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**MEDICAL PHARMACOLOGY
UNIT EXAMINATION II
OCTOBER 25, 2000**

Each of the questions or incomplete statements below is followed by suggested answers or completions. Select the **ONE** that is best in each case.

- Which diuretic is used to treat wide angle glaucoma?
 - acetazolamide (Diamox[®])
 - mannitol (Osmitol[®])
 - water
 - chlorothiazide (Diuril[®])
 - ethacrynic acid (Edecrin[®])
- An edematous individual with ascites has an early morning appointment with his physician. A blood sample is taken and reveals evidence of liver damage and a very high level of alcohol. Which diuretic might be helpful in correcting this individual's edema?
 - mannitol (Osmitol[®])
 - acetazolamide (Diamox[®])
 - spironolactone (Aldactone[®])
 - triamterene (Dyrenium[®])
 - ethanol
- An individual with pulmonary edema is also experiencing gastric distress. Which diuretic would be the most suitable to treat the pulmonary edema?
 - furosemide (Lasix[®])
 - ethacrynic acid (Edecrin[®])
 - chlorothiazide (Diuril[®])
 - mannitol (Osmitol[®])
 - water
- Mannitol (Osmitol[®])
 - is used to treat the early stages of renal failure.
 - inhibits carbonic anhydrase.
 - abolishes "free water" production.
 - is used to treat edema associated with congestive heart failure.
 - causes hyperuricemia.

5. Torseimide (Demadex[®]) *Loop*
- A. is mainly a "K⁺ sparing" diuretic.
 - B. is safe to use in patients allergic to sulfonamides.
 - C. abolishes "free water" production.
 - D. is mainly used to treat hypothalamic diabetes insipidus.
 - E. is safe to use in patients with gout.
6. To treat the "syndrome of inappropriate ADH secretion", administer
- A. demeclocycline (Declomycin[®]).
 - B. chlorothiazide (Diuril[®]).
 - C. ethacrynic acid (Edecrin[®]).
 - D. ethanol.
 - E. mannitol (Osmitol[®]).
7. Select the **FALSE** statement.
- A. "Loop" diuretics are used to treat hypercalcemia.
 - B. Thiazide diuretics are used to treat nephrogenic diabetes insipidus.
 - C. Thiazide diuretics are used to treat calcium containing stones in the urine.
 - D. Desmopressin acetate (dDAVP) is used to treat hypothalamic diabetes insipidus.
 - E. "K⁺ sparing" diuretics are used to counter the hyperkalemia caused by thiazide and "Loop" diuretics.
8. Select the **TRUE** statement.
- A. Swelling of breasts can occur during spironolactone (Aldactone[®]) treatment.
 - B. Ethacrynic acid (Edecrin[®]) makes the urine basic.
 - C. Hearing loss is a common side effect associated with desmopressin acetate (dDAVP).
 - D. Hypermnatremia results from excessive water intake during treatment with chlorothiazide (Diuril[®]).
 - E. Hyperuricemia typically occurs during treatment with amiloride (Midamor[®]).
9. An individual with congestive heart failure is experiencing some edema. Which drug or combination of drugs might be beneficial to this individual?
- A. a reduced dose of a digitalis like drug and a normal dose of chlorothiazide (Diuril[®])
 - B. triamterene (Dyrenium[®])
 - ~~C. water~~
 - D. spironolactone (Aldactone[®]) *↓ VR*
 - ~~E. mannitol (Osmitol[®])~~
- A*
Ac2D

10. Select the **TRUE** statement about kidney function.

- A. Most of the glomerular filtrate is reabsorbed from the distal convoluted tubule. ✓
- B. Carbonic anhydrase enables the bicarbonate in the glomerular filtrate to be reabsorbed.
- C. The thin descending limb of Henle's Loop is impermeable to water.
- D. The thick ascending limb of Henle's Loop is permeable to water.
- E. Antidiuretic hormone acts mainly at the distal convoluted tubule.

11. Which of the following topical antibiotics is the most notorious sensitizer that often causes allergic contact dermatitis?

- A. neomycin
- B. bacitracin
- C. polymyxin
- D. mupirocin
- E. erythromycin

12. Which maneuver is most helpful to enhance absorption of a topically applied drug into the skin?

- A. Use a cream instead of an ointment.
- B. Occlude the area with plastic wrap.
- C. Remove dimethylsulfoxide from the vehicle.
- D. Add paraben to the vehicle.
- E. Expose the skin to ultraviolet light.

13. A 32-year old woman, G.T., is 39 weeks pregnant. She has been in labor for 9 hours but contractions are only moderately intense. The fetus is normally positioned and appears to be normal. G.T. has no known medical problems and has had a "normal" pregnancy. Which of the following is the most appropriate medication to use to improve uterine contraction?

- A. oxytocin (Syntocinon®)
- B. ritodrine (Yutopar®)
- C. mifepristone (RU 486®)
- D. misoprosol (Cytotec®)
- E. nifedipine (Procardia®)

14. S.N. is a 20-year old female who has just delivered a normal baby. Following the delivery of the placenta R.N. is now experiencing postpartum hemorrhage. 15-methyl PGF_{2α} (Prostin F_{2α}®) has been administered. Which of the following potential symptoms is most likely to be caused by the administered prostaglandin?

BCaE

- A. vaginal laceration
- B. hypotension
- C. diarrhea
- D. miosis
- E. respiratory distress

15. Magnesium sulfate (Mag Sul[®]) has been administered to B.P., a 25-year old woman who is 26-week pregnant and was brought by her husband to the emergency room in labor. B.P. has no other known health problems. Which of the following adverse scenarios is most likely to be caused by the magnesium sulfate?

accept A11

- ~~A.~~ coronary ischemia
- ~~B.~~ bronchospasms
- C. jaundice
- ~~D.~~ electrolyte imbalance
- ~~E.~~ headache

The following three questions are related to the following scenario (Questions 16-18).

X.G. is a 54-year old male who is overweight (BMI = 29.8), has a 12-year history of hypertension and a 6-year history of type 2 diabetes. Also, he has elevated cholesterol and triglyceride levels. Mr. G. works at a warehouse where he is foreman of a shift crew. He smokes 25 cigarettes per day. His current medications are propranolol (Inderal[®]), glyburide (Diabeta[®]) lovastatin (Mevacor[®]) and. His current blood pressure, non-fasted glucose and total cholesterol levels are 145/95 (normal 140/90), 150 mg/dL (normal 150 mg/dL) and 205 mg/dL (normal <200 mg/dL). He states that he tries to eats "right" but has a hard time "sticking to the diet" and does not exercise as much as he has been encouraged to do.

16. Which of the following aspects of Mr. G. history and exam is least likely to contribute to his excess weight?

- A. level of exercise
- B. propranolol (inderal[®])
- C. food intake
- D. glyburide (Diabeta[®])
- E. lovastatin (Mevacor[®])

17. Which of the following pharmacological agents is most likely be helpful to Mr. G. to loss weight?

- A. orlistat (Xenical[®])
- ~~B.~~ amitriptyline (Elavil[®])
- ~~C.~~ clonidine (Catapres[®])
- ~~D.~~ alendronate (Fosamax[®])
- ~~E.~~ ergocalciferol (Drisdol[®])

18. Which of the following is important to explain to Mr. G. about taking this medication?

- A. It interfer with the actions of the glyburide.
- B. It is most likely to be helpful if he adheres to the recommended diet and exercise program.
- C. It will cause nausea at first but that symptom diminishes after a while.
- D. It should only be taken 2 hours after or before meals.
- E. It can cause jaundice in some people.

19. D.H. is a 57-year-old female has an elevated plasma alkaline phosphatase level, elevated hydroxyproline urine levels, bone pain and hearing loss. Which of the following has been shown to be helpful to individuals to diminish these symptoms as a chronic, out-patient therapy?

- A. parathyroid hormone (Parathar[®])
- B. raloxifene (Evista[®])
- C. calcitriol (Rocaltrol[®])
- D. gallium nitrate (Ganite[®])
- E. salmon calcitonin (Calcimar[®])

The following two questions are related to the following scenario (Questions 20-21).

H.S. is a 72-year old male with a stooped posture (exaggerated at the back of the neck). X-rays of the spine suggest deterioration of the vertebra. He has no other known pathologies and no contributory diagnoses are made upon exam and laboratory tests.

20. Which of the following might be most appropriate to administer to Mr. S. to minimize further deterioration of the spinal vertebra and other bone structures?

- A. estrogen (Premarin[®]) ✓
- B. human calcitonin (Cibacalcin[®]) ✓
- C. furosemide (Lasix[®]) ✗
- D. alendronate (Fosamax[®]) ✓
- E. chlorothiazide (Diuril[®]) ✗

21. What adverse effects must be monitored in follow-up exams/blood work of Mr. S.?

- A. elevated blood urea
- B. low blood glucose levels
- C. osteomalacia ✓
- D. vitamin D malabsorption ✓
- E. hypertension

22. J.B. is 9-month old female, has bowed legs. X-rays show skeletal deformities in the legs, arms and breast bone as well as her only erupted tooth. Her mother indicates that she cries "a lot" as if she were in pain. She has below-average length and weight. Blood chemistry shows low levels of phosphate and calcium and high levels of alkaline phosphatase. Other blood chemistry values are within normal ranges. Which of the following is likely to correct her symptoms and a reasonable pharmacological therapy to initiate while further tests are done to more specifically diagnose the problem?

- A. Salmon calcitonin (Calcimar[®])
- B. Calcitriol (Rocaltrol[®])
- C. Etidronate disodium (Didronel[®])
- D. Raloxifene (Evista[®])
- E. Orlistat (Xenical[®])

23. Which one of the following human disorders is **NOT** a good candidate for molecular intervention?

- A. cystic fibrosis
- B. a single gene disorder
- C. glioblastoma
- D. a genetic disorder caused by a dominant gene
- E. a genetic disorder caused by a recessive gene

24. Which one of the following statements is **FALSE**?

- A. A human genetic disorder which has a good animal model is a better candidate for gene therapy.
- B. The number of genes in the human genome is currently estimated to be between 150,000 and 180,000.
- C. We now have diagnostic tests for mutations in Huntington's disease gene.
- D. Gene therapy can be used to treat infectious diseases.
- E. RT-PCR technique can be employed to clone genes from small samples.

25. Which one of the following vectors can **NOT** be used for gene transfer?

- carE
- A. a genetically engineered adenoviral vector
 - B. a genetically engineered herpes simplex viral vector
 - C. recombinant plasmids mixed with microsomes
 - D. a genetically engineered retroviral vector
 - E. recombinant plasmids

26. Which one of the following statements is **CORRECT**?

- A. Hepatocytes are more difficult to transfect than fibroblasts.
- B. The most common current strategy for human gene therapy is repairing the mutant RNA in the cell.
- C. Incorporation of a gene by homologous recombination is always less beneficial than by random insertion.
- D. The most common current strategy for human gene therapy is repairing the mutant protein in the cell.
- E. Current concepts to successful human gene therapy dictate that gene transfer to somatic cells is not important.

27. Considering difficulties with in vivo systems of human gene therapy, which one of the following statements is **FALSE**?

- A. Loss of gene expression may occur often because of lack of promoters and other regulatory signals, resulting in abnormal mRNA processing.
- B.** Stem cells are found in small numbers in most organs and are not easily cultured.
- C. Loss of gene expression may occur, but never because of transient overproduction of a lethal protein.
- D. Loss of gene expression may occur probably because not all vectors work in all species.
- E. Loss of gene expression may occur probably because host antigenic response against the transfected cells or gene product may eliminate the cells.

28. Which one of the following techniques allows the best anatomical localization of a protein expressed in a cell type in a tissue (which produces this protein)?

- E**
- A.** in situ hybridization
 - B. differential display technology
 - C. western blot analysis
 - D. RFLP
 - E. immunohistochemistry

29. Sulfonylurea drugs reduce blood glucose levels mainly by

- B**
- A.** sensitizing peripheral tissues to glucose.
 - B. releasing pancreatic insulin.
 - C. releasing pancreatic glucagon.
 - D. inhibiting glucagon release.
 - E. inducing glycosuria.

30. Insulin for pharmacologic use is available in several forms. The only form that should be used for i.v. administration is

- A. ultralente insulin.
- B. protamine zinc insulin.
- C.** regular insulin.
- D. NPH insulin.
- E. semilente insulin.

31. Antidiabetic drugs work by several different mechanisms of action. Name the antidiabetic agent that acts by binding to a peroxisome proliferator-activated receptor.

- A. chlorpropamide
- B. tolbutamide
- C. gliclazide
- D.** rosiglitazone
- E. metformin

32. Which drug listed can be used to treat hyperprolactinemia?
- A. metyrapone
 - B. leuprolide
 - C. somatrem
 - D. octreotide
 - E. bromocriptine mesylate
33. The drug Octreotide has which of the following properties?
- A. It is a prolactin agonist.
 - B. It is a somatostatin agonist.
 - C. It is a somatostatin antagonist.
 - D. It is a gonadotropin releasing hormone agonist.
 - E. It is a dopamine antagonist.
34. A common diagnostic test for pituitary growth hormone release is
- ~~A.~~ the metyrapone test.
 - ~~B.~~ the dexamethasone suppression test.
 - ~~C.~~ the methyl dopa test.
 - D. the insulin tolerance test.
 - E. the glucose tolerance test.
35. Cushing's syndrome due to cortisol hypersecretion is diagnosed using which of the following tests?
- ~~A.~~ insulin tolerance test
 - B. dexamethasone suppression test
 - ~~C.~~ glucose tolerance test
 - D. metyrapone test
 - E. methyl dopa test
36. Aminoglutethimide has anti-glucocorticoid activity because the drug will
- 11 x 12
- A. inhibit activity of the steroid 17 α -hydroxylase enzyme (P450c17).
 - B. inhibit activity of the steroid 11 β -hydroxylase enzyme (P450c11).
 - ~~C.~~ inhibit activity of the cholesterol side chain cleavage enzyme (P450 ssc).
 - D. inhibit activity of the 3 β -hydroxysteroid dehydrogenase enzyme.
 - E. Inhibit activity of the steroid 21 β -hydroxylase enzyme (P450c21).
37. Which drug listed is an orally active mineralocorticoid sometimes used in congenital adrenal hyperplasia?
- ~~A.~~ prednisone
 - B. fludrocortisone
 - ~~C.~~ fluoxymesterone
 - D. mifepristone
 - E. metyrapone

38. Cosyntropin is the name of a drug that is

- A. a synthetic human ACTH₁₋₂₄.
- B. the pig version of ACTH.
- C. a synthetic corticotropin-releasing hormone.
- D. an analog of gonadotropin-releasing hormone.
- E. a preparation of human growth hormone.

39. A patient requires oral glucocorticoid therapy for about two weeks but cannot be expected to ingest multiple pills daily. Which of the following drugs is best suited to the patient's needs?

accept all
A

- A. dexamethasone
- B. cortisol
- C. prednisone
- D. desoxycorticosterone
- E. methylprednisolone

40. One of the statements below regarding the non-endocrine use of glucocorticoids is incorrect. Name the FALSE statement.

- A. Pharmacological doses of glucocorticoids for >2 weeks can result in Cushing's syndrome.
- B. Glucocorticoid therapy can elicit type-II like Diabetes Mellitus.
- C. Wound healing can be increased during glucocorticoid therapy.
- D. Stunting of growth can occur in children treated with glucocorticoids for a non-endocrine disorder.
- E. Congestive heart disease is a contraindication for glucocorticoid therapy.

41. A high protein diet is important for patients on prolonged pharmacologic doses of glucocorticoids because

BoD

- A. glucocorticoid treatment can reduce growth.
- B. glucocorticoid treatment will increase gluconeogenesis.
- C. glucocorticoids can cause glycosuria.
- D. glucocorticoids increase muscle catabolism.
- E. glucocorticoids inhibit calcium absorption from the GI tract.

42. A patient being treated for hereditary angioneurotic edema has developed jaundice. Name the drug that would most likely be responsible for the jaundice.

- A. testosterone enanthate
- B. danazol
- C. azatadine
- D. dexamethasone
- E. medroxyprogesterone acetate

43. Finasteride is a drug with antiandrogen properties. Name its mechanism of action.
- A. It stimulates the 3β -hydroxysteroid dehydrogenase enzyme.
 - B. It inhibits the $5\text{-}\alpha$ reductase enzyme.
 - C. It binds to androgen receptors.
 - D. It inhibits Leydig cell function.
 - E. It blocks the aromatase enzyme.
44. Choose the drug treatment below that will result in inhibition of testosterone synthesis.
- A. oral metyrapone
 - B. flutamide t.i.d.
 - C. long-term finasteride treatment
 - D. depo injection of desogestrel
 - E. continuous administration of gonadorelin
45. Name the antiandrogen drug whose mechanism of action is to antagonize binding to androgen receptors.
- A. finasteride *5 α reductase*
 - B. nafarelin *GnRH*
 - C. tamoxifen citrate *ER*
 - D. cyproterone acetate
 - E. raloxifene *ER*
46. Estrogens can be used therapeutically for each of the following conditions except one. Name the condition where estrogen therapy is not indicated.
- A. contraception
 - B. dysmenorrhea
 - C. hypogonadism (females)
 - D. undiagnosed abnormal genital bleeding
 - E. palliative treatment of prostatic adenocarcinoma
47. Name the correct property for the drug Mifepristone.
- A. It is used to block GnRH secretion and to inhibit ovulation.
 - B. It is a competitive antagonist at progesterone receptors.
 - C. It is a competitive antagonist at androgen receptors.
 - D. It is used as an oral contraceptive.
 - E. It is a competitive antagonist at estrogen receptors.

48. Name the selective estrogen receptor modulator (SERM) listed below that is indicated for the treatment and prophylaxis of osteoporosis but acts as an estrogen antagonist in uterine tissue.

- A. tamoxifen citrate
- B. raloxifene
- C. clomiphene citrate
- D. danazol
- E. stanazolol

49. Name the drug listed below that is commonly used for contraception as a spermicide.

- A. Desogestrel
- B. Nonoxynol-9
- C. Norethindrone
- D. Naloxone
- E. Norgestimate

50. Name the progestin listed below that is a 17α -hydroxyprogesterone derivative used for contraception.

- A. Norethindrone
- B. Norgestrel
- C. Mestranol
- D. Medroxyprogesterone acetate
- E. Levonorgestrel

51. How would an oral contraceptive containing only the drug norgestrel most likely be used?

- A. as an emergency contraceptive treatment
- B. to postpone menses for medical reasons
- C. for contraception in a breastfeeding woman
- D. for contraception in women that tend to forget to take the pill
- E. as a way to prevent ovulation

52. Atropine is a specific antidote for which of the following pesticides?

- A. paraquat
- B. diquat
- C. fluoroacetate
- D. malathion
- E. 2,4-dichlorophenoxyacetic acid

Organophosphate

Acetyl cholinesterase

53. Syrup of Ipecac should not be used
- A. in comatose patients.
 - B. following ingestion of caustic or corrosive compounds.
 - C. following ingestion of petroleum distillates.
 - D. following ingestion of strychnine.
 - E. in all of the above.
54. The most common (highest frequency of occurrence) toxicological emergency is exposure to
- A. heroin.
 - B. cosmetics.
 - C. cleansers.
 - D. aspirin.
 - E. pesticides.
55. Warfarin (coumadin) acts by
- A. inducing apoptosis in the liver.
 - B. inhibiting vitamin K production.
 - C. causing kidney necrosis.
 - D. blocking oxygen use by cytochrome oxidase.
 - E. causing apnea.
56. Acetaminophen causes liver and kidney necrosis by
- A. directly damaging proteins and nucleic acids.
 - B. inducing drug metabolizing enzymes.
 - C. being metabolized to stable sulfates and glucuronides.
 - D. being metabolized to a reactive intermediate.
 - E. reacting with glutathione.
57. Alpha amanitin, a toxin found in the mushroom *Amanita phalloides*, is a(n)
- A. nephrotoxin.
 - B. hallucinogen.
 - C. emetic.
 - D. cyclic octapeptide.
 - E. psilocybin analog.
58. The acute effects of solvent consumption (by the oral route) are
- A. GI irritation.
 - B. alcohol-like intoxication.
 - C. chemical pneumonia.
 - D. asphyxiation.
 - E. all of the above.

59. The most important spider worldwide (from a toxicology viewpoint) belongs to the

- A. *Loxosceles* family.
- B. *Mus* family.
- C. Latrodectus family.
- D. Aphonopelma family.
- E. Salticidae family.

60. Select the species causing the most envenomations each year in the United States that require medical treatment.

- Box C
- A. rattlesnake
 - B. wasp
 - C. honeybee
 - D. scorpion
 - E. coral snake

61. J.S., an African-American male with a blood pressure of 170/110mmHg and a heart rate of 86 bpm presents in your clinic. Drug of choice for initial mono-therapy would be

- A. captopril (Capoten®).
- B. propranolol (Inderal®).
- C. verapamil (Calan®).
- D. hydrochlorothiazide (HydroDiuril®).
- E. hydralazine (Apresoline®).

62. After several years of monotherapy, J.S.'s blood pressure escapes requiring additional therapy. You determine he needs a drug that will

- C, D, or E
- A. reduce inotropic state.
 - B. reduce chronotropic state.
 - C. reduce preload.
 - D. reduce afterload.
 - E. reduce blood volume.
- ?

63. Which of the following drugs would be appropriate therapy to add to the hydrochlorothiazide that J.S. is already taking?

- accept all
- ~~A.~~ propranolol (Inderal®)
 - ~~B.~~ furosemide (Lasix®)
 - ~~C.~~ spironolactone (Aldactone®)
 - D. captopril (Capoten®) AI not AD
 - E. nifedipine (Procardia®)

64. Diuretics produce their antihypertensive effects by

- Aa*
D
- A. initially reducing preload and subsequently reducing afterload.
 - B. reducing afterload and increasing chronotropic state.
 - C. initially reducing afterload and subsequently increasing inotropic state.
 - D. reducing both preload and inotropic state.
 - E. reducing both chronotropic and inotropic state.

65. R.K., a 55-year-old metal worker with hypertension and chronic stable angina, has been receiving sublingual nitroglycerin as needed, propranolol, and enalapril. He complains of having "weird dreams". You wish to change his medication to a water-soluble beta-blocker. Which of the following would be appropriate?

- A. timolol (Blockadren[®])
- B. sotalol (Betapace[®])
- C. atenolol (Tenormin[®])
- D. labetalol (Normodyne[®])
- E. metoprolol (Lopressor[®])

66. Nitroglycerin has been effective in terminating anginal pain in R.K. The mechanism of action of nitroglycerin in this form of angina is

- A*
- A. reduction of preload.
 - B. reduction of afterload.
 - C. reduction of inotropic state.
 - D. reduction of chronotropic state.
 - E. direct dilation of coronary arteries.
- Bath*

except all

67. Subsequently, R.K. presents complaining of a persistent, irritating cough. You decide to terminate treatment with _____ and replace therapy with _____. Which pair of drugs is appropriate to fill in the blanks?

- ↓*
- A. nitroglycerin (Nitrostat[®])....hydralazine (Apresoline[®])
 - B. enalapril (Vasotec[®])....captopril (Capoten[®]) *Bath A I*
 - C. enalapril (Vasotec[®])....nifedipine (Procardia[®])
 - D. enalapril (Vasotec[®])....furosemide (Lasix[®])
 - E. nitroglycerin (Nitrostat[®])....isosorbide dinitrate (Isodril[®])
- Asc -*

68. When Ernest Hemingway committed suicide he was reportedly taking antihypertensive medication. Which of the following medications might have contributed to his suicide?

- A. hydralazine (Apresoline[®])
- B. propranolol (Inderal[®])
- C. chlorothiazide
- D. reserpine (Serpasil[®])
- E. clonidine (Catapres[®])

69. Which one of the following drugs has been shown to enhance survival following myocardial infarction but can produce wheezing in smokers with chronic obstructive pulmonary disease?

- BB
- A. verapamil (Calan[®])
 - B. enalapril (Vasotec[®])
 - C. propranolol (Inderal[®])
 - D. losartan (Cozaar[®])
 - E. aldosterone (Aldactone[®])

70. All of the following drugs reduce chronic stable anginal attacks by lowering heart rate and inotropic state thereby decreasing myocardial oxygen demand EXCEPT

- A. verapamil (Calan[®]).
- B. propranolol (Inderal[®]).
- C. atenolol (Tenormin[®]).
- D. nitroglycerin.
- E. metoprolol (Lopressor[®]).

71. Which of the following anti-thrombotic agents act by directly blocking fibrinogen binding to platelets?

- C
- A. aspirin
 - B. clopidogrel (Plavix[®])
 - C. eptifibatide (Integrilin[®])
 - D. ticlopidine (Ticlid[®])
 - E. hirudin (Refludan[®])

72. Dopamine differs from Dobutamine in that it

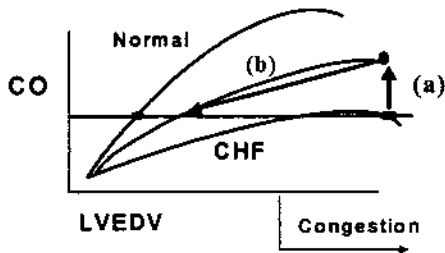
- E
- A. stimulates beta-1 adrenoceptors.
 - B. is a catecholamine.
 - C. increases cardiac output in heart failure.
 - D. must be administered intravenously.
 - E. can increase afterload.

73. Which one of the following drugs produces a vagomimetic action on the AV-node?

- A
- A. digoxin (Lanoxin[®])
 - B. phenytoin (Dilantin[®])
 - C. verapamil (Calan[®])
 - D. esmolol (Brevibloc[®])
 - E. atropine

74. On the following Ventricular Function Curve, (a) represents the mechanism of action of

- A. furosemide (Lasix®).
- B. nitroprusside (Nipride®).
- C. carvedilol (Coreg®).
- D. digoxin (Lanoxin®).
- E. enalapril (Vasotec®).



75. On the previous Ventricular Function Curve, (b) represents reduction in LVEDV resulting from

- A. withdrawal of sympathetic and renal compensatory reflexes.
- B. increased preload.
- C. decreased afterload.
- D. increased cardiac output.
- E. increased total peripheral resistance.

76. P.J., a 72-year-old patient with congestive heart failure, decompensated and was hospitalized. During that time, he received dobutamine intravenously. You wish to send him home on a long-term drug regimen that will provide both afterload and preload reduction, and has been demonstrated to increase survival. Which one of the following scenarios would most conveniently and safely achieve this goal with an oral therapy?

- A. digoxin (Lanoxin®)
- B. nitroprusside (Nipride®)
- C. milrinone (Primacor®)
- D. furosemide (Lasix®)
- E. hydralazine (Apresoline®) and isosorbid dinitrate (Isodril®)

77. Patients who develop heparin-induced thrombocytopenia can be switched to

- A. warfarin (Coumadin®).
- B. hirudin (Refludan®).
- C. clopidogrel (Plavix®).
- D. tirofiban (Aggrastat®).
- E. t-PA (Activase®).

LMW heparin

78. Which one of the following Class 1 antiarrhythmic agents has little effect on the responsiveness of normal ventricular muscles, decreases responsiveness of ischemic ventricular cells, and shortens the action potential duration in ventricular cells?

- A. quinidine
- B. flecainide (Tambacor[®])
- C. procainamide (Pronestyl[®])
- D. lidocaine (Xylocaine[®])
- E. amiodarone (Cordarone[®])

79. All of the following would be effective in the treatment of supraventricular tachycardia EXCEPT

- A. verapamil (Calan[®]).
- B. digoxin (Lanoxin[®]).
- C. esmolol (Brevibloc[®]).
- D. nifedipine (Procardia[®]).
- E. adenosine (Adenocard[®]).

80. Which one of the following statements about the cardiovascular effects of a bolus injection of norepinephrine is FALSE?

- A. Preload would increase. ✓
- B. Afterload would increase. ✓
- C. Heart rate would decrease.
- D. Cardiac output would increase.
- E. Sympathetic tone would be withdrawn from the arteries, veins, and heart.

81. H.T., a Caucasian male hypertensive patient, has been successfully treated with propranolol for 15 years, but now his blood pressure is beginning to escape control. You wish to add hydralazine (Apresoline[®]) to his regimen. Which one of the following signs would you expect to see?

- A. a reflex bradycardia
 - B. a reflex increase in total peripheral resistance
 - C. a reflex increase in venous pressure
 - D. an increase in heart rate mediated through increased sympathetic tone
 - E. a decrease in cardiac output
- B. E. Ant-dilator*

82. Which one of the following statements about postranslational gamma carboxylation of glutamic acid residues is FALSE?

- A. This process is required for activation of factors II, VII, IX, and X.
 - B. Gamma carboxylation allows the activated clotting factor to bind to calcium. ✓
 - C. Warfarin prevents gamma carboxylation of clotting factors.
 - D. Vitamin K is a required cofactor in the process of gamma carboxylation.
 - E. Inhibition of gamma carboxylation prevents the synthesis of those clotting factors that require calcium for activity. ✓
- BAE*

83. Which one of the following statements about the cardiac actions of endogenous norepinephrine is **FALSE**?
- A. Potassium efflux from all cardiac tissue is increased.
 - B. The rate of ventricular isovolumic contraction is increased.
 - C. The rate of ventricular relaxation is increased.
 - D. The effective refractory period in AV nodal cells is lengthened.
 - E. Action potential duration is shortened in atrial and ventricular muscle and conduction pathways such as the AV node and His Purkinje system.
84. The cause of digoxin (Lanoxin[®])-induced delayed after depolarizations (DADs) is thought to be
- A. delayed inactivation of voltage operated calcium channels.
 - B. calcium overload of the sarcoplasmic reticulum.
 - C. delayed closure of potassium rectifier currents.
 - D. delayed closure of cardiac sodium channels.
 - E. inappropriate chloride channel activation.
85. T.T. is a 52-year-old hypertensive patient with a 40 pack/year smoking history and Type II diabetes. You decide to try an ACE inhibitor and initiate therapy with captopril (Capoten[®]) and then switch him to enalapril (Vasotec[®]). You take this course of action because
- A. captopril is known not to cause angioedema.
 - B. enalapril is known not to cause an irritating cough.
 - C. captopril does not cross the blood-brain-barrier.
 - D. captopril has a short half life (3hr), while enalapril has a long half life (11hr).
 - E. captopril is a "prodrug".
86. You have been treating Sparky for effort angina that has been stable for one year. He takes atenolol (Tenormin[®]) prophylactically, and nitroglycerin (sublingual) as needed. He arrives in the emergency room after experiencing an anginal attack while playing paintball. The attack occurred due to both the physical and emotional stress of the contest. He took one nitroglycerin tablet (0.3mg) but got no relief. In a panic, he took four more tablets simultaneously and quickly passed out. Upon recovery, he had an excruciating headache and continuing chest pain. The continuing chest pain most likely results from
- A. ✓ a dramatic drop in preload.
 - B. a dramatic drop in afterload.
 - C. reflex tachycardia.
 - D. increased total peripheral resistance due to the atenolol.
 - E. inactive nitroglycerin.

87. One year after initiating propranolol therapy in a patient who presented with unstable angina, you are informed that he has been admitted to the CCU following a myocardial infarction. He reports that the propranolol depressed him and interfered with his sexual function, so he stopped taking it three days ago. You suspect his MI may be the result of

- A. enhanced coronary vasospasm.
- B. withdrawal supersensitivity.
- C. allergic hypersensitivity.
- D. tolerance to propranolol.
- E. tachyphylaxis.

88. An 80-year-old hypertensive patient receiving nadolol (Corgard[®]) has overdosed due to failing kidneys. His heart rate has fallen to 40 bpm and continues to drop. How could you reverse this trend through an understanding of competitive antagonism?

- A. Administer large doses of intravenous calcium.
- B. Administer large doses of intravenous phenylephrine.
- C. Administer large doses of dobutamine.
- D. Administer large doses of norepinephrine.
- E. Administer large doses of isoproterenol.

B, B₂

89. A patient currently taking atenolol (Tenormin[®]) for hypertension presents in the ER in hypertensive crisis. He receives intravenous nifedipine. Subsequently, a decrease heart rate is noted along with the drop in blood pressure. This bradycardia occurs due to

- A. a direct effect of nifedipine upon the heart.
- B. a reflex bradycardia caused by nifedipine.
- C. a reflex bradycardia caused by atenolol.
- D. competition between atenolol and nifedipine for liver metabolic enzymes.
- E. unmasking of the negative chronotropic effect of atenolol.

↓ TPR

90. Grandma Moses presents in the ER with the worst headache she's ever had and left side weakness. She is taking no medications. Examination of the CT scan shows no evidence of cerebral hemorrhage and you suspect she's having an embolic stroke. Her symptoms have lasted less than three hours. She is a candidate for

- A. streptokinase (Streptase[®]).
- B. hirudin (Refludan[®]).
- C. tissue plasminogen activator (Activase[®]).
- D. eptifibatid (Integrilin[®]).
- E. warfarin (Coumadin[®]).

91. Patient on warfarin (Coumadin[®]) had an INR of 2.5 at last visit to your clinic. Currently her INR is 4.0. The increase in INR most likely is related to
- ~~A.~~ different laboratories performing the assay.
 - ~~B.~~ different batches of thromboplastin.
 - C. concurrent cimetidine (Tagamet[®]) use (OTC) for gastric acid reflux.
 - D. phenobarbital use for sedation.
 - E. estrogen replacement therapy.
92. Patient with chronic obstructive pulmonary disease (COPD), heart failure, and hypertension, is currently on digoxin (Lanoxin[®]), enalapril (Vasotec[®]), and furosemide (Lasix[®]). An additional drug is added resulting in immediate AV block with ventricular tachycardia associated with an additional drop in total peripheral resistance. Measurement of digoxin reveals a doubling in plasma levels. What drug do you suspect has been added to the therapeutic armamentarium?
- ~~A.~~ lidocaine (Xylocaine[®])
 - B. verapamil (Calan[®])
 - C. atenolol (Tenormin[®])
 - ~~D.~~ losartan (Cozaar[®]).
 - E. clonidine (Catapres[®])
93. Which one of the following would be inappropriate for monotherapy of Prinzmetal's (vasospastic) angina?
- A. verapamil (Calan[®])
 - B. nitroglycerin
 - C. nifedipine (Procardia[®])
 - D. propranolol (Inderal[®])
 - E. isosorbide dinitrate (Isodril[®])
94. All of the following are effective at protecting the ventricle from rapid atrial rates, but generally fail to convert atrial fibrillation EXCEPT
- A. verapamil (Calan[®]).
 - B. esmolol (Brevibloc[®]).
 - C. adenosine (Adenocard[®]).
 - D. digoxin (Lanoxin[®]).
 - E. ibutilide (Corvert[®]).
95. Treatment with high doses of hydralazine (Apresoline[®]) or procainamide (Pronestyl[®]) in patients who are classified as "Slow Acetylators" can result in
- A. torsades de pointes.
 - B. visual disturbances.
 - C. systemic lupus erythematosus.
 - D. bronchospasm.
 - E. Raynaud's disease.

96. The electrophysiological effects of increasing concentrations of Digoxin (Lanoxin®) on His-Purkinje cells include

- A. increased responsiveness.
- B. increased refractoriness.
- C. hyperpolarization.
- D. depressed diastolic depolarization.
- E. increased excitability but decreased responsiveness.

97. Furosemide (Lasix®) can enhance digoxin toxicity by

- A. decreased serum potassium levels.
- B. decreased serum sodium levels.
- C. increased renin levels.
- D. increased calcium levels.
- E. increased magnesium levels.

98. Which one of the following drugs has been shown to increase survival in patients with heart failure?

- A. furosemide (Lasix®)
- B. digoxin (Lanoxin®)
- C. dobutamine (Dobutrex®)
- D. nitroprusside (Nipride®)
- E. spironolactone (Aldactone®)

99. Lidocaine (Xylocaine®) has little effect on the upstroke of the action potential of normal ventricular muscle cells because

- A. it only binds to the resting state of the sodium channel.
- B. it primarily blocks potassium channels.
- C. the " τ " (time to recovery) for the sodium channel is extremely too short for lidocaine.
- D. it only blocks the sodium leak current during diastolic depolarization.
- E. it causes the resting membrane potential to depolarize.

IB - inactive Na

100. Amiodarone (Cordarone®) can be classified as a

- A. class I, sodium channel blocker.
- B. class II, beta-adrenoceptor blocker.
- C. class III, potassium channel blocker.
- D. class IV, calcium channel blocker.
- E. All of the above.

*core
E
or C*

