

# Pharmacodynamics & Pharmacokinetics

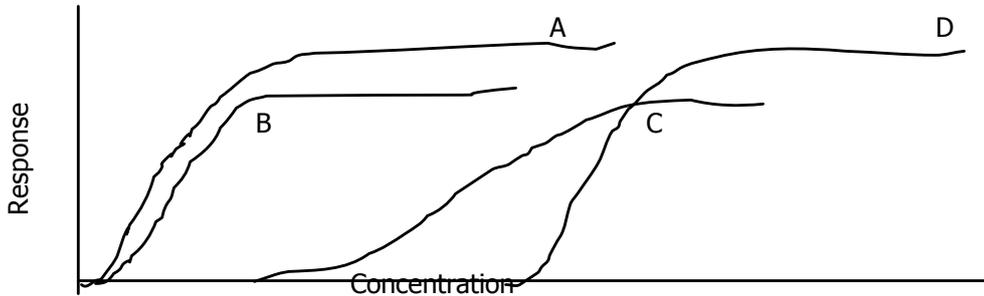
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May 2006

1. Which of the following drugs has an average half life of 50 hours?
  - a. Nortriptylline
  - b. Digoxin
  - c. Trimethoprim
  - d. Valproic acid
  - e. Lithium
  
2. All of the following have 100% oral bioavailability EXCEPT
  - a. Valproic acid
  - b. Trimethoprim
  - c. Digoxin
  - d. Diazepam
  - e. Lithium
  
3. All of the following drugs are >90% plasma protein bound EXCEPT
  - a. Diazepam
  - b. Frusemide
  - c. Fluoxetine
  - d. Gentamicin
  - e. Warfarin
  
4. Which of the following drugs has a volume of distribution >2000 l/70kg?
  - a. Aspirin
  - b. Imipramine
  - c. Digoxin
  - d. Propranolol
  - e. Chloroquine
  
5. What is the half life of a drug with a volume of distribution of 100l/70kg and a clearance of 7l/hr/70kg
  - a. 5 hours
  - b. 10 hours
  - c. 12.5 hours
  - d. 15 hours
  - e. 20 hours
  
6. All of the following drugs exhibit flow dependent elimination EXCEPT
  - a. Atenolol
  - b. Isoniazid
  - c. Propoxyphene
  - d. Amitriptylline
  - e. Lignocaine
  
7. Which of the following undergoes a phase I hydrolysis reaction? (biotransformation)
  - a. Ethanol
  - b. Naloxone
  - c. Morphine
  - d. Lignocaine
  - e. Diazepam

8. Which of the following undergoes acetylation in the liver? (Phase 2 biotransformation)
- Isoniazid
  - Acetaminophen
  - Salicylic acid
  - Epinephrine
  - Diazepam

9.



Which of these drugs is the most efficacious?

- Drugs A and B
  - Drug C
  - Drugs A and D
  - Drugs D and C
  - Drug A
10. Referring to the graph in question 9 – which of the drugs is most potent?
- A
  - B
  - C
  - D
  - A and B
11. EC<sub>50</sub> is
- Measured with a radioactive receptor
  - Always equal to K<sub>d</sub>
  - Drug concentration with 50% receptors bound
  - Representation of the receptors affinity for drug binding
  - Drug concentration with 50% of maximal drug effect
12. Which of the following will NOT alter the volume of distribution of a drug?
- Cardiac failure
  - Clearance
  - Age
  - Burns
  - Pleural effusion
13. Volume of distribution equals
- Dose given/plasma concentration
  - Total amount of drug in the body/plasma concentration
  - Urine drug concentration/plasma concentration
  - Dose given/urine concentration
  - Urine drug concentration/plasma concentration

14. Which of the following drugs undergoes rate limited elimination?
- Lignocaine
  - Morphine
  - Warfarin
  - Propranolol
  - Aspirin
15. Ligand gated channel receptors include all of the following EXCEPT
- GABA
  - Aspartate
  - Glycine
  - Glutamate
  - Ach-muscarinic
16. Regarding receptor regulation
- Receptor down regulation occurs over hours – days
  - Receptor responses to drugs often “desensitise” with time – this desensitisation is usually irreversible
  - The mechanism of agonist induced desensitisation of the nicotinic Ach receptor has been worked out in detail
  - All “internalised” receptors are degraded by lysosomes
  - None of the above are correct
17. Which of the following acts on intracellular receptors
- Serotonin
  - Glucagon
  - Corticosteroids
  - GABA
  - Insulin
18. Which of the following has ↑ bioavailability in the neonate when compared with older children/adults?
- Penicillin
  - Digoxin
  - Acetaminophen
  - Diazepam
  - Phenobarbital
19. First order kinetics
- Means rate of reaction is proportional to concentration
  - Are more common than zero order kinetics
  - Apply to exponential processes
  - Generally apply to high plasma concentrations (>20mg/100ml) of ethanol
  - Result in steady state concentrations after multiple dosing
20. A single compartment model means that
- One exponential term describes the decreasing plasma concentration of the drug
  - A single exponential term describes the rise in plasma concentration following oral administration
  - The drug does not penetrate tissues
  - The drug is restricted to the ECF
  - The drug is highly ionised

**Answers – Pharmacodynamics & Pharmacokinetics**  
**10 August 2004**

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1. B
2. C
3. D
4. E
5. B
6. A
7. D
8. A
9. C
10. A
11. E
12. B
13. B
14. E
15. E
16. A
17. C
18. A
19. D
20. A

# Analgesics/Toxicology MCQs

January 2007

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1. Regarding paraquat poisoning
  - a. The interval between ingestion and death is usually hours because of immediate pulmonary toxicity
  - b. Mechanism of action involves single electron oxidation of the herbicide to free radical species
  - c. Probable human lethal dosage is 50-500mg/kg
  - d. Oxygen high flow stops the pulmonary lesions occurring
  - e. Paraquat doesn't affect hepatic or renal functions
  
2. Regarding NSAIDs
  - a. Piroxicam has a half life of >50 hours
  - b. Aspirin reversibly inhibits COX
  - c. Diclofenac is a selective COX<sub>1</sub> inhibitor
  - d. Indomethacin is relatively free of adverse side effects
  - e. Ibuprofen is predominantly excreted unchanged in the urine
  
3. Regarding paracetamol (acetaminophen)
  - a. Less than 5% is excreted unchanged
  - b. Acetaminophen has no anti-inflammatory properties
  - c. The half life of paracetamol is 2-3 hours
  - d. Haemolytic anaemia has rarely been noted with paracetamol
  - e. All of the above are true
  
4. Regarding lead toxicity
  - a. Lead can induce an anaemia that is macrocytic
  - b. Young children absorb about 10% of ingested inorganic lead
  - c. Lead induced peripheral neuropathy often involves upper limb extensors resulting in wrist drop
  - d. High dose organic lead poisoning usually results in severe pneumonitis
  - e. All patients with elevated blood lead levels should have chelation treatment whether symptomatic or not
  
5. Regarding agents used to treat gout
  - a. As little as 8mg of colchicine taken over 24 hours may be fatal
  - b. Allopurinol is a xanthine oxidase stimulator
  - c. Probenecid is an organic alkaline substance
  - d. Colchicine may precipitate acute attacks of gout
  - e. Aspirin is effective against gout as it inhibits urate crystal phagocytosis
  
6. All of the following may be seen in organophosphate poisoning EXCEPT
  - a. Salivation
  - b. Tachycardia
  - c. Fibrillation of muscle fibres
  - d. Bronchospasm
  - e. Vomiting
  
7. Regarding aspirin
  - a. The average anti-inflammatory dose of aspirin is 0.6g up to 4 hourly
  - b. Aspirin's main side effect at usual doses is rash
  - c. Aspirin's antiplatelet effect lasts 8 – 10 days
  - d. At low toxic doses – respiratory acidosis may occur
  - e. Aspirin has a pka of 4.5

8. The main mechanism of action of colchicine is
- Inhibition of polymorphonuclear leucocytes
  - Inhibition of synoviocyte phagocytosis
  - Reduced formation of leukotriene D4
  - Inhibition of mononuclear phagocytes
  - Decreasing the body pool of urate
9. Aspirin inhibits all of the following EXCEPT
- Cyclo oxygenase
  - Recurrent miscarriages
  - Protacyclin synthesis
  - Kallikrein system
  - Lipo oxygenase
10. Acetaminophen (paracetamol) can undergo all of the following biotransformation reactions EXCEPT
- Deamination
  - N-oxidation
  - Glucuronidation
  - Sulphation
  - Glutathione conjugation
11. Aspirin
- Is hydrolysed to acetone and salicylate
  - Exhibits first order kinetics with elimination in low doses
  - Is mostly conjugated by the liver and excreted in the bile
  - Reversibly blocks the cyclooxygenase enzyme
  - Causes an immediate doubling of bleeding time
12. Regarding NSAIDs
- At high doses diclofenac demonstrates zero order kinetics
  - Aspirin is a reversible inhibitor of cyclooxygenase
  - Aspirin at doses of <2g/day reduces uric acid levels
  - All NSAIDs can be found in synovial fluid after repeated dosing
  - Use of ibuprofen and aspirin together increases the anti inflammatory effect
13. The metabolic pathway of detoxification that becomes increasingly important in paracetamol toxicity is
- Conjugation with glucuronide
  - Oxidation
  - Reduction
  - Cytochrome p-450 dependent glutathione conjugation
  - Methylation
14. Which of the following NSAIDs has a t<sub>1/2</sub> of about 1 hour
- Diclofenac
  - Naproxen
  - Piroxicam
  - Indomethacin
  - Ibuprofen
15. Which of the following symptoms of aspirin toxicity occurs at plasma salicylate concentrations of 100mg/dl?
- Tinnitus
  - Vasomotor collapse
  - Metabolic acidosis
  - Gastric intolerance
  - Renal failure

16. All of the following drugs can cause a wide anion gap metabolic acidosis EXCEPT
- Lithium
  - Methanol
  - Cyanide
  - Salicylates
  - Isoniazid
17. Which of the following drug overdoses may be amenable to the elimination technique of haemodialysis
- Calcium channel blockers
  - Benzodiazepines
  - Valproate
  - Quinidine
  - Opioids
18. Which of the following antidote – drug pairings is INCORRECT
- Acetaminophen → n-acetyl cysteine
  - $\beta$  blockers → glucagon
  - Opioids → naloxone
  - Benzodiazepines → Flumazenil
  - Tricyclic antidepressants → physostigmine
19. Regarding carbon monoxide poisoning
- CO has an affinity for Hb that is about 2000 times that of oxygen
  - Hyperbaric oxygen is indicated as a treatment for all patients with CO Hb levels >20%
  - The average concentration of CO in the atmosphere is about 0.1ppm
  - With room air at 1atm the elimination half time of CO is about 80 minutes
  - The foetus is resistant to the effects of CO exposure
20. "Erethism" is seen in which of the following intoxications
- Lead
  - Mercury
  - Arsine gas
  - Penicillamine
  - Arsenic
21. All of the following are NSAIDs EXCEPT
- Sulindac
  - Piroxicam
  - Gemfibrozil
  - Ketorolac
  - Diflunisal
22. Drugs which enhance other drug metabolism include all of the following EXCEPT
- Rifampicin
  - Ketoconazole
  - Phenobarbital
  - Griseofulvin
  - Phenytoin
23. Which of the following has a high extraction ratio
- Trimethoprim
  - Valproic acid
  - Lignocaine
  - Metronidazole
  - Diazepam

24. Heparin and protamine used together is an example of
- Physiologic antagonism
  - Chemical antagonism
  - Partial agonism
  - Irreversible antagonism
  - Agonal agonism
25. The half life of a drug with a Vd of 200ml/70kg and clearance of 10l/hr/70kg is
- 10 hours
  - 14 hours
  - 20 hours
  - 40 hours
  - Indeterminate

**Analgesics/Toxicology MCQs - Answers**  
**1 July 2004**

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- c
- a
- e
- c
- a
- b
- c
- a
- e
- a
- b
- d
- d
- a
- c
- a
- c
- e
- c
- b
- c
- b
- c
- b
- b

## PHARMACOLOGY MCQs May 2003

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1. Regarding local anaesthetics
  - a. Bupivacaine is metabolised faster than prilocaine
  - b. pKa of most local anaesthetics is 5 – 6
  - c. Local anaesthetic uptake is increased in an acidic environment
  - d. The charged form crosses the cell membrane more readily than the uncharged form
  - e. The charged form is more active at the receptor site
  
2. Regarding the relative size and susceptibility to block of types of nerve fibres
  - a. Pain fibres are affected after proprioception fibres
  - b. Large fibres are blocked before small
  - c. Myelinated nerves are blocked before unmyelinated of the same diameter
  - d. Slower firing fibres block before faster firing fibres
  - e. Central fibres are blocked before peripheral fibres
  
3. Regarding skeletal muscle relaxants
  - a. Suxemethonium is contraindicated in eye operations
  - b. Depolarising blockade increases intragastric pressure
  - c. Non depolarising blockade relaxes muscles equally
  - d. Suxemethonium may cause hypokalaemia
  - e. Depolarising blockade is usually reversed by administration of cholinesterase inhibitors
  
4. Regarding local anaesthetics, which of the following is true?
  - a. Local anaesthetics are weak acids
  - b. In the body they exist as either the uncharged base or as an anion
  - c. The charged form rapidly penetrates biologic membranes, whereas the unionised form is thought to be the most active at the receptor site
  - d. The local anaesthetic receptor is only accessible from the external side of the cell membrane – hence local anaesthetics can be less effective in infected tissues
  - e. The pKa of most local anaesthetics is 8.0 – 9.0, as infected tissues have a low extracellular pH, a very low fraction of nonionised local anaesthetic is available for diffusion into the cell.
  
5. For regional anaesthesia involving block of large nerves, maximal blood levels (and hence increased risk of toxic effects) occur in which of the following sites?
  - a. Intercostal
  - b. Caudal
  - c. Epidural
  - d. Brachial plexus
  - e. Sciatic nerve
  
6. The use of epinephrine with a local anaesthetic agent in spinal anaesthesia enhances the local anaesthetic effect by both reducing the systemic absorption and inhibiting release of substance P (reducing sensory firing). This results in prolonged local anaesthetic effect of about:
  - a. 10%
  - b. 25%
  - c. 50%
  - d. 75%
  - e. Epinephrine does not increase effect of spinal anaesthesia
  
7. How many ml of 2% lignocaine could be given to a 70kg patient before reaching the maximum allowable single dose of 4mg/kg?
  - a. 7ml
  - b. 10ml
  - c. 14ml
  - d. 20ml
  - e. 28ml

8. Select the incorrect statement regarding the two major classes of local anaesthetic agents
- Ester type local anaesthetics are metabolised by plasma cholinesterases and tend to have a shorter half life.
  - Amides are hydrolysed in the liver by the Cytochrome P450 system and tend to have a longer half life.
  - Local anaesthetics are usually weak acids.
  - Most local anaesthetics consist of a hydrophilic group and a lipophilic group connected by an amide or ester intermediate chain.
  - Liver dysfunction may increase the half life of amide local anaesthetics more than esters.
9. From the list below, the local anaesthetic with the longest duration of action is:
- Lignocaine
  - Bupivacaine
  - Mepivacaine
  - Prilocaine
  - Procaine
10. The following skeletal muscle relaxants undergo either spontaneous or hepatic metabolism, EXCEPT
- Vecuronium
  - Atracurium
  - Rocuronium
  - Pancuronium
  - None of the above
11. The following local anaesthetic agents and their side effects are correctly paired, EXCEPT:
- Procaine – methaemoglobinaemia
  - Bupivacaine – idioventricular rhythm
  - Tetracaine – allergic reaction
  - Lignocaine – circumoral numbness
  - Prilocaine – hypotension
12. Succinylcholine
- Produces a strong block of cardiac muscarinic receptors
  - At a dose of 1mg/kg can be expected to produce a neuromuscular blockade lasting 60 – 90 minutes
  - May cause a tachycardia if a second dose is given shortly after the first dose
  - May be associated with profound hypokalaemia, leading to cardiac arrest
  - Is contraindicated in eye surgery where the anterior chamber is to be opened

### Pharmacology Answers

- |      |       |
|------|-------|
| 1. E | 7. C  |
| 2. C | 8. C  |
| 3. B | 9. B  |
| 4. E | 10. D |
| 5. A | 11. A |
| 6. C | 12. E |

# Antibiotic MCQs

## January 2006

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1. All of the following antibiotics bind to the 50S subunit of the ribosome thereby inhibiting protein synthesis EXCEPT
  - a. Chloramphenicol
  - b. Erythromycin
  - c. Linezolid
  - d. Doxycycline
  - e. Clindamycin
  
2. Pharmacokinetics of doxycycline
  - a. 20% bound by serum proteins
  - b. 60-70% absorption after oral administration
  - c. Absorption is impaired by divalent cations,  $Al^{3+}$ , and antacids
  - d. Widely distributed especially into the CSF
  - e. Is eliminated via renal mechanisms
  
3. Which of the following inhibits DNA gyrase?
  - a. Penicillin
  - b. Trimethoprim
  - c. Chloramphenicol
  - d. Ciprofloxacin
  - e. Gentamicin
  
4. Resistance to Penicillin and other  $\beta$  lactams is due to
  - a. Modification of target PBPs
  - b. Impaired penetration of drug to target PBPs
  - c. Presence of an efflux pump
  - d. Inactivation of antibiotics by  $\beta$  lactamase
  - e. All of the above
  
5. All of the following are recognised adverse effects of isoniazid EXCEPT
  - a. Hepatitis
  - b. Peripheral neuropathy
  - c. Retrobulbar neuritis
  - d.  $\downarrow$  Phenytoin metabolism  $\rightarrow$   $\uparrow$  Phenytoin blood levels and toxicity
  - e. CNS toxicity
  
6. Regarding fluoroquinolones
  - a. Ciprofloxacin is ineffective in the treatment of gonococcus
  - b. Norfloxacin and Ciprofloxacin are predominantly faecally excreted
  - c. Norfloxacin and Ciprofloxacin have long half lives (12 hours)
  - d. They have poor oral bioavailability
  - e. May damage growing cartilage in children less than 18 years of age
  
7. Vancomycin
  - a. Is never orally administered as it is poorly absorbed from the GIT
  - b. Binds to the 30S unit on the ribosome and inhibits protein synthesis
  - c. 60% of vancomycin is excreted by glomerular filtration
  - d. Parenteral vancomycin is commonly used for treatment of infections caused by methicillin susceptible staphylococci
  - e. Adverse reactions to vancomycin are encountered in about 10% of patients

8. Regarding the "azole" group of antifungals
- Fluconazole has low water solubility
  - Ketoconazole may be given IV/PO
  - Itraconazole undergoes renal elimination
  - Clotrimazole is the treatment of choice for systemic candidiasis – given orally
  - They work by reduction of ergosterol synthesis by inhibition of fungal cytochrome P<sub>450</sub> enzymes
9. The fluoroquinolones
- May be administered to patients with severe campylobacter infection
  - Work by inhibiting dihydrofolate reductase
  - Have little effect against gram positive organisms
  - Are heavily metabolised in the liver
  - Are safe to give to breast feeding mothers
10. Clindamycin
- Inhibits bacterial cell wall synthesis
  - Is often used for prophylaxis of endocarditis in patients with Valvular disease who are undergoing dental procedures
  - Penetrates through BBB into CSF well
  - Works well against enterococci and gram negative aerobic organisms
  - Is 10% protein bound
11. Which of the following is a second generation cephalosporin?
- Ceftazidime
  - Cephalothin
  - Cefotaxime
  - Cefaclor
  - Cephalexin
12. The cephalosporin with the highest activity against gram positive cocci is
- Cefaclor
  - Cephalothin
  - Cefuroxime
  - Cefepime
  - Cefotaxime
13. Regarding the penicillins
- Penicillin ix excreted into breast milk to levels 3-15% of those present in the serum
  - Absorption of amoxyl is impaired by food
  - Benzathine penicillin is given PO
  - Penicillins are 90% excreted by glomerular filtration
  - Dosage of nafcillin should be adjusted in the presence of renal failure
14. Rifampicin
- Inhibits hepatic microsomal enzymes
  - Inhibits DNA synthesis
  - Is bactericidal for mycobacteria
  - Is not appreciably protein bound
  - Is predominantly excreted unchanged in the urine
15. Regarding resistance to antibiotics
- Penicillinases cannot inactivate cephalosporins
  - Macrolides can be inactivated by transferases
  - Mutation of aminoglycoside binding site is its main mechanism of resistance
  - Tetracycline resistance is a marker for multidrug resistance
  - Resistance to antibiotics is rarely plasmid encoded

16. Concerning toxicity of antibiotics
- Enamel dysplasia is common with aminoglycosides
  - Grey Baby Syndrome occurs with rifampicin use
  - A disulfiram like reaction can occur with macrolides
  - Haemolytic anaemias can occur with sulphonamide use
  - Nephritis is the most common adverse reaction with isoniazid
17. Which of the following is considered to be bacteriostatic?
- Penicillin
  - Chloramphenicol
  - Ciprofloxacin
  - Cefoxitin
  - Tobramycin
18. Half life of amphotericin B is
- 2 seconds
  - 20 minutes
  - 2 hours
  - 2 weeks
  - 2 months
19. Regarding antiseptic agents – all of the following are true EXCEPT
- Sodium hypochlorite is an effective antiseptic for intact skin
  - Potassium permanganate is an effective bactericidal agent
  - Formaldehyde may be used to disinfect instruments
  - Chlorhexidine is active against gram positive cocci
  - Ethanol is an effective skin antiseptic because it denatures microbial proteins
20. Ciprofloxacin
- Is a defluorinated analogue of nalidixic acid
  - Inhibits topoisomerases 2 and 3
  - Has no gram positive cover
  - Has bioavailability of 30%
  - May cause an arthropathy
21. Flucloxacillin
- Is ineffective against streptococci
  - Is active against enterococci and anaerobes
  - Blocks transpeptidation and inhibits peptidoglycan synthesis
  - Is poorly absorbed orally
  - Has excellent penetration into CNS and prostate
22. Aminoglycosides
- Have a  $\beta$  lactam ring
  - Can produce neuromuscular blockade
  - Are DNA gyrase inhibitors
  - Normally reach high CSF concentrations
  - Have good oral absorption but high first pass metabolism
23. Ribosomal resistance occurs with
- Sulphonamides
  - Penicillin
  - Fluoroquinolones
  - Macrolides
  - Trimethoprim

24. Regarding antivirals
- a. Delvirdine is a nucleoside reverse transcriptase inhibitor (NRTI)
  - b. Zidovudine (AZT) is a non nucleoside reverse transcriptase inhibitor (NNRTI)
  - c. NRTIs activate HIV-1 reverse transcriptase
  - d. Abacavir is a protease inhibitor
  - e. NRTIs require intracytoplasmic activation to the triphosphate form
25. All of the following are true regarding metronidazole EXCEPT
- a. It is used to treat giardia
  - b. It causes a metallic taste in the mouth
  - c. It inhibits alcohol dehydrogenase
  - d. It is used to treat gardnerella
  - e. It is useful against trichomonas vaginalis

**Antibiotic MCQs - Answers**  
**June 2004**

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- 1. d
- 2. c
- 3. d
- 4. e
- 5. c
- 6. e
- 7. e
- 8. e
- 9. a
- 10. b
- 11. d
- 12. b
- 13. a
- 14. c
- 15. c
- 16. d
- 17. b
- 18. d
- 19. a
- 20. d
- 21. c
- 22. b
- 23. d
- 24. e
- 25. c

# CNS Pharmacology Questions

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15 June 2004

1. Regarding antipsychotics as a group
  - a. Metabolites are important to the action of these drugs
  - b. Haloperidol has a higher systemic availability than thioridazine or chlorpromazine
  - c. Elimination half lives of these drugs range between 3 – 6 hours
  - d. This group of drugs generally has short clinical duration of action
  - e. Clozapine is a member of the dihydroindolone group
  
2. Which of the following antipsychotics (in excess dose) is responsible for cardiac arrhythmias?
  - a. Chlorpromazine
  - b. Clozapine
  - c. Thioridazine
  - d. Haloperidol
  - e. Thiothixene
  
3. Plasma lithium levels (assuming no change in daily lithium dose) may become toxic in the presence of all of the following EXCEPT
  - a. Pregnancy
  - b. Use of thiazides
  - c. Dehydration
  - d. Use of some non-steroidal anti-inflammatory drugs
  - e. Post partum state
  
4. Regarding pharmacokinetics of antidepressants
  - a. Most are highly protein bound
  - b. Fluoxetine is poorly absorbed
  - c. Tricyclics are predominantly excreted unchanged in the urine
  - d. Plasma half lives of antidepressants are mostly less than 10 hours
  - e. The half life of the older MAOIs is helpful in governing doses
  
5. Which of the following drugs is potentially dangerous in a single drug overdose
  - a. Moclobemide
  - b. Paroxetine
  - c. Sertraline
  - d. Trazodone
  - e. Amoxapine
  
6. Which of the following drugs is 99% protein bound in plasma
  - a. Gentamicin
  - b. Theophylline
  - c. Carbamazepine
  - d. Atenolol
  - e. Diazepam
  
7. Which of the following drugs is contraindicated (absolutely) in a patient with porphyria
  - a. Zolpidem
  - b. Chloral hydrate
  - c. Buspirone
  - d. Phenobarbitone
  - e. Diazepam

8. Regarding local anaesthetic agents
- Lignocaine is also an antiarrhythmic of the Vaughan Williams classification group 1A
  - At normal pH the larger fraction of local anaesthetic in the body fluids will be in the unchanged form
  - Bupivacaine may cause an apparent cyanosis in some patients
  - The duration of action of procaine will be increased in the presence of liver disease
  - Local anaesthetic agents block conduction in small myelinated axons prior to blockade of other axons
9. Regarding IV anaesthetic agents
- Ketamine is the induction agent of choice in a head injured patient
  - Propofol has a slow offset of action
  - Etomidate causes hypotension more commonly than thiopentone
  - Ideal agents for neuroleptanalgesia are fentanyl and droperidol
  - Thiopentone is metabolised at a rate of 40-50% per hour in humans following a single dose
10. Suxamethonium
- Is a non-depolarising neuromuscular blocking agent
  - Is contraindicated in all eye operations
  - Stimulates cardiac muscarinic receptors and autonomic ganglia
  - Its action is directly terminated by the action of plasma cholinesterase
  - Should not be administered to patients with burns >24 hours old because of its hypercalcaemic effect
11. Inhalational anaesthetics
- Enflurane is proconvulsant
  - Isoflurane is the inhalational agent of choice in patients with active IHD
  - Nitrous oxide is a useful adjunct to volatile anaesthetic use in women in the first trimester of pregnancy
  - Halothane has a MAC value of 75% making it less potent than desflurane
  - Desflurane is extensively metabolised via the liver
12. Phenytoin
- Is 20-30% bound to albumin
  - Is the drug treatment of choice in absence seizures
  - Undergoes flow limited elimination
  - Steady state mean plasma concentrations varies disproportionately with the dose
  - Preferentially binds to activated state sodium channels
13. Drugs of abuse can be extremely dangerous in the wrong hands! Which of the following is correct
- Ketamine is structurally related to psilocybin
  - LSD acts on various 5 HT receptor subtypes to produce its mind altering effects
  - Marijuana causes mydriasis and conjunctival infection
  - Cocaine has a long plasma half life
  - Amphetamine like drugs cause marked stimulation of appetite
14. Flumazenil
- Is cleared renally
  - Predictably reverses benzodiazepine induced respiratory depression
  - Antagonises CNS effects of opioids
  - Can precipitate seizures in mixed overdose
  - Has a half life of around 10 hours

15. Regarding non-depolarising muscle relaxants
- Pancuronium is eliminated via the kidney
  - Roacuronium is an isoquinolone derivative
  - Roacuronium undergoes Hoffman elimination
  - Vecuronium is eliminated predominantly via the kidney
  - Atracurium is eliminated via plasma pseudocholinesterase
16. Which of the following is a direct serotonin agonist
- Fluoxetine
  - Amitriptylline
  - Moclobemide
  - Ondansetron
  - Sumatriptan
17. The opiate associated with seizures when given in high doses to patients with renal failure is
- Morphine
  - Pethidine
  - Methadone
  - Fentanyl
  - Codeine
18. Ethanol
- Is lipid soluble
  - Is metabolised by the MEOS system at blood concentrations below 100mg/dl
  - Is a vasodilator
  - The most frequent neurological abnormality in chronic alcoholism is asymmetrical peripheral nerve injury specific to hands and feet
  - Alcohol is estimated to be responsible for approximately 10% of cases of hypertension
19. Which of the following local anaesthetic agents is an ester
- Bupivacaine
  - Ropivacaine
  - Prilocaine
  - Procaine
  - Lignocaine
20. Regarding temazepam – all of the following are true EXCEPT
- It produces inactive metabolites
  - It induces enzymes only to a minimal extent
  - It causes less hangover than nitrazepam
  - It causes rebound insomnia
  - It increases REM sleep
21. Regarding the antiepileptic drugs
- Lorazepam has documented efficacy against absence seizures
  - Phenytoin is able to stimulate its own metabolism by enzyme induction
  - Valproate has a large Vd (>500l/70kg)
  - The most common dose related adverse effects of Carbamazepine are ataxia and diplopia
  - Vigabatrin works by sodium channel blockade
22. Benzodiazepines
- Increase the duration of GABA gated chloride channel openings
  - Will depress (in high doses) the CNS to the point known as stage 3 of general anaesthesia
  - Bind to GABA $\beta$  receptors
  - Have extensive cardiodepressant effects in doses used to cause hypnosis
  - Decrease the duration of stage 2 NREM sleep

23. Regarding drugs used in Parkinson's disease
- Bromocriptine is the first line drug to treat Parkinson's disease in psychotic patients
  - 80-90% of a single dose of Levodopa enters the brain unaltered
  - Patients taking Selesiline to treat Parkinson's disease are limited in what they can eat because of the tyranine reaction phenomenon
  - Amantadine has anti Parkinsonian effects and is administered at a dose of 100mg bd
  - Anti muscarinic drugs are of benefit in elimination of bradykinesia in Parkinson's
24. A patient complains of post op muscle pain. This is most likely to be due to
- Suxamethonium
  - Propofol
  - Isoflurane
  - Atracurium
  - Ketamine
25. Lithium
- Has rapid onset of action
  - Is partially renally excreted
  - Has no neurological side effects
  - Has no contraindications to be given in conjunction with NSAIDS
  - Is contraindicated in sick sinus syndrome
26. With respect to opioid receptors
- Fentanyl works predominantly at the kappa receptors
  - Both  $\mu$  and delta receptors contribute to respiratory depression
  - Methadone is used for heroin withdrawal because its actions are predominantly at the delta receptors
  - Opioid receptors are coupled to a tyrosine kinase mechanism of action
  - Physical dependence and tolerance is caused by the rapid disintegration of receptors
27. Lignocaine
- Penetrates the axon in its charged form
  - Is more potent than bupivacaine
  - Has higher affinity for activated than resting sodium channels
  - Is a weak acid
  - Blocks voltage gated sodium channels at their extracellular end
28. Regarding adverse effects of propofol
- Post op vomiting is common
  - Hypertension is a complication
  - Severe acidosis can occur with its use in paediatric respiratory infections
  - It is positively inotropic
  - Tremor is a common side effect
29. Regarding inhaled anaesthetics
- They reduce MAP in direct proportion to their alveolar concentration
  - Nitrous oxide has a relatively low MAC
  - Halogenated agents have a lower brain: blood partition coefficient
  - Nitrous oxide causes a decrease in tidal volume and an increase in respiratory rate
  - They decrease the metabolic rate in the brain by decreasing cerebral blood flow
30. Local anaesthetic agents
- Are primarily  $K^+$  channel blockers
  - Prevent repolarisation of the membrane
  - Can be used with a vasodilator to prolong local action
  - Activity is enhanced by high extracellular  $K^+$  concentration
  - Activity is enhanced by high extracellular  $Ca^{2+}$

31. Which of the following side effects for given drugs is wrong
- Phenytoin – gum hypertrophy
  - Ethosuximide – hirsutism
  - Phenobarbital – enzyme induction
  - Carbamazepine – ataxia
  - Valproate – idiosyncratic hepatic toxicity
32. The main side effect of benztropine is
- Miosis
  - Confusion
  - Diarrhoea
  - GIT haemorrhage
  - Bronchorrhoea
33. Thiopentone
- Is not lipid soluble
  - Can be used IM or IV to induce anaesthesia
  - Has good analgesic properties
  - Can cause convulsive movements
  - Anaesthetic action is terminated by redistribution from CNS to other highly vascularised tissues
34. Nitrous oxide
- Can be used with O<sub>2</sub> as a carrier gas for halothane
  - Has poor analgesic properties
  - Forms a vapour which is explosive
  - Sensitises the heart to the action of catecholamines
  - Is an effective agent for inducing anaesthesia
35. Codeine
- Is more potent than fentanyl
  - Frequently causes diarrhoea
  - Is used to treat nausea caused by morphine
  - Occurs in foxglove plants
  - Depresses the cough reflex
36. Regarding GABA: all the following are true EXCEPT
- Receptor blockers have anticonvulsant activity
  - Is found in high concentrations in the basal ganglia
  - Concentrations in the basal ganglia are abnormally low in Huntington's chorea
  - Metabolism is inhibited by sodium valproate
  - Receptors are sensitive to the activity of benzodiazepines
37. Regarding local anaesthetics (LA)
- Lignocaine is metabolised in the liver faster than any of the other amide LA
  - Allergies to amide Las are more common than with the ester Las
  - Prilocaine is the most cardiotoxic LA
  - Cocaine is an amide LA which is often used as a drug of abuse
  - The +1/2 of lignocaine may be increased 3-4 fold in a patient with severe liver disease
38. Regarding nondepolarising muscle relaxants
- Jaw and eye muscles are paralysed before the limb and trunk muscles
  - Rocuronium is the most potent nondepolarising skeletal muscle relaxant
  - Atracurium is a steroid derivative
  - Vecuronium blocks cardiac muscarinic receptors, thus inducing moderate increase in heart rate
  - The nondepolarising agents produce a non-surmountable blockade

39. The skeletal muscle relaxant with the longest duration of action is
- Suxamethonium
  - Mivacurium
  - Pancuronium
  - Rocuronium
  - Vecuronium
40. Which of the following DOES NOT increase the susceptibility of a nerve fibre to conduction blockade by a local anaesthetic
- Small diameter
  - Myelination
  - Location in the periphery of a nerve
  - High firing rate
  - Short action potential duration

**Pharmacology Answers (CNS drugs)**  
**15 June 2004**

- |     |   |     |   |
|-----|---|-----|---|
| 1.  | b | 21. | d |
| 2.  | c | 22. | b |
| 3.  | a | 23. | d |
| 4.  | a | 24. | a |
| 5.  | e | 25. | e |
| 6.  | e | 26. | b |
| 7.  | d | 27. | c |
| 8.  | e | 28. | c |
| 9.  | d | 29. | a |
| 10. | c | 30. | d |
| 11. | a | 31. | b |
| 12. | d | 32. | b |
| 13. | b | 33. | e |
| 14. | d | 34. | a |
| 15. | a | 35. | e |
| 16. | e | 36. | a |
| 17. | b | 37. | e |
| 18. | c | 38. | a |
| 19. | d | 39. | c |
| 20. | e | 40. | e |

# CNS Drugs

## November 2006

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1. Diazepam
  - a. Is less lipid soluble than lorazepam
  - b. Binds sparingly to plasma proteins
  - c. Is potentiated by flumazenil
  - d. Undergoes microsomal oxidation in the kidney
  - e. Is mainly metabolised to desmethyl diazepam
  
2. Flumazenil
  - a. Is cleared renally
  - b. Predictably reverses benzodiazepine induced respiratory depression
  - c. Antagonises CNS effects of opioids
  - d. Can precipitate seizures in mixed overdose
  - e. Has a half life of around 10 hours
  
3. Regarding phenytoin toxicity
  - a. Vitamin D metabolism abnormalities can occur
  - b. Nystagmus is a late complication
  - c. Alopecia is a complication
  - d. Agranulocytosis occurs commonly
  - e. ↑ deep tendon reflexes are a manifestation of phenytoin toxicity
  
4. Regarding adverse effects of propofol
  - a. Severe acidosis can occur with its use in paediatric respiratory infection
  - b. Tremors are a common side effect
  - c. Post op vomiting is common
  - d. Hypertension is a complication
  - e. It is positively inotropic
  
5. Which of the following benzodiazepines has the shortest elimination half life
  - a. Lorazepam
  - b. Diazepam
  - c. Triazolam
  - d. Temazepam
  - e. Alprazolam
  
6. Suxamethonium
  - a. Is a non-depolarising neuromuscular blocking agent
  - b. Is contraindicated in all eye operations
  - c. Stimulates cardiac muscarinic receptors and autonomic ganglia
  - d. Its action is directly terminated by the action of plasma cholinesterase
  - e. Should not be administered to patients with burns > 24 hours old because of its hypercalcaemic effect
  
7. Which of the following side effects most occurs with haloperidol
  - a. Hypotension
  - b. Extrapyramidal side effects
  - c. Arrhythmias
  - d. Anti muscarinic side effects
  - e. Toxic confusional state

8. Regarding non-depolarising muscle relaxants
- Pancuronium is eliminated via the kidney
  - Rocuronium is an isoquinolone derivative
  - Rocuronium undergoes Hoffman elimination
  - Vecuronium is eliminated predominantly via the kidney
  - Atracurium is eliminated via plasma pseudocholinesterase
9. Lithium
- Has rapid onset of action
  - Is partly renally excreted
  - Has no interaction with NSAIDs
  - Is the treatment of choice for severe unipolar depression
  - Is contraindicated in sick sinus syndrome
10. Thiopentone
- Has low lipid solubility
  - May worsen cerebral oedema
  - Is not significantly metabolised
  - Has effects on the brain that are terminated by redistribution
  - Is likely to  $\uparrow$  MAP
11. Carbamazepine
- Can be used in the treatment of bipolar disorder, trigeminal neuralgia and epilepsy
  - Like phenytoin, enhances GABA activity at therapeutic concentrations
  - Has a rate of absorption that does not vary widely among different patients
  - Can cause a mild, but persistent leukopaenia and this is an indication to stop treatment
  - Has cytochrome p450 inhibiting properties
12. Which of the following is a direct serotonin agonist
- Fluoxetine
  - Amitriptylline
  - Moclobemide
  - Ondansetron
  - Sumatriptan
13. The opiate associated with seizures when given in high doses to patients with renal failure is
- Morphine
  - Pethidine
  - Methadone
  - Fentanyl
  - Codeine
14. Methadone is used in the treatment of narcotic addiction because
- It is a less efficacious analgesic compared with morphine
  - It produces a short withdrawal when ceased
  - It is a phenylpiperidine class narcotic agonist
  - It produces predictable effects when given orally
  - It does not produce constipation
15. Regarding the alcohols
- Alcohols can cause a wide anion gap metabolic acidosis
  - Formaldehyde is responsible for the toxic effects of methanol
  - A normal non-tolerant adult can metabolise 30-40grams of alcohol/hour
  - Ethanol is a potent vasoconstrictor
  - The volume of distribution of ethanol is 3L/kg

## Answers

1. E
2. D
3. A
4. A
5. C
6. C
7. B
8. A
9. E
10. D
11. A
12. E
13. B
14. D
15. A

# Drugs Acting on Smooth Muscle (GI and Resp)

August 2004

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1. Regarding H<sub>2</sub> receptor antagonists
  - a. They can be used to treat systemic mastocytosis
  - b. They are capable of >90% reduction in gastric acid secretion after a single dose
  - c. Up to 20% of ulcers may fail to heal with 4 weeks of conventional H<sub>2</sub> antagonist/antacid treatment
  - d. Cimetidine may cause reversible gynaecomastia and confusional states as side effects
  - e. All of the above are true
  
2. Agents promoting GI motility (ie prokinetic) include all of the following EXCEPT
  - a. Cisapride
  - b. Sucralfate
  - c. Metaclopramide
  - d. Bethanechol
  - e. Neostigmine
  
3. Regarding drugs that act on the colon
  - a. Lactulose is a stimulant laxative
  - b. Diphenoxylate is a weak analogue of fentanyl
  - c. Loperamide is safe for use in patients with diarrhoea from ulcerative colitis
  - d. Senna has a delayed onset of action
  - e. Kaolin is an adsorbent and is more effective in treatment of diarrhoea than loperamide or diphenoxylate
  
4. Proton pump inhibitors
  - a. Reversibly inhibit the gastric parietal cell proton pump H<sup>+</sup>/K<sup>+</sup>/ATPase
  - b. Are prodrugs
  - c. Are ineffective as part of the combination treatment for eradication of H pylori – famotidine should be used instead
  - d. A single daily dose inhibits 94% of gastric acid secretion
  - e. Have been shown to cause carcinoid tumours in humans when chronically administered
  
5. Regarding antiemetics
  - a. Diphenhydramine has a use for nausea associated with motion sickness
  - b. Prochlorperazine is a non-sedating antiemetic
  - c. Metoclopramide works peripherally, ie it does not enter the CNS
  - d. Ondansetron has higher efficacy and less adverse effects when compared with granisetron
  - e. Dexamethasone has antiemetic properties secondary to its clear effect on the CTZ
  
6. Glipizide
  - a. Initially binds to a specific receptor associated with a sodium channel in pancreatic B cells
  - b. Chronic administration reduces glucagon levels in NIDDMs
  - c. Has a half life of 6-8 hours
  - d. Is more efficacious than chlorpropamide
  - e. >80% is excreted unchanged in the urine
  
7. Insulin (subcut)
  - a. Is up to 60% cleared by the kidney
  - b. Inhibits protein synthesis
  - c. Causes lipodystrophy at injection sites as its most common adverse effect
  - d. Short acting insulin lasts 10 hours in the system
  - e. None of the above are true

8. Examples of vaccines using live agents include all of the following EXCEPT
- Measles
  - Mumps
  - Small pox
  - Influenza
  - Yellow fever
9. All of the following H<sub>1</sub> antagonists may cause moderate – marked sedation EXCEPT
- Diphenhydramine
  - Cyproheptadine
  - Pyrilamine
  - Promethazine
  - Loratadine
10. Histamine
- Causes ↑ BP by vasoconstricting effects
  - Stimulates gastric acid production
  - Is produced by bacteria in ciguatera fish causing GI upset and cardiovascular effects
  - Has insignificant effects on nerve endings
  - All of the above are correct
11. H<sub>2</sub> antagonists
- Irreversibly compete with histamine at H<sub>2</sub> receptors
  - Also bind to H<sub>1</sub> receptors
  - Famotidine inhibits the cytochrome P 450 system
  - Ranitidine is 7 times more potent than famotidine in treatment of duodenal ulcers
  - Ranitidine may ↑ bioavailability of ethanol by >40% in normal individuals
12. Regarding the ergot alkaloids
- Ergotism may be defined as a spectrum of hallucinations, convulsions and “fiery limb pains”
  - Bromocriptine has profound effects on uterine smooth muscle stimulation
  - Methysergide is a peptide alkaloid
  - PCP is an ergot alkaloid
  - Ergotamine constricts most human blood vessels and is short acting
13. Regarding drugs affecting serotonin
- Sumatriptan is a serotonin antagonist
  - Buspirone is a 5 HT<sub>1a</sub> agonist
  - Cyproheptadine is a competitive serotonin blocker in doses of 120 – 160mg/day
  - Ketanserin blocks 5 HT receptors and B receptors
  - Ondansetron is a 5 HT<sub>2</sub> antagonist
14. Methylxanthines
- Have negative inotropic/chronotropic effects
  - Have antidiuretic effects
  - Inhibit the enzyme phosphodiesterase at high concentrations
  - Theophylline has less selective smooth muscle effects compared with caffeine
  - Have no effect on skeletal muscle
15. Regarding drugs used to treat asthma
- Antimuscarinic agents are much more potent than B<sub>2</sub> agonists in reversing bronchospasm
  - Salmeterol has a duration of action of 4 – 6 hours
  - Isoproterenol is a potent bronchodilator but may cause cardiac arrhythmias
  - Cromolyn sodium is an excellent agent for treatment of acute asthma
  - Aminophylline contains 66% theophylline by weight

16. H<sub>1</sub> antagonist toxicities include all of the following EXCEPT
- Blurred vision
  - Diarrhoea
  - Orthostatic hypotension
  - Sleepiness
  - Dry mouth
17. Which of the following H<sub>1</sub> antagonists is also a potent local anaesthetic agent
- Loratadine
  - Cyclizine
  - Chlorpheniramine
  - Promethazine
  - Cetirazoline
18. Regarding sulfonylureas
- They increase insulin release from the pancreas by inhibition of sodium ion flux
  - They stimulate insulin synthesis
  - Tolbutamide is a second generation drug which should be used with caution in elderly diabetics
  - Glipizide therapy is contraindicated in patients with significant hepatic impairment
  - Chlorpropamide has the shortest half life of all the sulfonylureas
19. Metaclopramide
- Is a dopamine agonist
  - Is prokinetic
  - Increases gastric secretion
  - Releases adrenaline from neurons in the enteric nervous system's myenteric plexus
  - Has a half life of 8 hours – so is given 3 x per day
20. Which of the following statements about laxatives is correct
- Magnesium sulphate is well absorbed from the GIT
  - The action of castor oil depends on its lubricant properties
  - Senna contains substances that on hydrolysis yield chemicals which increase colonic activity
  - Sodium sulphate acts as an irritant purgative
  - Liquid paraffin acts by osmotically increasing the volume of gut contents
21. Ipratropium bromide
- Is a tertiary ammonium derivative of datura
  - Readily enters the CNS
  - Inhibits bronchoconstriction equally in all patients
  - Is slightly less effective than B<sub>2</sub> agonist agents in reversing Bronchospasm
  - Is useful if given IV
22. Regarding asthma treatment
- Salmeterol is a potent selective B<sub>2</sub> agonist with a short duration of action
  - Corticosteroids work in asthma by direct action on relaxing airway smooth muscle
  - Cromolyn sodium is an excellent agent given IM 3 monthly to prevent exercise induced asthma
  - ≥80-90% of the total dose of aerosol medication is deposited in the mouth/pharynx
  - Theophylline may produce seizures at blood concentrations around 20mg/l
23. Regarding antacids
- Calcium carbonate can cause milk alkali syndrome as an adverse effect
  - Aluminium hydroxide can cause constipation
  - Sodium bicarbonate is a highly soluble salt
  - Magnesium hydroxide is one of the constituents in Mylanta
  - All of the above are true

24. In which capacity does adrenaline act when it is given to treat asthma
- Partial agonist causing mild bronchodilation
  - Physiological antagonist of histamine
  - Competitive antagonist of histamine
  - Chemical antagonist of histamine
  - An irreversible antagonist
25. Salbutamol
- Stimulates adenylyl cyclase in smooth muscle cells
  - Rarely causes tachycardia
  - Is a B<sub>1</sub> selective adrenoceptor agonist
  - Should be used with caution in hyperkalaemic patients
  - Rarely results in tolerance through high use

**MCQs 10 August 2004**

**Answers**

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- E
  - B
  - D
  - B
  - A
  - B
  - A
  - D
  - E
  - B
  - E
  - A
  - B
  - C
  - C
  - B
  - D
  - D
  - B
  - C
  - D
  - D
  - E
  - B
  - A
-

# GENERAL Pharmacology MCQs

August 2006

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1. Regarding diuretics
  - a. They work to lower BP initially by ↓ peripheral vascular resistance.
  - b. Thiazide diuretics are potassium sparing.
  - c. They are effective in lowering BP 20-25mmHg in most patients.
  - d. BP response to thiazides continues to increase at doses greater than usual therapeutic dose.
  - e. Diuretics may impair glucose tolerance.
  
2. Which of the following drug's metabolism characteristics are bimodally distributed in the population?
  - a. Sodium nitroprusside
  - b. Clonidine
  - c. Minoxidil
  - d. Hydralazine
  - e. Phentolamine
  
3. Regarding the ACE inhibitors
  - a. They inhibit peptidyl dipeptidase thus preventing the inactivation of bradykinin.
  - b. Captopril is a prodrug
  - c. They are used with caution in patients with IDH as reflex sympathetic activation occurs 2° to the hypotensive effects of the ACE inhibitors.
  - d. They have no role in treating the normotensive diabetic patients.
  - e. They are useful antihypertensives in late pregnancy.
  
4. Which of the following calcium channel blockers is excreted predominantly in the faeces?
  - a. Nifedipine
  - b. Felodipine
  - c. Diltazem
  - d. Nimodipine
  - e. Verapamil
  
5. Which of the following increases the risk of digoxin induced arrhythmias?
  - a. Hyperkalaemia
  - b. Hypercalcaemia
  - c. Hypermagnesaemia
  - d. Hyperuricaemia
  - e. Hypernatraemia
  
6. Propranolol
  - a. Is a β1 specific blocker
  - b. Causes prominent postural hypotension
  - c. Has no effect of plasma lipids
  - d. Inhibits the stimulation of rennin production by catecholamines
  - e. Has a  $t_{1/2}$  of 12 hours
  
7. Hydralazine
  - a. Dilates veins but not arterioles
  - b. Is contraindicated in the treatment of pre-eclampsia
  - c. Can cause an SLE type syndrome in up to 10-20% of patients
  - d. Causes orthostatic hypotension in many cases
  - e. Is extremely useful as a single agent in the treatment of hypertension

8. Regarding atropine
- It is a quaternary amine alkaloid ester of tropic acid
  - About 60% of the dose of atropine is excreted unchanged in the urine
  - Atropine has prominent stimulant CNS effects when given in standard usual doses
  - It causes irreversible blockade of the actions of cholinomimetics at muscarinic receptors
  - It causes diarrhoea
9.  $\beta$  blockers have many different properties. Which of the following statements is correct?
- Atenolol has high lipid solubility
  - Esmolol has partial agonist activity
  - Labetalol is  $\beta_1$  selective
  - The elimination half life of sotalol is 12 hours
  - Timolol has prominent local anaesthetic activity
10. Digoxin has all of the following actions on cardiac electrical function EXCEPT
- $\downarrow$  atrial muscle automaticity
  - $\downarrow$  AV node conduction velocity
  - $\downarrow$  refractory period in Purkinje system and ventricles
  - ST depression on ECG – especially with chronic use
  - Bigeminy can occur
11. Amiodarone (oral)
- Has a half life of 5 days
  - Increases clearance of warfarin, theophylline and other drugs
  - Has high affinity for activated sodium channels
  - Causes torsades de pointes frequently because of prolongation of the QT interval
  - Causes photodermatitis in about 25% of patients
12. Loop diuretics
- Consist of spironolactone and bendrofluazide
  - Inhibit the  $\text{Na}^+ \text{K}^+ 2\text{Cl}^-$  transport pump in the distal tubule of the kidney
  - Can cause a usually irreversible ototoxic reaction
  - Can cause hyperuricaemia and precipitate gout
  - Inhibit renal prostaglandin synthesis
13. Regarding the alpha blockers
- Phenoxybenzamine binds to  $\alpha$  receptors causing irreversible blockade
  - Prazosin has a much higher affinity for  $\alpha_2$  receptors compared with  $\alpha_1$  receptors
  - They may precipitate urinary retention
  - They have no effect on peripheral vascular resistance
  - Doxazosin has a short half life of 2 hours
14. Sotalol
- Is a selective  $\beta_1$  blocker
  - Is only effective in treatment of supraventricular arrhythmias
  - Is extensively metabolised in the liver
  - Causes torsade de pointes when plasma concentrations of sotalol are normal-low
  - Has a usual effective dosage of 80-320mg twice daily
15. Which of the following drugs causes cinchonism?
- Tocainide
  - Lignocaine
  - Quinidine
  - Flecainide
  - Procainamide

16. Which of the following IV antihypertensive drugs also inhibits insulin release?
- Diazoxide
  - Hydralazine
  - Labetalol
  - Fenoldopram
  - Nitroprusside
17. LMW heparin
- MW = 15000
  - Inhibits activated factor X
  - Has unpredictable pharmacokinetics
  - Can be used with minimal problems in renal failure
  - Is readily reversed with protamine sulphate
18. Lignocaine
- Is class 1A antiarrhythmic
  - Blocks both activated and inactivated sodium channels
  - Has good oral bioavailability
  - Is the treatment of choice for most SVTs
  - Elimination half life is decreased in patients with hepatic impairment
19. Flecainide
- Is a class III antiarrhythmic
  - Half life is approximately 2 hours
  - Potently blocks potassium channels
  - Is extensively hepatically metabolised
  - Has potent antimuscarinic effects
20. Heparin
- May cause severe thrombocytopenia in 25% of patients
  - Binds to antithrombin 3 thereby stimulating production of more clotting factors
  - Is contraindicated in pregnancy
  - Action can be reversed by protamine
  - Can be administered SC, IM, or IV
21. Regarding fibrinolytic agents
- Streptokinase is synthesised by staphylococci
  - They all activate fibrinogen
  - They are all of similar cost
  - TPA is safer than streptokinase in elderly patients
  - Streptokinase causes systemic fibrinolysis
22. Regarding calcium channel blockers
- Calcium channel blockers are not bound to plasma proteins
  - Nifedipine has less vascular potency than verapamil
  - Felodipine has been shown to inhibit insulin release in humans
  - Diltiazem has a plasma half life of 3 – 4 hours
  - Verapamil has a high affinity for cerebral blood vessels thus decreasing vaso spasm post subarachnoid haemorrhage
23. Digoxin
- Is poorly lipid soluble
  - Is extensively metabolised
  - Has minimal GI toxicity
  - Is 80% bound to plasma proteins
  - Has half life in the body of 40 hours

24. Drugs which may increase digoxin effect include all of the following EXCEPT
- Antacids
  - Diltiazem
  - Furosemide
  - Quinidine
  - Amiodarone
25. Methyldopa
- Lowers the heart rate and cardiac output more than clonidine does
  - Causes reduction in renal vascular resistance
  - Has minimal CNS side effects
  - Has 80% bioavailability
  - Usual therapeutic dose is about 1-2mg/day
26. All of the following drugs may share cross reactivity secondary to the presence of a sulphonamide moiety EXCEPT
- Acetazolamide
  - Chlorothiazide
  - Furosemide
  - Bymetamide
  - Amiloride
27. Verapamil
- Is contraindicated in treatment of SVT because of the side effect of hypotension
  - Is the agent of choice for treatment of arrhythmias in children less than one
  - Is not hepatically metabolised
  - Is a class 3 antiarrhythmic
  - Can cause VF
28. In patient on warfarin, an increase in INR tends to occur with
- Cholestyramine
  - Vitamin K
  - Metronidazole
  - Rifampicin
  - Phenobarbital
29. Sodium nitroprusside
- ↑ cGMP by release of nitric oxide
  - ↓ vascular resistance but ↑ blood pressure by direct action on sympathetic nervous system
  - Is a complex of calcium and cyanide groups
  - Is predominantly an arteriodilator
  - Has onset of action in 10-15 minutes
30. The toxic effects of organic nitrates include
- Met haemoglobinaemia
  - Cyanide poisoning
  - Bradycardia
  - Precipitating glaucoma
  - Bronchospasm
31. Most  $\beta$  blockers
- Have a small volume of distribution
  - Have poor bioavailability
  - Have  $t_{1/2}$  lives of 3 – 10 hours
  - Are highly lipid soluble and hence cross the blood brain barrier
  - Are rarely excreted unchanged

32. Which of the following antihypertensive drugs acts on the vasomotor centre
- Prazosin
  - Clonidine
  - Hydralazine
  - Reserpine
  - Losartan
33. Regarding streptokinase
- The GUSTO trial showed a higher risk of haemorrhagic shock compared to tPA
  - It is administered IV as a single rapid bolus dose
  - It converts plasmin to plasminogen
  - There are no in vivo inhibitors for the streptokinase – proactivation complex
  - Urokinase is made by bacteria
34. Concerning toxicity of lignocaine
- Lignocaine is highly cardiotoxic compared to other local anaesthetics
  - Side effects are not dose related
  - Lignocaine exacerbates ventricular arrhythmias in about 10% of patients
  - Hypotension is very common with lignocaine toxicity
  - Neurological side effects are uncommon with lignocaine toxicity
35. Noradrenaline
- Is more potent than Salbutamol at  $\beta_2$  receptors
  - Is less potent than isoprenaline at  $\alpha$  receptors
  - Antagonises the effects of dopamine
  - Has similar potency to adrenaline at  $\beta_1$  receptors
  - Is less potent than adrenaline at  $\alpha$  receptors
36. The adverse effects of captopril include
- Hypokalaemia
  - $\uparrow$  cholesterol
  - Polycythaemia
  - Dry cough
  - Hypoglycaemia
37. Regarding local anaesthetics
- Bupivacaine is metabolised faster than prilocaine
  - pKa of most local anaesthetics is 5 – 6
  - Local anaesthetic uptake is increased in an acidic environment
  - The charged form crosses the cell membrane more readily than the uncharged form
  - The charged form is more active at the receptor site
38. Regarding the relative size and susceptibility to block of types of nerve fibres
- Pain fibres are affected after proprioception fibres
  - Large fibres are blocked before small
  - Myelinated nerves are blocked before unmyelinated of the same diameter
  - Slower firing fibres block before faster firing fibres
  - Central fibres are blocked before peripheral fibres
39. Regarding skeletal muscle relaxants
- Suxemethonium is contraindicated in eye operations
  - Depolarising blockade increases intragastric pressure
  - Non depolarising blockade relaxes muscles equally
  - Suxemethonium may cause hypokalaemia
  - Depolarising blockade is usually reversed by administration of cholinesterase inhibitors

40. Regarding local anaesthetics, which of the following is true?
- Local anaesthetics are weak acids
  - In the body they exist as either the uncharged base or as an anion
  - The charged form rapidly penetrates biologic membranes, whereas the unionised form is thought to be the most active at the receptor site
  - The local anaesthetic receptor is only accessible from the external side of the cell membrane – hence local anaesthetics can be less effective in infected tissues
  - The pKa of most local anaesthetics is 8.0 – 9.0, as infected tissues have a low extracellular pH, a very low fraction of nonionised local anaesthetic is available for diffusion into the cell.
41. For regional anaesthesia involving block of large nerves, maximal blood levels (and hence increased risk of toxic effects) occur in which of the following sites?
- Intercostal
  - Caudal
  - Epidural
  - Brachial plexus
  - Sciatic nerve
42. The use of epinephrine with a local anaesthetic agent in spinal anaesthesia enhances the local anaesthetic effect by both reducing the systemic absorption and inhibiting release of substance P (reducing sensory firing). This results in prolonged local anaesthetic effect of about:
- 10%
  - 25%
  - 50%
  - 75%
  - Epinephrine does not increase effect of spinal anaesthesia
43. How many ml of 2% lignocaine could be given to a 70kg patient before reaching the maximum allowable single dose of 4mg/kg?
- 7ml
  - 10ml
  - 14ml
  - 20ml
  - 28ml
44. Select the incorrect statement regarding the two major classes of local anaesthetic agents
- Ester type local anaesthetics are metabolised by plasma cholinesterases and tend to have a shorter half life.
  - Amides are hydrolysed in the liver by the Cytochrome P450 system and tend to have a longer half life.
  - Local anaesthetics are usually weak acids.
  - Most local anaesthetics consist of a hydrophilic group and a lipophilic group connected by an amide or ester intermediate chain.
  - Liver dysfunction may increase the half life of amide local anaesthetics more than esters.
45. From the list below, the local anaesthetic with the longest duration of action is:
- Lignocaine
  - Bupivacaine
  - Mepivacaine
  - Prilocaine
  - Procaine
46. The following skeletal muscle relaxants undergo either spontaneous or hepatic metabolism, EXCEPT
- Vecuronium
  - Atracurium
  - Rocuronium
  - Pancuronium
  - None of the above

47. The following local anaesthetic agents and their side effects are correctly paired, EXCEPT:
- Procaine – methaemoglobinaemia
  - Bupivacaine – idioventricular rhythm
  - Tetracaine – allergic reaction
  - Lignocaine – circumoral numbness
  - Prilocaine – hypotension
48. Succinylcholine
- Produces a strong block of cardiac muscarinic receptors
  - At a dose of 1mg/kg can be expected to produce a neuromuscular blockade lasting 60 – 90 minutes
  - May cause a tachycardia if a second dose is given shortly after the first dose
  - May be associated with profound hypokalaemia, leading to cardiac arrest
  - Is contraindicated in eye surgery where the anterior chamber is to be opened
49. Regarding antipsychotics as a group
- Metabolites are important to the action of these drugs
  - Haloperidol has a higher systemic availability than thioridazine or chlorpromazine
  - Elimination half lives of these drugs range between 3 – 6 hours
  - This group of drugs generally has short clinical duration of action
  - Clozapine is a member of the dihydroindolone group
50. Which of the following antipsychotics (in excess dose) is responsible for cardiac arrhythmias?
- Chlorpromazine
  - Clozapine
  - Thioridazine
  - Haloperidol
  - Thiothixene
51. Plasma lithium levels (assuming no change in daily lithium dose) may become toxic in the presence of all of the following EXCEPT
- Pregnancy
  - Use of thiazides
  - Dehydration
  - Use of some non-steroidal anti-inflammatory drugs
  - Post partum state
52. Regarding pharmacokinetics of antidepressants
- Most are highly protein bound
  - Fluoxetine is poorly absorbed
  - Tricyclics are predominantly excreted unchanged in the urine
  - Plasma half lives of antidepressants are mostly less than 10 hours
  - The half life of the older MAOIs is helpful in governing doses
53. Which of the following drugs is potentially dangerous in a single drug overdose
- Moclobemide
  - Paroxetine
  - Sertraline
  - Trazodone
  - Amoxapine
54. Which of the following drugs is 99% protein bound in plasma
- Gentamicin
  - Theophylline
  - Carbamazepine
  - Atenolol
  - Diazepam

55. Which of the following drugs is contraindicated (absolutely) in a patient with porphyria
- Zolpidem
  - Chloral hydrate
  - Buspirone
  - Phenobarbitone
  - Diazepam
56. Regarding local anaesthetic agents
- Lignocaine is also an antiarrhythmic of the Vaughan Williams classification group 1A
  - At normal pH the larger fraction of local anaesthetic in the body fluids will be in the unchanged form
  - Bupivacaine may cause an apparent cyanosis in some patients
  - The duration of action of procaine will be increased in the presence of liver disease
  - Local anaesthetic agents block conduction in small myelinated axons prior to blockade of other axons
57. Regarding IV anaesthetic agents
- Ketamine is the induction agent of choice in a head injured patient
  - Propofol has a slow offset of action
  - Etomidate causes hypotension more commonly than thiopentone
  - Ideal agents for neuroleptanalgesia are fentanyl and droperidol
  - Thiopentone is metabolised at a rate of 40-050% per hour in humans following a single dose
58. Suxamethonium
- Is a non-depolarising neuromuscular blocking agent
  - Is contraindicated in all eye operations
  - Stimulates cardiac muscarinic receptors and autonomic ganglia
  - Its action is directly terminated by the action of plasma cholinesterase
  - Should not be administered to patients with burns >24 hours old because of its hypercalcaemic effect
59. Inhalational anaesthetics
- Enflurane is proconvulsant
  - Isoflurane is the inhalational agent of choice in patients with active IHD
  - Nitrous oxide is a useful adjunct to volatile anaesthetic use in women in the first trimester of pregnancy
  - Halothane has a MAC value of 75% making it less potent than desflurane
  - Desflurane is extensively metabolised via the liver
60. Phenytoin
- Is 20-30% bound to albumin
  - Is the drug treatment of choice in absence seizures
  - Undergoes flow limited elimination
  - Steady state mean plasma concentrations varies disproportionately with the dose
  - Preferentially binds to activated state sodium channels
61. Drugs of abuse can be extremely dangerous in the wrong hands! Which of the following is correct
- Ketamine is structurally related to psilocybin
  - LSD acts on various S HT receptor subtypes to produce its mind altering effects
  - Marijuana causes mydriasis and conjunctival infection
  - Cocaine has a long plasma half life
  - Amphetamine like drugs cause marked stimulation of appetite

62. Flumazenil
- Is cleared renally
  - Predictably reverses benzodiazepine induced respiratory depression
  - Antagonises CNS effects of opioids
  - Can precipitate seizures in mixed overdose
  - Has a half life of around 10 hours
63. Regarding non-depolarising muscle relaxants
- Pancuronium is eliminated via the kidney
  - Roacuronium is an isoquinolone derivative
  - Roacuronium undergoes Hoffman elimination
  - Vecuronium is eliminated predominantly via the kidney
  - Atracurium is eliminated via plasma pseudocholinesterase
64. Which of the following is a direct serotonin agonist
- Fluoxetine
  - Amitriptylline
  - Moclobemide
  - Ondansetron
  - Sumatriptan
65. The opiate associated with seizures when given in high doses to patients with renal failure is
- Morphine
  - Pethidine
  - Methadone
  - Fentanyl
  - Codeine
66. Ethanol
- Is lipid soluble
  - Is metabolised by the MEOS system at blood concentrations below 100mg/dl
  - Is a vasodilator
  - The most frequent neurological abnormality in chronic alcoholism is asymmetrical peripheral nerve injury specific to hands and feet
  - Alcohol is estimated to be responsible for approximately 10% of cases of hypertension
67. Which of the following local anaesthetic agents is an ester
- Bupivacaine
  - Ropivacaine
  - Prilocaine
  - Procaine
  - Lignocaine
68. Regarding temazepam – all of the following are true EXCEPT
- It produces inactive metabolites
  - It induces enzymes only to a minimal extent
  - It causes less hangover than nitrazepam
  - It causes rebound insomnia
  - It increases REM sleep
69. Regarding the antiepileptic drugs
- Lorazepam has documented efficacy against absence seizures
  - Phenytoin is able to stimulate its own metabolism by enzyme induction
  - Valproate has a large Vd (>500l/70kg)
  - The most common dose related adverse effects of Carbamazepine are ataxia and diplopia
  - Vigabatrin works by sodium channel blockade

70. Benzodiazepines
- Increase the duration of GABA gated chloride channel openings
  - Will depress (in high doses) the CNS to the point known as stage 3 of general anaesthesia
  - Bind to GABA $\beta$  receptors
  - Have extensive cardiodepressant effects in doses used to cause hypnosis
  - Decrease the duration of stage 2 NREM sleep
71. Regarding drugs used in Parkinson's disease
- Bromocriptine is the first line drug to treat Parkinson's disease in psychotic patients
  - 80-90% of a single dose of Levodopa enters the brain unaltered
  - Patients taking Selesiline to treat Parkinson's disease are limited in what they can eat because of the tyranine reaction phenomenon
  - Amantadine has anti Parkinsonian effects and is administered at a dose of 100mg bd
  - Anti muscarinic drugs are of benefit in elimination of bradykinesia in Parkinson's
72. A patient complains of post op muscle pain. This is most likely to be due to
- Suxamethonium
  - Propofol
  - Isoflurane
  - Atracurium
  - Ketamine
73. Lithium
- Has rapid onset of action
  - Is partially renally excreted
  - Has no neurological side effects
  - Has no contraindications to be given in conjunction with NSAIDS
  - Is contraindicated in sick sinus syndrome
74. With respect to opioid receptors
- Fentanyl works predominantly at the kappa receptors
  - Both MU and delta receptors contribute to respiratory depression
  - Methadone is used for heroin withdrawal because its actions are predominantly at the delta receptors
  - Opioid receptors are coupled to a tyrosine kinase mechanism of action
  - Physical dependence and tolerance is caused by the rapid disintegration of receptors
75. Lignocaine
- Penetrates the axon in its charged form
  - Is more potent than bupivacaine
  - Has higher affinity for activated than resting sodium channels
  - Is a weak acid
  - Blocks voltage gated sodium channels at their extracellular end
76. Regarding adverse effects of propofol
- Post op vomiting is common
  - Hypertension is a complication
  - Severe acidosis can occur with its use in paediatric respiratory infections
  - It is positively inotropic
  - Tremor is a common side effect
77. Regarding inhaled anaesthetics
- They reduce MAP in direct proportion to their alveolar concentration
  - Nitrous oxide has a relatively low MAC
  - Halogenated agents have a lower brain: blood partition coefficient
  - Nitrous oxide causes a decrease in tidal volume and an increase in respiratory rate
  - They decrease the metabolic rate in the brain by decreasing cerebral blood flow

78. Local anaesthetic agents
- Are primarily  $K^+$  channel blockers
  - Prevent repolarisation of the membrane
  - Can be used with a vasodilator to prolong local action
  - Activity is enhanced by high extracellular  $K^+$  concentration
  - Activity is enhanced by high extracellular  $Ca^{2+}$
79. Which of the following side effects for given drugs is wrong
- Phenytoin – gum hypertrophy
  - Ethosuximide – hirsutism
  - Phenobarbital – enzyme induction
  - Carbamazepine – ataxia
  - Valproate – idiosyncratic hepatic toxicity
80. The main side effect of benztropine is
- Miosis
  - Confusion
  - Diarrhoea
  - GIT haemorrhage
  - Bronchorrhoea
81. Thiopentone
- Is not lipid soluble
  - Can be used IM or IV to induce anaesthesia
  - Has good analgesic properties
  - Can cause convulsive movements
  - Anaesthetic action is terminated by redistribution from CNS to other highly vascularised tissues
82. Nitrous oxide
- Can be used with  $O_2$  as a carrier gas for halothane
  - Has poor analgesic properties
  - Forms a vapour which is explosive
  - Sensitises the heart to the action of catecholamines
  - Is an effective agent for inducing anaesthesia
83. Codeine
- Is more potent than fentanyl
  - Frequently causes diarrhoea
  - Is used to treat nausea caused by morphine
  - Occurs in foxglove plants
  - Depresses the cough reflex
84. Regarding GABA: all the following are true EXCEPT
- Receptor blockers have anticonvulsant activity
  - Is found in high concentrations in the basal ganglia
  - Concentrations in the basal ganglia are abnormally low in Huntington's chorea
  - Metabolism is inhibited by sodium valproate
  - Receptors are sensitive to the activity of benzodiazepines
85. Regarding local anaesthetics (LA)
- Lignocaine is metabolised in the liver faster than any of the other amide LA
  - Allergies to amide LAs are more common than with the ester LAs
  - Prilocaine is the most cardiotoxic LA
  - Cocaine is an amide LA which is often used as a drug of abuse
  - The  $t_{1/2}$  of lignocaine may be increased 3-4 fold in a patient with severe liver disease

86. Regarding nondepolarising muscle relaxants
- Jaw and eye muscles are paralysed before the limb and trunk muscles
  - Rocuronium is the most potent nondepolarising skeletal muscle relaxant
  - Atracurium is a steroid derivative
  - Vecuronium blocks cardiac muscarinic receptors, thus inducing moderate increase in heart rate
  - The nondepolarising agents produce a non-surmountable blockade
87. The skeletal muscle relaxant with the longest duration of action is
- Suxamethonium
  - Mivacurium
  - Pancuronium
  - Rocuronium
  - Vecuronium
88. Which of the following DOES NOT increase the susceptibility of a nerve fibre to conduction blockade by a local anaesthetic
- Small diameter
  - Myelination
  - Location in the periphery of a nerve
  - High firing rate
  - Short action potential duration
89. Diazepam
- Is less lipid soluble than lorazepam
  - Binds sparingly to plasma proteins
  - Is potentiated by flumazenil
  - Undergoes microsomal oxidation in the kidney
  - Is mainly metabolised to desmethyl diazepam
90. Regarding phenytoin toxicity
- Vitamin D metabolism abnormalities can occur
  - Nystagmus is a late complication
  - Alopecia is a complication
  - Agranulocytosis occurs commonly
  - ↑ deep tendon reflexes are a manifestation of phenytoin toxicity
91. Regarding adverse effects of propofol
- Severe acidosis can occur with its use in paediatric respiratory infection
  - Tremors are a common side effect
  - Post op vomiting is common
  - Hypertension is a complication
  - It is positively inotropic
92. Which of the following benzodiazepines has the shortest elimination half life
- Lorazepam
  - Diazepam
  - Triazolam
  - Temazepam
  - Alprazolam

93. Which of the following side effects most occurs with haloperidol
- Hypotension
  - Extrapyramidal side effects
  - Arrhythmias
  - Anti muscarinic side effects
  - Toxic confusional state
94. Thiopentone
- Has low lipid solubility
  - May worsen cerebral oedema
  - Is not significantly metabolised
  - Has effects on the brain that are terminated by redistribution
  - Is likely to  $\uparrow$  MAP
95. Carbamazepine
- Can be used in the treatment of bipolar disorder, trigeminal neuralgia and epilepsy
  - Like phenytoin, enhances GABA activity at therapeutic concentrations
  - Has a rate of absorption that does not vary widely among different patients
  - Can cause a mild, but persistent leukopaenia and this is an indication to stop treatment
  - Has cytochrome p450 inhibiting properties
96. Methadone is used in the treatment of narcotic addiction because
- It is a less efficacious analgesic compared with morphine
  - It produces a short withdrawal when ceased
  - It is a phenylpiperidine class narcotic agonist
  - It produces predictable effects when given orally
  - It does not produce constipation
97. Regarding the alcohols
- Alcohols can cause a wide anion gap metabolic acidosis
  - Formaldehyde is responsible for the toxic effects of methanol
  - A normal non-tolerant adult can metabolise 30-40grams of alcohol/hour
  - Ethanol is a potent vasoconstrictor
  - The volume of distribution of ethanol is 3L/kg

## MCQs 2 Mar 06

### Answers

- |     |   |     |   |
|-----|---|-----|---|
| 1.  | E | 51. | A |
| 2.  | D | 52. | A |
| 3.  | A | 53. | E |
| 4.  | C | 54. | E |
| 5.  | B | 55. | D |
| 6.  | D | 56. | E |
| 7.  | C | 57. | D |
| 8.  | B | 58. | C |
| 9.  | D | 59. | A |
| 10. | A | 60. | D |
| 11. | E | 61. | B |
| 12. | D | 62. | D |
| 13. | A | 63. | A |
| 14. | E | 64. | E |
| 15. | C | 65. | B |
| 16. | A | 66. | C |
| 17. | B | 67. | D |
| 18. | B | 68. | E |
| 19. | C | 69. | D |
| 20. | D | 70. | B |
| 21. | E | 71. | D |
| 22. | D | 72. | A |
| 23. | E | 73. | E |
| 24. | A | 74. | B |
| 25. | B | 75. | C |
| 26. | D | 76. | C |
| 27. | E | 77. | A |
| 28. | C | 78. | D |
| 29. | A | 79. | B |
| 30. | A | 80. | B |
| 31. | C | 81. | E |
| 32. | B | 82. | A |
| 33. | D | 83. | E |
| 34. | C | 84. | A |
| 35. | D | 85. | E |
| 36. | D | 86. | A |
| 37. | E | 87. | C |
| 38. | C | 88. | E |
| 39. | B | 89. | E |
| 40. | E | 90. | A |
| 41. | A | 91. | A |
| 42. | C | 92. | C |
| 43. | C | 93. | B |
| 44. | C | 94. | D |
| 45. | B | 95. | A |
| 46. | D | 96. | D |
| 47. | A | 97. | A |
| 48. | E |     |   |
| 49. | B |     |   |
| 50. | C |     |   |

# General Pharmacology MCQs

01 November 2005

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1. Regarding diuretics
  - a. They work to lower BP initially by ↓ peripheral vascular resistance.
  - b. Thiazide diuretics are potassium sparing.
  - c. They are effective in lowering BP 20-25mmHg in most patients.
  - d. BP response to thiazides continues to increase at doses greater than usual therapeutic dose.
  - e. Diuretics may impair glucose tolerance.
  
2. Which of the following drug's metabolism characteristics are bimodally distributed in the population?
  - a. Sodium nitroprusside
  - b. Clonidine
  - c. Minoxidil
  - d. Hydralazine
  - e. Phentolamine
  
3. Regarding the ACE inhibitors
  - a. They inhibit peptidyl dipeptidase thus preventing the inactivation of bradykinin.
  - b. Captopril is a prodrug
  - c. They are used with caution in patients with IDH as reflex sympathetic activation occurs 2° to the hypotensive effects of the ACE inhibitors.
  - d. They have no role in treating the normotensive diabetic patients.
  - e. They are useful antihypertensives in late pregnancy.
  
4. Which of the following calcium channel blockers is excreted predominantly in the faeces?
  - a. Nifedipine
  - b. Felodipine
  - c. Diltazem
  - d. Nimodipine
  - e. Verapamil
  
5. Which of the following increases the risk of digoxin induced arrhythmias?
  - a. Hyperkalaemia
  - b. Hypercalcaemia
  - c. Hypermagnesaemia
  - d. Hyperuricaemia
  - e. Hypernatraemia
  
6. Propranolol
  - a. Is a β1 specific blocker
  - b. Causes prominent postural hypotension
  - c. Has no effect of plasma lipids
  - d. Inhibits the stimulation of rennin production by catecholamines
  - e. Has a  $t_{1/2}$  of 12 hours
  
7. Hydralazine
  - a. Dilates veins but not arterioles
  - b. Is contraindicated in the treatment of pre-eclampsia
  - c. Can cause an SLE type syndrome in up to 10-20% of patients
  - d. Causes orthostatic hypotension in many cases
  - e. Is extremely useful as a single agent in the treatment of hypertension

8. Regarding atropine
- It is a quaternary amine alkaloid ester of tropic acid
  - About 60% of the dose of atropine is excreted unchanged in the urine
  - Atropine has prominent stimulant CNS effects when given in standard usual doses
  - It causes irreversible blockade of the actions of cholinomimetics at muscarinic receptors
  - It causes diarrhoea
9.  $\beta$  blockers have many different properties. Which of the following statements is correct?
- Atenolol has high lipid solubility
  - Esmolol has partial agonist activity
  - Labetalol is  $\beta_1$  selective
  - The elimination half life of sotalol is 12 hours
  - Timolol has prominent local anaesthetic activity
10. Digoxin has all of the following actions on cardiac electrical function EXCEPT
- $\downarrow$  atrial muscle automaticity
  - $\downarrow$  AV node conduction velocity
  - $\downarrow$  refractory period in Purkinje system and ventricles
  - ST depression on ECG – especially with chronic use
  - Bigeminy can occur
11. Amiodarone (oral)
- Has a half life of 5 days
  - Increases clearance of warfarin, theophylline and other drugs
  - Has high affinity for activated sodium channels
  - Causes torsades de pointes frequently because of prolongation of the QT interval
  - Causes photodermatitis in about 25% of patients
12. Loop diuretics
- Consist of spironolactone and bendrofluazide
  - Inhibit the  $\text{Na}^+ \text{K}^+ 2\text{Cl}^-$  transport pump in the distal tubule of the kidney
  - Can cause a usually irreversible ototoxic reaction
  - Can cause hyperuricaemia and precipitate gout
  - Inhibit renal prostaglandin synthesis
13. Regarding the alpha blockers
- Phenoxybenzamine binds to  $\alpha$  receptors causing irreversible blockade
  - Prazosin has a much higher affinity for  $\alpha_2$  receptors compared with  $\alpha_1$  receptors
  - They may precipitate urinary retention
  - They have no effect on peripheral vascular resistance
  - Doxazosin has a short half life of 2 hours
14. Sotalol
- Is a selective  $\beta_1$  blocker
  - Is only effective in treatment of supraventricular arrhythmias
  - Is extensively metabolised in the liver
  - Causes torsade de pointes when plasma concentrations of sotalol are normal-low
  - Has a usual effective dosage of 80-320mg twice daily
15. Which of the following drugs causes cinchonism?
- Tocainide
  - Lignocaine
  - Quinidine
  - Flecainide
  - Procainamide

16. Which of the following IV antihypertensive drugs also inhibits insulin release?
- Diazoxide
  - Hydralazine
  - Labetalol
  - Fenoldopram
  - Nitroprusside
17. LMW heparin
- MW = 15000
  - Inhibits activated factor X
  - Has unpredictable pharmacokinetics
  - Can be used with minimal problems in renal failure
  - Is readily reversed with protamine sulphate
18. Lignocaine
- Is class 1A antiarrhythmic
  - Blocks both activated and inactivated sodium channels
  - Has good oral bioavailability
  - Is the treatment of choice for most SVTs
  - Elimination half life is decreased in patients with hepatic impairment
19. Flecainide
- Is a class III antiarrhythmic
  - Half life is approximately 2 hours
  - Potently blocks potassium channels
  - Is extensively hepatically metabolised
  - Has potent antimuscarinic effects
20. Heparin
- May cause severe thrombocytopenia in 25% of patients
  - Binds to antithrombin 3 thereby stimulating production of more clotting factors
  - Is contraindicated in pregnancy
  - Action can be reversed by protamine
  - Can be administered SC, IM, or IV
21. Regarding fibrinolytic agents
- Streptokinase is synthesised by staphylococci
  - They all activate fibrinogen
  - They are all of similar cost
  - TPA is safer than streptokinase in elderly patients
  - Streptokinase causes systemic fibrinolysis
22. Regarding calcium channel blockers
- Calcium channel blockers are not bound to plasma proteins
  - Nifedipine has less vascular potency than verapamil
  - Felodipine has been shown to inhibit insulin release in humans
  - Diltiazem has a plasma half life of 3 – 4 hours
  - Verapamil has a high affinity for cerebral blood vessels thus decreasing vaso spasm post subarachnoid haemorrhage
23. Digoxin
- Is poorly lipid soluble
  - Is extensively metabolised
  - Has minimal GI toxicity
  - Is 80% bound to plasma proteins
  - Has half life in the body of 40 hours

24. Drugs which may increase digoxin effect include all of the following EXCEPT
- Antacids
  - Diltiazem
  - Furosemide
  - Quinidine
  - Amiodarone
25. Methyldopa
- Lowers the heart rate and cardiac output more than clonidine does
  - Causes reduction in renal vascular resistance
  - Has minimal CNS side effects
  - Has 80% bioavailability
  - Usual therapeutic dose is about 1-2mg/day
26. All of the following drugs may share cross reactivity secondary to the presence of a sulphonamide moiety EXCEPT
- Acetazolamide
  - Chlorothiazide
  - Furosemide
  - Bymetamide
  - Amiloride
27. Verapamil
- Is contraindicated in treatment of SVT because of the side effect of hypotension
  - Is the agent of choice for treatment of arrhythmias in children less than one
  - Is not hepatically metabolised
  - Is a class 3 antiarrhythmic
  - Can cause VF
28. In patient on warfarin, an increase in INR tends to occur with
- Cholestyramine
  - Vitamin K
  - Metronidazole
  - Rifampicin
  - Phenobarbital
29. Sodium nitroprusside
- ↑ cGMP by release of nitric oxide
  - ↓ vascular resistance but ↑ blood pressure by direct action on sympathetic nervous system
  - Is a complex of calcium and cyanide groups
  - Is predominantly an arteriodilator
  - Has onset of action in 10-15 minutes
30. The toxic effects of organic nitrates include
- Met haemoglobinaemia
  - Cyanide poisoning
  - Bradycardia
  - Precipitating glaucoma
  - Bronchospasm
31. Most  $\beta$  blockers
- Have a small volume of distribution
  - Have poor bioavailability
  - Have  $t_{1/2}$  lives of 3 – 10 hours
  - Are highly lipid soluble and hence cross the blood brain barrier
  - Are rarely excreted unchanged

32. Which of the following antihypertensive drugs acts on the vasomotor centre
- Prazosin
  - Clonidine
  - Hydralazine
  - Reserpine
  - Losartan
33. Regarding streptokinase
- The GUSTO trial showed a higher risk of haemorrhagic shock compared to tPA
  - It is administered IV as a single rapid bolus dose
  - It converts plasmin to plasminogen
  - There are no in vivo inhibitors for the streptokinase – proactivation complex
  - Urokinase is made by bacteria
34. Concerning toxicity of lignocaine
- Lignocaine is highly cardiotoxic compared to other local anaesthetics
  - Side effects are not dose related
  - Lignocaine exacerbates ventricular arrhythmias in about 10% of patients
  - Hypotension is very common with lignocaine toxicity
  - Neurological side effects are uncommon with lignocaine toxicity
35. Noradrenaline
- Is more potent than Salbutamol at  $\beta_2$  receptors
  - Is less potent than isoprenaline at  $\alpha$  receptors
  - Antagonises the effects of dopamine
  - Has similar potency to adrenaline at  $\beta_1$  receptors
  - Is less potent than adrenaline at  $\alpha$  receptors
36. The adverse effects of captopril include
- Hypokalaemia
  - $\uparrow$  cholesterol
  - Polycythaemia
  - Dry cough
  - Hypoglycaemia

**MCQs 18 May 04**  
**Answers**

- |     |   |     |   |
|-----|---|-----|---|
| 1.  | E | 19. | C |
| 2.  | D | 20. | D |
| 3.  | A | 21. |   |
| 4.  | C | 22. | D |
| 5.  | B | 23. | E |
| 6.  | D | 24. | A |
| 7.  | C | 25. | B |
| 8.  | B | 26. | D |
| 9.  | D | 27. | E |
| 10. | A | 28. | C |
| 11. | E | 29. | A |
| 12. | D | 30. | A |
| 13. | A | 31. | C |
| 14. | E | 32. | B |
| 15. | C | 33. | D |
| 16. | A | 34. | C |
| 17. | B | 35. | D |
| 18. | B | 36. | D |

## Pharmacology Questions May 06

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1. The drug with the highest first pass metabolism is
  - a. Chlorpropamide
  - b. Diazepam
  - c. Verapamil
  - d. Theophylline
  - e. Warfarin
  
2. Loading dose
  - a. Is inversely proportional to volume of distribution
  - b. Is proportional to accumulation factor
  - c. Is independent of rate of administration to multicompartment pharmacokinetics
  - d. Equals target concentration X accumulation factor
  - e. Of theophylline administered IV in a normal 70kg person = 100mg
  
3. Half life
  - a. Is not a useful parameter in drug dosage
  - b. Depends on the volume of distribution and clearance of a drug
  - c. Is defined as the time required for a third of the drug to be eliminated
  - d. Does not vary with age
  - e. Is not altered with certain disease states
  
4. Ribosomal resistance occurs with
  - a. Sulphonamides
  - b. Penicillin
  - c. Macrolides
  - d. Fluoroquinolones
  - e. Trimethoprim
  
5. Volume of distribution
  - a. Is directly proportional to concentration
  - b. May be defined only in respect to blood
  - c. Can vastly exceed any physical volume in the body
  - d. Is not influenced by plasma binding
  - e. Has no influence upon half life
  
6. Clearance of which drug involves capacity limited elimination
  - a. Phenytoin
  - b. Theophylline
  - c. Propranolol
  - d. Lithium
  - e. Gentamicin
  
7. Regarding biotransformation
  - a. Phase 1 reactions always precede phase II
  - b. Skin is an organ involved in biotransformation of drugs
  - c. Water conjugation is phase I biotransformation
  - d. CYP2D6 accounts for the majority of p450 activity
  - e. Epoxidation is phase II biotransformation

8. Age associated changes in pharmacokinetics include
- A reduction in creatinine clearance in two thirds of the population
  - A decrease in body fat
  - An increase in body water
  - A greater reduction in conjugation compared with oxidation
  - A decreased absorption related to age alone
9. Regarding biotransformation, which of the following is true
- Ethanol enhances methanol metabolism
  - Grapefruit juice inhibits cyclosporin metabolism
  - Phenytoin inhibits theophylline metabolism
  - Rifampicin inhibits oral contraceptives metabolism
  - Griseofulvin inhibits warfarin metabolism
10. Clearance
- Is the amount of drug eliminated divided by the concentration of the drug
  - Is constant for most drugs in clinical settings at therapeutic levels
  - Is very high for lithium
  - Is independent of concentration for phenytoin
  - Is inversely proportional to volume of distribution
11. The metabolic pathway of detoxification that becomes increasingly important in paracetamol toxicity is
- Conjugation with glucuronide
  - Oxidation
  - Reduction
  - Cytochrome P-450 dependent glutathione conjugation
  - Methylation
12. Phase II reactions in metabolic biotransformation include all of the following EXCEPT
- Water conjugation
  - Cytochrome P-450 dependent oxidations
  - Acetylation
  - Methylation
  - Glucuronidation
13. Which of the following is NOT a phase I drug metabolising reaction
- Acetylation
  - Deamination
  - Hydrolysis
  - Oxidation
  - Reduction
14. Regarding first-pass metabolism
- Sublingual drug administration completely bypasses the liver
  - Approximately 50% of a rectally administered dose bypasses the liver
  - First-pass elimination does not occur in drugs administered by inhalation
  - The inferior haemorrhoidal vein drains into the portal system
  - Oral bioavailability is completely determined by hepatic metabolism
15. Which of the following  $t_{1/2}$  lives is correct
- Enalapril  $t_{1/2} = 3$  hours
  - Warfarin  $t_{1/2} = 37$  hours
  - Digoxin  $t_{1/2} = 20$  hours
  - Cimetidine  $t_{1/2} = 1.9$  hours
  - Acetaminophen  $t_{1/2} = 2$  hours

16. All the following drugs enhance drug metabolism EXCEPT
- Rifampicin
  - Phenylbutazone
  - Pyridostigmine
  - Glutethimide
  - Benzo [a] pyrene
17. The following drugs exhibit low first pass metabolism EXCEPT
- Phenytoin
  - Tolbutamide
  - Theophylline
  - Chlorpropamide
  - Morphine
18. What is the half life of a drug which has a volume of distribution of 500 l/70kg and a clearance of 7 l /70kg?
- 10 hours
  - 50 hours
  - 70 hours
  - 150 hours
  - 350 hours
19. Examples of drugs which are extensively bound to plasma proteins include all of the following EXCEPT
- Lithium
  - Nifedipine
  - Phenytoin
  - Cyclosporin
  - Salicylic acid
20. Regarding agonists/antagonists
- Phenoxybenzamine is a reversible alpha blocker
  - The presence of an irreversible antagonist always changes the EC50 of the agonist
  - Protamine is a physiological antagonist of heparin
  - Theophylline produces some of its effects by competitive inhibition of cGMP degradation
  - Prednisone has a greater EC50 than dexamethasone

### Pharmacology Answers December 03

- |       |       |
|-------|-------|
| 1. C  | 11. D |
| 2. B  | 12. B |
| 3. B  | 13. A |
| 4. C  | 14. B |
| 5. C  | 15. C |
| 6. A  | 16. C |
| 7. B  | 17. E |
| 8. A  | 18. B |
| 9. B  | 19. A |
| 10. B | 20. E |