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Corrected

**DENTAL PHARMACOLOGY
EXAMINATION # 1**

February 3, 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.

45. All
Questions 1 – 50: Select the single, most appropriate answer.

1. All of the following statements apply to chlorpromazine ^{low potency} EXCEPT:

- B**
- A. Blocks muscarinic receptors ✓
 - (B)** Stimulates histamine receptors ^{low EP side-effects}
 - C. Blocks dopamine D-2 receptors ✓
 - D. Causes orthostatic hypotension T ✓
 - E. Is a member of the phenothiazine class of antipsychotic agents T ✓

2. Vasoconstriction is most likely produced by stimulation of

- A**
- (A)** Alpha-1 adrenergic receptors
 - B. Alpha-2 adrenergic receptors
 - C. Muscarinic receptors
 - D. Beta-1 adrenergic receptors
 - E. Beta-2 adrenergic receptors

3. All of the following receptors are G-protein-linked EXCEPT:

- E**
- A. Muscarinic ✓
 - B. Alpha-1 adrenergic ✓
 - C. Alpha-2 adrenergic ✓
 - D. Beta-1 adrenergic ✓
 - (E)** Nicotinic ^{↑ Na⁺ influx}

4. Which of the following drugs is useful in prevention of motion sickness?

- D**
- A. Physostigmine
 - B. Edrophonium
 - C. Bethanechol
 - (D)** Scopolamine
 - E. Albuterol

5. Following a urinary tract infection, an elderly patient suffers from incontinence due to constant spasms of the urinary bladder. Which drug is most likely to relieve the patient's symptoms?

A. Bethanechol
B. Propranolol
C. Oxybutynin
D. Clonidine
E. Phenylephrine

6. A patient presents to the emergency room with an acute overdose of a weak acid ($pK_a=6.8$). The drug is excreted unchanged by the kidney. At which pH of the tubular filtrate will the greatest amount of drug be excreted?

A. 5.2
B. 6.0
C. 6.8
D. 7.4
E. 7.8

$$pK_a - pH = \frac{HA}{A^-}$$

$$6.8 - 7.8 = -1.0$$

$$5.2 - 6.8 = -1.6$$

$$-1.6 = \frac{1}{100}$$

$$6.8 - 7.8 = -1.0$$

$$-1.0 = \frac{1}{10}$$

7. Potent inhalational anesthetic; use is most associated with production of seizure activity:

A. Nitrous oxide *N₂O hypoxia*
B. Thiopental *non inhalation*
C. Halothane
D. Enflurane →
E. Desflurane →

8. A 58-year-old man is brought to the emergency room of a local hospital unconscious from a drug overdose. Which route would be most rapid and effective for administration of an antidote?

A. Oral
B. Transdermal
C. Topical
D. Intravenous
E. Intraocular

9. Which of the following drugs is excreted unchanged in the expired air?

- A. Thiopental
- B. Succinylcholine
- ☒ C. Nitrous oxide
- D. Propranolol
- E. Benztropine

10. Alcohol is metabolized at a rate that follows zero order kinetics; therefore, it is metabolized at a rate that is

- A. Directly proportional to its plasma concentration
- B. Inversely proportional to its plasma concentration
- ☒ C. Independent of its plasma concentration
- D. Logarithmically proportional to its plasma concentration
- E. Nonlinearly related to its plasma concentration

11. Sinemet (carbidopa/levodopa) is effective in treating Parkinsonism because

- A. Levodopa is converted to carbidopa in the periphery
- B. Carbidopa crosses the blood-brain-barrier to increase levels of endogenous dopamine
- C. Carbidopa accelerates the conversion of levodopa into dopamine in the periphery
- D. Carbidopa is converted to levodopa in the periphery
- ☒ E. Carbidopa inhibits the breakdown of levodopa in the periphery

12. Which of the following statements **LEAST** characterizes triazolam Bz

- A. Binds to a benzodiazepine receptor, enhancing GABA-mediated chloride influx τ
- ☒ B. Is useful in the treatment of insomnia τ
- C. Greatly inhibits the activity of the drug-metabolizing microsomal system τ ; BAFB \uparrow IT
- D. Combined with ethanol, it may produce respiratory depression τ
- E. Adverse effects may include drowsiness, dizziness, lethargy and ataxia \rightarrow

short acting

13. All of the following statements about ethanol are true **EXCEPT**:

- B**
- A. Is hepatotoxic
 - (B)** Elevates body temperature by peripheral vasoconstriction
 - C. Suppresses the release of antidiuretic hormone
 - D. Can lead to excessive gastric acid secretion
 - E. Acute overdose can cause death by respiratory depression

14. Which of the following drugs produces Parkinson-like symptoms?

- E**
- A. Trihexyphenidyl
 - B. Bromocriptine ✓
 - C. Benztropine ✓
 - D. Selegiline ✓
 - (E)** Haloperidol

15. Disulfiram produces nausea after ethanol ingestion by interfering with the breakdown of

- B**
- A. Formaldehyde
 - (B)** Acetaldehyde
 - C. Formic acid
 - D. Acetone
 - E. Oxalate

16. _____ reverses the action of tubocurarine at the neuromuscular junction.

(A) Edrophonium → AChE's

B. Atropine TOX ✓ MUSCARINIC

C. Strychnine - NMS

D. Benztropine

E. Chlordiazepoxide BZ

Non-depolarizing AChE's
drug:

NON-DEPOL.

AChE - ANTAGONIST TO NDEP
AGONIST TO DEP

A

17. Identify the pure non-depolarizing drug that produces the **LEAST** release of histamine and has minimal effect on the cardiovascular system?

- A. Benzoquinonium
- B. Metocurine
- C. d-Tubocurarine
- ☒ D. Vecuronium
- E. Succinylcholine

18. Which of the following statements best describes the mechanism of action of procaine?

- A. Blocks the reuptake of norepinephrine
- B. Stimulates nicotinic receptors
- C. Blocks chloride influx
- D. Stimulates GABA_A receptors
- ☒ E. Blocks sodium influx

19. Which of the following describes the most likely adverse reaction of lidocaine?

seizures

- A. Hepatotoxicity
- ☒ B. Neurotoxicity
- C. Hypertension and tachycardia ↓
- D. Renal toxicity N
- E. Gastric ulceration N

20. The maximum effect of an agonist, shown by the height of its dose-response curve, is an indicator of

- A. Potency
- B. ED50
- C. Half-life
- ☒ D. Efficacy
- E. Fraction of drug absorbed

21. An intravenous dose of 100 micrograms of a drug results in an initial plasma concentration = $2 \mu\text{g/L}$. The apparent volume of distribution is

A. 2 mL
B. 5 mL
C. 2 L
D. 20 L
E. 50 L

$$\frac{2 \mu\text{g}}{\text{L}} = \frac{100 \mu\text{g}}{x \text{ L}} \quad \frac{100}{2}$$

22. Which one of the following drugs is an irreversible inhibitor of monoamine oxidase? oxidase

A. Tranylcypromine \rightarrow
B. Nortriptyline TC ydic
C. Imipramine TC
D. Phenelzine \rightarrow
E. Amitriptyline TC ydic

23. Which one of the following is most likely to be responsible for amphetamine-induced increases in blood pressure?

α
ephedrine \rightarrow maa

A. Stimulation of GABA receptors
B. Indirect release of endogenous catecholamines
C. Metabolism to false neurochemical transmitters
D. Inhibition of catecholamine metabolism
E. Beta-2 adrenergic receptor agonism

24. Which one of the following drugs controls the manic phase of bipolar depression?

A. Doxepin TC ydic
B. Fluoxetine TC ydic
C. Paroxetine TC SSRI
D. Lithium carbonate manic
E. Desipramine TC ydic

25. All of the following statements apply to propranolol **EXCEPT**:

- B
- A. Is a competitive antagonist of beta adrenergic receptors
 - ☒ B. Is the drug of choice in patients with bronchial asthma
 - C. Possesses high lipid solubility
 - D. Is used for the prophylactic management of angina pectoris
 - E. Is used for the prophylactic management of migraine headache

26. Increased secretion of prolactin (as a side effect) is most likely to be associated with which one of the following psychotropic agents?

- D
- A. Imipramine *Tricycl.*
 - B. Olanzapine -
 - C. Fluoxetine - *SSRI*
 - D. Chlorpromazine - *Antipsychotic*
 - ☒ E. Clozapine -

27. Stimulation of muscarinic receptors produces all of the following effects **EXCEPT**:

- B
- A. Miosis
 - ☒ B. Skeletal muscle contraction
 - C. Decrease in heart rate
 - D. Decrease in blood pressure
 - E. Bronchoconstriction

28. Used for the induction of anesthesia:

- E
- A. Dantrolene
 - B. Bromocriptine
 - C. Isoproterenol -
 - D. Oxazepam
 - ☒ E. Midazolam

29. All of the following statements apply to phenylephrine **EXCEPT**:

- B
- A. Constricts small vessels in the nasal mucosa
 - ☒ B. Reduces secretions by inhibiting parasympathetic stimulation
 - C. Reverses hypotension during anesthesia
 - D. Is a direct-acting alpha adrenergic receptor agonist
 - E. Is added to local anesthetic solutions

30. A cardioselective adrenergic receptor blocker:

- D
- A. Timolol
 - B. Phentolamine
 - C. Propranolol
 - ☒ D. Atenolol
 - E. Bethanechol

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

- C
- A. Morphine
 - B. Thioridazine
 - ☒ C. Diazepam *62*
 - D. Haloperidol
 - E. Phenobarbital

32. Given the following information concerning general anesthetics, which drug will induce anesthesia at the fastest rate if given at the MAC concentration?

Drug	MAC	Blood: Gas Partition Coefficient
A	23.0	1.5
B	5.0	14.0
C	1.0	6.0
D	0.2	4.0
E	12.0	0.7

- E
- (A) Drug A
B. Drug B
C. Drug C
D. Drug D
E. Drug E

low MAC

lower B-G PC more potent

33. Which of the following statements concerning inhaled general anesthetics best fits current understanding of their mechanism of action?

- D
- A. Dissolve in the membrane, resulting in membrane expansion that indirectly inhibits nerve conduction N
B. Dissolve in the membrane, changing the membrane fluidity that indirectly inhibits nerve conduction N
C. Block sodium influx by acting as competitive inhibitors of acetylcholine binding N
D. Dissolve in the membrane, binding to hydrophobic sites on receptor-operated ion channels
(E) Block sodium influx by acting as competitive inhibitors of GABA binding

Meyer-Overton Theory

34. Which of the following statements best describes a characteristic of halothane?

- C
- A. Is excreted unchanged by the lungs and thus is not hepatotoxic
 - B. Is a relatively weak agent, not useful for stage three anesthesia
 - ☒ C. Is a depressant of respiration
 - D. Is administered intravenously
 - E. Its pharmacokinetic properties are best explained by redistribution to adipose tissue

35. The following statements about nitrous oxide are true **EXCEPT**:

- D
- A. Can cause hypoxia ↑
 - B. Produces dependence and tolerance on chronic exposure
 - C. Has analgesic properties +
 - ☒ D. Causes relaxation of skeletal muscle *No A*
 - E. Can be used in combination with local anesthetics to reduce the patient's anxiety

36. Which of the following drugs is most useful in stimulating salivary secretions?

- E
- A. Atropine
 - B. Pralidoxime
 - C. Benztropine
 - D. Propranolol
 - ☒ E. Pilocarpine

☒ 37. Treatment of acute organophosphate poisoning may include all of the following **EXCEPT**:

- irrev. CHE inhibitors*
- A. Atropine ✓ *Muscarinic antagonist*
 - B. Pralidoxime ✓ *+ox*
 - C. Oxygen
 - ☒ D. Diazepam
 - ☒ E. Epinephrine
- E

38. All of the following statements about nicotine are true EXCEPT:

- ☒ A. Lowers blood pressure and heart rate
- B. Chronic use is associated with tolerance and dependence
- C. Stimulates gastric acid secretion
- D. May cause seizures at acute high doses T
- E. Is highly lipid soluble T

39. Which of the following is LEAST likely to occur with high doses of atropine?

- A. Dry, flushed skin
- ☒ B. Bradycardia
- C. Elevation in body temperature
- D. Mental confusion
- E. Constipation

40. All of the following are true about the passive absorption of drugs from the gastrointestinal tract EXCEPT:

- A. Weak bases are mostly absorbed from the small intestine T
- B. Highly lipid soluble drugs are readily absorbed T
- C. An increase in dose will increase the rate of absorption T
- D. The drugs are susceptible to first pass metabolism
- ☒ E. Only the ionized portion of the drugs are absorbed

41. All of the following may reduce the duration of action of a drug EXCEPT:

- A. A reduction in oral absorption T
- B. Redistribution to adipose tissue
- ☒ C. A reduction in renal blood flow
- D. Metabolism by the liver
- E. Co-administration of a competitive antagonist

42. All of the following statements concerning buspirone are true **EXCEPT**:

- D
- ☒ A. Lacks muscle relaxant activity
 - B. Acts as a partial agonist at serotonin receptors
 - C. Used in the management of generalized anxiety disorder ✓
 - D. Has a quick onset of therapeutic action (within 1-2 days) ✓
 - E. Is a member of the azaperone class of anxiolytics ✓

43. Amantadine is used in the treatment of Parkinsonism because it

- C
- A. Inhibits the release of acetylcholine
 - B. Is a dopamine receptor agonist
 - ☒ C. Increases the level of endogenous dopamine in the striatum
 - D. Inhibits catechol-O-methyl transferase (COMT)
 - E. Blocks dopamine reuptake into presynaptic terminals

44. Which of the following drugs/toxins is matched to its mechanism of action?

- B
- A. Alpha-bungarotoxin – prevents glycine release from Renshaw cell
 - ☒ B. Botulinum Toxin – blocks acetylcholine release
 - C. Black Widow Spider Toxin – blocks the glycine receptor in the spinal cord
 - D. Tetanus Toxin – stimulates GABA release
 - E. Strychnine – binds irreversibly to the nicotinic receptor

45. Epinephrine is added to a preparation of mepivacaine in order to

- C
- A. Block its liver metabolism
 - B. Enhance its absorption into the systemic circulation
 - ☒ C. Increase its duration of action
 - D. Enhance its vasodilating effects
 - E. Alter its degree of ionization

46. A certain drug has an elimination half-life of 2 hr. The minimum time for its effective elimination (>95%) from the body is approximately

- A. 2 hrs
B. 4 hrs
C. 9 hrs
D. 16 hrs
E. 30 hrs

4.3

47. Clinically used, effective bronchodilator:

- A. Benztropine
B. Prazosin
C. Bethanechol
D. Metoprolol
E. Terbutaline

48. Which one of the following drugs, applied topically to the eye, causes mydriasis without producing cycloplegia?

- A. Phenoxybenzamine
B. Phenylephrine
C. Pilocarpine
D. Atropine
E. Neostigmine

For questions 49 and 50: For each of the numbered items, select the single most appropriate lettered response. You may use each letter once or not at all.

- A. Is a Ca^{2+} dependent process
B. Produces noncovalent enzyme modification
C. Produces covalent enzyme modification
D. Directly binds DNA, and modifies DNA and protein synthesis *st hormone*
E. Is regulated by inositol 1,4,5 trisphosphate *Ca^{2+} release*

49. Protein phosphorylation C

50. Steroid hormone receptor D

END OF EXAM