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NAME _____

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DENTAL PHARMACOLOGY
EXAMINATION #1

February 01, 2007

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 social security 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 School of Dentistry

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

1. A 50-year-old man is treated with bethanechol for nonobstructive atony of the bladder. 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 nicotinic receptors
   D. Inhibition of beta-2 adrenergic receptors
   E. Stimulation of muscarinic receptors

2. Which of the following drugs is most useful for the treatment of Alzheimer's disease?

   A. Carbachol
   B. Donepezil
   C. Pralidoxime
   D. Nicotine
   E. Propranolol

3. 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. Pilocarpine
   C. Nicotine
   D. Pralidoxime
   E. Phentolamine

4. Which of the following drugs is a muscarinic receptor blocker, used as an adjunct in the treatment of bronchial asthma?

   A. Mecamylamine
   B. Clonidine
   C. Ipratropium
   D. Bethanechol
   E. Albuterol

5. A patient has ingested a toxic overdose of lidocaine, a weak base. Which of the following measures can increase the excretion of lidocaine in the urine?

A. Administration of another weak base
B. Administration of an acidifying agent, ammonium chloride
C. Administration of an alkalinizing agent, sodium bicarbonate
D. You have no control over the excretion rate

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

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

7. Which of the following terms is best defined as the movement of drug out of the plasma to its site of action?

A. Absorption
B. Excretion
C. Redistribution
D. Distribution
E. Elimination

8. A drug with apparent volume of distribution = 5L is administered intravenously as a bolus dose of 100 mg. The initial plasma concentration (mg/L) attained is approximately

A. 0.15
B. 4.30
C. 20
D. 100
E. 1500

9. A drug that is rapidly and completely absorbed is given in a dose of 100 mg. The half-life of the drug is 4 hrs. After 8 hrs, the quantity remaining in the patient is

A. 2 mg
B. 4 mg
C. 9 mg
D. 25 mg
E. 43 mg

10. The competition between an active and an inactive drug for a common receptor (e.g., atropine and acetylcholine on the heart rate) represents a drug-drug interaction termed

A. Pharmacological antagonism
B. Functional antagonism
C. Chemical antagonism
D. Synergism
E. Additively

11. With inhalation anesthetics the rate of onset of anesthesia is

A. Independent of the partial pressure of the anesthetic gas in the lung
B. Inversely proportional to the partial pressure of the anesthetic gas in the lung
C. Inversely proportional to the solubility of anesthetic gas in the blood
D. Independent of the solubility of anesthetic gas in the blood
E. Proportional to the solubility of anesthetic gas in the blood

12. Which of the following drugs produces the least postoperative vomiting, fastest recovery, and ability of patients to walk sooner and generally feel better after its use?

A. Thiopental
B. Ketamine
C. Propofol
D. Halothane
E. Fentanyl

13. Which of the following drugs is a potent inhalation anesthetic; use is most associated with production of seizures?

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

14. The protein that couples a receptor (example – α_2-adrenergic receptor) to the inhibition of adenylyl cyclase is called

A. Gi
B. Gs
C. Gq
D. G12
E. G13

15. Which of the following drugs is a centrally acting alpha-2 adrenoceptor agonist, producing dry mouth, drowsiness and bradycardia?

C

A. Guanethidine
B. Phenoxybenzamine
C. Clonidine
D. Doxazosin
E. Prazosin

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

C

A. Propranolol
B. Terazosin
C. Terbutaline
D. Phenylephrine
E. Methoxamine

17. In addition to lithium, which of the following drugs is useful in treating the manic phase of bipolar depression?

B

A. Amitriptyline
B. Sodium valproate
C. Phenobarbital
D. Ethosuximide
E. Fluoxetine

18. Which of the following drugs is most effective in the treatment of status epilepticus?

F

A. Ethosuximide followed by propranolol
B. Phenobarbital followed by topiramate
C. Lamotrigene
D. Gabapentin
E. Lorazepam followed by fosphenytoin

19. Buspirone is an anti-anxiety agent that acts as

B

A. A selective serotonin reuptake inhibitor
B. A partial agonist at serotonergic-1A receptors
C. An agonist at GABA receptors
D. An agonist at D-2 receptors in the striatum
E. A pro-drug for nordiazepam

20. Which of the following drugs is most likely to cause the "cheese effect" (causing hypertensive crises) when taken in conjunction with tyramine-containing foodstuffs?

A. Desipramine
B. Haloperidol
C. Amitriptyline
D. Tranylcypromine
E. Nortriptyline

21. Which of the following drugs is most likely to stimulate excessive release of prolactin, causing galactorrhea and menstrual irregularities?

A. Fluoxetine
B. Haloperidol
C. Chlordiazepoxide
D. Atropine
E. Pergolide

22. All of the following drugs produce muscular relaxation via action in the central nervous system **EXCEPT**

A. Mephenesin
B. Diazepam
C. Baclofen
D. Dantrolene
E. Chlordiazepoxide

23. D-tubocurare, a neuromuscular blocker

A. Affects larger group muscles before smaller group muscles
B. Is antagonized by physostigmine
C. Produces little or no release of histamine
D. Produces a depolarization in the subsynaptic membrane of the muscle cell
E. Stimulates nicotinic receptors

24. Dantrolene when used as a muscle relaxant acts by

A. Increasing the activity of the Renshaw cell
B. Blocking the nicotinic receptor on the muscle
C. Blocking calcium release from the sarcoplasmic reticulum in the muscle
D. Blocking the muscarinic receptor in the central nervous system
E. Direct inhibition of the activity of the alpha-motoneuron

25. All of the following conditions have been attributed to excessive alcohol consumption, **EXCEPT**

A. Cirrhosis of the liver
B. Korsakoff's Psychosis
C. Fetal Alcohol Syndrome
D. Congestive heart failure
E. Coronary artery disease

26. Alcohol ingestion is associated with all of the following **EXCEPT**

A. Ataxia and slurred speech
B. Decrease in high density lipoproteins
C. Cutaneous vasodilation
D. Increased fat production in the liver
E. Inhibition of antidiuretic hormone

27. A benzodiazepine when acting at the GABA ionophore produces

A. A decrease in the amplitude of the EPSP
B. An increase in the amplitude of the IPSP
C. An increase in the duration of the IPSP
D. A decrease in the duration of the EPSP
E. No change in the IPSP

28. Which of the following is a short-acting benzodiazepine that is most useful in the treatment of insomnia?

A. Triazolam
B. Chlordiazepoxide
C. Phenobarbital
D. Nitrazepam
E. Diazepam

29. Norepinephrine re-uptake into the noradrenergic nerve terminal is inhibited by

A. Atropine
B. Propranolol $\beta_1 \& \beta_2$
C. Cocaine
D. Physostigmine
E. Strychnine

30. The principal transmitter released from sympathetic postganglionic fibers to the heart is

A

(A) Norepinephrine
~~B.~~ Dopamine
C. Glutamate
D. Glycine
E. Acetylcholine

31. A 35-year-old woman is spraying plants in her greenhouse with malathion. She accidentally inhales the chemical and begins to experience signs of intoxication. Her symptoms are most likely to include

D

A. Renal failure
B. Urinary retention and constipation
C. Mydriasis and cycloplegia
(D) Bronchoconstriction, diarrhea and excessive secretions
E. Dry mouth and eyes, fever and flushed dry skin

~~32.~~ All of the following are potential uses of muscarinic receptor blockers **EXCEPT**:

A

~~A.~~ To produce miosis during eye surgery
(B) To treat cardiac bradycardia, post myocardial infarction
~~C.~~ To reduce the symptoms of overactive bladder
~~D.~~ To reduce gastrointestinal spasm
~~E.~~ To relieve the tremor of drug-induced parkinsonism

33. Aspirin is a weak acid. If you administer aspirin, which has a pKa=3.5, what would be the ratio of non-ionized to ionized drug in the small intestine, with a pH of 5.5?

A

(A) 1/100
B. 1/10
C. 1/1
D. 10/1
E. 100/1

$3.5 - 5.5 = \log \frac{ION}{NONION}$

$.01 =$

34. The route of administration most susceptible to first-pass metabolism is

D

A. Intravenous
B. Sublingual
C. Rectal
(D) Oral
E. Transdermal

35. A patient has been taking Drug A to reduce his elevated blood pressure. While on vacation, a physician prescribes a second drug (Drug B) for an infection. Several days later, the patient presents to the emergency room with hypertensive crises. The most likely explanation is that Drug B

A. Displaced Drug A from plasma proteins
B. Competed with Drug A for tubular secretion
C. Enhanced the oral absorption of Drug A
D. Is an inducer of cytochrome P_{450}
E. Is an antihypertensive drug

36. The potency of a drug is indicated by which one of the following terms?

A. *ED50*
B. E_{max}
C. Volume of distribution
D. Receptor concentration (R_t)
E. Half-life

37. Which of the following is a rapid-acting inhalation anesthetic, but has low potency; it is useful in minor dental procedures?

A. Nitrous oxide
B. Desflurane
C. Midazolam
D. Enflurane
E. Halothane

38. Which statement best describes the general anesthetic halothane?

A. It is not metabolized in the liver and thus is not hepatotoxic
B. It is a weak agent not useful for stage three anesthesia
C. It depresses cardiac output
D. It is administered intravenously
E. It increases blood pressure

39. Which of the following is a ligand-gated ion channel that allows Ca^{2+} or Na^{+} to enter cells?

A. $GABA_A$ receptor
B. $GABA_B$ receptor
C. β-adrenergic receptor
D. Muscarinic receptor
E. Nicotinic receptor

40. Which of the following effects will most likely follow stimulation of beta-2 adrenoceptors?

D

A. Decrease in heart rate
B. Decrease in mental cognition
C. Secretion from sweat glands
D. Bronchial smooth muscle relaxation
E. Constriction of blood vessels

41. Which of the following drugs is a cardioselective (beta-1) adrenergic receptor blocker?

E

A. Pseudoephedrine
B. Isoproterenol
C. Methoxamine
D. Dobutamine
E. Metoprolol

42. Which of the following drugs would be suitable as an add-on drug for partial seizures in adults?

A

A. Lamotrigene
B. Clonazepam
C. Diazepam
D. Nortriptyline
E. Clonidine

43. Flumazenil will reverse the respiratory depression associated with which of the following agents?

F

A. Propofol
B. Desflurane
C. Ketamine
D. Fentanyl
E. Midazolam

44. Diazepam is useful for all of the following indications **EXCEPT**

C

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

45. A 50-year-old woman is treated for depression. Protriptyline is prescribed to relieve her depression. Four days later she calls the doctor to say the pills are having no effect and she still feels depressed. The best course of action would be to advise her to

E

A. Add a second antidepressant
B. Stop the pills for a week then continue as before
C. Double the dose
D. Substitute a more efficacious antidepressant
(E) Continue the medication as prescribed because of the known delay in onset of effectiveness

46. Sinemet, a combination of levodopa and carbidopa, is used to treat Parkinsonism. Carbidopa is important in this preparation because it

D

A. Stimulates release of dopamine in the central nervous system
B. Accelerates the breakdown of levodopa to dopamine in the central nervous system
C. Blocks reuptake of dopamine in the central nervous system
(D) Inhibits the breakdown of levodopa to dopamine in the periphery
E. Is a dopamine receptor (D2) agonist

~~47.~~ A patient being treated for psychosis by haloperidol develops a Parkinson-like tremor. Which of the following drugs should be used to alleviate the patient's tremor?

↓ACh

E

~~A.~~ Levodopa
~~B.~~ Carbidopa
C. Bromocriptine
(D) Amantadine
~~E.~~ Benztropine

~~48.~~ Which of the following muscle relaxants acts on the GABAb receptor?

D

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

49. Botulinum Toxin acts by

A. Decreasing Ca^{++} release from the sarcoplasmic reticulum
B. Preventing glycine release
C. Binding irreversibly to the nicotinic receptor
D. Releasing excessive amounts of acetylcholine
E. Preventing acetylcholine release

50. Alcohol is metabolized at a rate that is described by 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

END OF EXAM