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 tropoisomerases 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 penicillinc
   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. Norfloxacillin
   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 proteinsynthesis 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
1. Regarding equilibrium potential (mammalian spinal motor neurons)
   a. The resting membrane potential is – 70 mV – identical to that of Ecl
   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
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 β 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 β 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
   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 P450 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
   a. 2 seconds
   b. 20 minutes
   c. 2 hours
   d. 2 weeks
   e. 2 months

19. Regarding antiseptic agents – all of the following are true EXCEPT
   a. Sodium hypochlorite is an effective antiseptic for intact skin
   b. Potassium permanganate is an effective bactericidal agent
   c. Formaldehyde may be used to disinfect instruments
   d. Chlorhexidine is active against gram positive cocci
   e. Ethanol is an effective skin antiseptic because it denatures microbial proteins

20. Ciprofloxacin
   a. Is a defluorinated analogue of nalidixic acid
   b. Inhibits topoisomerases 2 and 3
   c. Has no gram positive cover
   d. Has bioavailability of 30%
   e. May cause an arthropathy

21. 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

22. Aminoglycosides
   a. Have a β lactam ring
   b. Can produce neuromuscular blockade
   c. Are DNA gyrase inhibitors
   d. Normally reach high CSF concentrations
   e. Have good oral absorption but high first pass metabolism

23. Ribosomal resistance occurs with
   a. Sulphonamides
   b. Penicillin
   c. Fluoroquinolones
   d. Macrolides
   e. Trimethoprim
24. Regarding antivirals
   a. Delvindine 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
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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