1267. With increasing concentrations of a local anesthetic, the order of effect is
A. Pain fibers—sensory fibers—motor fibers
B. Sensory fibers—pain fibers—motor fibers
C. Pain fibers—motor fibers—sensory fibers
D. Sensory fibers—motor fibers—pain fibers
E. Sensory fibers—motor fibers—pain fibers

1268. Akathisia, Parkinson-like syndrome, galactorrhea, and amenorrhea are side effects of perphenazine, caused by
A. Blockade of muscarinic receptors
B. Blockade of Alpha-adrenergic receptors
C. Blockade of dopamine receptors
D. Supersensitivity of dopamine receptors
E. Stimulation of nicotinic receptors

1269. A patient on Lorazepam for fibromyalgia has been out of drug for four days. He presents with rhinorrhea, etc. Treatment of choice is:
A. Clonidine
B. Gabapentin
C. Diazepam
D. Oxycodone
E. Methadone

1270. Which of the following is a true labeled indication for prescribing CNS stimulants?
A. Narcolepsy
B. Enhanced alertness for driving
C. Reversing opioid induced sedation
D. Chronic pain associated with thalamic strokes
E. Fibromyalgia syndrome

1271. A 59-year-old woman with a 60 pack-year smoking history was diagnosed with lung cancer 2 months ago. She now enters the hospital in coma. Her serum calcium is 16 mg/dL. Which of the following (given with IV fluids) would be most useful to reduce serum calcium in this patient rapidly?

1272. The following drug is not associated with enhancement of the activity of g-aminobutyric acid (GABA)
A. Chlordiazepoxide
B. Phenobarbital
C. Diazepam
D. Valproic acid
E. Chlorpromazine

1273. Which of the following is unlikely to be associated with oral drug administration of an enteric-coated dosage form?
A. Irritation to the gastric mucosa with nausea and vomiting
B. Destruction of the drug by gastric acid or digestive enzymes
C. Unpleasant taste of the drug
D. Formation of nonabsorbable drug-food complexes
E. Variability in absorption caused by fluctuations in gastric emptying time

1274. Tachyphylaxis to local anesthetics is most closely related to the following
A. Speed of injection
B. Dosing interval
C. Temperature of local anesthetic
D. Volume of local anesthetic
E. pH of solution

1275. Which of the following is considered to be the most cardio-toxic?
A. Bupivacaine S-isomer
B. Bupivacaine racemic mixture
C. Bupivacaine R-isomer
D. Ropivacaine
E. Lidocaine
1276. Intrathecal baclofen may be indicated for
   A. Spasticity
   B. Neuropathic Pain
   C. nociceptive Pain
   D. somatic Pain
   E. Pelvic pain

1277. The consumption of shellfish harvested during a “red tide” (due to a large population of a dinoflagellate species) is not recommended. This is because the shellfish are likely to contain
   A. Arsenic
   B. Botulinum toxins
   C. Cyanide
   D. Saxitoxin
   E. Tetrodotoxin

1278. A 23-year-old heroin addict was brought to a hospital suffering from marked bradykinesia, muscle rigidity, and tremor at rest. Unfortunately, the extrapyramidal dysfunction was permanent in this patient, since he had self-administered this agent this is cytotoxic to nigrostriatal dopaminergic neurons.
   A. MDMA
   B. MPTP
   C. Ma-huang
   D. Meperidine
   E. Mescaline

1279. Which of the following local anesthetics may cause methemoglobinemia?
   A. Prilocaine
   B. Ropivacaine
   C. Bupivacaine
   D. Procaine
   E. Chloroprocaine

1280. The pharmacologic effects of acetylsalicylic acid (Aspirin®) include
   A. Reduction in elevated body temperature
   B. Promotion of platelet aggregation
   C. Alleviation of pain by stimulation of prostaglandin synthesis
   D. Efficacy equal to that of acetaminophen as an anti-inflammatory agent
   E. Less gastric irritation than other salicylates

1281. If one patient is taking amitriptyline (Elavil®) and another patient is taking chlorpromazine (Thorazine®), they are both likely to experience the following:
   A. Excessive salivation
   B. Extrapyramidal dysfunction
   C. Gynecomastia
   D. Increased gastrointestinal motility
   E. Postural hypotension

1282. If a single drug is to be administered to this patient the most appropriate choice in terms of efficacy and safety is
   A. Ampicillin

1283. Which of the following is highly selective inhibitor of cyclooxygenase II?
   A. Aspirin
   B. Acetaminophen
   C. Ibuprofen
   D. Celecoxib
   E. Piroxicam

1284. Regarding the thiazolidinediones used in diabetes mellitus, which one of the following statements is false?
   A. They are inducers of liver drug-metabolizing enzymes
   B. They interact with peroxisome-proliferator-activated receptors
   C. Hypoglycemia is a major problem when they are used as sole agents in type 2 diabetes
   D. They reduce both fasting and postprandial hyperglycemia
   E. Though rare, troglitazone has caused liver failure

1285. Which best describes the mechanism of interaction of cimetidine with benzodiazepine?
   A. It decreases benzodiazepine's metabolism
   B. It decreases benzodiazepine's sensitivity at the site of action
   C. It decreases benzodiazepine's renal excretion
   D. It decreases benzodiazepine's plasma protein binding
   E. It decreases benzodiazepine's intestinal absorption

1286. The three scales of the Minnesota Multiphasic Personality Inventory (MMPI) included in the “conversion V” are:
   A. Hypochondriasis, psychasthenia, depression
   B. Hypochondriasis, depression, hysteria
   C. Paranoia, hysteria, depression
   D. Social introversion, depression, hysteria
   E. Hypochondriasis, anxiety, somatization

1287. The most likely cause of these signs and symptoms is overdosage of
   A. Aspirin
   B. Acetaminophen
   C. Dextromethorphan
   D. Diphenhydramine
   E. Ethanol

1288. The elimination half-life of which of the following tetracyclines remains unchanged when the drug is administered to an anuric patient?
   A. Methacycline
   B. Oxytetracycline
   C. Doxycycline
   D. Tetracycline
   E. None of the above
1289. Which of the following best describes the protein binding properties of albumin for local anesthetics?
A. Low affinity, low capacity
B. Low affinity, high capacity
C. High affinity, low capacity
D. High affinity, high capacity
E. High affinity only

1290. The phenothiazines have a variety of actions at different receptor types. However, they do NOT appear to interact with receptors for
A. Dopamine
B. Histamine
C. Nicotine
D. Norepinephrine
E. Muscarine

1291. A psychiatric patient taking medications develops a tremor, thyroid enlargement, and leukocytosis. The drug he is taking is most likely to be
A. Clomipramine (Anafranil®)
B. Haloperidol (Haldol®)
C. Imipramine (Tofranil®)
D. Lithium
E. Sertraline (Zoloft®)

1292. Inhibitors of serotonin (5-HT) uptake such as paroxetine (Paxil®) interact significantly with which of the following drugs?
A. Chlorpromazine
B. Tranylcypromine
C. Halothane
D. Benztrpine
E. Digoxin

1293. Which of the following agents does not act on prostaglandins peripherally, and as such does not block local inflammation?
A. Acetaminophen®
B. Ibuprofen®
C. Naproxen®
D. Celebrex®
E. Aspirin®

1294. The mechanism of action of benzodiazepines is
A. Activation of GABAb receptors
B. Antagonism of glycine receptors in the spinal cord
C. Blockade of the action of glutamic acid
D. Increased GABA-mediated chloride ion conductance
E. Inhibition of GABA aminotransferase

1295. Which one of the following statements about scopolamine is false?
A. It has depressant actions of the CNS
B. It may cause hallucinations
C. It is poorly distributed across the placenta to the fetus
D. It may prevent motion sickness and vertigo when applied as a patch to the skin
E. It is similar to atropine in reducing gastrointestinal motility

1296. Which one of the following drugs mimics the activity of metenkephalin in the dorsal horn of the spinal cord?
A. Deprenyl (selegiline)
B. Trampyphenidyl
C. Baclofen
D. Morphine
E. Phenobarbital

1297. In the management of this patient, which one of the following procedures is not likely to have therapeutic value?
A. Alkalization of the urine
B. Correction of metabolic acidosis and electrolyte imbalance
C. Gastric lavage with an endotracheal tube in place
D. Hemodialysis, if pH or CNS signs are not readily controlled
E. Treatment with acetylcysteine

1298. The first local anesthetic used clinically was
A. Cocaine
B. Tetracaine
C. Lidocaine
D. Bupivacaine
E. Mepivacaine

1299. The highest concentration of phenol clinically used in neurolytic blocks is:
A. 6%
B. 10%
C. 20%
D. 40%
E. 100%

1300. In addition to its use in the treatment of schizophrenia, chlorpromazine is effective
A. In reducing nausea and vomiting
B. As an antihypertensive agent
C. As an antihistaminic
D. In the treatment of depression
E. For treating bipolar affective disorder

1301. Recreational use of drugs sometimes leads to dependence. Which of the following is LEAST likely to cause physical dependence?
A. Amphetamine
B. Cocaine
C. Heroin
D. Mescaline
E. Secobarbital

1302. Which one of the following effects of the opioid analgesics is most likely to be mediated via activation of mu receptors?
A. Cough suppression
B. Elevation of arterial PCO2
C. Emesis
D. Sedation
E. Vasodilation
1303. A 38-year-old divorced woman who lived alone visited a psychiatrist because she was depressed. Her symptoms included low self-esteem, with frequent ruminations on her worthlessness, and hypersomnia. She was hyperphagic and complained that her limbs felt heavy. An initial diagnosis was made of a major depressive disorder with atypical symptoms. Treatment was initiated with amitriptyline, but after 2 months the patient had not improved significantly. Which one of the following drugs is MOST likely to have therapeutic value in this depressed patient?

A. Buprenorphine
B. Diazepam
C. Paroxetine
D. Methylphenidate
E. Risperidone

1304. Which of the following corticosteroids has the highest anti-inflammatory potency?

A. Betamethasone
B. Triamcinolone diacetate
C. Triamcinolone acetonide
D. Depo-methylprednisolone
E. Hydrocortisone

1305. What is the maximum dose of lidocaine without epinephrine?

A. 2 mg/kg
B. 3 mg/kg
C. 4 mg/kg
D. 5 mg/kg
E. 6 mg/kg

1306. Psychiatric evaluation of a patient after 6 weeks of treatment with a monoamine oxidase inhibitor (MAOI) shows no improvement. The psychiatrist now writes a prescription for fluoxetine which the patient starts two days after her final dose of the MAOI. Since the MAOIs used as antidepressants continue to exert effects for 2 or more weeks after discontinuance, the most likely result of the administration of fluoxetine now will be to cause

A. A rapid amelioration of her depressive symptoms
B. Electrocardiographic abnormalities
C. Extrapyramidal dysfunction
D. The serotonin syndrome
E. Weight gain

1307. After an intravenous bolus injection of lidocaine, the major factors determining the initial plasma concentration are

A. Dose and clearance
B. Dose and apparent volume of distribution
C. Apparent volume of distribution and clearance
D. Clearance and half-life
E. Half-life and dose

1308. Haloperidol may best be characterized by which of the following statements?

A. It is a selective D2 receptor agonist
B. Its mechanism of action is completely different from that of chlorpromazine
C. It is more potent as an antipsychotic drug than is chlorpromazine
D. It produces a lower incidence of extrapyramidal reactions than does chlorpromazine

1309. Of the following characteristics, which is unlikely to be associated with the process of facilitated diffusion of drugs?

A. The transport mechanism becomes saturated at high drug concentrations
B. The process is selective for certain ionic or structural configurations of the drug
C. If two compounds are transported by the same mechanism, one will competitively inhibit the transport of the other
D. The drug crosses the membrane against concentration gradient and the process requires cellular energy
E. The transport process can be inhibited noncompetitively by substances that interfere with cellular metabolism

1310. A young woman presents with a several-year history of ulcerative colitis. Recently she has been treated with alprazolam 0.5 mg Q 8 hrs. This pharmacologic treatment can be expected to:

A. Reduce stress and anxiety
B. Result in long-term improvement
C. Reduce interpersonal dilemmas
D. Produce a mild stimulus
E. Be used without development of tolerance

1311. Which one of the following statements about cocaine is false?

A. Blocks sodium channels in axonal membranes
B. Blood pressure increase is due to its ability to release noradrenaline from sympathetic nerve terminals
C. Cardiac arrhythmias may occur at high doses
D. Derived from a botanical source
E. Topical application can provide local anesthesia and restrict bleeding

1312. The pKa of Lidocaine is:

A. 7.4
B. 7.6
C. 7.7
D. 8.0
E. 8.2

1313. Clinically significant methemoglobinemia may result from administration of large doses of

A. Chloroprocaine
B. Bupivacaine
C. Etidocaine
D. Prilocaine
E. Lidocaine
1314. Which of the following statements is most correct?
A. Maximum efficacy of a drug is directly correlated with its potency
B. The therapeutic index if the LD50 (or TD50) divided by the ED50
C. A partial agonist has no effect on its receptors unless another drug is present
D. Graded dose-response data provide information about the standard deviation of sensitivity to the drug in the population studied
E. Quantal dose-response curves provide information about the efficacy of a drug

1315. The toxicity spectrum of aspirin does not include
A. Increased risk of encephalopathy in children with viral infections
B. Increased risk of peptic ulcers
C. Hyperprothrombinemia
D. Metabolic acidosis
E. Respiratory alkalosis

1316. In comparing the following possible routes, which is associated with the excretion of quantitatively small amounts of drugs or their metabolic derivatives?
A. Biliary tract
B. Kidneys
C. Lungs
D. Feces
E. Milk

1317. Although it does not act at any histamine receptor, epinephrine reverses many effects of histamine. Epinephrine is a
A. Competitive inhibitor of histamine
B. Noncompetitive antagonist of histamine
C. Physiologic antagonist of histamine
D. Chemical antagonist of histamine
E. Metabolic inhibitor of histamine

1318. Carbidopa is useful in the treatment of Parkinson's disease because it
A. Is a precursor of levodopa
B. Is a dopaminergic receptor agonist
C. Prevents peripheral biotransformation of L-dopa
D. Prevents a breakdown of dopamine
E. Promotes a decreased concentration of L-dopa in the nigrostriatum

1319. Most drug receptors are
A. Small molecules with a molecular weight between 100 and 1000
B. Lipids arranged in a bilayer configuration
C. Proteins located on cell membranes or in the cytosol
D. DNA molecules
E. RNA molecules

1320. Which of the following local anesthetics is the least protein bound?
A. Lidocaine
B. Bupivacaine
C. Ropivacaine
D. Mepivacaine
E. Procaine

1321. Which of the following statements about antiplatelet drugs is false?
A. Abciximab is a monoclonal antibody that binds to the glycoprotein IIb/IIIa receptor
B. Decreased formation of thromboxane underlies the antiplatelet action of aspirin
C. Ibuprofen reversibly inhibits cyclooxygenase in platelets
D. Ticlopidine is an inhibitor of the platelet thrombin receptor
E. Dipyridamole is occasionally used with warfarin in patients with artificial heart valves

1322. Morphine 300 mg po is equivalent to:
A. Morphine 10mg intrathecally
B. Sufentanyl 100mcg intrathecally
C. Morphine 1mg intrathecally
D. Fentanyl 1mcg intrathecally
E. Codeine 60 mg orally

1323. A phase II clinical trials typically involve
A. Measurement of the pharmacokinetics of the new drug in normal volunteers
B. Double-blind evaluation of the new drug in thousands of patients with target disease
C. Postmarketing surveillance of drug toxicities
D. Evaluation of the new drug in 50 to several hundred patients with the target disease
E. Collection of data regarding late-appearing toxicities from patients previously studied in phase I trials

1324. Which one of the following drugs is used in the treatment of male impotence and activates prostaglandin E1 receptors?
A. Alprostadil
B. Fluoxetine
C. Mifepristone
D. Sildenafil
E. Zafirlukast

1325. A patient with Zollinger-Ellison syndrome has been receiving high doses of cimetidine for 7 weeks. A frequent adverse effect of cimetidine is
A. Agranulocytosis
B. Systemic lupus erythematosus
C. Inhibition of hepatic metabolism of other drugs
D. Antiestrogenic effects
E. Hypertension

1326. A 45-year-old patient is to have reconstructive surgery on a hand that was recently injured in an accident. The anesthesiologist plans to use regional anesthesia of the arm for a fairly long procedure. The amide-type local anesthetic with the longest duration of action is
A. Cocaine
B. Bupivacaine
C. Lidocaine
1327. Which of the following local anesthetics is useful for topical (surface) administration only?
A. Procaine
B. Bupivacaine
C. Etidocaine
D. Benzocaine
E. Lidocaine

1328. Beta-lactamase production by strains of Haemophilus influenzae, Moraxella catarrhalis, and Neisseria gonorrhoeae confers resistance against penicillin G. Which one of the following antibiotics is most likely to be effective against all strains of each of the above organisms?
A. Ampicillin
B. Ceftriaxone
C. Clindamycin
D. Gentamicin
E. Piperacillin

1329. Which of the following drugs increase alprazolam’s half life?
A. Fluoxetine (Prozac®)
B. Fluvoxamine (Luvox®)
C. Paroxetine (Paxil®)
D. Sertraline (Zoloft®)
E. Clozapine (Clozaril®)

1330. Of the following antiepileptic agents, which is associated with causing psychosis?
A. Phenobarbital
B. Ethosuximide
C. Phenytoin
D. Vigabatrin
E. Valproic acid

1331. A patient with terminal cancer is suffering from pain that is gradually increasing in intensity. In the management of pain in such a patient
A. Physical dependency occurs universally in later stages of the disease
B. To delay the development of dependency, opioid analgesics should never be given for initial management of chronic pain
C. Meperidine is more effective than morphine in cancer pain states
D. Nonsteroidal anti-inflammatory drugs may control symptoms during a significant portion of the course of the disease
E. The placebo effect is absent

1332. Which of the following are hydrolyzed by plasma pseudocholinesterases?
A. Lidocaine
B. Ropivacaine
C. Bupivacaine
D. Tetracaine
E. Etidocaine

1333. Seizures occur at what serum concentration range for lidocaine?
A. 10-12 µg/mL
B. 10-12 ng/mL
C. 100-120µg/mL
D. 1-1.2 mg/mL
E. 10-12 mg/mL

1334. The serum concentration of lidocaine would be highest with which route of administration specifically at 60 minutes after administration?
A. Intravenous
B. Epidural
C. Brachial Plexus
D. Intercostal
E. Subarachnoid

1335. Which of the following corticosteroids has the highest anti-inflammatory potency?
A. Cortisone
B. Prednisone
C. Triamcinolone
D. Methylprednisone
E. Dexamethasone

1336. The most common adverse effect associated with the tricyclic antidepressants is
A. Anticholinergic effects
B. Seizures
C. Arrythmias
D. Hepatotoxicity
E. Nephrotoxicity

1337. Concomitant SSRI and TCA therapy can lead to which of the following:
A. Elevated TCA blood levels
B. Decreased TCA blood levels
C. Increased SSRI blood levels
D. Decreased SSRI blood levels
E. Increased TCA and SSRI blood levels

1338. The serum concentration of lidocaine would be highest with which route of administration specifically at 5 minutes after administration?
A. Intravenous
B. Intercostal
C. Epidural
D. Brachial Plexus
E. Subcutaneous

1339. Acetyl salicylic acid (aspirin) exerts its action by:
A. Prostaglandin synthesis
B. Inhibiting platelet aggregation
C. Antipyretic action at the hypothalamus
D. Inactivating cyclooxygenase
E. All of the above
1340. Which of the following is most correct about modern psychopharmacology?
A. There is a one-diagnosis-one-drug approach
B. Many variables affect the practice of psychopharmacology
C. Medications must be given in large dosages for months to work
D. Monitoring is rarely necessary and dose adjustments are infrequently warranted
E. Medications exert their effect within hours.

1341. The earliest sign of lidocaine toxicity is:
A. Shivering
B. Nystagmus
C. Lightheadedness and dizziness
D. Toxic-clonic seizures
E. Nausea and vomiting

1342. A 35-year-old female who has never been pregnant suffers each month from pain, discomfort, and mood depression at the time of menses. She may benefit from the use of this selective inhibitor of the reuptake of serotonin.
A. Amitriptyline
B. Bupropion
C. Mirtazapine
D. Paroxetine
E. Trazodone

1343. Efficacy with TCAs in treating depression is generally thought to be seen in____
A. 1 to 3 days
B. 3 to 7 days
C. 3 to 7 weeks
D. 6 to 8 weeks
E. After 2 months

1344. Carisoprodol (Soma®) is associated with all of the following EXCEPT:
A. Potentially habituating, with potential for abuse
B. Hepatic impairment
C. Mirtazapine
D. Paroxetine
E. Trazodone

1345. Of the following, which is unlikely to be associated with receptors bound to plasma membranes, their interaction with ligands, and the biologic response to this interaction?
A. Structurally, these receptors have hydrophobic amino acid domains, which are in contact with the membrane, and hydrophilic regions, which extend into the extracellular fluid and the cytoplasm
B. Chemical interactions of ligands with these receptors may involve the formation of many types of bonds, including ionic, hydrogen, van der Waals', and covalent
C. Ligand-receptor interactions are often stereospecific (i.e., one stereoisomer is usually more potent than the other)
D. In some cases, a ligand that acts as an agonist at membrane-bound receptors increases the activity of an intracellular second messenger
E. Activation of membrane-bound receptors and subsequent intracellular events elicit a biologic response through the transcription of DNA

1346. The antidepressant with the least sedation side effect is:
A. Desipramine
B. Trazadone
C. Nortriptyline
D. Maprotiline
E. Amitriptyline

1347. The side effects of intravenous (IV) local anesthetics are related to central nervous system (CNS) toxicity. Signs are all of the following EXCEPT
A. Metallic taste
B. Tinnitus
C. Agitation
D. Increased appetite
E. Convulsions

1348. Which of the following statements is true?
A. Acetaminophen leads to more toxicity annually than NSAIDs
B. Aspirin is known to have a lower annual associated toxicity cost compared to acetaminophen
C. NSAIDs cause fewer GI toxicity events than acetaminophen and aspirin
D. Acetaminophen use is associated with a lower annual toxicity cost
E. Aspirin produces a temporary effect on platelet aggregation

1349. Distribution of medication into the brain is most commonly governed by which of the following?
A. Regional cerebral blood flow
B. Abnormalities in the blood-brain barrier
C. Percent of the drug that is protein bound
D. Relative density of target receptors for binding
E. Gastric and intestinal motility

1350. Norepinephrine will cause contraction of the smooth muscle in
A. Bronchioles
B. Pupils
C. Intestine
D. Arterioles
E. Ciliary body

1351. When an inactive substance or condition induces a therapeutic change, the procedure (result) is called
A. Nonpharmaceutical reaction
B. Modulated conditioning
C. Placebo effect
D. Reaction formation
E. Fantasy reaction
1352. The drug of choice for the management of osteoporosis caused by high-dose use of glucocorticoids is
A. Alendronate  
B. Calcitonin  
C. Mestranol  
D. Oxandrolone  
E. Vitamin D

1353. Catecholamines are all of the following, except
A. Drugs that contain a 3,4 dihydroxybenzene structure  
B. Are produced by monoamine oxidase  
C. Are inactivated by catechol-O-methyl transferase  
D. Are most effectively inactivated by synaptic re-uptake  
E. Broken down into byproducts, one of which is meta-nephrine

1354. Synaptic action of catecholamines is terminated by
A. Monoamine oxidase  
B. Tyrosine hydroxylase  
C. Norepinephrine transporter  
D. Catechol-O-methyl transferase  
E. Aromatic amino transferase

1355. The primary determinant of local anesthetic potency is
A. pKa  
B. Molecular weight  
C. Lipid solubility  
D. Concentration  
E. Protein binding

1356. Which of the following is a selective inhibitor of monoamine oxidase type B (MAO-B) and, therefore, useful in treating parkinsonism?
A. Bromocriptine  
B. Carbidopa  
C. Selegiline  
D. Phenelzine  
E. Tranylcypromine

1357. Two drugs may act on the same tissue or organ through independent receptors, resulting in effects in opposite directions. This is known as
A. Physical antagonism  
B. Chemical antagonism  
C. Competitive antagonism  
D. Irreversible antagonism  
E. Dispositional antagonism

1358. The intrathecal equivalent of the epidural administration of 10 mg of morphine is:
A. 0.1 mg  
B. 1 mg  
C. 5 mg  
D. 10 mg  
E. 0.5 mg

1359. Which of the following is an antidepressant agent that selectively inhibits serotonin (5-HT) uptake with minimal effect on norepinephrine uptake
A. Protriptyline  
B. Maprotiline  
C. Fluoxetine  
D. Desipramine  
E. Amoxapine

1360. The opioid which has been implicated in Torsade de Pointes is:
A. Morphine  
B. Meperidine  
C. Buprenorphine  
D. Methadone  
E. Propoxyphene

1361. Which of the following is false?
A. The rate of renal dose dopamine is 1-3 mcg/kg/minute  
B. Renal dose dopamine promotes diuresis  
C. Renal dose dopamine has been conclusively demonstrated to prevent acute renal failure  
D. Renal dose dopamine may exacerbate bacterial translocation in the presence of mesenteric ischemia  
E. Metoclopramide may interfere with dopamine effects on the kidney

1362. Which is true? Propanolol…
A. Does not decrease heart rate and cardiac contractility  
B. Is not subject to a significant hepatic first pass effect  
C. Is not poorly protein bound  
D. Does not reduce the clearance of local anesthetics  
E. Does not increase airway resistance

1363. A patient has been taking aspirin for rheumatoid arthritis for 8 years. Exacerbations are becoming worse and she asks the physician about drugs that might stop the progression of the disease. Which one of the following is not a disease-modifying (slow-acting) antirheumatic drug?
A. Auranofin  
B. Hydroxychloroquine  
C. Methotrexate  
D. Penicillamine  
E. Rofecoxib

1364. A 24-year-old schizophrenic man has been treated for several years with haloperidol but, since parkinsonism-like effects are worsening, the drug is discontinued and treatment is started with olanzapine. Which one of the following statements about the new medication is false?
A. Antipsychotic effects may take several weeks to develop  
B. Alleviates some of the negative symptoms of schizophrenia  
C. Causes agranulocytosis  
D. Has a greater affinity for serotonin receptors than for dopamine receptors in the CNS  
E. Less effect on pituitary function than haloperidol
1365. The main advantage of neurolytic nerve blockade with phenol versus alcohol is
A. Denser blockade
B. Blockade is permanent
C. The effects of the block can be evaluated immediately
D. The block is less painful
E. Phenol is selective for sympathetic fibers

1366. Of the following, which is a phase II biotransformation reaction?
A. Sulfoxide formation
B. Nitro reduction
C. Ester hydrolysis
D. Sulfate conjugation
E. Deamination

1367. The concentration of epinephrine corresponding to a 1:200,000 mixture is:
A. 0.5 µg/mL
B. 5 µg/mL
C. 50 µg/mL
D. 0.5 µg/mL
E. 0.1 mg/mL

1368. Damage to dopamine neurons in the midbrain is a central feature of the pathophysiology of Parkinson’s disease. The loss of midbrain dopamine in this disease is accompanied by
A. An increase in the dopamine transporter
B. A decrease in dopamine 1 receptor density
C. An increase in dopamine 2 receptor density
D. A decrease in dopamine synthesis in remaining dopamine neurons
E. An increase in both dopamine 1 and dopamine 2 receptor density

1369. What would be the most appropriate dose of ephedrine, for a patient that has a fall in blood pressure, following epidural anesthesia?
A. 10-25 mg
B. 100-250 micrograms
C. 10-25 micrograms
D. 1-2.5 micrograms
E. 100-250 mg

1370. Clonidine
A. Preferentially inhibits alpha 1 receptors
B. Only binds to alpha 2 receptors
C. Prolongs the sensory block of subarachnoid bupivacaine
D. Produce pruritus, epidurally
E. Does not reduce shivering

1371. Which of the following irreversibly inhibits alpha receptors?
A. Phentolamine
B. Prazosin
C. Phenoxysbenzamine
D. Esmolol
E. Clonidine

1372. Which of the following local anesthetics has the lowest ratio of dosage for cardiovascular collapse to dosage required for central nervous system toxicity?
A. Lidocaine
B. Etidocaine
C. Bupivacaine
D. Prilocaine
E. Chloroprocaine

1373. The correct arrangement of local anesthetics in order of their ability to produce cardiotoxicity from most to least is:
A. Bupivacaine, lidocaine, ropivacaine
B. Bupivacaine, ropivacaine, lidocaine
C. Ropivacaine, bupivacaine, lidocaine
D. Lidocaine, ropivacaine, bupivacaine
E. Lidocaine, bupivacaine, ropivacaine

1374. The antidepressant below with the highest risks of inducing seizures is:
A. Doxepin
B. Trazadone
C. Amitriptyline
D. Maprotiline
E. Nortriptyline

1375. The antidepressant below with the least anticholinergic and least sedating effects is:
A. Amitriptyline
B. Imipramine
C. Doxepin
D. Trazadone
E. Desipramine

1376. Adrenergic receptors are coupled to
A. G proteins
B. Tyrosine kinase
C. Sodium channels
D. Cyclo-oxygenase
E. Nerve growth factor

1377. All of the following medications can cause sexual dysfunction. However, the following drug does not inhibit desire or decrease arousal.
A. Amphetamines
B. Phenothiazines
C. alpha-Methyldopa
D. Guanethidine
E. Tricyclic Anti-Depressents

1378. Local anesthetic per spinal segment to patients between 20 and 40 years of age receiving an epidural is most likely limited to
A. 0.5 mL
B. 1.0 mL
C. 1.5 mL
D. 2.0 mL
E. 2.5 mL
1379. The maximum dose of lidocaine containing 1:200,000 epinephrine that can be administered to a 70-kg patient for regional anesthesia is
A. 50 mg
B. 100 mg
C. 200 mg
D. 500 mg
E. 1000 mg

1380. Which of the following is described as a competitive benzodiazepine receptor antagonist?
A. Ketamine
B. Chlordiazepoxide
C. Flumazenil
D. Midazolam
E. Triazolam

1381. Among the local anesthetics used for intravenous regional anesthesia (Bier block) the most rapidly metabolized and thus least toxic accentis:
A. Etidocaine
B. Lidocaine
C. Ropivacaine
D. Prilocaine
E. Mepivacaine

1382. Intractable itching is best treated with:
A. Chlorpromazine
B. Pimozide
C. Haloperidol
D. Risperidone
E. Clozapine

1383. The polyethylene glycol in depot steroids
A. Does not cause degenerative lesions in nerves of experimental animals
B. Is present in methylprednisolone but not triamcinolone
C. Is not concentrated enough in the commercial preparation to block nerve transmission
D. Does not cause arachnoiditis when injected intrathecally
E. All of the above

1384. Acetaminophen is a proven analgesic and anti-pyretic through action at:
A. Hypothalamus
B. Dorsal horn of the spinal cord
C. Modulation of neurotransmitter activity at the locus ceruleus
D. By cholinergic enhancement of the GABA-B receptor complex
E. Acetaminophen is superior to aspirin in providing analgesia.

1385. A young mother is breast-feeding her 2-month-old infant. Which one of the following drug situations involving the mother is MOST likely to be safe for the nursing infant?
A. Doxycycline, for Lyme disease
B. Metronidazole, for trichomoniasis

Directions: Each question below contains four suggested responses of which one or more is correct. Select
A if 1, 2 and 3 are correct
B if 1 and 3 are correct
C if 2 and 4 are correct
D if 4 is correct
E if All (1, 2, 3 and 4) are correct

1386. Accidental poisonings are common with both aspirin and ibuprofen, two OTC drugs available in tasty chewable tablets. In cases of overdose, aspirin is more likely than ibuprofen to cause
A. Autonomic instability
B. Hepatic necrosis
C. Metabolic acidosis
D. Thrombocytopenia
E. Ventricular arrhythmias

1387. Newer COX-2 selective NSAIDs were believed to be preferred agents based on which of the following criteria:
1. Diminished renal toxicity
2. Diminished hepatic toxicity
3. Diminished platelet effects
4. Diminished gastrointestinal toxicity

1388. Which one of the following best describes the implications of aging on the activity of psychoactive medications?
1. Absorption is increased due to decreased surface villi, gastric motility, intestinal perfusion & delayed gastric emptying
2. Increased albumin lessens the amount of free medication carried in the blood
3. Changes in liver & kidney function along with drug-drug interactions lead to increased metabolism, shortened half-lives, and less likely toxicity
4. Distribution is altered due to decrease in total body water & lean body mass

1389. Which of the following antidepressant classes maintains the best evidence for treating neuropathic pain?
1. Selective Serotonin Reuptake Inhibitors
2. Heterocyclic Antidepressants
3. Serotonin Norepinephrine reuptake inhibitors
4. Tricyclic Antidepressants
1390. Of the following agents is/are effective topical anesthetics when applied to mucous membranes
1. Lidocaine
2. Cocaine
3. Tetracaine
4. Procaine

1391. Which of the following best describes the receptor effects of psychoactive medications?
1. Some agents are agonists for receptors and stimulate the specific biological activity of the receptor
2. Some agents are antagonists for receptors and inhibit biological activity
3. Some agents are partial agonists because they cannot fully activate a specific receptor
4. All antagonists stimulate receptor activity

1392. Most commonly observed side effects in adults who use Gabapentin include:
1. Somnolence
2. Peripheral edema.
3. Dizziness.
4. Amnesia.

1393. Epidurally administered opioids encompass the following true statements.
1. Posterior radicular arteries transfer opioids to the dorsal horn
2. The epidural venous system carries opioids through the systemic circulation
3. Epidural fat and opioids bind
4. Opioids are carried through the dura by diffusing across arachnoid granulations and enter the cerebrospinal fluid (CSF)

1394. Traditional NSAIDs (e.g. Ibuprofen) are now known to effect their pharmacodynamic activity via inhibition of:
1. Cyclooxygenase 1
2. Prostaglandin synthetase
3. Thromboxane synthetase
4. Cyclooxygenase 2

1395. Which of the following local anesthetics depend on hepatic blood flow for plasma clearance?
1. Procaine
2. Prilocaine
3. Tetracaine
4. Lidocaine

1396. Which of the following drugs have sodium channel blocking properties?
1. Lidocaine
2. Ziconotide
3. Quinidine
4. Strychnine

1397. Concomitant use of a COX-2 selective NSAID with an ACE inhibitor potentially produces which of the following adverse effects:
1. Hypotension via an additive pharmacodynamic effect
2. Hypertension via an additive pharmacokinetic effect
3. Hypotension via an opposing pharmacokinetic effect
4. Hypertension via an opposing pharmacodynamic effect

1398. Gabapentin is labeled by the Food and Drug Administration for use in:
1. Epilepsy
2. Myofascial pain syndrome.
3. Post herpetic neuralgia.
4. Bi-polar disease

1399. The seizure threshold for local anesthetics is raised by
1. Hypokalemia
2. Hyperoxia
3. Hypocarbia
4. Acidosis

1400. Dopamine agonists include
1. Bromocriptine (Parlodel)
2. Pergolide (Permax)
3. Ropinirole (Requip)
4. Prochlorperazine (Compazine)

1401. The triptan class of drugs are selective
1. Muscarinic agonists
2. Dopamine agonists
3. Cholinergic agonists
4. Serotonin agonists

1402. Local anesthetic metabolized by ester hydrolysis include
1. Lidocaine
2. Cocaine
3. Mepivacaine
4. Tetracaine

1403. Which of the following local anesthetic concentrations is(are) isobaric?
1. 2% Lidocaine
2. 0.5% Tetracaine
3. 0.5% Bupivacaine
4. 0.75% Bupivacaine

1404. Which is true about the lumbar epidural instillation of local anesthetics?
1. Ropivacaine and bupivacaine at identical concentrations will provide identical depths and durations of motor block
2. Local anesthetics diffuse across the dura and act on the spinal cord and exiting nerve roots
3. Hypotension, bradycardia, and high thoracic levels of sensor-motor block that occurs 10-15 minutes after an epidural test dose, suggest a subarachnoid block
4. Local anesthetics exit the intervertebral foramina and cause multilevel paravertebral nerve blocks
1405. Risk factors for induction of gastropathy and induction of gastroduodenal ulcers include:
1. Age over 60
2. Alcohol use
3. Steroid use
4. Multiple NSAID use

1406. Which of the following statements about routes of administration of opioids is/are true:
1. The rectal route may be used safely in patients with thrombocytopenia.
2. The intravenous route is more effective than the subcutaneous route.
3. The transdermal route yields predictable and stable blood levels.
4. The transmucosal route may be effective in certain situations but it is expensive.

1407. True statements concerning local anesthetics include the following:
1. The un-ionized form of a local anesthetic binds to the nerve membrane to actually block conduction
2. If one node of Ranvier is blocked, conduction will be reliably interrupted
3. The ability of a local anesthetic to block nerve conduction is directly proportional to the diameter of the fiber
4. The presence of myelin enhances the ability of a local anesthetic to block nerve conduction

1408. Non Steroidal Anti Inflammatory medicines should be used with caution with the following cotherapeutic agents:
1. Coumadin
2. Methotrexate
3. Lithium Carbonate
4. H2 Antagonists

1409. Hepatic toxicity and NSAID is related to:
1. Class of NSAID
2. Pharmacokinetics of drug
3. Dose of drug
4. Cholestatic activity

1410. Factor(s) that influence systemic absorption of local anesthetics include
1. Site of injection of the local anesthetic
2. Lipid solubility of the local anesthetic
3. Addition of vasoconstrictor substances to the local anesthetic
4. Concentration of the local anesthetic

1411. Plasma monitoring should be considered with a tricyclic antidepressant in the following situation:
1. Lack of efficacy
2. Suspected Non-compliance
3. Dosing in excess of 50 mg
4. Concurrent therapies with potential cardiac toxicity

1412. Which of the following statements about alcoholics withdrawing from alcohol are true:
1. Overhydration more likely than dehydration
2. Well-nourished patients should receive vitamins
3. Often dependent also on other CNS depressants
4. Withdrawal syndrome followed by insomnia

1413. Factor(s) that antagonize local anesthetics include
1. Tissue acidosis
2. Presence of myelin
3. Increasing fiber diameter
4. Rapid firing rate

1414. Local anesthetic blockade is
1. Ionic
2. Reversible
3. Frequency-dependant
4. Depolarizing

1415. Which of the following are metabolized by monoamine oxidase?
1. Norepinephrine
2. Dopamine
3. Epinephrine
4. Serotonin

1416. Side effect/s of corticosteroids is/are:
1. Hypoglycemia
2. Hyperkalemia
3. Decreased intraocular pressure
4. Psychosis

1417. A 29-year-old male requires suturing for a deep laceration in his palm. He is allergic to benzocaine. Which of the following local anesthetics could safely be used?
1. Cocaine
2. Tetracaine
3. Procaine
4. Bupivacaine

1418. Hypercalcemia can occur in the following:
1. Renal cell carcinoma
2. Cushing’s syndrome
3. Hyperparathyroidism
4. Pituitary Adenoma
1419. Tricyclic toxicities are best described by which of the following?
1. Diarrhea and urinary frequency
2. Adverse effect on cardiac rhythm
3. No effect on other mental disorders other than relief of Major Depression
4. Delirium may result from central cholinergic blockade

1420. Symptoms of salicylate toxicity include:
1. Tinnitus
2. Acid-Base disturbances.
3. Dehydration
4. Mydriasis

1421. Non-selective NSAID agents inhibit both:
1. Cyclooxygenase-I Constitutive Pathway
2. Leukotrienes Pathway
3. Cyclooxygenase-II Inducible Pathway
4. Arachidonic Acid Lipid Membrane Cascade

1422. Which of the following would indicate alcohol dependence?
1. Persistent drinking, even though worsens gastric ulcers
2. Job efficiency impaired due to repeated hangovers
3. Several unsuccessful attempts to cut down on drinking
4. Family history of alcoholism

1423. Pharmacokinetic properties and toxicity of NSAIDs appear to be related to:
1. Plasma half life
2. Protein binding
3. Dose of the drug
4. Hepatic function

1424. Which of the following is true about local anesthetics?
1. They pass through the nerve membrane as in their base form
2. Once in the axoplasm, the ionized form that binds to the Na+ channel
3. Those local anesthetics with PKa of 7.6 would be expected to have a faster onset of action compared to those with a PKa of 8.0
4. The benzene ring is an important moiety in determining the lipid solubility of ester local anesthetics

1425. Identify accurate statements of central nervous system effects of anti-inflammatory drugs?
1. Reduction of hyperalgesia at the spinal level
2. Decreasing prostanoid production
3. Action at the central opioid mechanisms responsible for analgesia
4. Inhibition of magnesium activation at the N-Methyl D Aspartate Receptor

1426. Which best describes the mechanism of interaction of nonsteroidal anti-inflammatory drugs (NSAIDs) with lithium salts?
1. They increase lithium intestinal absorption
2. They increase lithium plasma protein binding
3. They increase lithium sensitivity at its site of action
4. They increase lithium renal reabsorption

1427. The elimination half-life of an amide local anesthetic is prolonged in which of the following conditions?
1. Liver disease
2. Term pregnancy
3. Heart failure
4. Kidney disease

1428. Epinephrine is effective in increasing the clinical duration of action of
1. Procaine
2. Lidocaine
3. Tetracaine
4. Etidocaine

1429. Drugs that will decrease the plasma clearance of ester-type local anesthetics include
1. Echothiophate
2. N2O
3. Neostigmine
4. Phenytoin

1430. True statements regarding additives to local anesthetics for neuraxial blocks include
1. Intrathecal clonidine has analgesic properties
2. Intrathecal phenylephrine has analgesic properties
3. Intrathecal epinephrine has analgesic properties
4. Addition of epinephrine to epidural local anesthetics increases the incidence of hypotension

1431. Anti Inflammatory medications exert their action at the tissue level by blocking:
1. Phospholipase A2
2. Arachidonic Acid Liberation at the Lipid Membrane
3. Functional Leukotrienes
4. Lipoxygenase

1432. Clonidine has been found to be a useful drug for
1. Nociceptive Pain
2. Somatic Pain
3. Psychogenic pain
4. Neuropathic Pain
1433. Frequency-dependant anesthetic blockade is characterized by
   1. Enhanced binding in open state
   2. Reduced release in resting state
   3. State-dependent phasic block
   4. Deeper blockade at higher frequency

1434. Receptors involved in opioid activity include:
   1. Mu
   2. Delta
   3. Kappa
   4. Gamma

1435. The following agents are Alpha-2 agonists,
   1. Clonidine
   2. Dexmedetomidine
   3. Tizanidine
   4. Antipamezole

1436. Glycerin is
   1. Weakly neurolytic
   2. Hyperbaric relative to CSF
   3. Used for trigeminal neuralgia
   4. Usually mixed with ethyl alcohol

1437. Which of the following drugs will decrease the plasma clearance of amide-type local anesthetics?
   1. Propranolol
   2. Cimetidine
   3. Halothane
   4. Phenytoin

1438. Glucocorticoids enhance
   1. Phospholipase A2
   2. Gluconeogenesis
   3. Cytokines
   4. Lipolysis

1439. Methemoglobin associated with prilocaine
   1. Requires liver metabolism of local anesthetic
   2. Is of little clinical consequence
   3. Is treated with methylene blue
   4. Arises from oxidation of hemoglobin

1440. As compared to adults, which of the following typify pediatric osseous development?
   1. Lower energy absorption
   2. Greater mineral content
   3. Thinner periosteum
   4. Greater porosity

1441. Pharmacogenetic variability in drug effects occur by:
   1. Differences in drug metabolism
   2. Altered levels of normal receptor protein
   3. Variations in drug receptor binding
   4. Acquired variations due to mutations

1442. Para-aminobenzoic acid is a metabolite of
   1. Mepivacaine
   2. Benzocaine
   3. Bupivacaine
   4. Tetracaine

1443. Which of the following classes of pharmacologic agents is(are) useful for nausea?
   1. Butyrophenones (Haloperidol and droperidol)
   2. Benzodiazepines (midazolam, Diazepam)
   3. Antiserotonergic agents (ondansetron)
   4. Opioids (fentanyl, Sufentanyl, Demerol)

1444. The duration of epidural anesthesia is affected by
   1. Height of patient
   2. Age of patient
   3. Weight of patient
   4. Addition of epinephrine (1:200,000) to the local anesthetic

1445. Adverse effects of traditional NSAIDs (e.g. Ibuprofen) may include:
   1. Renal
   2. Cutaneous
   3. Gastrointestinal
   4. Central nervous system

1446. The following statements about drug therapy for insomnia are accurate.
   1. Barbiturates gradually lead to an increase in the activity of hepatic enzymes
   2. Patients develop tolerance for benzodiazepines much more rapidly than for pentobarbital
   3. Barbiturates suppress REM sleep
   4. There is no cross-tolerance to other hypnotics

1447. COX II selectivity of NSAIDs:
   1. Is associated with prostaglandin inhibition that is associated with pain and hyperalgesia
   2. Preserves normal function of the GI mucosa
   3. Is characterized by the ability to decrease sensitization in the central nervous system by inhibition of prostanoid formation, and action of substance P at the NMDA receptor
   4. Related to sexual dysfunction in males over age 60
1448. Ziconotide
1. Is a N-type voltage sensitive calcium channel antagonist.
2. Has been reported to be beneficial in spinal cord injury.
3. Has side effects including nystagmus, ataxia, hallucinations etc.
4. Is a L-type voltage sensitive calcium channel antagonist.

1449. Phenol is
1. Hyperbaric relative to CSF
2. Produces selective coagulation of proteins
3. Has a local anesthetic effect
4. Causes selective small fiber destruction

1450. Local anesthetics are added to an infusion to treat following type(s) of pain.
1. Nociceptive Pain
2. visceral Pain
3. somatic pain
4. neuropathic pain

1451. Hypercalcemia may lead to the following:
1. Delirium and confusion
2. Fatigue
3. Anorexia
4. Constipation

1452. Which of the following local anesthetic/s has/have inherent vasoconstriction activity?
1. Ropivacaine
2. Cocaine
3. Mepivacaine
4. Lidocaine

1453. Duration of action of local anesthetics may be increased by
1. Adding vasoconstrictors
2. Adding bicarbonate
3. Increasing the dose
4. Use of carbonated solutions

1454. Tramadol might be considered a medication to use with caution in those taking:
1. Monoamine oxidase inhibitors.
2. Serotonin reuptake inhibitors.
3. Concomitant use of tricyclic anti-depressants.

1455. Which of the following drugs produce sodium channel blockade?
1. Lidocaine
2. Phenytoin
3. Quinidine
4. Amitriptyline

1456. The following statements are true regarding fentanyl as a good agent for transdermal use:
1. Low molecular weight
2. Adequate lipid solubility
3. High analgesic potency
4. Low abuse potential

1457. Pharmacodynamics is concerned with:
1. Absorption
2. Signaling pathways coupled to receptors
3. Distribution
4. Receptor binding

1458. The mechanism of action for the neurolytic effects of alcohol is/are?
1. Dehydration of proteins
2. Extraction of cholesterol
3. Precipitation of mucoproteins
4. Protein coagulation

1459. Opioid peptides are derived from larger prohormones that include:
1. Proenkephalin A
2. Proopiomelanocortin
3. Proenkephalin B
4. Alpha neoendorphin

1460. Prototypic kappa-receptor agonists include:
1. Dynorphin
2. N-allyl normetazocaine
3. Ketocyclazocaine
4. DADL

1461. Enkephalins are found in the:
1. Sympathetic nervous system
2. Gastrointestinal tract
3. Periaqueductal gray
4. Adrenal Medulla

1462. Ethyl alcohol
1. Causes selective small fiber destruction
2. Produces a more profound block than phenol
3. Has a local anesthetic effect
4. Hypobaric relative to CSF
1463. The following are true choices which may lead to decreased opioid requirements:
1. Combined treatment with local anesthetics
2. Advance age
3. Decreased renal function
4. Combined treatment with gabapentin

1464. Beta-endorphin is found in the:
1. Locus ceruleus
2. Hypothalamus
3. Periaqueductal gray
4. Pituitary

1465. Examples of phenanthrene class of opioid include all except:
1. Morphine
2. Fentanyl
3. Codeine
4. Meperidine

1466. 30mg of MS04 orally are equivalent to:
1. 10mg MS04 IV
2. 20mg of oral oxycodeone
3. 1.5mg hydromorphone IV
4. 20mg methadone

1467. A patient in the intensive care unit is receiving an infusion of epinephrine, after exsanguinating significantly following a total hip replacement. The order states that epinephrine should be titrated, but kept in the range of 10-20 micrograms/minute. The ICU nurse, however, accidentally writes for 1-2 mcg/minute. One would expect:
1. An increase in the systolic blood pressure
2. A reduction in mean arterial blood pressure
3. An increase in blood flow to the muscles
4. An increase in blood flow to the skin

1468. Which of the following can be administered orally?
1. Albuterol
2. Epinephrine
3. Ephedrine
4. Dopamine

1469. Epinephrine causes which of the following?
1. Relaxation of gastrointestinal smooth muscle
2. Relaxation of the trigone
3. Contraction of the urinary sphincter
4. Contraction of the detrusor muscle

1470. The volume of distribution for a particular pharmacologic agent is influenced by its:
1. Ionization state
2. Polarity
3. Lipophilicity
4. Molecular weight

1471. The following drugs are effective in a treatment of pruritus from administration of neuraxial opiates:
1. Nalbuphine 5mg IV
2. Diphenhydramine 50mg IV
3. Hydroxyzine 20mg IM
4. Propofol 10mg IV

1472. Which of the following drugs are serotonin antagonists?
1. Ondansetron (Zofran)
2. Granisetron (Kytril)
3. Dolasetron (Anzemet)
4. Metoclopramide (Reglan)

1473. Serious drug interactions may occur with MAO inhibitors and which of the following drugs?
1. Fluoxetine
2. Amitriptyline
3. Sumatriptan
4. Meperidine

1474. The common side effects of clonidine may include the following:
1. Orthostatic hypotension
2. Dry mouth
3. Bradycardia
4. Sedation

1475. Tricyclic antidepressant toxicities include which of the following?
1. Delirium
2. Weight gain
3. Urinary retention
4. Prolongation of QT interval

1476. Which of the following factors must be true for two drugs to be considered:
1. Identical Area Under the Curve data for both drugs
2. Drugs given by the same route of administration
3. Time to peak plasma concentrations the same
4. Equal peak plasma concentrations

1477. Phase II reactions
1. Are oxidative processes
2. Increase water solubility
3. Are typically microsomal
4. Occur in the kidney

1478. Dose-response curves of drugs describe
1. Activity
2. Potency
3. Affinity
4. Slope

1479. High risk factors for NSAID-induced renal insufficiency include:
1. Significant hypovolemia
2. Severe congestive heart failure
3. Hepatic cirrhosis
4. Older age
1480. Which of the following are correct regarding drugs bound to plasma proteins?
   1. Have large volumes of distribution
   2. Are typically biologically active
   3. Displaced by other drugs
   4. Filtered by the glomerulus

1481. Medications used for the pharmacologic treatment of mania include:
   1. Carbamazepine
   2. Gabapentin
   3. Valproate
   4. Verapamil

1482. Ergot alkaloid drugs include:
   1. Ergonovine
   2. Lysergic acid
   3. Methysergide
   4. Bromocriptine

1483. Dopamine effects include regulation of
   1. Memory
   2. Cognition
   3. Motivation
   4. Emotion

1484. Factor(s) that determine the proportion of local anesthetic that exists in the un-ionized (freebase) and
   ionized (cation) forms include
   1. Local anesthetic concentration
   2. Tissue pH
   3. Local anesthetic volume
   4. pKa of the local anesthetic

1485. Local anesthetics are organic
   1. Amines
   2. Aromatic
   3. Alkaloids
   4. Acids

1486. The adverse effects of L-dopa therapy improved by adding carbidopa include:
   1. Mydriasis
   2. Cardiac arrhythmia
   3. Nausea
   4. Depression

1487. Choose the true statement:
   1. Alpha - 1 acid glycoprotein predominantly binds basic drugs
   2. Local pH may affect the volume of distribution
   3. the volume of distribution is inversely related to protein binding
   4. Morphine is mostly bound to albumin

1488. Which of the following drugs induces the activity of CYP 3A4?
   1. Carbamazepine
   2. Phenobarbital
   3. Phenytoin
   4. Fluoxetine

1489. Therapy with acetylsalicylic acid needs to be carefully evaluated in patients with "Franklin's triad" which includes:
   1. Nasal polyps
   2. Asthma
   3. Urticaria
   4. Rhinorrhea

1490. True statement regarding alpha 1-acid glycoprotein include that it:
   1. Has high capacity and low affinity
   2. Has a high affinity for basic drugs
   3. Remains unaffected by recent trauma
   4. Is an acute-phase reactant

1491. The antidepressant(s) which is/are secondary amine(s) TCA:
   1. Desipramine
   2. Doxepin
   3. Nortriptyline
   4. Imipramine

1492. Which of the following are true statements concerning NSAIDs?
   1. Do not produce pharmacological dependence
   2. May be opioid sparing
   3. Are extensively protein bound
   4. Do not maintain an analgesic ceiling

1493. Medical conditions and/or factors which may affect the amount of free circulating drug include:
   1. Hepatic Cirrhosis
   2. Burns
   3. Renal sufficiency
   4. Trauma

1494. NSAIDs which are considered “prodrugs” include:
   1. Piroxicam
   2. Nabumetone
   3. Diflunisal
   4. Sulindac

1495. Glucocorticoids enhance:
   1. Phopholipase A2
   2. Gluconeogenesis
   3. Cytokines
   4. Lypolysis

1496. Which of the following is/are amino ester local anesthetic/s?
   1. Lidocaine
   2. Bupivacaaine
   3. Mepivacaaine
   4. Tetracaine
### Definitions of Opioids

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
<th></th>
</tr>
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<tbody>
<tr>
<td>Opiate</td>
<td>A drug derived from alkaloids of the opium poppy</td>
<td></td>
</tr>
<tr>
<td>Opioid</td>
<td>The class of drugs that includes opiates, opioid peptides, and all synthetic and semisynthetic drugs that mimic the actions of the opiates</td>
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</tr>
<tr>
<td>Opioid peptides</td>
<td>Endogenous peptides that act on opioid receptors</td>
<td></td>
</tr>
<tr>
<td>Opioid agonist</td>
<td>A drug that activates some or all opioid receptor subtypes and does not block any</td>
<td></td>
</tr>
<tr>
<td>Partial agonist</td>
<td>A drug that can activate an opioid receptor to effect a submaximal response</td>
<td></td>
</tr>
<tr>
<td>Opioid antagonist</td>
<td>A drug that blocks some or all opioid receptor subtypes</td>
<td></td>
</tr>
<tr>
<td>Mixed agonist antagonist</td>
<td>A drug that activates some opioid receptor subtypes and blocks other subtypes</td>
<td></td>
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</tbody>
</table>


### List of Opioids Agonists and Antagonists

<table>
<thead>
<tr>
<th>Subclass</th>
<th>Prototype</th>
<th>Major Variants</th>
<th>Other Significant Agents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong agonists</td>
<td>Morphine</td>
<td>Heroin, meperidine, methadone</td>
<td>Fentanyl, levorphanol</td>
</tr>
<tr>
<td>Moderate agonists</td>
<td>Codeine</td>
<td></td>
<td>Oxycodone, hydrocodone</td>
</tr>
<tr>
<td>Weak agonists</td>
<td>Propoxyphene</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partial agonists</td>
<td>Buprenorphine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mixed agonist-antagonists</td>
<td>Pentazocine</td>
<td>Nalbuphine</td>
<td>Butorphanol</td>
</tr>
<tr>
<td>Antagonists</td>
<td>Naloxone</td>
<td>Naltrexone</td>
<td></td>
</tr>
<tr>
<td>Antitussive</td>
<td>Dextromethorphan</td>
<td></td>
<td>Codeine</td>
</tr>
<tr>
<td>Antidiarrheal</td>
<td>Diphenoxylate</td>
<td></td>
<td>Loperamide</td>
</tr>
</tbody>
</table>

### Definitions

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tolerance</td>
<td>A decreased response to a drug, necessitating larger doses to achieve the same effect. This can result from increased disposition of the drug (metabolic tolerance), an ability to compensate for the effects of a drug (behavioral tolerance), or changes in receptor or effector systems involved in drug actions (functional tolerance)</td>
</tr>
<tr>
<td>Psychologic dependence</td>
<td>Compulsive drug-using behavior in which the individual uses the drug for personal satisfaction, often despite known health risks</td>
</tr>
<tr>
<td>Physiologic dependence</td>
<td>A state characterized by signs and symptoms, frequently the opposite of those caused by a drug, when it is withdrawn from chronic use or when the dose is abruptly lowered. Psychologic dependence usually precedes physiologic dependence</td>
</tr>
<tr>
<td>Abstinence syndrome</td>
<td>A term used to describe the signs and symptoms that occur on withdrawal of a drug in a physiologically dependent person</td>
</tr>
<tr>
<td>Controlled substance</td>
<td>A drug deemed to have abuse liability that is listed on governmental Schedules of Controlled Drugs. Such schedules categorize illicit drugs, control prescribing practices, and mandate penalties for illegal possession, manufacture, and sale of listed drugs. Controlled substance schedules are presumed to reflect current attitudes toward substance abuse; therefore, which drugs are regulated depends on a social judgment</td>
</tr>
<tr>
<td>Designer drug</td>
<td>A synthetic derivative of a drug, with slightly modified structure but no major change in pharmacodynamic action. Circumvention of the Schedules of Controlled drugs is a motivation for the illicit synthesis of designer drugs.</td>
</tr>
</tbody>
</table>


### Schedules of Controlled Drugs

<table>
<thead>
<tr>
<th>Schedule</th>
<th>Criteria</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>No medical use; high addiction potential</td>
<td>Flunitrazepam, heroin, LSD, marijuana, mescaline, methaqualone, PCP, DOM, MDMA</td>
</tr>
<tr>
<td>II</td>
<td>Medical use; high addiction potential</td>
<td>Strong opioid agonists, cocaine, short half-life barbiturates, amphetamines, methylphenidate</td>
</tr>
<tr>
<td>III</td>
<td>Medical use; moderate potential for dependence</td>
<td>Anabolic steroids, codeine and moderate opioid agonists, dronabinol, thiopental</td>
</tr>
<tr>
<td>IV</td>
<td>Medical use; low abuse potential</td>
<td>Benzodiazepines, chloral hydrate, meprobamate, weak opioid agonists, zolpidem, zaleplon</td>
</tr>
</tbody>
</table>

### Signs and symptoms of overdose and withdrawal

<table>
<thead>
<tr>
<th>Subclass</th>
<th>Prototype</th>
<th>Major Variants</th>
<th>Other Significant Agents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sedative-hypnotics</td>
<td>Secobarbital, benzodiazepines, ethanol</td>
<td>Pentobarbital, alprazolam, diazepam</td>
<td>Methaqualone, meprobamate</td>
</tr>
<tr>
<td>Opioids</td>
<td>Heroin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stimulants</td>
<td>Amphetamine</td>
<td>Methamphetamine, phentmetrazine</td>
<td>DOM, MDA, MDMA</td>
</tr>
<tr>
<td></td>
<td>Cocaine, caffeine, nicotine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hallucinogens</td>
<td>LSD, phencyclidine</td>
<td>Mescaline</td>
<td>Scopolamine</td>
</tr>
<tr>
<td>Marijuana</td>
<td>“Grass”</td>
<td>Hashish</td>
<td>Dronabinol</td>
</tr>
<tr>
<td>Inhalants</td>
<td>Nitrous oxide, toluene</td>
<td>Ether</td>
<td>Chloroform, benzene</td>
</tr>
</tbody>
</table>

1Cardiac arrhythmias, myocardial infarction, and stroke occur more frequently in cocaine overdose than with other CNS stimulants.

2Ethanol withdrawal includes the excited hallucinatory state of delirium tremens.


---

<table>
<thead>
<tr>
<th>Subclass</th>
<th>Prototype</th>
<th>Major Variants</th>
<th>Other Significant Agents</th>
</tr>
</thead>
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</tr>
<tr>
<td>Opioids</td>
<td>Heroin</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>Amphetamine</td>
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<td>DOM, MDA, MDMA</td>
</tr>
<tr>
<td></td>
<td>Cocaine, caffeine, nicotine</td>
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</tr>
<tr>
<td>Inhalants</td>
<td>Nitrous oxide, toluene</td>
<td>Ether</td>
<td>Chloroform, benzene</td>
</tr>
<tr>
<td></td>
<td>Amyl nitrite</td>
<td>Isobutyl nitrite</td>
<td></td>
</tr>
</tbody>
</table>

### Benzodiazepine Indications

<table>
<thead>
<tr>
<th>Drug and Half-life</th>
<th>Primary Indications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short-acting (t(1/2 &lt; 5) hr)</strong></td>
<td></td>
</tr>
<tr>
<td>Midazolam [Versed]</td>
<td>Preanesthetic</td>
</tr>
<tr>
<td>Triazolam [Halcion]</td>
<td>Hypnotic, preanesthetic</td>
</tr>
<tr>
<td><strong>Intermediate-acting (t(1/2 5-24) hr)</strong></td>
<td></td>
</tr>
<tr>
<td>Alprazolam [Xanax]</td>
<td>Anxiolytic, antidepressant *</td>
</tr>
<tr>
<td>Clonazepam [Klonopin]</td>
<td>Anticonvulsant</td>
</tr>
<tr>
<td>Estazolam [ProSom]</td>
<td>Hypnotic</td>
</tr>
<tr>
<td>Lorazepam [Ativan]</td>
<td>Anxiolytic, hypnotic, preanesthetic</td>
</tr>
<tr>
<td>Oxazepam [Serax]</td>
<td>Anxiolytic</td>
</tr>
<tr>
<td>Temazepam [Restoril]</td>
<td>Hypnotic</td>
</tr>
<tr>
<td><strong>Long-lasting (t(1/2 &gt; 24) hr)</strong></td>
<td></td>
</tr>
<tr>
<td>Chlordiazepoxide [Librium] †</td>
<td>Anxiolytic, preanesthetic</td>
</tr>
<tr>
<td>Clorazepate [Tranxene] † ‡</td>
<td>Anxiolytic</td>
</tr>
<tr>
<td>Diazepam [Valium] †</td>
<td>Anxiolytic, preanesthetic, anticonvulsant</td>
</tr>
<tr>
<td>Flurazepam [Dalmane]</td>
<td>Hypnotic</td>
</tr>
<tr>
<td>Prazepam [Centrax] † ‡</td>
<td>Anxiolytic</td>
</tr>
<tr>
<td>Quazepam [Doral]</td>
<td>Hypnotic</td>
</tr>
</tbody>
</table>

* For panic disorders.
† Converted to the long-acting, active metabolite.
‡ Pro-drug.

## Classification, Potency, and Adverse Effects of Antipsychotic Drugs

<table>
<thead>
<tr>
<th>Drugs and Classifications</th>
<th>Oral Dosage Range (mg/day)</th>
<th>Extrapyramidal Effects*</th>
<th>Autonomic Effects</th>
<th>Sedation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aliphatic phenothiazines</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chlorpromazine [Thorazine, generic]</td>
<td>100-1000</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>Triflupromazine [Vesprin]</td>
<td>50-150</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td><strong>Piperidine phenothiazines</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thioridazine [Mellaril, generic]</td>
<td>100-800</td>
<td>+</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>Mesoridazine [Serentil] †</td>
<td>50-400</td>
<td>+</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td><strong>Piperazine phenothiazines</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trifluoperazine [Stelazine, generic]</td>
<td>10-60</td>
<td>+++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Fluphenazine [Prolixin, Permitil] ‡</td>
<td>5-20</td>
<td>++++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Perphenazine [Trilafon]</td>
<td>16-64</td>
<td>+++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Acetophenazine [Tindal]</td>
<td>80-120</td>
<td>+++</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td><strong>Aliphatic thioxanthene</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chlorprothixene [Taractan]</td>
<td>100-600</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td><strong>Piperazine thioxanthene</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thiothixene [Navane, generic]</td>
<td>2-120</td>
<td>+++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td><strong>Butyrophenone</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haloperidol [Haldol, generic]</td>
<td>2-20</td>
<td>++++</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>Other heterocyclic drugs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Molindone [Moban] †</td>
<td>20-200</td>
<td>+++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Loxapine [Loxitane]</td>
<td>20-250</td>
<td>+++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Clozapine [Clozaril] ‡**</td>
<td>25-400</td>
<td>+</td>
<td>+++</td>
<td>+++</td>
</tr>
</tbody>
</table>

* Excluding tardive dyskinesia.
† No antiemetic action.
‡ Esterification (enanthate or decanoate) results in depot form.
** Agranulocytosis I up to 3% of patients.

Relative Activity of Antidepressant Drugs on Norepinephrine and Serotonin Prejunctional Neuronal Uptake.

<table>
<thead>
<tr>
<th>Drug and Classification</th>
<th>Inhibition of Norepinephrine Uptake</th>
<th>Inhibition of Serotonin Uptake</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Tricyclic antidepressants</td>
</tr>
<tr>
<td><strong>Tertiary amines</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amitriptyline [Elavil, others]</td>
<td>+/-</td>
<td>++</td>
</tr>
<tr>
<td>Imipramine [Tofranil, others]</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Trimipramine [Surmontil]</td>
<td>+</td>
<td>0</td>
</tr>
<tr>
<td>Doxepin [Sinequan, others]</td>
<td>++</td>
<td>+</td>
</tr>
<tr>
<td>Clomipramine [Anafranil]</td>
<td>+</td>
<td>+++</td>
</tr>
<tr>
<td><strong>Secondary amines</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Desipramine [Norpramin, Petoframe, generic]</td>
<td>+++</td>
<td>0</td>
</tr>
<tr>
<td>Nortriptyline [Aventyl, Pamelor]</td>
<td>++</td>
<td>+/-</td>
</tr>
<tr>
<td>Protriptyline [Vivactil]</td>
<td>++</td>
<td>0</td>
</tr>
<tr>
<td><strong>Dibenzoxazepines</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amoxapine [Asendin]*</td>
<td>++</td>
<td>0</td>
</tr>
<tr>
<td><strong>Selective serotonin reuptake inhibitors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluoxetine [Prozac]</td>
<td>+</td>
<td>+++</td>
</tr>
<tr>
<td>Paroxetine [Paxil]</td>
<td>0</td>
<td>+++</td>
</tr>
<tr>
<td>Sertraline [Zoloft]</td>
<td>0</td>
<td>+++</td>
</tr>
<tr>
<td><strong>Atypical antidepressants</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trazodone [Desyrel, generic]</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td>Maprotiline [Ludominil]</td>
<td>++</td>
<td>0</td>
</tr>
<tr>
<td>Bupropion [Wellbutrin]</td>
<td>+</td>
<td>0</td>
</tr>
<tr>
<td>Venlafaxine [Effexor]</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Nefazodone [Serzone] ‡</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

* Has dopamine-receptor antagonist activity.
† Has serotonin-receptor agonist and antagonist activity.
‡ Has serotonin-receptor antagonist activity.

Relationship between Blockade of Neurotransmitter Receptors and Anti-Depressant-induced Side Effects

<table>
<thead>
<tr>
<th>Receptor Subtype</th>
<th>Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Histamine $H_1$-receptors</td>
<td>Sedation</td>
</tr>
<tr>
<td></td>
<td>Weight gain</td>
</tr>
<tr>
<td></td>
<td>Hypotension</td>
</tr>
<tr>
<td></td>
<td>Potentiation of CNS depressants</td>
</tr>
<tr>
<td>Muscarinic receptors</td>
<td>Dry mouth</td>
</tr>
<tr>
<td></td>
<td>Blurred vision</td>
</tr>
<tr>
<td></td>
<td>Urinary retention</td>
</tr>
<tr>
<td></td>
<td>Constipation</td>
</tr>
<tr>
<td></td>
<td>Memory dysfunction</td>
</tr>
<tr>
<td></td>
<td>Tachycardia</td>
</tr>
<tr>
<td>$\alpha_1$-adrenoceptors</td>
<td>Postural hypotension</td>
</tr>
<tr>
<td></td>
<td>Reflex tachycardia</td>
</tr>
<tr>
<td></td>
<td>Potentiation of antihypertensive effects of prazosin</td>
</tr>
<tr>
<td>$\alpha_2$-adrenoceptors</td>
<td>Blockade of antihypertensive effects of clonidine</td>
</tr>
<tr>
<td></td>
<td>alpha-methyldopa</td>
</tr>
<tr>
<td>Serotonin 5-HT$1$-receptors</td>
<td>Ejaculatory dysfunction</td>
</tr>
<tr>
<td></td>
<td>Hypotension</td>
</tr>
<tr>
<td></td>
<td>Alleviation of migraine</td>
</tr>
</tbody>
</table>


Relative Development of Tolerance to Opioid Actions.

<table>
<thead>
<tr>
<th>Substantial</th>
<th>Minimal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analgesia</td>
<td>Constipation</td>
</tr>
<tr>
<td>Respiratory depression</td>
<td>Seizures</td>
</tr>
<tr>
<td>Euphoria and dysphoria</td>
<td>Antagonist activity</td>
</tr>
<tr>
<td>Sedation</td>
<td></td>
</tr>
<tr>
<td>Nausea and vomiting</td>
<td></td>
</tr>
<tr>
<td>Cough suppression</td>
<td></td>
</tr>
</tbody>
</table>

Answers

1267. **Answer:** A  
**Explanation:**  
Reference: Katzung, pp 439-441. 
The primary effect of local anesthetics is blockade of voltage channel-gated Na channels. Progressively increasing concentrations of local anesthetics results in an increased threshold of excitation, a slowing of impulse conduction, a decline in the rate of rise of the action potential, a decrease in the height of the action potential, and eventual obliteration of the action potential. 

Local anesthetics first block small unmyelinated or lightly myelinated fibers (pain), followed by heavily myelinated but small-diameter fibers (sensory) and then larger-diameter fibers (proprioception, pressure, motor).  
Source: Stern - 2004

1268. **Answer:** C  
**Explanation:**  
Unwanted pharmacologic side effects produced by phenothiazine antipsychotic drugs (e.g., perphenazine) include Parkinson-like syndrome, akathisia, dystonias, galactorrhea, amenorrhea, and infertility. These side effects are due to the ability of these agents to block dopamine receptors. The phenothiazines also block muscarinic and a-adrenergic receptors, which are responsible for other effects. 
Source: Stern - 2004

1269. **Answer:** C

1270. **Answer:** A  
Source: Cole EB, Board Review 2003

1271. **Answer:** B

1272. **Answer:** E  
**Explanation:**  
A, C. Benzodiazepines (e.g., chlordiazepoxide, diazepam) bind to receptors on the Cl− channel and enhance the binding of GABA to its receptor. 
*B g–aminobutyric acid is an inhibitory neurotransmitter that activates the Cl− channel.

B. Barbiturates also act on the Cl− channel to increase the opening frequency of the channel.  
D. Valproic acid elevates brain levels of GABA by inhibiting GABA metabolism.  
E. Chlorpromazine blocks the activity of dopamine receptors and has little or no effect on the GABA system.  
Source: Stern - 2004

1273. **Answer:** E  
**Explanation:**  
Reference: Katzung, p 602. 
Tasteless enteric-coated tablets and capsules are formulated to resist the acidic pH found in the stomach. Once the preparation has passed into the intestine, the coating dissolves in the alkaline milieu and releases the drug. Therefore, gastric irritation, drug destruction by gastric acid, and the forming of complexes of the drug with food constituents will be avoided. 
Source: Stern-2004

1274. **Answer:** B

1275. **Answer:** C  
**Explanation:**  
(Raj, Practical Mgmt of Pain, 3rd Ed, page 566, Stoelting, Pharmacology and Physiology of Anesthetic Practice, 3rd Ed., page 170-171) 
All local anesthetics can produce a dose dependent depression of cardiac conduction velocity, including intra-atrial, AV nodal, His-Purkinje, and intraventricular pathways. Part of local anesthetic cardiac toxicity is due to blockade of cardiac sodium channels. Accidentally administered bupivacaine can lead to precipitous hypotension, dysrhythmias, and A-V heart block. The dissociation of highly lipid soluble bupivacaine from Na+ channels is slow.

Bupivacaine is a racemic mixture, wherein the R enantiomer is more toxic than the S-enantiomer. Ropivacaine is a pure S-enantiomer which is intermediate in toxicity between lidocaine and bupivacaine 
Source: Shah RV, Board Review 2004

1276. **Answer:** A  
Source: Lou Etal. Pain Practice: march 2001

1277. **Answer:** D
Prilocaine is an amide local anesthetic that is metabolized to orthotoluidine. Orthotoluidine is an oxidizing compound that is capable of converting hemoglobin to methemoglobin. If the dose of prilocaine exceeds 600mg, there may be enough methemoglobin (3-5 g/dl) to cause the patient to appear cyanotic. Methemoglobinemia is readily reversed by the administration of methylene blue, 1-2 mg/kg intravenously over 5 minutes. This effect, however, may be short lived, since the methylene blue may be cleared before converting all of the methemoglobin to hemoglobin.

Source: Shah RV, Board Review 2004

Reference: Katzung, pp 599-603

Aspirin (acetylsalicylic acid) is the most extensively used analgesic, antipyretic, and anti-inflammatory agent of the group of compounds known as NSAIDs, or nonopioid analgesics. Most of its therapeutic and adverse effects appear to be related to the inhibition of prostaglandin synthesis. Nonsteroidal anti-inflammatory drugs inhibit the activity of the enzyme cyclooxygenase, which mediates the conversion of arachidonic acid to prostaglandins that are involved in pain, fever, and inflammation. Aspirin may produce irritation and ulceration of the gastrointestinal (GI) tract, an adverse effect that is about equal to other salicylates. It also inhibits platelet aggregation.

Acetaminophen, like aspirin, has analgesic and antipyretic properties, but it does not have clinically significant anti-inflammatory activity and is not irritating to the GI tract.

Source: Stern - 2004

Reference: Hardman, pp 1129-1131. All tetracyclines can produce negative nitrogen balance and increased blood urea nitrogen (BUN) levels. This is of clinical importance in patients with impaired renal function. With the exception of doxycycline, tetracyclines should not be used in patients that are anuric. Doxycycline is excreted by the GI tract under these conditions, and it will not accumulate in the serum of patients with renal insufficiency.

Source: Stern - 2004

Fatalities have been reported when fluoxetine and MAO inhibitors (MAOIs) such as tranylcypromine have been given simultaneously.

The MAOIs should be stopped at least two weeks before the administration of fluoxetine or paroxetine.

Source: Jackson KC, Board Review 2003
The enkephalins are endogenous agonists of the opioid receptors. They are located in areas of the brain and spinal cord related to the perception of pain. These areas include the laminae I and II of the spinal cord, the spinal trigeminal nucleus, and the periaqueductal gray.

- Selegiline and trihexyphenidyl are anti-Parkinsonism drugs.
- Baclofen is a skeletal muscle relaxant agonist for the GABA receptor.

Source: Stern - 2004

1297. **Answer: E**

1298. **Answer: A**

1299. **Answer: B**
   Source: Day MR, Board Review 2004

1300. **Answer: A**
   Explanation:
   Chlorpromazine is the prototype compound of the phenothiazine class of antipsychotic drugs. It is indicated for use in the treatment of a variety of psychoses, which includes schizophrenia, and in the treatment of nausea and vomiting, in both adults and children, from a number of causes. The drug can be administered orally, rectally, or intramuscularly for this purpose. It is believed that the effectiveness of the compound is based on the inhibition of dopaminergic receptors in the chemoreceptor trigger zone of the medulla. Other phenothiazine derivatives are also used for emesis, including thiethylperazine, prochlorperazine and perphenazine. Although chlorpromazine may cause orthostatic hypotension and has mild H1-histamine receptor blocking activity, the drug is never used as an antihypertensive or as an antihistaminic.
   Chlorpromazine is not an effective antidepressant drug, and lithium salts are used for treating the mania that is associated with bipolar affective disorder.
   Source: Stern - 2004

1301. **Answer: D**

1302. **Answer: B**

1303. **Answer: C**

1304. **Answer: A**
   Explanation:
   Explanation: Hydrocortisone has an anti-inflammatory potency of 1. Triamcinolone diacetate, triamcinolone acetonide, and depo-methylprednisolone all have an anti-inflammatory potency of 5. Betamethasone and dexamethasone both have an anti-inflammatory potency of 25.
   Source: Day MR

1305. **Answer: C**
   Explanation:
   Explanation: Maximum dose is 4 mg/kg. Maximum dose of lidocaine with epinephrine is 7 mg/kg.
   Source: Day MR

1306. **Answer: D**

1307. **Answer: B**

1308. **Answer: D**
   Explanation:
   Haloperidol is a butyrophenone derivative with the same mechanism of action as the phenothiazines, that is, blockade of dopaminergic receptors. It is more selective for D2 receptors. Haloperidol is more potent on a weight basis than the phenothiazines, but produces a higher incidence of extrapyramidal reactions than does chlorpromazine.
   Source: Stern - 2004

1309. **Answer: D**
   Explanation:
   Drugs can be transferred across biologic membranes by passive processes (i.e., filtration and simple diffusion) and by specialized processes (i.e., active transport, facilitated diffusion, and pinocytosis). Active transport is a carrier-mediated process that shows all of the characteristics listed in the question. Facilitated diffusion is similar to active transport except that the drug is not transported against a concentration gradient and no energy is required for this carrier-mediated system to function. Pinocytosis usually involves transport of proteins and macromolecules by a complex process in which a cell engulfs the compound within a membrane-bound vesicle.
   Source: Stern-2004

1310. **Answer: A**
   Explanation:
   (Baum, pp 224.)
   - Traditionally, minor tranquilizers have been used as a standard approach to the treatment of psychophysio-logic disorders. However, they fail to deal with the underlying psychological, social, or physiologic problem, especially on a long-term basis. They are effective in providing short-term relief for high levels of stress or anxiety and can be more effective if combined with behavior therapy or psychotherapy.
   - Interpersonal dilemmas are not affected, though they may seem to be temporarily dulled with minor tranquilizers.
Minor tranquilizers often have the side effect of drowsiness, can lead to tolerance with the need for increased dosages, and can produce withdrawal symptoms of insomnia, tremors, and even hallucinations. Source: Ebert 2004

1311. Answer: B

1312. Answer: C
Source: Day MR, Board Review 2004

1313. Answer: D
Explanation:
Large doses of prilocaine, usually greater than 600 mg epidurally, can result in clinically significant methemoglobinemia. Prilocaine is metabolized by the liver to o-toluidine, which is responsible for the oxidation of hemoglobin to methemoglobin. Methemoglobinemia can be treated with IV methylene blue, or it will resolve spontaneously.
Source: Hall and Chantigan.

1314. Answer: B

1315. Answer: C

1316. Answer: E
Source: Smith H, Board Review 2005

1317. Answer: C

1318. Answer: C
Explanation:
Carbidopa is an inhibitor of aromatic L-amino acid decarboxylase. It cannot readily penetrate the central nervous system (CNS) and, thus, decreases the decarboxylation of L-dopa in the peripheral tissues. This promotes an increased concentration of L-dopa in the nigrostriatum, where it is converted to dopamine. In addition, the effective dose of L-dopa can be reduced.
Source: Stern - 2004

1319. Answer: C

1320. Answer: E
Source: Day MR, Board Review 2004

1321. Answer: D

1322. Answer: C
Explanation:
MSO4 300mg po is equivalent to 100mg IV, 10mg epidurally, or 1mg intrathecally. Sufentanyl is 20 times as potent as MSO4, and fentanyl is 3 times as potent.
Source: Trescot AM, Board Review 2004

1323. Answer: D

Answer: A

1327. Answer: D
Explanation:
Local anesthetics are agents that, when applied locally, block nerve conduction; they also prevent generation of a nerve impulse. All contain a lipophilic (benzene) functional group and most a hydrophilic (amine) group.

Benzoic acid does not contain the thermal hydrophilic amine group; thus, it is only slightly soluble in water and is slowly absorbed with a prolonged duration. It is, therefore, only useful as a surface anesthetic.
Source: Stern - 2004

1328. Answer: B

1329. Answer: B
Explanation:
Among the SSRIs, fluvoxamine appears to present the greatest risk of drug-drug interactions. Fluvoxamine is metabolized by CYP 3A4. Fluvoxamine may increase the half-lives of alprazolam and diazepam and should not be coadministered with these agents. Fluvoxamine may increase theophylline concentrations 3-fold and warfarin concentrations 2-fold, with important clinical consequences. Fluvoxamine raises concentrations and may increase the activity of clozapine, carbamazepine, methadone, propranolol, and diltiazem.
Source: Laxmaiah Manchikanti, MD

1330. Answer: D
Explanation:
Vigabatrin can induce psychosis. It is recommended that it not be used in patients with preexisting depression and psychosis.
Source: Stern - 2004

1331. Answer: D

1332. Answer: D
Explanation:
Plasma pseudocholinesterases hydrolyze the ester linkage of ester local anesthetics. Amide local anesthetics undergo biotransformation in the liver.
Source: Shah RV, Board Review 2004

1333. Answer: A
Explanation:
As the serum levels of lidocaine rise, the patient may be at increased risk for seizures. At 10 to 12 micrograms/ml., inhibitory pathways in the brain are selectively inhibited, but facilitatory neurons are unopposed.

Seizures originate in the amygdale and hippocampus.

Lidocaine toxicity presents with prodromal symptoms, before seizures: slow speech, jerky movements, tremors, and hallucinations.

Reference: Hardman, pp 31-34.

* Based upon the molecular mechanisms with which receptors transduce signals, four major classes of receptors have been identified:
  - ion channel receptors,
  - receptors that interact with G proteins,
  - receptors with tyrosine kinase activity, and
  - nuclear receptors.

* The first three types of receptors are complex membrane bound proteins with hydrophilic regions located within the lipoid cell membrane and hydrophilic regions located within the lipoid cell membrane and hydrophilic portions found protruding into the cytoplasm of the cell and the extracellular milieu; when activated, all of these receptors transmit (or transduce) information presented at the extracellular surface into ionic or biochemical signals within the cell (i.e., second messengers). Nuclear receptors are found in the nucleus of the cell, not bound to plasma membranes. In addition, these receptors do not transduce information by second-messenger systems; rather, they bind to nuclear chromatin and elicit a biologic response through the transcription of DNA and alterations in the formation of cellular proteins. Ligand binding to all types of receptors may involve the formation of ionic, hydrogen, hydrophobic, van der Waals’, and covalent bonds. In most cases, ligand-receptor interactions are stereospecific; for example, natural (-)-epinephrine is 1000 times more potent than (+)-epinephrine.

Source: Stern-2004
1349. Answer: A
Source: Cole EB, Board Review 2003

1350. Answer: D
Explanation:
(Guyton, pp 701-703.) The catecholamines nor, epinephrine and epinephrine will activate both alpha and beta-adrenergic receptors. When the alpha-adrenergic receptors are stimulated, they activate a G protein, which in turn activates phospholipase C that hydrolyzes PIP2 and produces IP3 and DAG. The IP3 causes the release of Ca2+ from the sarcoplasmic reticulum, which in turn increases muscle contraction. alpha1 adrenergic receptors predominate on arteriolar smooth muscle, so these muscles contract when stimulated with norepinephrine. The bronchi, pupillary, and ciliary smooth muscles all contain beta receptors, which cause smooth muscle relaxation. The intestinal smooth muscle relaxation is initiated by an alpha2-adrenergic receptor.

1351. Answer: C
Explanation:
(Carlson, pp 352-359.)
- Testosterone administered postpubertally to castrated rats can restore aggressiveness to almost normal levels. Similarly, neonatal female mice develop masculine aggressive behavior on receiving androgens. Androgens also promote aggression in humans.
- Boys are more aggressive than girls at ages 3 to 10, as has been demonstrated in studies of children.
Source: Ebert 2004

1352. Answer: A

1353. Answer: B
Explanation:
(Stoelting, 3rd Ed., Chapter 12)
In order for a drug to be classified as a catechol, hydroxyl groups must be present on the 3 and 4 carbon positions of the benzene ring. Catecholamines are rapidly inactivated by monoamine oxidase and catechol-O-methyl transferase. MAO is found in the GI tract, liver, and kidneys and catalyzes oxidative deamination. COMT methylates the hydroxyl group of catecholamines and these inactive methyalted metabolites are conjugated with glucuronic acid and appear in the urine as breakdown products. These byproducts include metanephrine, nometanephrine, and 3-methoxy-4-hydroxymandelic acid.

Despite the importance of enzymatic breakdown, the actions of catecholamines are principally stopped by uptake back into the post-ganglionic sympathetic nerve endings. The synapse is between the post-ganglionic nerve terminal and the effector tissue.
Source: Shah RV, Board Review 2005 for Smith

1354. Answer: B

1355. Answer: C

1356. Answer: C
Explanation:
- Two types of MAO have been found:
  - MAO-A, which metabolizes norepinephrine and serotonin, and
  - MAO-B, which metabolizes dopamine.

A. Bromocriptine is a dopamine receptor agonist.
B. Carbidopa inhibits the peripheral metabolism of L-dopa.
  - It is also useful in the treatment of parkinsonism.
C. Selegiline is a selective inhibitor of MAO-B. It therefore inhibits the breakdown of dopamine and prolongs the therapeutic effectiveness of L-dopa in parkinsonism.
D. Phenelzine and tranylcypromine are nonselective MAOIs.
Source: Katzung

1357. Answer: A
Explanation:
Reference: Hardman, p 68.
Physiologic, or functional, antagonism occurs when two drugs produce opposite effects on the same physiologic function, often by interacting with different types of receptors. A practical example of this is the use of epinephrine as a bronchodilator to counteract the bronchoconstriction that occurs following histamine release from mast cells in the respiratory tract during a severe allergic reaction. Histamine constricts the bronchioles by stimulating histamine H1 receptors in the tissue; epinephrine relaxes this tissue through its agonistic activity on b2-adrenergic receptors.

Chemical antagonism results when two drugs combine with each other chemically and the activity of one or both is blocked. For example, dimercaprol chelates lead and reduces the toxicity of this heavy metal. Competitive antagonism, or inactivation, occurs when two compounds compete for the same receptor site; this is a reversible interaction. Thus, atropine blocks the effects of acetylcholine on the heart by competing with the neurotransmitter for binding to cardiac muscarinic receptors. Irreversible antagonism generally results from the binding of an antagonist to the same receptor site as the agonist by covalent interaction or by a very slowly dissociating noncovalent interaction. An example of this antagonism is the blockade produced by phenoxybenzamine on a-adrenergic receptors, resulting in a long-lasting reduction in the activity of norepinephrine.

Dispositional antagonism occurs when one drug
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alters the pharmacokinetics (absorption, distribution, biotransformation, or excretion) of a second drug so that less of the active compound reaches the target tissue. For example, Phenobarbital induces the biotransformation of warfarin, reducing its anticoagulant activity.

Source: Stern-2004

1358. **Answer: B**

Explanation:
* The site of action of spinally administered opiates is the substantia gelatinoa of the spinal cord.

* Epidural administration is complicated by factors related to dural penetration, absorption in fat, and systemic uptake; therefore, the quantity of intrathecally administered opioid required to achieve effective analgesia is typically much smaller.

* The ratio of epidural to intrathecal dose of morphine is approximately 10:1.

* Morphine is typically given in doses of 3 to 10mg in the lumbar epidural space. 5) Intrathecal morphine dosage is 0.2 to 1.0 mg.

* Onset time for epidural administration is 30 to 60 minutes with a peak effect in 90 to 120 minutes.

1359. **Answer: C**

Source: Smith H, Board Review 2005

1360. **Answer: D**

Source: Smith H, Board Review 2005

1361. **Answer: C**

Explanation:
(Stoelting 3rd Ed., Chapter 12)

Renal dose dopamine may promote diuresis, but it is not conclusive whether it may protect against acute renal failure. Dopamine antagonists, such as metoclopramide or droperidol, interfere with dopamine effects on the kidney. Low dose dopamine may exacerbate GI mucosal ischemia and contribute to multiple organ dysfunction syndrome.

Source: Shah RV, Board Review 2005 for Smith

1362. **Answer: C**

Explanation:
(Stoelting, 3rd Ed., Chapter 14)

Nonselective Beta Blockers do reduce heart rate and cardiac contractility. They are highly absorbed by the gut, but are subject to a significant first pass effect. They are highly protein bound. They do reduce the clearance of local anesthetics, by affecting hepatic blood flow. They do increase airway resistance.

Source: Shah RV, Board Review 2005 for Smith

1363. **Answer: E**

1364. **Answer: C**

1365. **Answer: D**

Explanation:
A. At concentrations less than 5% phenol produces protein denaturation whereas greater than 5% cause protein coagulation and non-specific segmental demyelination

- Density of blockade is similar with phenol and alcohol

B. The initial block wears off over a 24-hour period, during which time neurolysis occurs.

C. One must wait a day to determine effectiveness of the neurolytic block.

D. Neurolytic blockade with phenol (6% to 10% in glycerine) is painless because phenol has a dual action as both a local anesthetic and a neurolytic agent.

- Alcohol (100% ethanol) is painful on injection and should be preceded by local anesthetic injection.

E. None of the neurolytic agents affect only sympathetic fibers.

1366. **Answer: D**

Source: Smith H, Board Review 2005

1367. **Answer: B**

Explanation:
Epinephrine is commonly packaged as follows:

1:1000  1000 mg per 1,000 mL = 1 mg/mL

1:10,000 1000 mg per 10,000 mL = 0.1 mg/mL

1:200,000 means 1 g = 1000mg = 1,000,000 µg per 200,000mL

1,000,000 µg /200,000 mL = 5 mg/mL

Source: Hall and Chantigan

1368. **Answer: E**

Explanation:
(Cooper, pp 317-322.)

- Although there are hypotheses and models of neurotransmitter dysfunction for many psychiatric and neurologic diseases, Parkinson’s disease remains the model disorder in which damage to a specific neural pathway characterized by a particular neurotransmitter can explain most or all of the pathophysiology of the disease.

- Patients with Parkinson’s disease have biochemical evidence of greatly decreased dopamine function in the brain because of degeneration of the nigrostriatal tract. A neurotoxic model of the disease, produced in primates by
administration of a derivative of meperidine (MPTP), demonstrated that severe damage to dopamine-containing nigrostriatal neurons produced nearly all of the signs and symptoms of Parkinson’s disease. As dopamine neurons in the nigrostriatal tract degenerate, compensatory changes occur that also contribute to the pathophysiology. These changes include a matching loss of the dopamine transporter and a compensatory rise in both dopamine 1 and dopamine 2 postsynaptic receptor density. The remaining dopamine neurons synthesize and release more dopamine as a compensatory mechanism. These secondary physiologic changes probably explain some of the signs and symptoms seen in patients with advanced Parkinson’s disease who are being treated with agents that augment dopamine production. One example is the “on-off” phenomenon in which patients have abnormal increases in movement after administration of dopamine-augmenting agents, probably because of hypersensitive dopamine receptors in remaining neurons of the nigrostriatal tract.

Source: Ebert 2004

1369. Answer: A

Explanation:
(Stoelting, 3rd Ed., Chapter 12)

Ephedrine 10-25 mg is administered to adults that drop their BP following regional anesthesia. Ephedrine is an indirect acting synthetic non-catecholamine that stimulates alpha and beta receptors. Ephedrine is more effective in correcting non-cardiac circulatory changes as compared to selective alpha and beta agonists. The doses of ephedrine are1/250th that of epinephrine. Tachyphylaxis may occur.

Source: Shah RV, Board Review 2005 for Smith

1370. Answer: C

Explanation:
(Stoelting 3rd Ed., chapter 15)

Clonidine preferentially activates alpha 2 receptors over alpha 1 by 220:1. Hence it does not inhibit alpha 1 receptors and it does not only bind to alpha 2 receptors. Clonidine is often used to prolong the effects of subarachnoid bupivacaine and tetracaine...specifically, motor and sensory blockade. Intravenous fluids may be needed to prevent hypotension. Oral clonidine, 150-200 mcg, may prolong spinal anesthesia, but may increase the risk of hypotension and bradycardia. Clonidine does not cause the side effects associated with spinal or epidural opioids: pruritis, nausea and vomiting, delayed gastric emptying. Clonidine does stop shivering, when given IV (75 mcgs), by inhibiting central thermoregulatory control.

Source: Shah RV, Board Review 2005 for Smith

1371. Answer: C

Explanation:
(Stoelting, 3rd Ed.)
one spinal segment. Two thirds of these would be above the epidural entry side and one third would be below.

1379. **Answer: D**  
Explanation:  
The maximum dose of local anesthetics containing 1:200,000 epinephrine that can be used for major nerve blocks is:  
Lidocaine, 500mg  
Mepivacaine, 500mg  
Prolonged, 600mg  
Bupivacaine, 225mg  
Etidocaine, 400mg  
Tetracaine, 200mg.

1380. **Answer: C**  
Explanation:  
Reference: Katzung, pp 373-374.  
antagonist. The drug reverses the CNS sedative effects of benzodiazepines and is indicated where general anesthesia has been induced by or maintained with benzodiazepines such as diazepam, lorazepam, or midazolam.  
Source: Stern - 2004

1381. **Answer: B**  
Source: Smith H, Board Review 2005

1382. **Answer: A**

1383. **Answer: C**  

1384. **Answer: A**  
Source: Hansen HC, Board Review 2004

1385. **Answer: C**

1386. **Answer: C**

1387. **Answer: D (4 Only)**  
Source: Jackson KC, Board Review 2003

1388. **Answer: D (4 Only)**  
Source: Cole EB, Board Review 2003

1389. **Answer: D (4 Only)**  
Source: Jackson KC, Board Review 2003

1390. **Answer: A (1, 2, & 3)**  
Explanation:  
* Lidocaine, tetracaine, and cocaine are all effective topical anesthetics when applied to mucous membranes.

* Cocaine is unique among local anesthetics in that it is a vasoconstrictor.

* Procaine penetrates the mucous membranes poorly and is not useful as a topical agent.

1391. **Answer: A (1, 2, & 3)**  
Source: Cole EB, Board Review 2003

1392. **Answer: A (1,2, & 3)**  
Source: Hansen HC, Board Review 2004

1393. **Answer: E (All)**  
Explanation:  
When an opioid is delivered to the epidural space, all the listed actions occur. These characteristics affect the clinical effects of various opioids in the following way: Lipid-soluble agents (e.g., fentanyl) have rapid onset of analgesia, short duration, and early respiratory depression associated with the degree of systemic uptake. Hydrophilic agents (e.g., morphine) have slow onset of analgesia, prolonged duration, and late respiratory depression associated with rostral spread via the CSF to the brainstem.  

1394. **Answer: D (4 Only)**  
Source: Jackson KC, Board Review 2003

1395. **Answer: C (2 & 4)**

1396. **Answer: B (1 & 3)**

1397. **Answer: D (4 Only)**  
Source: Jackson KC, Board Review 2003

1398. **Answer: B (1 & 3)**  
Source: Hansen HC, Board Review 2004

1399. **Answer: B (1 & 3)**  
Explanation:  
* Hyperventilation of the lungs and hypocarbia decrease cerebral blood flow, thus reducing delivery of local anesthetic to the brain.

* The alkalosis and hypokalemia that occur as a result of hyper-ventilation lead to hyperpolarization of the resting transmembrane potential of neurons, thus increasing the seizure threshold for local anesthetics.

* Acidosis and hypercarbia decrease the seizure threshold for local anesthetics.

* Hyperoxia does nothing to prevent seizures.

1400. **Answer: A (1, 2, & 3 )**

1401. **Answer: D (4 Only)**

1402. **Answer: C (2 & 4)**
1403. Answer: E (All)
Explanation:
All of these local anesthetic concentrations are isobaric.
Tetracaine 0.5% is prepared by mixing equal volumes of 1% tetracaine and preservative-free saline. Hyperbaric solutions can be prepared by mixing equal volumes of 1% tetracaine and 10% dextrose, resulting in 0.5% tetracaine in 5% dextrose, or by mixing equal volumes of 0.75% bupivacaine with 10% dextrose, yielding a 0.375% solution of bupivacaine in 5% dextrose. Alternatively, factory-mixed preparations of 0.75% bupivacaine in 8.25% dextrose and 5% lidocaine in 7.5% dextrose are available.
To prepare hypobaric tetracaine, 10mg (1 mL of 1% tetracaine) are mixed with 9 mL of sterile H2O to yield 10 mL of 0.1% tetracaine. This has a baricity of 1.0.

1404. Answer: C (2 & 4)
Explanation:
(Raj, Practical Mgmt of Pain 3rd Ed. Chapter 39, Stoelting, 3rd Ed., page 174-5.)
There are 2 prevailing theories of how epidural local anesthetics work. These are choices 2 and 4. Ropivacaine is thought to produce a less dense and less prolonged motor block compared to bupivacaine. Additionally, ropivacaine is less cardiotoxic and is thus advantageous in the obstetric population. Delayed onset of hypotension, bradycardia, and a high motor-sensory block, suggests a subdural block. A test dose, by definition, is a small volume of local anesthetic (with/without an admixture of epinephrine [to check for vascular uptake]) that is used to exclude an subarachnoid injection. The delay in presentation suggests a subdural block.
The hypotension is due to sympatholysis. The bradycardia is due to interruption of the cardiac accelerator fibers and the Bezold-Jarisch reflex.
Source: Shah RV, Board Review 2004

1405. Answer: E (All)
Source: Hansen HC, Board Review 2004

1406. Answer: D (4 Only)

1407. Answer: D (4 Only)
Explanation:
1. The un-ionized form of the local anesthetic traverses the nerve membrane whereas the ionized form actually blocks conduction. About three nodes of Ranvier must be blocked to achieve anesthesis.
2. The ability of a local anesthetic to block conduction is inversely proportional to the diameter of the fiber.
3. The presence of myelin enhances the ability of a local anesthetic to block conduction, as does rapid firing.

1408. Answer: A (1, 2, & 3)
Source: Hansen HC, Board Review 2004

1409. Answer: A (1, 2, & 3)
Source: Hansen HC, Board Review 2004

1410. Answer: E (All)
Explanation:
The amount of systemic absorption of a local anesthetic depends on the total dose injected, the vascularity of the injection site, the speed of injection, whether or not a vasoconstrictor is added to the local anesthetic solution, and the physicochemical properties of the local anesthetic, such as protein and tissue binding, lipid solubility, and the degree of ionization at physiologic pH. For all local anesthetics, systemic absorption is greatest after injection for intercostal nerve and caudal blocks, intermediate for epidural blocks, and least for brachial plexus and sciatic nerve blocks.

1411. Answer: A (1, 2, & 3)
Source: Jackson KC. Board Review 2003

1412. Answer: E (All)
Explanation:
Physical symptoms of withdrawal from alcohol usually occur 6-48 hours after last drink, subside in 5-7 days without treatment, but irritability nd insomnia may last 10 days or longer. Nutritional and vitamin deficiencies are common even if the individual appears well nourished. The patient must be watched for overhydration especially during IV fluid replacement.
Source: Psychiatry specialty Board Review By William M. Easson, MD and Nicholas L. Rock, MD

1413. Answer: B (1 & 3)
Explanation:
* The presence of myelin and a rapid neuronal firing rate actually enhance the ability of local anesthetics to block the neuron.

* Local anesthetics gain access to receptors when the sodium channels are open, as occurs during an action potential.

* Larger-diameter fibers are more difficult to block than smaller-diameter fibers.

* Tissue acidosis results in formation of the ionized form of the local anesthetics. This form does not readily transverse the lipophilic cell membrane.

1414. Answer: A (1, 2, & 3)

1415. Answer: E (All)

1416. Answer: D (4 Only)
Source: Day MR, Board Review 2004

1417. Answer: D (4 Only)
Explanation:
Of the listed agents, only bupivacaine is an amide. Allergy to amide-type local anesthetics is much less frequent than with ester-type local anesthetics, such as benzocaine; patients who demonstrate an allergy to one such drug will be allergic to all of them.

Source: Stern - 2004

1418. Answer: B (1 & 3)

1419. Answer: C (2 & 4)
Source: Cole EB, Board Review 2003

1420. Answer: A (1,2, & 3)
Source: Hansen HC, Board Review 2004

1421. Answer: B (1 & 3)
Source: Hansen HC, Board Review 2004

1422. Answer: A (1, 2, & 3)
Explanation:
Alcohol dependence is characterized by the inability to cut down and stop drinking, despite repeated efforts to control drinking ("going on the wagon"), binges, and amnesia periods, and continued drinking while knowing a serious physical condition is being exacerbated by alcohol.
Source: Psychiatry specialty Board Review By William M. Easson, MD and Nicholas L. Rock, MD

1423. Answer: A (1,2, & 3)
Source: Hansen HC, Board Review 2004

1424. Answer: E (All)
Explanation:
(Raj, Practical Mgmt of Pain, 3rd E., Chapter 39)
The benzene ring is an aromatic moiety that is a major contributor to the lipid solubility of a local anesthetic. Local anesthetics need to be lipid soluble, i.e., unionized or in their base form, in order to cross the neural membrane and enter the axoplasm. Once in the axoplasm, the local anesthetic can acquire a proton and become ionized. The ionized form will bind to the active portion of the Na+ channel
Source: Shah RV, Board Review 2004

1425. Answer: A (1, 2, & 3)
Source: Hansen HC, Board Review 2004

1426. Answer: D (4 Only)
Explanation:
Reference: Hardman, p 448. Katzung, p 493, 1130. Some NSAIDs can increase proximal tubular reabsorption of lithium salts, which can create toxic levels of lithium in the plasma.
Source: Stern - 2004

1427. Answer: B (1 & 3)

1428. Answer: A (1, 2, & 3)
Explanation:
1. Epinephrine or phenylephrine is frequently added to local anesthetic solutions to produce vasoconstriction. This decrease systemic absorption of the local anesthetic and prolongs the duration of action of the local anesthetic.

2. The extent to which epinephrine prolongs the block depends on both the site of injection and the specific local anesthetic. These beneficial effects are limited when vasoconstrictors are used with epidural etidocaine and bupivacaine.

1429. Answer: B (1 & 3)
Explanation:
* Ester-type local anesthetics are broken down partly in the blood by pseudocholinesterase and red cell esterase and partly in the liver.

* Anticholinesterase drugs, such as echothiophate, neostigmine, pyridostigmine, and edrophonium, inhibit pseudocholinesterase and thus slow the plasma clearance of ester-type local anesthetics.

* Phenytoin is an enzyme inducer that may hasten the metabolism of amide-type local anesthetics, such as lidocaine but would have little, if any, effect on ester-type local anesthetics and would certainly not impede their plasma clearance.

1430. Answer: E (All)
Explanation:
Clonidine alone, when administered neuraxially, is an effective analgesic. Intrathecal drugs possessing alpha-agonist (phenylephrine/epinephrine) properties will also produce analgesia. Intrathecal epinephrine will reduce systemic/vascular uptake of local anesthetics, thereby enhancing their effects, including hypotension.

1431. Answer: D (4 Only)
Source: Hansen HC, Board Review 2004

1432. Answer: D (4 Only)
Source: Lou Etal. Pain Practice: march 2001

1433. Answer: E (All)

1434. Answer: A (1, 2, & 3)
Source: Trescot A, Board Review 2003

1435. Answer: A (1, 2, & 3)
Explanation:
Clonidine, Tizanidine and Dexmedetomidine are a2 (alpha -2) agonists. Antipamazole is an a2-antagonist. a2 agonists have been used in the management of hypertension for many years. Their role has now expanded to chronic pain management and as muscle relaxants. One proposed
mechanism of analgesic action of α2 agonists is by reducing sympathetic outflow by a direct action on the preganglionic outflow at the spinal level.

Clonidine is available in oral, transdermal and epidural or intrathecal use form. It is used for the treatment of Complex Regional Pain Syndromes, cancer pain, headaches, post herpetic neuralgia and peripheral neuropathy.

Tizanidine has been used for painful conditions involving spasticity. Dexmedetomidine is currently used as sedative in the Intensive Care Unit.

Source: Chopra P, 2004

1436. Answer: A (1, 2, & 3)

1437. Answer: A (1, 2, & 3)
   Explanation:
   Sympathomimetics, β(beta)-adrenergic receptor antagonist, volatile anesthetics, and the H2 - receptor antagonist cimetidine reduce hepatic blood flow, thereby reducing plasma clearance of amide-type local anesthetics. There is also evidence that propranolol directly inhibits mixed-function oxidase activity of hepatocytes. Phenolamine increases clearance of lidocaine by enzyme induction.

1438. Answer: C (2 & 4)

1439. Answer: E (All)

1440. Answer: D (4 Only)
   Source: Boswell MV, Board Review 2004

1441. Answer: E (All)
   Explanation:
   Important variations in drug response occur in microorganisms, such as HIV and bacteria, which accounts for resistance to drugs

1442. Answer: C (2 & 4)
   Explanation:
   * Para-aminobenzoic acid is a metabolic breakdown product of ester anesthetic and is responsible for allergic reactions in some individuals.

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1443. Answer: B (1 & 3)

1444. Answer: D (4 Only)

1445. Answer: E (All)
   Source: Smith H, Board Review 2005

1446. Answer: B (1 & 3)
   Explanation:
   (Kandel, pp 498-959.)
   · Even though many sleeping pills are initially helpful, they lose their effectiveness within 2 weeks.
   · The repeated administration of barbiturates (e.g., pentobarbital or phenobarbital) results in a gradual increase in hepatic enzymes, which normally are responsible for the degradation of the barbiturates. Not only is their pharmacologic action decreased, but since the liver enzymes are relatively nonspecific, the result is often a broad cross-tolerance to other hypnotics. Barbiturates are known to suppress REM sleep, so when the drug is withdrawn, a marked REM rebound results, often aggravating insomnia.
   · The benzodiazepines are addictive. Flurazepam increases hepatic enzymes at a much slower rate; hence patients develop a tolerance much more slowly than for pentobarbital. However, an active metabolite of flurazepam remains in the body for a longer period of time (more than 24 h), which results in a gradual increase of these breakdown substances in the blood. Thus, the effects of the drug are often felt during the daytime as diminished alertness and hand-eye coordination. These symptoms are also aggravated by alcohol.
   Source: Ebert 2004

1447. Answer: A (1,2, & 3)
   Source: Hansen HC, Board Review 2004

1448. Answer: A (1, 2, & 3)
   Source: Lou Etal. Pain Practice: march 2001

1449. Answer: B (1 & 3)

1450. Answer: D (4 Only)
   Source: Lou Etal. Pain Practice: march 2001

1451. Answer: E (All)

1452. Answer: A (1, 2, & 3)
   Source: Day MR, Board Review 2004
1453. Answer: B (1 & 3)
Explanation:
Addition of CO₂ or HCO₃⁻ to local anesthetic solutions hastens the onset of the anesthetic block but does not increase its duration. Vasoconstrictors decrease absorption (and metabolism) of local anesthetics. A larger dose results in longer anesthetic duration, as well as denser blockade.

1454. Answer: A (1, 2, & 3)
Source: Hansen HC, Board Review 2004

1455. Answer: E (All)

1456. Answer: A (1, 2, & 3)
Source: Smith H, Board Review 2005

1457. Answer: C (2 & 4)
Source: Smith H, Board Review 2005

1458. Answer: A (1, 2 & 3)
Explanation: Neurolytic action is by dehydration, with extraction of cholesterol, phospholipids, and cerebrosides, and precipitation of mucoproteins. This results in sclerosis of nerve fibers and myelin sheath (demyelination and subsequent wallerian degeneration). The basal lamina of the Schwann cell is often spared and the axon often regenerates.

Source: Day MR

1459. Answer: A (1, 2, & 3)
Source: Smith H, Board Review 2005

1460. Answer: B (1 & 3)
Source: Smith H, Board Review 2005

1461. Answer: E (All)
Source: Smith H, Board Review 2005

1462. Answer: C (2 & 4)
Source: Smith H, Board Review 2005

1463. Answer: E (All)
Source: Smith H, Board Review 2005

1464. Answer: E (All)
Source: Smith H, Board Review 2005

1465. Answer: B (1 & 3)
Source: Smith H, Board Review 2005

1466. Answer: E (All)
Source: Smith H, Board Review 2005

1467. Answer: C (2 & 4)
Explanation: (Stoelting, 3rd Ed., Chapter 12)
Epinephrine demonstrates:
- Beta-2 receptor agonism at 1-2 mcg/minute
- Beta-1 receptor agonism at 4-6 mcg/minute
- Alpha and Beta agonism at 10-20 mcg/minute
Thus, at
- High doses: Beta 1 will increase systolic BP/HR/Cardiac Output Beta 2 will reduce diastolic BP
Hence, mean arterial pressure will marginally increase, and pulse pressure will increase—reflex bradycardia will not occur
High to Low doses: reduced alpha agonism implies increased perfusion to the skin. Since Beta-2 agonism is preserved at low doses, then skeletal muscle perfusion will be preserved
Source: Shah RV, Board Review 2005 for Smith

1468. Answer: B (1 & 3)
Explanation: (Stoelting, 3rd Ed., chapter 12)
Albuterol is a selective beta 2 agonist that is given for the treatment of acute bronchospasm due to asthma. Although it can be given orally, it is usually given via nebulization or as a metered dose inhaler.
Ephedrine is resistant to MAO in the gut and is absorbed unchanged into the circulation after oral administration.
Endogenous catecholamine can be broken down by GI mucosal and hepatic enzymes
Source: Shah RV, Board Review 2005 for Smith

1469. Answer: B (1 & 3)
Explanation: (Stoelting, 3rd Ed., chapter 12)
Epinephrine relaxes the detrusor and the gastrointestinal smooth muscle. Epinephrine contracts the trigone and urinary sphincter. During a ‘fight or flight’ response, one does not want to pee or defecate.
Source: Shah RV, Board Review 2005 for Smith

1470. Answer: E (All)
Source: Smith H, Board Review 2005

1471. Answer: E (All)
Source: Smith H, Board Review 2005

1472. Answer: E (All)

1473. Answer: E (All)
Source: Boswell MV, Board Review 2004

1474. Answer: E (All)
1475. **Answer: E (All)**
Source: Boswell MV, Board Review 2004

1476. **Answer: E (All)**
Source: Boswell MV, Board Review 2004

1477. **Answer: C (2 & 4)**
Explanation:
Metabolism of drugs occurs in the liver (most important) as well as the kidneys, lungs and gastrointestinal tract. Phase II reactions are conjugation reactions, which involve covalent binding of adducts to drugs to increase water solubility and enhance renal excretion. Most conjugation reactions occur in the cytosol (except for glucuronidation, which is microsomal).
Source: Boswell MV, Board Review 2004

1478. **Answer: E (All)**
Source: Boswell MV, Board Review 2004

1479. **Answer: A (1, 2, & 3)**
Source: Smith H, Board Review 2005

1480. **Answer: B (1 & 3)**
Source: Boswell MV, Board Review 2004

1481. **Answer: E (All)**
Explanation:
Anticonvulsants are effective more quickly than lithium, and potentiate the effect. Centrally acting L type calcium channel blockers are also helpful.
Source: Boswell MV, Board Review 2004

1482. **Answer: E (All)**

1483. **Answer: E (All)**

1484. **Answer: C (2 & 4)**
Explanation:
* Local anesthetics are weak bases with pKas ranging from 7.6 to 8.9.

* A low pH will result in the formation of the ionized species because more protons (hydrogen ions) are available to bind to the nitrogen atoms in the local anesthetics.

* Local anesthetic concentration and volume have nothing to do with the fraction of anesthetics in the ionized form.

1485. **Answer: A (1, 2, & 3 )**

1486. **Answer: A (1, 2, & 3)**
Explanation:
Adding carbidopa decreases the amount of dopamine that is formed peripherally from dopa by dopa decarboxylase. Depression, psychosis, and other psychiatric adverse effects of L-dopa are mediated by CNS dopamine, so adding carbidopa does not make them less likely. The combination of L-dopa and carbidopa reduces the extracerebral metabolism of L-dopa, resulting in decreased peripheral adverse effects.
Source: Stern - 2004

1487. **Answer: A (1, 2, & 3)**
Source: Smith H, Board Review 2005

1488. **Answer: A (1, 2, & 3)**
Explanation:
Fluoxetine is an inhibitor of CYP 2D6
Source: Boswell MV, Board Review 2004

1489. **Answer: A (1, 2, & 3)**
Source: Smith H, Board Review 2005

1490. **Answer: C (2 & 4)**
Source: Smith H, Board Review 2005

1491. **Answer: B (1 & 3)**
Source: Smith H, Board Review 2005

1492. **Answer: A (1, 2, & 3)**
Source: Smith H, Board Review 2005

1493. **Answer: E (All)**
Source: Smith H, Board Review 2005

1494. **Answer: C (2 & 4)**
Source: Smith H, Board Review 2005

1495. **Answer: C (2 & 4)**
Source: Smith H, Board Review 2005

1496. **Answer: D (4 only)**
Explanation:
Amino ester local anesthetics include tetracaine, cocaine, prilocaine, and chloroprocaine. Amino amide local anesthetics include: lidocaine, etidocaine, bupivacaine, ropivacaine, mepivacaine, prilocaine, and levobupivacaine.
Source: Day MR