

## Antibiotics MCQs

1. All of the following are true regarding penicillins EXCEPT
  - a. Most penicillins only cross the blood brain barrier when the meninges are inflamed.
  - b. Penicillins don't require dosage adjustment in renal failure
  - c. Penicillins inhibit cross linkage of peptidoglycans in the cell wall
  - d. Piperacillin is a penicillin active against pseudomonas
  - e. Only about 5 to 10% of people with a past history of penicillin allergy have a reaction on re exposure
  
2. Ciprofloxacin
  - a. Is a defluorinated analogue of nalidixic acid
  - b. Inhibits topoisomerases 2 and 3
  - c. Has no gram positive cover
  - d. Has a bioavailability of 30%
  - e. May cause an arthropathy
  
3. Resistance to B lactams
  - a. Can be due to an efflux pump
  - b. Is most commonly due to modification of the target PBPs
  - c. Does not involve penetration of drug to target PBPs
  - d. Infers resistance only to penicillins
  - e. Can involve up to 5 different B lactamases
  
4. Macrolides
  - a. Have enhanced activity at acidic pH
  - b. Have little activity against legionella
  - c. Have half lives which increase in patients with anuria
  - d. Induce cytochrome p450 enzymes
  - e. Are contraindicated in neonates
  
5. Flucloxacillin
  - a. Is ineffective against streptococci

- b. Is active against enterococci and anaerobes
  - c. Blocks transpeptidation and inhibits peptidoglycan synthesis
  - d. Is poorly absorbed orally
  - e. Has excellent penetration into CNS and prostate
6. All of the following inhibit nucleic acid synthesis EXCEPT
- a. Norfloxacin
  - b. Chloramphenicol
  - c. Trimethoprim
  - d. Rifampicin
  - e. Sulfasalazine
7. Which of the following is a second generation cephalosporin?
- a. Cefaclor
  - b. Ceftazidime
  - c. Cephalexin
  - d. Cefotaxime
  - e. Cephalothin
8. Regarding the pharmacokinetics of the tetracyclines
- a. Tetracyclines are 40 to 80 % bound by serum proteins
  - b. Absorption is enhanced by coadministration of antacids
  - c. Tetracyclines cross the blood brain barrier easily
  - d. Doxycycline is excreted predominantly by the kidney
  - e. Demeclocycline is a short acting tetracycline drug
9. All of the following are recognized adverse effects of isoniazid EXCEPT
- a. Hepatitis
  - b. Peripheral neuropathy
  - c. Retrobulbar neuritis
  - d. Decreased phenytoin metabolism – increased phenytoin blood levels / toxicity
  - e. CNS toxicity
10. Vancomycin

- a. 90% of vancomycin is excreted by glomerular filtration
- b. Inhibits protein synthesis in bacteria
- c. Is bactericidal against gram negative bacilli
- d. Is well absorbed from the GIT
- e. One adverse reaction to infusions of vancomycin is the “blue man” syndrome

11. Regarding mechanisms of antiviral drug action

- a. blockage of viral uncoating is caused by rifampicin
- b. Zidovudine is a protease inhibitor
- c. Amantidine blocks viral DNA packaging and assembly
- d. Indinavir is a reverse transcriptase inhibitor
- e. Acyclovir inhibits viral DNA synthesis

12. Regarding toxicity of antibiotics

- a. Enamel dysplasia is common with aminoglycosides
- b. Gray baby syndrome occurs with rifampicin use
- c. Haemolytic anaemias can occur with sulphonamide use
- d. Nephritis is the most common adverse reaction with isoniazid
- e. Disulfiram like reaction can occur with macrolides

13. Chloramphenicol

- a. Does not penetrate the blood brain barrier
- b. Must be administered parenterally
- c. Can be safely used in premature infants
- d. Can cause depression of bone marrow function
- e. Can cause discoloration of developing teeth when given to children

14. Spironolactone

- a. Has a steroid structure
- b. Is a partial agonist
- c. Promotes sodium retention
- d. Increases potassium loss
- e. Is a loop diuretic

15. Which of the following drugs cause diuresis by the mechanisms indicated?

- a. Ethanol – by preventing the reabsorption of sodium from renal tubular fluid
- b. Digoxin – by inhibiting release of ADH
- c. Dopamine – by inhibiting active transport of chloride over the entire length of the descending limb of the loop of Henle
- d. Frusemide – by inhibiting carbonic anhydrase
- e. Chlorothiazide – by inhibiting active sodium transport in the ascending limb of the loop of Henle

## Antibiotics Pharmacology Answers

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

Physiology MCQS – Revision Chapter one  
27/01/04

1. Regarding equilibrium potential (mammalian spinal motor neurons)
  - a. The resting membrane potential is  $-70$  mV – identical to that of  $E_{Cl}$
  - b. Equilibrium potential of potassium is  $+90$  mV
  - c. Increases in external sodium concentrations decrease the resting membrane potential
  - d. Equilibrium potential of sodium is  $-60$  mV
  - e.  $Na^+K^+$  ATPase pumps 2 sodium out of cell for every 3 potassium it pumps in
  
2. Regarding body composition
  - a. 18% body weight is protein / related substances
  - b. 15% body weight is interstitial fluid
  - c. 60% body weight is water
  - d. 5% body weight is plasma
  - e. All of the above are true
  
3. Regarding buffers in the body
  - a. Initial correction of pH disturbance is achieved by the kidneys
  - b. The phosphate buffer system is the predominant buffer in the blood
  - c. Bones contribute to buffering by taking up bicarbonate
  - d. Hb is an important buffer in the blood
  - e. All of the above are true
  
4. The size of the action potential is decreased by
  - a. Decreased extracellular calcium
  - b. Increased external sodium
  - c. Decreased internal sodium
  - d. Decreased internal potassium
  - e. Increased internal potassium
  
5. Regarding body fluid compartments

- a. About 2/3 TBW is extracellular
- b. ECF / intracellular fluid volume ratio is larger in infants than in adults
- c. Plasma volume in a 70 kg male is approximately 5 litres
- d. A 30 year old male has 40% water as a percentage of body weight
- e. Transcellular fluid has a greater volume than intracellular fluids

6. Fick's Law of Diffusion is dependent on all EXCEPT

- a. The posture of the subject
- b. The solubility of the gas
- c. Thickness of membrane barrier
- d. Molecular weight of the gas
- e. Area of the membrane

7. Regarding movement across cell membranes

- a. Exocytosis requires sodium and energy
- b. Insulin reuptake is by receptor mediated endocytosis
- c. Thyroid hormones decrease the activity of the NaK ATPase
- d. Active transport of sodium is rarely coupled with other substances
- e. NaK ATPase has a 1:1 coupling ratio

8. In regard to pH

- a. pH of a solution is the log to base 10 of the reciprocal hydrogen ion concentration
- b. Is the negative log of the concentration of hydrogen ions
- c. For each pH unit less than 7 – the concentration of hydrogen ion is increased 10 fold
- d. A pH of 7 is equal to a hydrogen ion concentration of  $10^{-7}$  mmol/l
- e. All of the above are true

9. Regarding heterotrimeric G proteins

- a. GDP is bound to the B subunit
- b. They are not serpentine receptors
- c. The delta unit separates from the other subunits to bring about the biological effect

- d. The intrinsic GTPase activity of the alpha subunit converts GTP to GDP
- e. They span the membrane seven times

10. Which of the following is correct?

- a. Chloride concentration in interstitial fluid is greater than in the plasma
- b. Potassium concentration in interstitial fluid is greater than that in intracellular fluid
- c. Sodium concentration in intracellular fluid is greater than in plasma
- d. Protein concentration in plasma is greater than in intracellular fluid
- e. Bicarbonate concentration in intracellular fluid is greater than in interstitial fluid

11. Regarding basic physiological measures – all of the following are true EXCEPT

- a. Osmolarity is the number of osmoles / litre of solution
- b. PH is the log to base 10 of the reciprocal of hydrogen ion concentration
- c. Carbon has a molecular mass of 12 dalton
- d. Osmolarity is measured by freezing point depression
- e. One equivalent of sodium is 23 g/l

12. With regards to cell membrane potential

- a. The Donnan effect relies on nondiffusible ions
- b. The exterior of the cell is negative with respect to the interior
- c. The membrane potential tends to push chloride out of the cell
- d. It can be derived by measuring the chloride concentration and using the Nernst equation
- e. Potassium leaks out against its concentration gradient

13. Regarding the comparison of ECF with CSF – all of the following are true EXCEPT

- a. CSF has less protein
- b. CSF has lower osmolality
- c. CSF has lower pH
- d. CSF has more bicarbonate
- e. CSF has lower specific gravity

14. Which of the following does NOT act via an intracellular receptor?

- a. Cortisol
- b. Thyroxine
- c. ANP
- d. Aldosterone
- e. Retinoic acid

15. Regarding functional morphology of the cell

- a. Tay Sachs disease is a cell membrane disorder
- b. Actin is the most abundant protein in mammalian cells
- c. Peroxisomes are 5 um in diameter
- d. The assembly of microtubules in the cell cytoskeleton is facilitated by cold
- e. Myosin 1 is present in skeletal muscle

## ANSWERS Physiology Revision Chapter One

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

1. All of the following antibiotics bind to the 50S subunit of the ribosome thereby inhibiting proteinsynthesis 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. ↓ Phenytoin metabolism → ↑ 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
  - a. Fluconazole has low water solubility
  - b. Ketoconazole may be given IV/PO
  - c. Itraconazole undergoes renal elimination
  - d. Clotrimazole is the treatment of choice for systemic candidiasis – given orally
  - e. They work by reduction of ergosterol synthesis by inhibition of fungal cytochrome P<sub>450</sub> enzymes
  
9. The fluoroquinolones
  - a. May be administered to patients with severe campylobacter infection
  - b. Work by inhibiting dihydrofolate reductase
  - c. Have little effect against gram positive organisms
  - d. Are heavily metabolised in the liver
  - e. Are safe to give to breast feeding mothers
  
10. Clindamycin
  - a. Inhibits bacterial cell wall synthesis
  - b. Is often used for prophylaxis of endocarditis in patients with Valvular disease who are undergoing dental procedures
  - c. Penetrates through BBB into CSF well
  - d. Works well against enterococci and gram negative aerobic organisms
  - e. Is 10% protein bound
  
11. Which of the following is a second generation cephalosporin?
  - a. Ceftazidime
  - b. Cephalothin
  - c. Cefotaxime
  - d. Cefaclor
  - e. Cephalexin
  
12. The cephalosporin with the highest activity against gram positive cocci is
  - a. Cefaclor
  - b. Cephalothin
  - c. Cefuroxime

- d. Cefepime
  - e. Cefotaxime
13. Regarding the penicillins
- a. Penicillin is excreted into breast milk to levels 3-15% of those present in the serum
  - b. Absorption of amoxyl is impaired by food
  - c. Benzathine penicillin is given PO
  - d. Penicillins are 90% excreted by glomerular filtration
  - e. Dosage of nafcillin should be adjusted in the presence of renal failure
14. Rifampicin
- a. Inhibits hepatic microsomal enzymes
  - b. Inhibits DNA synthesis
  - c. Is bactericidal for mycobacteria
  - d. Is not appreciably protein bound
  - e. Is predominantly excreted unchanged in the urine
15. Regarding resistance to antibiotics
- a. Penicillinases cannot inactivate cephalosporins
  - b. Macrolides can be inactivated by transferases
  - c. Mutation of aminoglycoside binding site is its main mechanism of resistance
  - d. Tetracycline resistance is a marker for multidrug resistance
  - e. Resistance to antibiotics is rarely plasmid encoded
16. Concerning toxicity of antibiotics
- a. Enamel dysplasia is common with aminoglycosides
  - b. Grey Baby Syndrome occurs with rifampicin use
  - c. A disulfiram like reaction can occur with macrolides
  - d. Haemolytic anaemias can occur with sulphonamide use
  - e. Nephritis is the most common adverse reaction with isoniazid
17. Which of the following is considered to be bacteriostatic?
- a. Penicillin
  - b. Chloramphenicol
  - c. Ciprofloxacin
  - d. Cefoxitin
  - e. 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 permanganase 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 trichomonoas 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

