

Candidate MCQs

Week 10 Pharmacology

1SM Brain Natriuretic Peptide

- A Reduces glomerular filtration fraction
- B Release is increased by changing from lying to standing
- C Inhibits proximal tubule sodium reabsorption
- D Acts on a specific cAMP-linked receptor
- E Is synthesised primarily in the CNS

2SM Which of the following statements about Theophylline is *incorrect*?

- A It inhibits Phosphodiesterase
- B It is an antagonist at Adenosine receptors
- C It reduces gastrointestinal motility
- D Its metabolism is increased by cigarette smoking
- E β – adrenoceptor antagonists may be useful in treating arrhythmias associated with toxicity

3JF Regarding Nitric oxide

- A Low dose intravenous nitric oxide has been shown to improve cardiopulmonary function in adult patients with pulmonary artery hypertension
- B Hypotension in septic shock can be treated with nitric oxide
- C Nitric oxide is a potent inhibitor of neutrophil adhesion to the vascular endothelium
- D Nitric oxide stimulates platelet adhesion & aggregation
- E Nitric oxide production is stimulated by the presence of superoxide

4JF Which of the following statements regarding Histamine is true?

- A A significant amount of histamine is excreted unchanged in the urine
- B Most tissue histamine is sequestered and bound in granules in neutrophils
- C The bound form of histamine is biologically active
- D Morphine-induced histamine release is associated with mast cell degranulation
- E Histamine-induced vasodilation is mediated primarily by nitric oxide

5NH Which of the following is Muscarinic antagonist?

- A Epinephrine
- B Ephedrine
- C Montelukast
- D Ipratropium
- E Triamcinolone

6NH Which of the following is a direct bronchodilator mostly used by oral route?

- A Epinephrine
- B Cromolyn
- C Ipratropium
- D Zileuton
- E Theophylline

7NM With regards to antihistamines which of the following is false?

- A First generation antihistamines are often used as motion sickness pills
- B First generation antihistamines are potent local anaesthetics due to sodium channel blockade
- C Overdose effects include atropine like effects
- D Ventricular arrhythmias have occurred in concurrent use of antifungal and macrolide antibiotics in early second generation antihistamines
- E Sedation is uncommon in newer antihistamines due to more specific histamine receptor binding

8NM With regards to arachidonic acid metabolism which of the following is true

- A Ibuprofen is COX-1 selective
- B PGE₂ and PGF₂ α are uterine relaxants
- C Prostaglandins reduce acid production in the stomach
- D TXA₂ increases glomerular filtration through its vasodilating effect
- E Interleukin-1 promotes synthesis and release of PGE₂ which increases body temperature

- 9MD With regard to the anti-histamines which statement is false**
- A** Terfenadine has been associated with torsades de pointes due to K⁺ channel blockade
 - B** H₂ antagonists decrease gastric acid secretion by inhibiting adenylyl cyclase activity, decreasing cAMP production and lowering intracellular Ca²⁺ concentration
 - C** Chlorpheniramine is an alkylamine
 - D** The second generation H₁ antagonists are generally less sedating than the older drugs
 - E** Piperazines such as cyclizine are the agent of choice for morning sickness due to their proven safety in pregnancy

- 10MD Nitric oxide**
- A** Is used in newborns with pulmonary hypertension and acute respiratory distress syndrome
 - B** Inhibits adenylyl cyclase to decrease cAMP and cause vasodilation
 - C** Is also known as Vascular Endothelial Growth Factor
 - D** Causes some platelet aggregation
 - E** Causes erectile dysfunction

MCQs Week 12

Stephen Macdonald

	Concerning the control of ventilation
1	
A	The main stimulus to ventilation is mediated by the action of CO ₂ at peripheral chemoreceptors
B	The ventilatory response to increasing PCO ₂ is reduced by hypoxia
C	In exercise, the increased respiratory rate is due to increased blood PCO ₂
D	The change in CSF pH for a given change in PCO ₂ is greater than in blood
E	The Hering-Breuer reflex plays an important role in controlling the depth of breathing in adult humans
Answer	D
Explanation	Central receptors; increased by hypoxia; PCO ₂ not increased – mechanism unknown; H-B reflex not important in adults
Subject	PHYSIOLOGY
Category	RESPIRATORY
Reference:	WEST 7 th Ed 124-134

	Regarding Carbon monoxide poisoning
2	
A	Impairment of tissue cytochrome function is an important factor
B	The affinity of CO for haemoglobin is 10 times that of O ₂
C	O ₂ release from HbO ₂ is impaired
D	Arterial O ₂ concentration and PO ₂ are reduced
E	The physiological effect of 50% of Hb bound to CO is the same as an acute drop of hematocrit of 50%
Answer	C
Explanation	Not important clinically; affinity 210x; PO ₂ unchanged; CO shifts curve to left (see fig 37-8)
Subject	PHYSIOLOGY
Category	RESPIRATORY
Reference:	GANONG 22 Ed 690

	Gentamicin
3	
A	Inhibits bacterial cell wall synthesis
B	Antibiotic effect persists beyond the measurable presence of drug in serum
C	Effects are reduced by the co-administration of penicillins
D	Once-daily dosing improves effectiveness but increases the risk of toxicity
E	Ototoxicity is usually reversible
Answer	B
Explanation	Protein synthesis; synergy with cell wall inhibitors; less toxicity with OD dosing; ototoxicity is irreversible
Subject	PHARMACOLOGY
Category	ANTIBIOTICS
Reference:	KATZUNG 8 th Ed 787-789

4	Regarding anti-HIV drugs
A	Indinavir is a nucleoside reverse-transcriptase inhibitor
B	The main toxic effect of Zidovudine (AZT) is on peripheral nerves
C	Combination regimes improve effectiveness but accelerate development of resistance
D	Zidovudine (AZT) reduces vertical transmission, and is of benefit in prophylaxis following needlestick injury
E	Drug interactions are rarely a problem with nonnucleoside reverse transcriptase inhibitors
Answer	D
Explanation	Indinavir is protease inhibitor; AZT marrow suppression; combination regimes delay onset of resistance; Several NNRTIs have major interactions due to P450 metabolism
Subject	PHARMACOLOGY
Category	ANTIINFECTIVE AGENTS
Reference:	KATZUNG 8 th Ed 831-840

Candidate MCQs

Week 12 Pharmacology

- 1SM Gentamicin**
- A Inhibits bacterial cell wall synthesis
- B Antibiotic effect persists beyond the measurable presence of drug in serum
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- 2SM Regarding anti-HIV drugs**
- A Indinavir is a nucleoside reverse-transcriptase inhibitor
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- C Combination regimes improve effectiveness but accelerate development of resistance
- D Zidovudine (AZT) reduces vertical transmission, and is of benefit in prophylaxis following needlestick injury
- E Drug interactions are rarely a problem with nonnucleoside reverse transcriptase inhibitors
- 3MD Which of the following Quinolones is NOT renally excreted**
- A Ciprofloxacin
- B Levofloxacin
- C Moxifloxacin
- D Norfloxacin
- E Ofloxacin
- 4MD With regard to antifungal agents**
- A Amphotericin has good oral bioavailability
- B Itraconazole has much higher CSF penetration than fluconazole
- C Griseofulvin is given orally for the treatment of dermatophytosis
- D Flucytosine is given parenterally due to its poor oral bioavailability
- E Ketoconazole is highly selective for fungal P450 and so has less side effects than the other azoles such as gynaecomastia, infertility and menstrual irregularities
- 5NM With regards to Penicillin Resistance, which of the following is true?**
- A Competitive binding of β -lactamases with the β -Lactams at the penicillin Binding site
- B Impaired penetration of antibiotic to penicillin binding site in gram positive bacteria
- C Carbapenems are highly resistant to hydrolysis by penicillinases and cephalosporinases
- D Gram positive bacteria may produce an efflux pump
- E Only 50 β -Lactamases have been identified and these are narrow in substrate specificity
- 6NM With regards to Aminoglycosides which of the following is true**
- A Its binding site is 30S –subunit ribosomal protein
- B Their mechanism of action involves interruption of DNA synthesis
- C They have good oral bioavailability
- D They are used widely for their gram positive cover
- E Multiple daily doses are needed for adequate efficacy

- 7NH** **With regard to beta lactam antibiotics**
- A** Methicillin causes less serious nephritis compared to other penicillins
 - B** Penicillin G is bactericidal at a dose of 18 – 24 million units
 - C** Alteration in PBP is not responsible for methicillin resistance in staphylococcus
 - D** Resistance caused by impaired penetration of antibiotics to target PBP occurs only in Gram negative organisms
 - E** Cephalosporins active against enterococci and *Listeria monocytogenes*

- 8NH** **Which of the following antimalarials is used for eradication of liver stage?**
- A** Quinine
 - B** Chloroquine
 - C** Mefloquine
 - D** Antifols
 - E** Primaquine

ANSWERS:

- 1. B
- 2. D
- 3. C
- 4. C
- 5. C
- 6. A
- 7. D
- 8. E

MCQs Week 14

Stephen Macdonald

1	Concerning drugs acting at γ-aminobutyric acid (GABA) ion channels
A	Benzodiazepines act at GABA _A chloride channels to increase the duration of GABA mediated channel opening
B	Lorazepam and oxazepam do not form active metabolites
C	Baclofen is an inverse agonist
D	The mechanism of action of ketamine is partly due to binding at GABA channels
E	The effects of barbiturates may be reversed by flumazenil
Answer	B
Explanation	BZs increase <i>frequency</i> of channel opening (cf Barbiturates); Baclofen is GABA _B agonist; ketamine blocks NMDA glutamate receptor channels and ACh receptors; flumazenil is antagonist at BZ binding sites but not barbiturate
Subject	PHARMACOLOGY
Category	CNS
Reference:	KATZUNG 8 th 367-371 For review of Ketamine see Cromhout A, <i>Emergency Medicine</i> 15,155-159 (2003)

2	Regarding anticonvulsant agents
A	Carbamazepine is a hepatic enzyme inhibitor
B	Vigabatrin is an irreversible inhibitor of GABA transaminase
C	Sodium valproate has a large volume of distribution due to its low protein binding in plasma
D	A skin rash associated with Lamotrigine is usually transient and the drug should be continued
E	The rate of elimination of Phenytoin is dependent on its concentration at high serum drug levels
Answer	B
Explanation	Carbamazepine is an enzyme inducer; Valproate is 90% protein bound; Lamotrigine is associated with life-threatening toxic epidermal necrolysis and SJ syndrome; Phenytoin displays zero order kinetics at high levels so ROE is concentration <i>independent</i>
Subject	PHARMACOLOGY
Category	CNS
Reference:	KATZUNG 8 th 397-405

3	All of the following are actions of insulin, <i>except</i>
A	Increased glucose entry into cells
B	Increased K ⁺ uptake by cells
C	Increased protein catabolism
D	Increased fatty acid synthesis
E	Increased glycogen synthesis
Answer	C
Explanation	Insulin decreases protein catabolism
Subject	PHYSIOLOGY
Category	ENDOCRINE & METABOLISM
Reference:	GANONG 22 nd 337 (Table 19-4)

4	Regarding calcium homeostasis
A	Vitamin D increases intestinal calcium absorption by binding directly to a calcium-hydrogen pump on the enterocyte basal membrane
B	Calcitonin is secreted by the follicular cells of the thyroid gland
C	The carpopedal spasm associated with hyperventilation is due to displacement of calcium from plasma binding sites at high blood pH
D	The actions of parathyroid hormone (PTH) include resorption of calcium from bone, increased urine phosphate excretion and increased formation of 1,25-dihydroxycholecalciferol in the kidney
E	Hypercalcemia of malignancy is due to ectopic secretion of Parathyroid hormone (PTH) in the majority of cases
Answer	D
Explanation	A- is a steroid so acts via cell nuclear receptor; B – parafollicular cells; C – increased binding; E – PTH <i>related</i> peptide (PTHrP)
Subject	PHYSIOLOGY
Category	ENDOCRINE AND METABOLISM
Reference:	GANONG 22 nd 388-393

Candidate MCQs
Week 16 Physiology

- 1MD** **Which of the following cells of the retina depolarise only?**
- A Bipolar cell
 - B Cones
 - C Horizontal cells
 - D Amacrine cells
 - E Rods
- 2MD** **Which of the following tracts transmit auditory and visual impulses to the cerebellum?**
- A Olivocerebellar
 - B Cuneocerebellar
 - C Tectocerebellar
 - D Vestibulocerebellar
 - E Dorsal spinocerebellar
- 3SM** **Regarding pain, which of the following statements is correct**
- A C fibres release glutamate as their neurotransmitter
 - B The spinothalamic tract carries pain fibres which originate in the ipsilateral dorsal horn of the spinal cord
 - C Referred pain is the result of convergence in the dorsal horn of the spinal cord
 - D Allodynia is a spontaneous prolonged burning sensation characteristic of neuropathic pain
 - E Pain afferents from the lateral part of the diaphragm run in the phrenic nerve
- 4SM** **Regarding the muscle reflex arc**
- A Muscle spindle afferent fibres are of two types – Ia and Ib
 - B Stimulation of γ -efferent fibres directly results in visible contraction
 - C The inverse stretch reflex refers to the relaxation of antagonist muscles associated with muscle contraction
 - D Spasticity and clonus result from hyperactivity of muscle spindles
 - E The Golgi tendon organ is important in the reflex control of muscle length
- 5NM** **With regards to Weber and Rinne tests which of the following is true**
- A Conduction deafness in one ear will result in louder sound in the diseased ear using Weber's test
 - B Using Rinne's test, conduction deafness in one ear results in the vibration being heard in the air after bone conduction is over
 - C Using Weber's test, the sound is louder in an ear affected with nerve deafness
 - D Rinne's test involve placing the base of a vibrating tuning fork on the vertex of the skull
 - E In the normal ear vibrations in the air are not heard after bone conduction is over
- 6NM** **With regards to smell**
- A The olfactory neuron receptors reside in the olfactory glomerulus
 - B The olfactory tract pierces the cribriform plate
 - C There are 10 – 20 million receptor cells each containing a single unmyelinated cilia
 - D The olfactory mucous membrane is devoid of mucous so as to expose olfactory cilia to stimulating substances
 - E The olfactory system can discriminate between 10,000 different odours

Pharmacology MCQs Week 16

1. A normal anion gap is maintained in poisoning with:

- Answer A Methanol
- Answer B Salicylates
- Answer C HCl
- Answer D Metformin
- Answer E Iron

2. Carbon Monoxide:

- Answer A Binds to sulfhydryl groups in enzymes
- Answer B Causes anaemia
- Answer C Binds strongly to the bone marrow, brain and kidney
- Answer D Average concentration of CO in the atmosphere is 200ppm
- Answer E Main adverse effects are from hypoxia

3. In paracetamol poisoning, which of the following statements is FALSE?

- Answer A Toxicity is favoured by Phase II metabolism
- Answer B Toxicity is increased in glutathione deficiency
- Answer C Hypoglycaemia on presentation indicates significant liver damage.
- Answer D Hepatotoxicity is more likely in patients on anticonvulsants.
- Answer E N-acetylbenzoquinoneimine (NAPQI) forms covalent bonds with hepatic proteins causing toxicity

4. Methanol:

- Answer A is metabolised to oxalic acid
- Answer B causes a metabolic acidosis due to inhibition of cytochrome c
- Answer C binds to activated charcoal
- Answer D produces renal damage due to crystal formation
- Answer E is slowly absorbed orally

5. Which of the following drug/sign of toxicity pairs is INCORRECTLY matched?

- Answer A Quinine - blindness
- Answer B Phenytoin - ataxia
- Answer C Aspirin - tinnitus
- Answer D Clonidine - bradycardia
- Answer E Fluoxetine - sedation

6. Activated charcoal binds poorly with all of the following EXCEPT:

- Answer A** Iron
Answer B Lithium
Answer C Phenobarbitol
Answer D Tolbutamine
Answer E Methanol

7. In the elimination of toxins:

- Answer A** Hemoperfusion does not improve fluid and electrolyte balance.
Answer B The efficiency of haemodialysis is a function of the molecular weight, endogenous clearance and protein binding of the specific toxin.
Answer C Toxins with large volumes of distribution are poorly removed by haemodialysis.
Answer D Embolization of adsorbed particles is a potential complication of haemoperfusion.
Answer E All of the above.

Answers Pharmacology MCQs Week 16

1. C
2. E
3. A
4. B
5. E
6. C
7. E

Week 16 MCQs

Stephen Macdonald

1	Regarding pain, which of the following statements is correct
A	C fibres release glutamate as their neurotransmitter
B	The spinothalamic tract carries pain fibres which originate in the ipsilateral dorsal horn of the spinal cord
C	Referred pain is the result of convergence in the dorsal horn of the spinal cord
D	Allodynia is a spontaneous prolonged burning sensation characteristic of neuropathic pain
E	Pain afferents from the lateral part of the diaphragm run in the phrenic nerve
Answer	C
Explanation	A- Substance P; B- contralateral ; D - this is <i>causalgia</i> ; E – central diaphragm by phrenic, lateral part by somatic intercostal nerves
Subject	PHYSIOLOGY
Category	FUNCTION OF NERVOUS SYSTEM
Reference:	GANONG 22 nd 138-146

2	Regarding the muscle reflex arc
A	Muscle spindle afferent fibres are of two types – Ia and Ib
B	Stimulation of γ -efferent fibres directly results in visible contraction
C	The inverse stretch reflex refers to the relaxation of antagonist muscles associated with muscle contraction
D	Spasticity and clonus result from hyperactivity of muscle spindles
E	The Golgi tendon organ is important in the reflex control of muscle length
Answer	D
Explanation	A – Ia and II; B – only innervate intrafusal fibres; C&E ISR is relaxation of muscle due to excessive stretch and is important in maintaining <i>force</i> of contraction - sensory receptor is Golgi tendon organ
Subject	PHYSIOLOGY
Category	FUNCTION OF THE NERVOUS SYSTEM
Reference:	GANONG 22 nd 130-134

3	Which of the following statements regarding organophosphate intoxication is <i>incorrect</i>
A	Pralidoxime removes organophosphate from acetylcholinesterase if 'aging' has not occurred
B	Features include salivation, bronchospasm, miosis and delirium
C	Atropine is the drug of choice for hypotension
D	Plasma cholinesterase activity is a useful marker of severity
E	Tachycardia and hypertension may occur
Answer	D
Explanation	Cholinesterase activity is a sensitive marker of exposure but a poor indicator of severity
Subject	PHARMACOLOGY
Category	TOXICOLOGY
Reference:	Katzung 8 th Ed Chs 7&8. Cameron et al, Textbook of Adult Emergency Medicine (2 nd Ed) Ch 28.14

4	Which of the following drugs used in diabetes is correctly matched to its mechanism of action
A	Insulin : increases expression of GLUT 2 glucose transporter in muscle and adipose tissue
B	Glipizide : K^+ channel closure in B cells causing insulin secretion
C	Roziglitazone : inhibition of intestinal α -glucosidase
D	Acarbose: reduced insulin resistance by effects on gene transcription
E	Glucagon: hepatic glycogenolysis mediated by increased cGMP
Answer	B
Explanation	A – GLUT 4; C – Acarbose; D – Glitazones; E - cAMP
Subject	PHARMACOLOGY
Category	PANCREATIC HORMONES AND DIABETIC DRUGS
Reference:	KATZUNG 8 th Ed Chapter 41

Candidate MCQs
Pharmacology Week 16

- 1MD** **Which of the following drugs are NOT amenable to haemodilysis or haemoperfusion?**
- A Carbamazepine
 - B Phenobarbital
 - C Amitriptyline
 - D Valproic acid
 - E Metformin
- 2MD** **Which of the following drugs used to treat open-angle glaucoma DO NOT work by decreasing aqueous humour secretion?**
- A Acetazolamide
 - B Timolol
 - C Pilocarpine
 - D Betaxolol
 - E Apraclonidine
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 - C Rosiglitazone : inhibition of intestinal α -glucosidase
 - D Acarbose: reduced insulin resistance by effects on gene transcription
 - E Glucagon: hepatic glycogenolysis mediated by increased cGMP
- 5NM** **With regards to insulin preparations which of the following is true**
- A Insulin aspart is an intermediate acting insulin with rapid absorption and sustained long action
 - B Insulin glargine is a ultra long acting insulin analogue commonly used in mixed insulin preparations
 - C Zinc is used with intermediate acting insulin to improve stability and shelf half life
 - D Acidic pH is required for insulin to stay in solution
 - E Insulin lispro has a low variability of absorption subcutaneously
- 6NM** **With regards to drug poisoning**
- A Arrhythmias in tricyclic antidepressants is due to their α -blocking properties
 - B B-blockers are useful antidotes for hypotension and tachycardia secondary to theophylline overdose
 - C Organophosphate poisoning is associated with salivation, diarrhoea, sweating and mydriasis
 - D Flumazenil is routinely given in benzodiazepine overdose resulting in altered conscious state
 - E Calcium channel blockers should be treated with atropine to reduce AV blockade