# DENTAL PHARMACOLOGY 2005
## EXAM III
April 7, 2005

1 Diuretics such as furosemide are used to treat congestive heart failure because they

A increase pulmonary congestion
B decrease plasma volume
C display an "afterload" effect
D increase oxygen demand.

2 Which effect **BEST** describes the mechanism of action of digoxin, a digitalis glycoside used in treatment of congestive heart failure?

A Decrease systolic force of contraction
B Activates $Na^+$-$K^+$ exchange in cardiac muscle
C Decreases the influx of $Ca^{2+}$
D Increases cardiac output

3. Angiotensin converting enzyme (ACE) inhibitors such as Captopril are effective in the treatment of congestive heart failure because they are

A afterload reducing agents
B preload reducing agents
C direct vasoconstrictors
D direct vasodilators.
E effective in increasing sodium and water retention

4 Which of the following is a β-adrenergic antagonist (β-blocker) used in the treatment of congestive heart failure?

A Lidocaine
B Propranolol
C Verapamil
D Enalapril
E Digoxin

5 Which of the following reasons **BEST** explains why lidocaine can be used to treat arrhythmias?

A Ineffective against atrial flutters and atrial fibrillations
B Blocks activated $Na^+$ channels
C Increases conduction velocity
D Increases phase 4 depolarization
E Blocks closed $K^+$ channels

Exam 3 Pharmacology

6 Which of the following statements regarding class III anti-arrhythmia drugs such as Amiodarone is **CORRECT**?

A May display toxicity to thyroid and lungs
B Can behave as a partial β-adrenergic antagonist (β-blocker)
C Attenuate the action potential (phase 0 depolarization) - no effect on phase 0
→ D Block $Na^+$ channels to increase repolarization currents

7 Which of the following drugs is a $Ca^{2+}$-channel blocker used to treat arrhythmias?

A Lidocaine
B Flecainide
C Pindolol
→ D Diltiazem
E Midazolam

8 Which effect would be observed if binding of Angiotensin II to the $AT_1$ receptor were inhibited?

→ A Decreased vasoconstriction
B Increased blood pressure
C Increased $Na^+/H_2O$ retention
D Increased afterload

9 All of the following statements regarding isoproterenol are correct **EXCEPT** that it

→ A binds with poor affinity to β-adrenergic receptors.
B produces peripheral vasodilation.
C is a good bronchodilator
D increases cardiac output.

10 The $Ca^{2+}$-blocker nifedipine reduces myocardial ischemia/angina by which of the following mechanisms?

A Reducing activation of $\alpha_1$-adrenergic receptors
→ B Decreasing blood pressure and dilating coronary arteries
C Dilating coronary arteries and increasing myocardial wall tension
D Enhancing growth of collateral vessels

11 Spironolactone is effective in the treatment of hypertension because it

A behaves as a β-adrenergic antagonist (β-blocker)
B blocks $Ca^{2+}$ channels.
→ C blocks aldosterone effects on the kidney
D blocks acetylcholine binding

12. Losartan™ or Irbesartan™ administration reduces blood pressure by which of the following reasons or mechanisms?

A They are highly selective angiotensin II receptor antagonists.
B They are both potent angiotensin-converting enzyme (ACE) inhibitors.
C They are both $Ca^{2+}$-channel blockers
D They both increase the production of aldosterone

13 Niacin at high doses can be used as an antihyperlipidemic agent because it

A inhibits HMG-CoA reductase
B acts to inhibit transcription of proteins involved in fatty acid metabolism.
C inhibits lipolysis in adipose tissue.
D removes bile acids from the gastrointestinal tract
E directly inhibits cholesterol uptake by the liver

14 Statins like Mevacor™ and Lipitor™ are antihyperlipidemic agents because they

A inhibit HMG-CoA reductase
B act to inhibit transcription of proteins involved in fatty acid metabolism.
C inhibit lipolysis in adipose tissue.
D remove bile acids from the gastrointestinal tract.
E directly inhibit cholesterol uptake by the liver.

15. Which of the following drugs, used as an anti-anginal agent, must be administered sublingually?

A Captopril
B Furosemide
C Isosorbide dinitrate
D Nitroglycerin
E Atropine

16 Which of the following drugs used in the treatment of cardiovascular disease would be contraindicated for someone undergoing major oral surgery?

A Nitroglycerin
B Captopril
C Aspirin
D Furosemide
E Propranolol

17 Which of the following drugs is used to prevent deep vein thrombosis?

A Atropine
B Aspirin
C Heparin
D Vitamin K
E Streptokinase

18 Angiotensin converting enzyme inhibitors are used clinically for all of the following indications **EXCEPT**

A. treatment of cardiac systolic dysfunction.
B. therapy of normal-renin associated hypertension.
C. management of hypokalemia
D treatment of acute coronary thrombosis and pulmonary edema.
E prevention of cardiac remodeling in hypertensive states

19 Nearly two-thirds of filtered sodium is reabsorbed in which segment of the nephron?

A The proximal renal tubules
B. The thin descending limb of the loop of Henle
C The thick ascending limb of the loop of Henle
D The distal convoluted tubules
E. The collecting ducts

20 Which portion of the nephron utilizes the greatest amounts of ATP?

A The proximal renal tubules
B The thin descending limb of the loop of Henle
C The thick ascending limb of the loop of Henle
D The distal convoluted tubules
E The collecting ducts

21 Which of the following combinations of diuretic drugs is **LEAST** effective?

A Bumetanide and hydrochlorothiazide
B Furosemide and triamterene
C Hydrochlorothiazide and amiloride
D Spironolactone and triamterene
E Spironolactone and furosemide

22. Furosemide can produce all of the following effects **EXCEPT**

A hypokalemia
B acute renal failure
C toxicity similar to that of sulfonamides
D enhanced renin secretion
E metabolic alkalosis.

23. All of the following diuretics act at the lumenal side of renal tubules **EXCEPT**

A. hydrochlorothiazide
B triamterene
C ethacrynic acid.
D. bumetanide.
E spironolactone

24. All of the following ions are important in generating currents during each cardiac cycle **EXCEPT**

A. $Ca^{2+}$
B. $K^{+}$
C. $Mg^{2+}$
D. $Na^{+}$

25. Which of the following receptors is important for sensing short term changes in blood pressure?

A. $\beta_1$-Adrenergic receptors
B. Baroreceptors
C. Chemoreceptors
D. Dopamine receptors
E. Nicotinic cholinergic receptors

26. Which tissue is responsible for the pacemaker potentials that control contraction of the heart?

A. Atrioventricular node
B. Bundle of His
C. Purkinje fibers
D. Sinoatrial node
E. Ventricular myocardium

27. All of the following pairs of agents and actions or agents and receptors occur physiologically in normal individuals **EXCEPT**

A. acetylcholine – muscarinic receptors
B. angiotensin II – vasoconstriction
C. epinephrine – dopamine receptors
D. epinephrine – vasodilation
E. norepinephrine - α-adrenergic receptors

28. All of the following drugs are antiinflammatory **EXCEPT**

A. ibuprofen.
B. naproxen.
C. acetaminophen
D. aspirin.
E. prednisone.

29 A patient who has been taking large quantities of aspirin might show increased postoperative bleeding because aspirin inhibits

A. synthesis of thromboxane and prevents platelet aggregation
B. synthesis of prostacyclin and prevents platelet disaggregation
C. synthesis of prostaglandins and prevents production of blood platelets
D. thrombin and prevents formation of the fibrin network
E. intestinal absorption of vitamin K and prevents synthesis of blood clotting factors

30. Which of the following pharmacologic actions is **NOT** produced by prostaglandins?

A. Pyrexia
B. Uterine contraction
C. Increased gastric acid secretion
D. Increased capillary permeability
E. Increased sensitivity to pain upon intradermal injection

31 Which of the following conditions or effects does **NOT** result from prolonged treatment with corticosteroids?

A. Gastric ulcer
B. Osteoporosis
C. Hyperglycemia
D. Skeletal muscle atrophy
E. Redistribution of body fat

32 All of the following agents useful for treatment of rheumatoid arthritis can be used simultaneously with anakinra **EXCEPT**

A. aspirin
B. celecoxib
C. infliximab
D. methotrexate
E. prednisone

33. The most prominent acute toxic effect associated with acetaminophen use is

A. hemorrhage.
B. renal necrosis.
C. hepatic necrosis.
D. gastric ulceration.
E. respiratory alkalosis.

34. Which of the following drugs is an effective antitussive?

A. Ibuprofen
B. Dextromethorphan
C. Guaifenesin
D. Aspirin
E. Acetaminophen

35 Receptors which mediate the primary effects of opioids are

A. presynaptic transporters of amines.
B. membrane proteins activated by endogenous peptides
C. enzymes which convert arachidonic acid to prostaglandins
D. NMDA and glutamate receptors
E. present in the brain but not the spinal cord

36 All of the following bind to opioid receptors **EXCEPT**

A. endorphins.
B. enkephalins.
C. naloxone.
D. substance P
E. dynorphins.

37 All of the following terms have a distinct medical meaning or definition **EXCEPT**

A. opioid.
B. opiate.
C. dependence.
D. addiction.
E. narcotic

38 All of the following effects are commonly produced by administration of an opioid **EXCEPT**

A. respiratory depression
B. nausea
C. constipation
D. tolerance
E. smooth muscle relaxation

39 Which of the following agents sensitizes peripheral nerve endings to noxious and/or painful stimuli?

A. Bradykinin
B. Serotonin
C. Histamine (itching).
D. $H^+$ (acid)
E. Prostaglandins

40 All of the following effects can be produced by administration of an opioid **EXCEPT**

A. suppression of the cough reflex (antitussive).
B. elevation of mood
C. constriction of pupils
D. inhibition of vomiting (antiemetic).
E. stimulation of release of histamine from mast cells

41. Which of the following agents is **LEAST** likely to produce either physical dependence or addiction?

A. Codeine
B. Morphine
C. Oxycodone
D. Hydrocodone
E. Tramadol

42. A 57 year old person receiving propranolol (β-blocker) for hypertension presents with an acute allergic asthma attack. Which of the following treatments is specifically *contraindicated*?

A. Ipratropium bromide (anti-cholinergic)
B. Loratadine (anti-histamine)
C. Budenoside (Pulmicort or Rhinocort)
D. Albuterol
E. None of the above

43. Which of the following classes of bronchodilators is **MOST** effective in chronic obstructive pulmonary disease (COPD)?

A. Anticholinergics
B. β-Adrenergic agonists
C. β-Adrenergic receptor antagonists
D. Corticosteroids
E. Methylxanthines

44. Bronchoconstriction in chronic obstructive pulmonary disease (COPD) due to epithelial damage occurs by what mechanism?

A. Loss of endogenous β-agonist release leading to increased smooth muscle contraction
B. Activation of exposed sensory nerve fibers leading to acetylcholine release and cholinergic bronchoconstriction
C. Increased inflammatory mediator release leading to smooth muscle oxidative damage
D. Loss of epithelial derived acetylcholine release leading to increased bronchoconstriction
E. None of the above

45. Anti-leukotrienes and antihistamines are both used as treatments for allergen-induced asthma. These compounds are best used

A. prophylactically to prevent allergen-mediated responses.
B. in response to an acute asthmatic attack due to their fast action.
C. in combination with anti-cholinergic agents.
D. in combination with β-adrenergic antagonists (β-blockers).

46. Which statement accurately describes the mechanisms of action of corticosterords?

A Fast-acting anti-inflammatory due to increased calcium release stimulated in inflammatory cells, especially Mast cells
B Bind selectively to epithelial cells leading to endogenous β-agonist release
C Slow-acting agents that influence protein expression by binding to nuclear receptors which then bind directly to specific DNA sequences
D Fast-acting agents that increase chloride secretion across epithelial cells leading to improved airway clearance
E Fast-acting agents that bind to membrane receptors and elevate $Ca^{2+}$

47 Which of the following drugs has an antihypertensive effect at low doses and an antidiuretic effect at high doses?

A Bumetanide
B Lisinopril
C Spironolactone
D Hydrochlorothiazide
E Losartan

48 Leukotrienes are derived from arachidonic acid and are potent mediators of allergic asthmatic responses. Which of the following therapies would **NOT** ameliorate leukotriene effects?

A Increased expression lipocortin-1 after corticosteroid treatment
B Inhibition of cyclooxygenase activity by aspirin or ibuprofen leading to reduced prostaglandin synthesis
C Inhibition of 5-lipoxygenase activity leading to reduced 5-HPETE formation
D Receptor blockade using "lukast" drugs

49 Which of the following is a concern with prolonged, repeated use of β-receptor agonists for the treatment of acute asthmatic exacerbations?

A negative regulation of corticosteroid receptor function resulting in reduced steroid effectiveness
B Secondary release of acetylcholine leading to cholinergic airway contraction
C Increased mast cell recruitment leading to more severe allergic responses
D β-Receptor desensitization via β-receptor kinase (βARK) activation
E None of the above

50 In the electrocardiogram, the QRS complex corresponds to approximately what part of the action potential?

A Phase 0 to 1
B Phase 1 to 2
C Phase 2 to 3
D Phase 3 to 4
E Phase 4 to 0

## BONUS QUESTIONS

51. While effective in the treatment of congestive heart failure, β-adrenergic antagonists (β-blockers) can also used to treat arrhythmias because they

A are excreted solely through the kidneys
B have no effect on the A-V node
→ C reduce ventricular response to atrial fibrillations
D have no effect on mortality

52 Cholestipol™ is used as an antihyperlipidemic agent because it

A inhibits HMG-CoA reductase
B acts to inhibit transcription of proteins involved in fatty acid metabolism
→ C inhibits lipolysis in adipose tissue
D removes bile acids from the gastrointestinal tract
E directly inhibits cholesterol uptake by the liver

53 Which of the following drugs would likely be used to treat sinus tachycardia?

A Atropine
B Isoproterenol
→ C Propranolol
D Lidocaine
E Verapamil

54 All of the following statements describe a known effect of corticosteroid treatment **EXCEPT**

A decreased recruitment of eosinophils.
B increased expression of β-receptors on smooth muscle cells
C decreased cytokine expression from T-lymphocytes and macrophages
D reduced mucous secretion from glands
→ E increased Mast cell recruitment and histamine release

55. Which of the following sequences correctly describes the order of the conduction pathway for the cardiac action potential?

A AV node – SA node – internodal pathways – Purkinje fibers – ventricular myocardium
B AV node – SA node – Purkinje fibers – internodal pathways – ventricular myocardium
C Internodal pathways – SA node – Purkinje fibers – AV node – ventricular myocardium
D Purkinje fibers – SA node – internodal pathways – AV node – ventricular myocardium
→ E SA node – AV node – Internodal pathways – Purkinje fibers – ventricular myocardium