycardia *cause brady X*
 - C. To reduce spasms of the bladder ✓
 - D. To reduce gastrointestinal spasm ✓
 - E. To relieve the tremor of drug-induced parkinsonism ✓ *↓ ACH*

9. A patient has ingested a toxic overdose of aspirin, which is a weak acid. Which of the following measures can increase the excretion of aspirin in the urine?

- C
- A. Administration of a drug that blocks tubular secretion
 - B. Administration of an acidifying agent, ammonium chloride
 - ☒ C. Administration of an alkalinizing agent, sodium bicarbonate
 - D. Administration of another weak acid
 - E. You have no control over the excretion rate
- ↑ basic*

10. All of the following factors are true about absorption of a lipid-soluble drug EXCEPT:

- C
- A. The higher the concentration, the faster the rate of absorption ✓
 - B. The larger the surface area at the site of absorption, the faster the rate of absorption ✓
 - ☒ C. Co-administration of a vasoconstrictor drug will ~~enhance~~ drug absorption into the plasma
 - D. Charged molecules are poorly absorbed from the gastrointestinal tract ✓
 - E. Weak acids are primarily absorbed from the small intestine ✓

11. Which of the following terms is best defined as the movement of drug away from its site of action to other tissues, where it can be stored?

- D**
- A. ~~Absorption~~
 - B. ~~Excretion~~
 - C. Distribution
 - D. Redistribution**
 - E. ~~Elimination~~

12. Which of the following is a rapid-acting, short duration of action, depolarizing neuromuscular blocker, that is broken down by pseudocholinesterase?

- E**
- A. D-tubocurare
 - B. Pancuronium
 - C. Hexafluorenum
 - D. Benzoquinonium
 - E. Succinylcholine**

13. Which barbiturate has the longest duration of action following a single hypnotic dose?

- C**
- A. Pentobarbital
 - B. Diazepam ~~X~~
 - C. Phenobarbital**
 - D. Mephobarbital *short*
 - E. Thiopental *short*

14. Alpha-bungarotoxin acts by

- A**
- A. Binding to the nicotinic receptor on the muscle**
 - B. Binding to the glycine receptor on the alpha-motoneuron
 - C. Preventing acetylcholine release from the pre-synaptic membrane of the neuromuscular junction
 - D. Causing excessive acetylcholine release from the pre-synaptic membrane of the neuromuscular junction
 - E. Preventing glycine release from the Renshaw cell

15. Both the benzodiazepines and the barbiturates

- D**
- A. Can induce anesthesia
 - B. Decrease the magnitude and the duration of the EPSP (excitatory post-synaptic potential)
 - C. Are presently prescribed with equal frequency as hypnotic agents
 - D. Act at the GABA ionophore**
 - E. Induce the liver microsomal enzymes to the same extent

20. Each of the following intravenous anesthetic agents is correctly matched with its major side effect EXCEPT:

- A. Propofol – prolonged hangover *x ↓ hangover*
- B. Thiopental – laryngospasm ✓
- C. Fentanyl – respiratory depression ✓
- D. Etomidate – myoclonic movements ✓
- E. Ketamine – hallucinations ✓

21. Which of the following enzymes is regulated by diacylglycerol?

- A. Protein kinase A
- B. Protein kinase C
- C. Phospholipase C
- D. Adenylate cyclase
- E. Guanylate cyclase

22. Which of the following best describes the signaling involved in steroid hormone action?

- A. Binding to a receptor containing a tyrosine kinase
- B. Diffusion across the cell membrane, followed by action on soluble guanylyl cyclase
- C. Activation of a G-protein that inhibits adenylate cyclase
- D. Opening of a transmembrane ion channel
- E. Diffusion into the cell and activating a receptor that binds to DNA

23. Stimulation of which of the following receptors is most likely to produce bronchoconstriction and bradycardia?

- A. Alpha-1 adrenergic *x*
- B. Beta-1 adrenergic *x*
- C. Beta-2 adrenergic *x*
- D. Muscarinic
- E. Nicotinic *x*

24. Which one of the following drugs activates alpha-2 adrenoceptors located presynaptically in the central nervous system?

- A. Prazosin
- B. Clonidine
- C. Phentolamine
- D. Metoprolol
- E. Albuterol

D 25. All of the following statements are true concerning amphetamine EXCEPT:

- A. Tolerance develops to the appetite suppressant effects ✓
- B. Is used to reverse the sleepiness of narcolepsy ✓
- C. Is a schedule II controlled substance ✓
- ☒ D. Prevents the release of dopamine from nerve endings in the central nervous system
- E. Is used in the management of attention-deficit hyperactivity disorder ✓

E 26. Many tricyclic antidepressants produce anticholinergic side effects, including

- A. Diarrhea *chol*
- B. Alopecia
- ☒ C. Hypertension *anti*
- D. Sweating *chol*
- ☒ E. Xerostomia *anti*

D 27. All of the following statements apply to chlorpromazine EXCEPT:

- A. Blocks histamine receptors
 - B. Causes orthostatic hypotension
 - C. Blocks muscarinic receptors
 - ☒ D. Decreases the secretion of prolactin ↑
 - E. Is a member of the phenothiazine class of antipsychotic agents
- Antipsy*

C 28. Diazepam is suitable for all of the following indications EXCEPT:

- A. Oral sedation in dentistry ✓
- B. Musculo-skeletal disorders ✓
- ☒ C. Obsessive-compulsive disorder
- D. Generalized anxiety disorder ✓
- E. Acute alcohol withdrawal ✓

C 29. Which one of the following drugs is a reversible inhibitor of monoamine oxidase (MAO)?

- A. Amitriptyline
- B. Nortriptyline
- ☒ C. Tranylcypromine
- D. Desipramine
- E. Sertraline

B 30. Which one of the following drugs would be most likely to control the manic phase of bipolar depression?

- A. Fluoxetine
- ☒ B. Lithium
- C. Doxepin
- D. Paroxetine
- E. Protriptyline

31. Which one of the following drugs would be the best choice for controlling seizures associated with status epilepticus?

- A. Gabapentin
- B. Topiramate
- ☒ C. Lorazepam
- D. Haloperidol
- E. Phenobarbital

32. Which one of the following antiepileptic drugs may be used in the treatment of absence seizures when ethosuximide is not satisfactory?

- A. Lamotrigine
- ☒ B. Valproic acid
- ☒ C. Fosphenytoin
- D. ~~Carbamazepine~~
- E. ~~Gabapentin~~

33. Which of the following statements best describes the mechanism of action of bupivacaine?

- ☒ A. Reversibly blocks sodium influx
- B. Binds to the GABA ionophore
- C. Blocks alpha-adrenergic receptors
- D. Enhances chloride influx
- E. Binds to a G-protein-linked receptor

34. Which of the following drugs would reduce the absorption of procaine into the systemic circulation, thus increasing its duration of action?

- A. Prazosin
- ☒ B. Epinephrine
- C. Albuterol
- D. Bethanechol
- E. Metoprolol

35. If the half-life of elimination of a drug is 8 hr, approximately what percentage of the drug remains at 12 hrs?

- A. 90%
- B. 45%
- ☒ C. 35%
- D. 25%
- E. 10%

100
8 hrs
50
- 8 hrs
25%

36. A 50-year-old woman is spraying plants with malathion in her greenhouse. She accidentally inhales the chemical and begins to experience signs of intoxication. Her symptoms are most likely to include

- A. Bronchoconstriction and diarrhea
- B. Urinary retention and constipation
- C. Mydriasis and cycloplegia
- D. ~~Fever and xerostomia~~
- E. ~~Hepatotoxicity~~

37. A young child accidentally eats a plant containing a toxic substance. His symptoms include dry mouth and eyes; his skin is flushed, red and dry; he has a fever and is tachycardic; his vision is blurred; and he becomes confused. He most likely has ingested

- A. Atropine
- B. Propranolol
- C. Nicotine
- D. Pralidoxime
- E. Phentolamine

38. Local anesthetics are weak bases. If you administer a local anesthetic with a pKa of 8.4, what would be the ratio of ionized to non-ionized drug in the plasma, with a pH of 7.4?

- A. 1/100
- B. 1/10
- C. 1/1
- D. 10/1
- E. 100/1

$$8.4 - 7.4 = 1$$
$$10^1 / 1 \text{ non}$$

39. All of the following are true about drug elimination EXCEPT:

- A. Inhalation anesthetics (e.g., nitrous oxide) are excreted via the lungs ✓
- B. Drugs and metabolites, with molecular weights greater than 450, may be excreted in the bile ✓
- C. Free drug in the plasma is susceptible to glomerular filtration ✓
- D. Drugs may be metabolized to active or inactive products ✓
- E. Enterohepatic recirculation reduces the duration of action of a drug

40. Which of the following muscle relaxants is least likely to produce sedation as a side effect?

- A. Mephenesin
- B. Cyclobenzaprine
- C. ~~Diazepam~~
- D. Baclofen
- E. Dantrolene

41. Which of the following is a short-acting benzodiazepine that is used to treat insomnia?

- ☒ A. Triazolam
- B. Chlordiazepoxide
- C. Oxazepam
- D. Nitrazepam
- E. Diazepam

42. The chief disadvantage of nitrous oxide as a general anesthetic is

- A. Prolonged recovery time due to retention in fat X
- B. Poor analgesia X
- C. Excessive relaxation of skeletal muscles X
- D. Slow induction X
- ☒ E. Low potency (high MAC)

43. Which of the following is a potent inhalation anesthetic that is most associated with production of seizure activity?

- A. Nitrous oxide
- B. Thiopental
- C. Midazolam
- ☒ D. Enflurane
- E. Desflurane

44. Which one of the following is produced by stimulation of alpha adrenoceptors?

- A. Secretion from sweat glands X
- B. Decrease in heart rate X
- ☒ C. Constriction of blood vessels
- D. Bronchial dilation β
- E. Decrease in mental cognition X

45. Which one of the following drugs would be most suitable for the relief of bronchoconstriction?

- A. Terazosin
- B. Guanethidine
- C. Timolol
- ☒ D. Terbutaline
- E. Haloperidol

46. All of the following statements apply to propranolol EXCEPT:

- A. Is used in the treatment of hypertension ✓
- B. Possesses high lipid solubility ✓
- ☒ C. Is a competitive antagonist of beta-1, but not beta-2, receptors X
- D. Is used for the prophylactic management of angina pectoris
- E. Is contraindicated in patients with bronchial asthma

β_1, β_2
blocker

B 47. Which one of the following drugs is an antidepressant that selectively inhibits serotonin re-uptake?

- A. Desipramine
- ☒ B. Paroxetine
- C. Protriptyline
- D. Thioridazine
- E. Mirtazepine

E 48. All of the following statements concerning buspirone are true EXCEPT:

- A. Acts as a partial agonist at the serotonin 5HT-1A receptor
- B. Lacks muscle relaxant activity ✓
- C. Is used in the management of generalized anxiety disorder ✓
- D. Lacks sedative activity ✓
- ☒ E. Is metabolized to nordiazepam

E 49. Flumazenil reverses the behavioral depressant effects of which one of the following drugs?

- A. Ethanol
- B. Morphine
- C. Phenoxybenzamine
- D. Haloperidol
- ☒ E. Chlordiazepoxide

C 50. Effects of lidocaine include all of the following EXCEPT:

- A. Local anesthesia ✓
- B. Neural toxicity ✓
- ☒ C. Hypertension X
- D. Tonic-clonic convulsions ✓
- E. Decrease in heart rate ✓

(End of Exam)