Chapter 8
Infectious diseases:

1. Regarding prion related diseases
(a) The risk of transmission of Creutzfeldt-Jakob disease is through corneal transplant
(b) Kuru is spread through the eating of feral cattle
(c) Creutzfeldt-Jakob disease is uniquely sporadic in incidence
(d) These are primarily diseases of the gastrointestinal tract and brain
(e) none of the above is true

2. Regarding viruses, which statement is **not** true
(a) They are obligate intracellular organisms
(b) They are encased exclusively in a protein coat called a capsid
(c) They are characterised as being either a DNA or an RNA virus, but never both
(d) They range between 20-300 nm in size
(e) Herpes zoster virus has the potential for latent infection

2a. Which of the following is not a DNA virus ***(old paper)***
(a) HSV
(b) HBV
(c) HIV
(d) EBV
(e) VZV

3. Bacteria
(a) are eukaryotes
(b) that are Gram positive have a cell wall sandwiched between two phospholipid bilayers
(c) can have pili, which enable bacteria to move in their environment
(d) can be infected by plasmids, which can change non-pathogenic bacteria into virulent strains
(e) Streptococcus epidermidis is a major cause of dental caries

4. Regarding infectious diseases
(a) Fungi are prokaryotes
(b) Q fever is caused by a viral infection
(c) Mycoplasma have a bacterial cell wall
(d) Influenza is a single stranded RNA virus
(e) Trichomonas is a common bacterial cause of urethritis

5. Concerning transmission of disease
(a) T and B cell lymphocytes are very important propagation of the innate immune response to infection
(b) The presence of fatty acids on the skin promotes the dermal growth of micro-organisms
(c) Vibrio cholerae is resistant to the actions of stomach acid
(d) Vibrio cholerae does not invade the gut wall, but produces a toxin which produces the bacterial disease
(e) Strep pneumoniae elaborate toxins that paralyse the mucosal cilia in the respiratory tract

6. Regarding the transmission of disease
(a) Influenza viruses possess hemagglutinin proteins that bind to sialic acid on the surface of epithelial cells
(b) *Streptococcus pneumoniae* has specific binding receptors for epithelial cells of the respiratory tract
(c) Rhinoviruses grow optimally at $37^{o}C$
(d) The acidity of the urine serves as the main defence against urinary tract infection
(e) M cells of the mucosa associated lymphoid tissue are important for transport of IgA into the gut lumen

7. Regarding the spread and dissemination of microbes (p354)
(a) Polioviruses are transported free in the plasma, and do not require a host cell as a transport medium
(b) Infected foci disseminated by blood are called primary foci
(c) Secondary foci are usually solitary
(d) *Rubella* infection during the third trimester causes deafness
(e) Transmission of *Treponema pallidum* to the foetus occurs at any stage of pregnancy

8. Regarding sexually transmitted diseases
(a) Shigella species can be spread by sexual contact
(b) The initial site of infection for a sexually transmitted infection may be the oropharynx
(c) The organisms responsible tend to be short-lived outside the host
(d) Neonatal herpes simplex virus infection is much more likely to cause visceral disease than is infection acquired later in life
(e) all of the above are true

9. Micro-organisms can cause disease by all these mechanisms except
(a) Entry into host cells resulting in cell death
(b) Release of toxins that kill at a distance
(c) ingestion of host cells
(d) inducement of host immune responses that cause additional tissue damage
(e) all of the above

10. Viral mechanisms of injury include
(a) insertion of viral DNA/RNA that induces the formation of proteins that are toxic to host cells
(b) proteases, which damage cell membranes
(c) Adhesins on the surface of viruses that aid the attachment to host cells and damage the cell membrane
(d) inhibition of the production of major histocompatibility complex 1 (MHC I) by epithelial cells
(e) none of the above

11. The mechanisms of bacterial virulence include
(a) Variation in the type of pili expressed by N. gonorrhoeae
(b) Recruitment of complement by the bacteria to aid in opsonisation of *M. tuberculosis*
(c) Induction of host cell apoptotic mechanisms by bacterial proteins
(d) a and b
(e) all of the above

12. Concerning bacterial virulence,
(a) The enzymes that bacteria produce have in vitro effects that clearly demonstrate their role in the pathogenicity and virulence of the microbe
(b) The immune response to bacterial lipopolysaccharide is always beneficial for the host, as it mobilises protective immunity
(c) Toxins that alter host intracellular signalling usually utilise a two subunit mechanism
(d) Neurotoxins produced by *C. tetani* are toxic to neurons
(e) Toxic shock syndrome is an example of the actions of *S. aureus* endotoxin

13. Microbes evade the immune system by utilising all of the following mechanisms EXCEPT
(a) shedding antigen
(b) production of superantigen
(c) remaining inaccessible to the host immune system
(d) preventing T cell activation
(e) resistance to innate immune defences

14. Recognition of virally infected cells by the cell mediated immune system
(a) can be inhibited by viral action in interfering with the transporter associated with antigen processing
(b) can be prevented by the removal of class 1 major histocompatibility complex (MHC 1) from the rough endoplasmic reticulum
(c) is inhibited by prevention of MHC 1 synthesis
(d) can be inhibited by virally produced decoy MHC 1 like molecules
(e) all of the above

15. The host inflammatory response to infection
(a) is a wide spectrum of differing triggered responses, which recognises the diversity of microbes
(b) for HBV infection is the predominance of plasma cells
(c) which induces cytoproliferative inflammation is usually viral
(d) to necrotising inflammation seen in C perfringens infection is strong, with many inflammatory cells in the necrotised tissue
(e) generally appears as uniform responses, unique to certain pathogens

16. Viral infections, such as
(a) measles (rubeola) have four distinct strains
(b) mumps, is part of the paramyxovirus family
(c) polio are derived from 5 different strains of polio viruses
(d) herpes viruses are very small unencapsulated viruses with single stranded RNA
(e) mumps is a self limiting mild infection

17. Measles (rubeola virus)
(a) vaccination does not produce lifelong immunity
(b) rash produced is T cell mediated
(c) is spread primarily by skin contact
(d) rash is very prominent in those with deficiencies in cell mediated immunity
(e) is a self limiting disease, but vaccination is common, as skin lesions can scar

18. Polio ***(old paper 2004)***
(a) is an RNA paramyxovirus
(b) causes neurological problems in greater than 50% of infected individuals
(c) vaccination is less effective due to mutation of attenuated virus to the wild type
(d) virus infects the motor nuclei of the dorsal horn
(e) invades and replicates in the motor neurons of the brain stem or spinal cord

19. Viral haemorrhagic fevers
(a) cause haemorrhagic manifestations are due in part to endothelial dysfunction
(b) are caused by a double stranded DNA virus
(c) cause haemorrhagic dysfunction by infecting hepatocytes and reducing the number of soluble clotting factors in the blood
(d) caused by these viruses use humans as the natural vector
(e) requires a large dose of virus for infection to occur

19a. In infectious disease ***(old paper)***
(a) bacterial endotoxin is the inner wall mucoprotein
(b) exotoxin in vivo molecular mechanisms are mostly unknown
(c) microbes propagating in the gut lumen are accessible to IgA antibodies
(d) macrophages found in the bronchi play a major role in protecting the lungs from infection
(e) bacterial adhesins, which bind bacteria to host cells have a broad range of host cell specificity

20. Bacterial endotoxin ***(old paper)***
(a) is exemplified by streptokinase
(b) is the cause of the severe form of diphtheria
(c) is the cause of gas gangrene
(d) induces the production of tumour necrosis factor
(e) is the outer wall of Gram positive bacteria

21. Herpes simplex virus
(a) type 1 usually infects the genitalia
(b) type 1 is the major cause of corneal blindness in the USA
(c) infection in neonates is usually mild
(d) lesions around the mucosal orifices, are usually unilateral and dependent on the dermatome
(e) does not cause disseminated disease, rather, localised cutaneous lesions

22. Cytomegalovirus
(a) directed antibodies are present in 25% of the population
(b) mononucleosis in adults generally causes glandular fever-like symptoms of lethargy, splenomegaly, and lymphadenopathy
(c) binds to epidermal growth factor receptor, and this is the means by which it enters host cells
(d) is routinely screened for in donated blood
(e) infection acquired in utero causes cytomegalic inclusion disease in 5% of cases

23. Regarding Varicella zoster (VZV) infection
(a) Latent VZV causes shingles, and is also called Herpes zoster
(b) Chickenpox is mild in adults
(c) It is transmitted by skin-to-skin contact
(d) Chickenpox rash occurs concurrently with the respiratory infection
(e) It usually recurs as the shingles on a regular basis

24. Infectious mononucleosis
(a) causes a more fulminant disease in childhood
(b) is a self limiting disease with no potential long term sequelae
(c) IgM antibodies directed against viral capsid persist for life
(d) causes the appearance of atypical activated T lymphocytes
(e) causes lymphadenopathy, but the spleen is not enlarged

25. In infectious mononucleosis
(a) usually resolves in 2 weeks
(b) can lead to B-cell lymphoma in HIV patients
(c) jaundice is a rare complication
(d) fever is always present in acute disease
(e) causes a classic pattern of hepatitis

26. *Staphylococcus aureus*
(a) is characterised by its possession of a penicillin resistant plasmid
(b) main virulence factor is δ-toxin
(c) superantigen stimulates massive T cell activation
(d) causes toxic shock syndrome, which is a unique disease associated with the pathogen
(e) causes food poisoning because of the actions of β toxin on the gastrointestinal tract

27. *Staphylococcus aureus* ***(old paper)***
(a) produces toxins that stimulate emetic receptors in the abdominal viscera
(b) has a lipase that degrades lipids on the skin surface
(c) has a capsule that allows it to attach to artificial surfaces
(d) has receptors on its surface which allow binding to host endothelial cells
(e) has all of the above features

28. *Staphylococcus aureus* can cause all of the following except ***(old paper)***
(a) food poisoning
(b) osteomyelitis
(c) carbuncles
(d) scarlet fever
(e) scalded skin syndrome

29. With respect to streptococcal infection *(old paper)*
(a) *Streptococcus agalactiae* can cause necrotising fasciitis
(b) *Streptococcus pyogenes* can cause meningitis in neonates
(c) may result in glomerulonephritis 3 weeks post infection
(d) they are characterised by neutrophilic infiltrates and large amounts of tissue destruction
(e) Erysipelas is most common in children

30. Regarding *C diphtheriae* infection
(a) a single molecule of diphtheria toxin can kill a cell, by preventing protein synthesis
(b) immunisation prevents carriage of the bacterium
(c) the endotoxin causes the formation of a dense fibrinosuppurative exudate
(d) can cause massive cardiac necrosis
(e) none of the above is true

31. Anthrax
(a) infection of the gastrointestinal tract is fatal in 50% of cases
(b) cutaneous infection causes regional lymphadenopathy and a classic black eschar
(c) produces spores that can be ground into a powder
(d) can cause a haemorrhagic mediastinitis
(e) all of the above is true

32. *Neisseria meningitidis*
(a) colonisation of the oropharynx is a prelude to disease
(b) colonisation leads to clearance of the organism, and is protective for that strain
(c) has three serotypes
(d) infection has a mortality of 30%
(e) capsule is highly opsinogenic

33. Non thrombocytic purpura is associated with ***(old paper)***
(a) systemic lupus erythematosus
(b) meningococcaemia
(c) HIV
(d) Epstein Barr virus
(e) fat embolism

34. *Pseudomonas*
(a) has been cultured from antiseptic containing bottles
(b) is a common pathogen in extensive burns
(c) causes pulmonary failure in cystic fibrosis patients
(d) causes keratitis in contact lens wearers
(e) all of the above

35. *Yersinia pestis*
(a) causes mucus gland enlargement called buboes
(b) blocks the gut of the flea, ensuring that it regurgitates before feeding off a human
(c) pneumonic plague is spread by flea bite, with haematogenous spread to the lungs
(d) produces a bacterial toxin that inhibits phagocytosis
(e) b and d are true

36. Regarding tuberculosis
(a) a positive Mantoux test proves active disease
(b) dead Mycoplasma bacterium produce an endotoxin that inhibits phagolysosome formation
(c) It is the leading infectious cause of death in the world
(d) patients with silicosis are particularly susceptible
(e) Epithelial cells of the respiratory tract are the primary cells infected by the mycobacterium

37. All of the following cause splenomegaly except ***(old paper)***
(a) leprosy
(b) toxoplasmosis
(c) tuberculosis
(d) typhoid fever
(e) cytomegalovirus

38. Concerning TB
(a) Cavitation is common in immunocompromised patients
(b) The elderly may develop primary TB more than once
(c) Reactivation of TB most often has apical lung disease with cavitation
(d) reactivation of latent TB occurs in regions with high levels of contagion
(e) Secondary TB classically localises to the lower lobes of one or both lungs

39. Concerning TB
(a) Haemoptysis is present in 50% of cases with secondary TB
(b) The Ghon complex is the consolidation that usually occurs in the lower part of the upper lobe
(c) Because of a quick result, PCR is now the gold standard for diagnosis
(d) Primary tuberculosis has classic caveation disease
(e) Lymphadenitis is uncommon

40. Concerning *M leprae*
(a) Antibodies produces against the microbe confer immunity
(b) A dominant T helper cell 2 (T_H2) response is critical to clearing the disease
(c) It has a high degree of contagiousness in the tropics
(d) The earlobes are most likely affected
(e) Bacille Calmette-Guerin (BCG) vaccination confers no protection against this disease

41. Treponema pallidum infection
(a) produces a primary chancre which heals with or without therapy
(b) can produce secondary stage symptoms, skipping the primary chancre
(c) produce papillomas
(d) vertical transmission is most common if the mother has had the infection for 5 or more years
(e) of the foetus does not cause intrauterine death

42. Syphilis testing
(a) by the rapid PCR testing is now thew gold standard
(b) by the VDRL often produces a negative result in tertiary syphilis
(c) by non-treponemal antibody tests is normally positive within the first four weeks of contracting the disease
(d) a patient with concurrent SLE produces false negative results
(e) none of the above is true

43. Regarding spirochaetes
(a) Relapsing fever has the characteristic erythema chronicum migrans, an expanding area of redness at the site of the louse bite
(b) Lyme disease causes Hutchinson's teeth in vertical transmission
(c) Lyme disease is rare in the USA
(d) T. pallidum lacks genes for making nucleotides and fatty acids
(e) Antibiotic treatment for Relapsing fever clears the disease without complication

44. Clostridium species ***(old paper)***
(a) are all spore forming organisms
(b) C tetani produces an endotoxin that causes muscle spasm
(c) Vaccination against C tetani has not significantly reduced the incidence of tetanus
(d) C botulinum toxin blocks serotonin and dopamine receptors
(e) C perfringens causes wound infections 10 days post injury

45. Regarding clostridium infection
(a) C difficile causes severe sepsis
(b) The clostridia species are all aerobic organisms
(c) Unlike C botulinum, C tetani infection readily causes paralysis
(d) ingestion of food contaminated with C perfringens causes prolonged diarrhoea
(e) C perfringens produces 14 toxins, the most important being α toxin

46. Rickettsial infections ***(old paper)***
(a) are facultative intracellular bacteria
(b) produce cytotoxic Rickettoxin
(c) The immune response produces γ-interferon, which paradoxically increases rickettsial proliferation
(d) principally infects the endothelium
(e) are predominantly sexually transmitted

47. Candida p398-90
(a) of the oral cavity (thrush) in healthy young individuals is not of clinical concern
(b) most commonly takes the form of a superficial infection of the oral cavity
(c) vaginitis is rarely seen with women on the oral contraceptive pill
(d) oesophagitis is often associated with Barrett's oesophagus
(e) is a mould

48. Concerning fungal infection
(a) the presence of hyphae could indicate Cryptococcus infection
(b) serious sinusitis is a common finding in previously healthy individuals infected with aspergillus
(c) Cryptococcus produces melanin
(d) Candida pneumonia is usually lobar and unilateral
(e) Aspergillus enters the body through superficial abrasions

49. In malaria ***(old paper)***
(a) plasmodium vivax causes severe anaemia
(b) parasites mature in red blood cells
(c) inoculated sporozoites immediately invade the spleen
(d) plasmodium falciparum causes hepatomegaly
(e) cerebral malaria is caused by parasites invading the grey mater

50. In malaria
(a) *P falciparum* causes clumping of red blood cells
(b) *P ovale* is able to infect red blood cells of any age
(c) *P malariae* infection is prevented by the absence of Duffy antigen, which the parasite uses for entry into the red blood cell
(d) the merozoite is the infectious stage, found in the salivary glands of mosquitoes
(e) the *P vivax* schizont form lies latent in hepatocytes, which causes relapses of malaria

51. Concerning protozoans
(a) Leishmaniasis uses a tick vector
(b) Mucocutaneous Leishmaniasis is only found in the Old World
(c) *Babesia microti* are sensitive to cold temperature, and die on refrigeration
(d) Babesiosis uses the same vector as Lyme disease
(e) *Malaria malariae* infection often causes nephrotic syndrome

52. Concerning metazoan infection
(a) Echinococcus, which cause hydatids, use humans as the definitive host
(b) Strongyloidiasis is spread through an insect vector
(c) Trichinosis is spread through the ingestion of undercooked chicken
(d) Hydatid cysts are most likely to be found in the liver
(e) Schistosomiasis of the type found in Latin America often infects the bladder

Answers:

1. Regarding prion related diseases p346-347

(a) The risk of transmission of Creutzfeldt-Jakob disease is through corneal transplant, contaminated growth hormone and brain electrode placement: variant CJD is passed through ingestion of infected cattle

(b) Kuru is spread through ***cannibalism***

(c) Creutzfeldt-Jakob disease is **sporadic but has a familial incidence also**

(d) These are primarily diseases of the ***brain, causing encephalopathies***

(e) none of the above is true ***(wrong)***

2. Regarding viruses, which statement is **not true** p347-348

(a) They are obligates intracellular organisms

(b) They are encased in a protein coat called a capsid**, but sometimes have a lipid coat as well**

(c) They are characterised as being either a DNA or an RNA virus, but never both

(d) They range between 20-300nm in size

(e) Herpes zoster virus has the potential for latent infection

2a. Which of the following is not a DNA virus (table 8-4 p347)***(old paper)***

(a) HSV

(b) HBV (all the other hepatitic viruses are RNA)

(c) HIV is a single stranded RNA virus

(d) EBV

(e) VZV, HPV, adenovirus, vaccina (smallpox vaccine) and CMV. ***All else ssRNA***

Rotavirus is the ***only x2 stranded RNA*** virus. MMR=SS RNA. Parvo=SS DNA

3. Bacteria p348-9

(a) are ***prokaryotes, meaning that they have a cell membrane, but lack a distinct nucleus and other membrane bound intranuclear organelles***

(b) that are Gram ***negative*** have a cell wall sandwiched between two phospholipid bilayers. ***Gram positive*** have a thick wall surrounding the cell membrane that retains crystal-violet stain

(c) can have pili, which are a method of attaching to host cells. ***Flagella*** enable bacteria to move in their environment

(d) can be infected by plasmids, which can change non-pathogenic bacteria into virulent strains

(e) Streptococcus ***mutans*** is a major cause of dental caries

4. Regarding infectious diseases p346-351

(a) Fungi are ***eukaryotes***

(b) Q fever is caused by a ***rickettsial*** infection

(c) Mycoplasma have ***no bacterial cell wall***

(d) Influenza is a single stranded RNA virus

(e) Trichomonas is a common ***protozoan*** cause for urethritis

5. Regarding transmission of disease p352-353
(a) T and B cell lymphocytes are very ***important for the adaptive immune response to infection***
(b) The presence of ***fatty acids on the skin inhibits the dermal growth of micro-organisms, and so does the pH of the skin: 5.5***
(c) Vibrio cholerae ***is susceptible to the actions of stomach acid***. If ingested with baking soda, there is a 10, 000 fold increase in susceptibility in the patient. Protozoans like Giardia are not.
(d) Vibrio cholerae does not invade the gut wall, but produces a toxin which produces the bacterial disease
(e) ***H influenzae*** elaborate toxins that paralyse the mucosal cilia in the respiratory tract

6. Regarding the transmission of disease p352
(a) Influenza viruses possess hemagglutinin proteins that bind to sialic acid on the surface of epithelial cells, but then the sialic acid is still attached. To disengage from that, the neuraminidase cleaves the sialic acid. It also lowers the viscosity of the mucus to allow passage of the virus.
(b) ***Streptococcus pneumoniae and S Aureus have no specific binding receptors*** for epithelial cells of the respiratory tract, but they get in after damage, eg post virally, when the epithelium has been stripped off
(c) ***Rhinoviruses grow optimally at 33^{o}C,*** which is the temperature for the upper respiratory tract
(d) ***The flow of urine serves as the main defence against urinary tract infection***
(e) M cells of the mucosa associated lymphoid tissue are ***important for presenting antigen to lymphoid cells***, and binding of important organisms such as E coli, V cholerae, P typhi and Shigella

7. Regarding the spread and dissemination of microbes (p354)
(a) Polioviruses and HBV are transported free in the plasma, and do not require a host cell as a transport medium
(b) Infected foci disseminated by blood are called ***secondary*** foci
(c) Secondary foci ***can be*** solitary ***or disseminated, such as miliary TB***
(d) Rubella infection during the ***third trimester causes little damage***, but in the 1st trimester, it can cause deafness, blindness, congenital heart defects, and mental retardation, depending on which part it infects and at what point they develop
(e) Transmission of *Treponema pallidum* to the ***foetus can really only occur in the late second trimester, where it causes foetal osteochondritis***

8. Regarding sexually transmitted diseases p355
(a) Shigella species can be spread by sexual contact
(b) The initial site of infection for a sexually transmitted infection may be the oropharynx
(c) The organisms responsible tend to be short-lived outside the host
(d) Neonatal herpes simplex virus infection is much more likely to cause visceral disease than is infection acquired later in life
(e) all of the above are true

9. Micro-organisms can cause disease by all these mechanisms except p356
(a) Entry into host cells resulting in cell death
(b) Release of toxins that kill at a distance
(c) ingestion of host cells: hookworms are not micro-organisms, but cause illness by feeding off RBC's
(d) inducement of host immune responses that cause additional tissue damage
(e) all of the above ***(wrong)***

10. Viral mechanisms of injury include (p 201, 357, 360)
(a) insertion of viral DNA/RNA that ***inhibits host protein synthesis***
(b) Damage to cell membranes ***is performed by viral protein insertion into cell membranes, damaging cellular integrity, or promoting cell fusion. Proteases of the host enable viral binding to host cells eg flu haemaglutinin.***
(c) Adhesins are on the surface of ***bacteria*** that aid the attachment to host cells
(d) inhibition of the production of major histocompatibility complex 1 (MHC I) by epithelial cells (p201,360)
(e) none of the above ***(wrong)***
The virus can also manipulate apoptosis, either preventing it (which is a defence mechanism) or promoting it (HIV). Virally induced proteins on the surface of the host cells may induce an immune response (HBV). Viral load within a cell may burst a cell, eg yellow fever. Secondary infections are common after viral illness, especially URTI's. Death of one cell type may lead to death of dependent cells eg poliovirus neuronal death leads to muscle atrophy and death. HPV can induce cell proliferation and transformation. This can lead to cancer.

11. The mechanisms of bacterial virulence include p358
(a) Variation in the type of pili expressed by N. gonorrhoeae
(b) Recruitment of complement by the bacteria to aid in opsonisation of M. tuberculosis
(c) Induction of host cell apoptotic mechanisms by bacterial proteins
(d) a and b
(e) all of the above ***(wrong)***
Adherence (adhesins, pili), intracellular bacteria, prevention of phagosome/lysosome fusion by TB, endotoxins, exotoxins. The pathogenicity of a bacterium are found grouped together in clusters called pathogenicity islands. Virulence also comes with concentration. Toxins are increased in production by S Aureus by autoinducer proteins.

11a. In infectious disease ***(old paper)*** pp352, 358
(a) bacterial endotoxin is the ***outer wall lipopolysaccharide of gram –ve bacteria***
(b) exotoxin in vivo molecular ***mechanisms are mostly known***
(c) microbes propagating in the gut lumen are accessible to IgA antibodies ***(?not stated)***
(d) macrophages found in the ***alveoli*** play a major role in protecting the lungs from infection
(e) bacterial adhesins *are limited in structural type*, but bind bacteria to host cells with a broad range of host cell specificity

12. Concerning bacterial virulence, p358-9

(a) The enzymes that some bacteria produce have in vitro effects, ***but their role in the pathogenicity and virulence of the microbe is unclear.*** Proteases made by *S. aureus* cleaving proteins that adhere epithelium to each other, splitting the epidermis from deeper skin.

(b) The response to bacterial lipopolysaccharide (endotoxin) ***can be beneficial*** for the host, as it mobilises protective immunity, ***but can induce*** DIC, ARDS and septic shock ***if the toxin is in large amounts***

(c) Toxins that alter host intracellular signalling usually utilise a two subunit mechanism. Protein B binds to the cell and enzymatic protein A is delivered into the cytoplasm

(d) Neurotoxins produced by *C. tetani* are ***not toxic to neurons***, but interact with involved in neurotransmitter release

(e) Toxic shock syndrome is an example of *S. aureus* ***superantigen action,*** which stimulates a large T lymphocyte response, and cytokine leak. The high concentration of cytokines cause capillary leak and shock.

13. Microbes evade the immune system by utilising all of the following mechanisms EXCEPT

(a) shedding antigen, ***and varying it eg flu, HIV= changing polymerases. Schistosoma she their antigens on entry through the skin within minutes***

(b) production of superantigen; S aureus, see q12.

(c) remaining inaccessible to the host immune system (eg lumen of the intestine; *C. difficile, V. cholera*)

(d) preventing T cell activation

(e) resistance to innate immune defences: E coli has sialic acid, which will not bind C3b, thereby evading the innate immune system. Herpes blocks complement activation

14. Recognition of virally infected cells by the cell mediated immune system p360

(a) can be inhibited by viral action in interfering with transporter associated with antigen processing ***(HSV)***

(b) can be prevented by the removal of class 1 major histocompatibility complex (MHC 1) from the rough endoplasmic reticulum ***(CMV)***

(c) is inhibited by prevention of MHC 1 synthesis ***(Adenovirus, CMV)***

(d) can be inhibited by virally produced decoy MHC 1 like molecules ***(HSV)***

(e) all of the above

15. The host inflammatory response to infection p363

(a) is a narrow *limited* spectrum of differing responses, ***set up to deal with microbes in a standardised way, but still recognising the diversity of microbes***

(b) for HBV infection is the predominance of ***lymphocyte cells***

(c) which induces cytoproliferative inflammation is usually viral

(d) to necrotising inflammation seen in *C perfringens* infection is not seen because of the speed of necrosis, ***with few inflammatory cells in the necrotised tissue***

(e) patterns serve as a guide, ***but rarely appear in pure form, because different host reactions occur at the same time.***

16. Viral infections, such as p363-4
(a) measles (rubeola) has only one distinct strain
(b) mumps, is part of the paramyxovirus family, that includes measles, RSV and parainfluenza virus
(c) polio are derived from ***3 different strains of polio viruses (including the one for the vaccine)***
(d) herpes viruses are ***very large encapsulated viruses with double stranded DNA***
(e) mumps is a ***generally*** self limiting mild infection, ***but can be the cause of encephalitis or orchitis causing sterility***

17. Measles (rubeola virus) p363
(a) vaccination ***produces lifelong immunity***
(b) rash produced is T cell mediated
(c) is spread primarily by ***respiratory droplet***
(d) rash is ***not seen*** in those with deficiencies in cell mediated immunity, ***but is seen in those patients with agammaglobulinaemia***
(e) ***can cause encephalopathy, immunosuppression, protein losing enteropathy, keratitis with scarring and blindness and haemorrhagic rash in malnourished kids***
18. Polio ***(old paper 2004)***
(a) is an ***encapsulated RNA enterovirus***
(b) cause neurological problems in ***less than 1% of infected individuals***
(c) vaccination ***is a rare cause of polio*** due to mutation of attenuated virus to the wild type
(d) virus infects the motor nuclei of the dorsal horn ***(false)***
(e) invades and replicates in the motor neurons of the brain stem or spinal cord

19. Viral haemorrhagic fevers (p365)
(a) cause haemorrhagic manifestations are due in part to platelet or endothelial dysfunction
(b) are caused by an ***ssRNA virus***
(c) cause haemorrhagic dysfunction by infecting hepatocytes and reducing the number of soluble clotting factors in the blood ***(wrong, SEE A)***
(d) caused by these viruses do not use humans as the natural vector ***(animal or insect)***
(e) requires a ***small dose of virus for infection to occur***

19a. In infectious disease ***(old paper)*** pp352, 358
(a) bacterial endotoxin is the ***outer wall lipopolysaccharide of gram –ve bacteria***
(b) exotoxin in vivo molecular ***mechanisms are mostly known***
(c) microbes propagating in the gut lumen are accessible to IgA antibodies ***(?not stated)***
(d) macrophages found in the ***alveoli*** play a major role in protecting the lungs from infection
(e) bacterial adhesins *are limited in structural type*, but bind bacteria to host cells with a broad range of host cell specificity

20. Bacterial endotoxin ***(old paper)*** p358
(a) Bacterial exotoxin is ***exemplified by streptokinase***
(b) ***exotoxin*** is the cause of the severe form of diphtheria
(c) ***C perfringens exotoxin*** is the cause of gas gangrene
(d) induces the production of tumour necrosis factor
(e) is the outer wall of ***Gram negative bacteria***

21. Herpes simplex virus p365-6
(a) ***type 2*** usually infects the genitalia ***(type 2 close to poo)***
(b) type 1 is the major cause of corneal blindness in the USA
(c) infection in neonates is ***often fulminant, with necrotic foci throughout the lungs, liver, adrenals and CNS***
(d) lesions around the mucosal orifices, are ***usually bilateral and independent of the dermatome***
(e) ***Can*** cause disseminated disease, especially in ***immunocompromised, and neonates***

22. Cytomegalovirus p367
(a) directed antibodies are present in ***50-100% of the population***
(b) mononucleosis in adults is almost always asymptomatic but ***may cause*** glandular fever-like symptoms of lethargy, splenomegaly, and lymphadenopathy
(c) binds to epidermal growth factor receptor, ***but entry into the cell by this method is unproved***
(d) is ***not*** routinely screened for in donated blood
(e) infection acquired in utero causes cytomegalic inclusion disease in 5% of cases, most being asymptomatic.

23. Regarding Varicella zoster (VZV) infection p368
(a) Latent VZV causes shingles (also called Herpes zoster)
(b) Chickenpox is more severe in adults
(c) It is transmitted by ***aerosol contact, unlike HSV***
(d) ***Chickenpox rash occurs two weeks*** after the respiratory infection
(e) It usually recurs as the shingles once: ***multiple recurrences are seen in the elderly and immunocompromised***

24. Infectious mononucleosis p370
(a) ***is usually asymptomatic*** in childhood
(b) is a self limiting disease with neoplastic capabilities: ***it can cause Burkitt's lymphoma, hairy leukoplakia***
(c) early in the course of infection, IgM antibodies are directed against viral capsid, later, ***IgG are formed and persist for life.***
(d) causes the appearance of atypical activated T lymphocytes
(e) causes lymphadenopathy, ***and the*** spleen is ***enlarged in most cases***

25. In infectious mononucleosis p370-1
(a) usually resolves ***in 4-6*** weeks
(b) can lead to B-cell lymphoma in HIV patients
(c) marked hepatic dysfunction and jaundice is a ***common*** complication
(d) fever is sometimes ***absent in acute disease, and the disease may be difficult to diagnose***
(e) causes hepatitis ***that may be impossible to distinguish from other hepatotropic viral illness***

26. Staphylococcus aureus
(a) is ***distinguished*** by its possession of ***many*** plasmids which encode for antibiotic resistance and many virulence factors
(b) has ***many virulence factors including surface proteins, protease type enzymes, multiple plasmids, and toxins***
(c) superantigen stimulates massive T cell activation, leading to massive cytokine release
(d) causes toxic shock syndrome, which is ***also caused by Strep pyogenes***
(e) causes food poisoning because of the actions of ***superantigen*** on the GIT

27. Staphylococcus aureus ***(old paper)***p371-2
(a) produces toxins that can stimulate cytokine production, causing vomiting
(b) has a lipase that degrades lipids on the skin surface
(c) has a capsule that allows it to attach to artificial surfaces **(not mentioned in new Robbins)**
(d) has receptors on its surface which allow binding to host endothelial cells
(e) all of the above

28. *Staphylococcus aureus* can cause all of the following except ***(old paper)***
(a) food poisoning
(b) osteomyelitis
(c) carbuncles
(d) scarlet fever (Strep pyogenes)
(e) scalded skin syndrome

29. With respect to streptococcal infection. ***Note only c was in old paper*** p373-4
(a) ***Streptococcus pyogenes*** can cause necrotising fasciitis
(b) ***Strep agalactiae*** can cause meningitis in neonates
(c) may result in glomerulonephritis 3 weeks post infection, due to immune complex mediated disease that is characterised by immune complex deposition (p977)
(d) they are characterised by neutrophilic infiltrates ***minimal tissue destruction***
(e) Erysipelas is most common in ***middle aged persons in warm climates, ahsa butterfly rash. Tissue necrosis is minor***

30. Regarding *C diphtheriae* infection p374-5

(a) a single molecule of diphtheria toxin can kill a cell, by preventing protein synthesis. It does this by inactivating elongation factor 2 (EF-2). One molecule can deactivate a million EF-2 molecules

(b) immunisation is ***directed against the toxin, but carriage continues***

(c) the ***exotoxin*** causes death of epithelium of the upper respiratory tract***, and the formation of a dense fibrinosuppurative exudate***

(d) can cause ***isolated myofibre necrosis***

(e) none of the above is true ***(wrong)***

31. Anthrax

(a) infection of the gastrointestinal tract is fatal in 50% of cases

(b) cutaneous infection causes regional lymphadenopathy and a classic black eschar, but rarely is fatal

(c) produces spores that can be ground into a powder for terrorist use

(d) inhalational anthrax can cause a haemorrhagic mediastinitis

(e) all of the above is true

32. Neisseria meningitidis p377

(a) colonisation of the oropharynx occurs in ***10% of any given population, and only a small fraction of those infected will get meningitis***

(b) colonisation leads to clearance of the organism, and is protective for that strain

(c) has ***thirteen or more serotypes***

(d) infection has a ***mortality of 10%, even with effective antibiotics***

(e) capsule ***prevents opsonisation***, but is still readily attacked by complement.

33. Non thrombocytic purpura is associated with ***(old paper)***

(a) systemic lupus erythematosus

(b) meningococcaemia

(c) HIV

(d) Epstein Barr virus

(e) fat embolism ***(thrombocytopaenic)***

34. Pseudomonas

(a) has been cultured from antiseptic containing bottles

(b) is a common pathogen in extensive burns, eventually prevailing. It is a common iatrogenic pathogen. It causes severe otitis externa in diabetics.

(c) causes pulmonary failure in cystic fibrosis patients

(d) causes keratitis in contact lens wearers

(e) all of the above

35. *Yersinia pestis* p379-380

(a) causes ***lymph node enlargement called buboes***

(b) blocks the gut of the flea, ensuring that it regurgitates before feeding off a human, ensuring spread

(c) pneumonic plague is spread by aerosol to the lungs***. Carrying rats are still common in the USA, Madagascar had an epidemic in 1999.***

(d) produces a bacterial toxin called a Yop, that inhibits phagocytosis

∴(e) b and d are true

36. Regarding tuberculosis p381
(a) a positive Mantoux test does ***not differentiate between infection and active disease***
(b) ***only live Mycoplasma bacterium*** produce an endotoxin that inhibits phagolysosome formation
(c) ***After HIV***, it is the leading infectious cause of death in the world
(d) patients with silicosis are particularly susceptible
(e) ***macrophages of the respiratory tract*** are the primary cells infected by the mycobacterium

37. All of the following cause splenomegaly except ***(old paper)***
(a) leprosy
(b) toxoplasmosis
(c) tuberculosis
(d) typhoid fever
(e) cytomegalovirus

38. Concerning TB p383
(a) Cavitation is ***rare in immunocompromised patients, as it requires granulomatous hypersensitivity reaction, which is absent in these people.***
(b) The elderly and immunocompromised may develop primary TB more than once. Lack of Mantoux reaction after previous reaction is an ominous sign
(c) Reactivation of TB ***most often resembles acute pneumonia*** with lower and middle lobe consolidation, hilar adenopathy and pleural effusion, rather than the classical apical lung disease with cavitation
(d) Reactivation of latent TB occurs in regions with low levels of contagion, ***but reinfection occurs in high level contagion areas***
(e) Secondary TB classically localises to the ***upper lobes of one or both lungs***

39. Concerning TB p385-6
(a) Haemoptysis is present in 50% of cases with secondary TB
(b) The Ghon complex is the consolidation that usually occurs in the lower part of the upper lobe (focus), ***with hilar caseous necrosis as well. It is called the Ranke complex when the lesions are seen on x-ray.***
(c) Because of a quick result, PCR the disease is picked up quickly (culture takes 10 weeks) ***but the gold standard is still culture, mainly for sensitivities***
(d) ***Secondary tuberculosis has classic cavitatory disease***, primary is the pneumonia and effusion etc.
(e) Lymphadenitis: ***Lymph nodes are the most common extrapulmonary site for TB, most often occurring in the cervical area***

40. Concerning *M leprae* p387
(a) Antibodies produces against the microbe paradoxically can form ***immune complexes that cause erythema nodosum, glomerulonephritis and vasculitis***
(b) ***A dominant T helper cell 1 (T_H1)*** response is critical to clearing the disease, as it is for TB. Production of IL-12 is critical for mobilising macrophages into killing. A dominant T_H2 response causes IL-4, 5 and 10, which inhibits macrophages. (also seen in asthma…a T_H2 response.)
(c) It has a ***low degree of contagiousness***
(d) The earlobes are most likely affected, and other areas of low temperature
(e) Bacille Calmette-Guerin (BCG) vaccination confers ***some*** protection against this disease

41. Treponema pallidum infection p389
(a) produces a primary chancre, which heals with or without therapy 3-6 weeks after development. It occurs three weeks after exposure. Haematogenous and lymphatic spread occurs before the chancre.
(b) can produce secondary stage symptoms after 2-10 weeks, ***following*** the primary chancre
(c) produce ***condylomata lata, papillomas are formed by HPV***
(d) vertical transmission is most ***very uncommon*** if the mother has had the infection for 5 or more years. ***It occurs with primary or secondary stages***
(e) of the foetus causes ***intrauterine or perinatal death in 25% of cases***

42. Syphilis testing
(a) by the rapid PCR testing is now thew gold standard
(b) by the VDRL often produces a negative result in tertiary syphilis
(c) by non-treponemal antibody tests is ***normally negative for*** the first four weeks after contracting the disease, ***even if the patient has a chancre***
(d) a patient with concurrent SLE produces ***false positive results, as does leprosy, drug addiction, pregnancy.***
(e) b is true. The chancre affects the scrotum in 70% of men, and the vulva or cervix in 50% of women. Endarteritis is in all stages of syphilis.

43. Regarding spirochaetes p391-2
(a) ***Lyme disease*** has the characteristic erythema chronicum migrans, an expanding area of redness at the site of the louse bite
(b) ***Syphilis*** causes Hutchinson's teeth in vertical transmission
(c) Lyme disease is ***common in the USA, and rates are rising***
(d) T. pallidum lacks genes for making nucleotides and fatty acids
(e) Antibiotic treatment for Relapsing fever can ***cause release of massive amounts of endotoxin, with massive cytokine release, leading to fever, hypotension, and leukopaenia.***

44. Clostridium species ***(old paper)*** p393-4
(a) are all spore forming organisms
(b) C tetani produces an ***exotoxin*** that causes muscle spasm
(c) Vaccination against C tetani ***has significantly*** reduced the incidence of tetanus
(d) C botulinum toxin blocks the ***synaptic release of Ach***
(e) C perfringens causes ***wound infections 1-3 days post injury***

45. Regarding clostridium infection p393-394
(a) C difficile causes ***pseudomembranous colitis, whereas, perfringens causes severe sepsis in patients with ischaemic gut or immunocompromised.*** Produces toxin A (chemokine) and B, a cytotoxin
(b) ***The clostridia species are all anaerobic organisms***
(c) ***C botulinum (blocks Ach) and C tetani infection (blocks γ amino butyrate) readily cause paralysis***
(d) ingestion of food contaminated with C perfringens causes a ***brief self limiting diarrhoea.***
(e) C perfringens produces 14 toxins, the most important being α toxin. It degrades lecithin and destroys RBC's platelets and muscle cells, and damages nerve sheaths

46. Rickettsial infections ***(old paper; only d)*** p395-6
(a) are ***obligate*** intracellular bacteria
(b) ***produce no toxin, and their LPS is not toxic***
(c) The immune response produces γ-interferon, which reduces rickettsial proliferation
(d) **principally infects the endothelium**
(e) are predominantly spread by ***arthropod vector, ticks, fleas, mites and chiggers***

47. Candida p398-90
(a) of the oral cavity (thrush) in healthy young individuals is of clinical concern, ***as this could be a marker for immune suppression***
(b) most commonly takes the form of a superficial infection of the oral cavity
(c) vaginitis is ***commonly*** seen with women on the oral contraceptive pill
(d) oesophagitis is often associated ***HIV infection and haematolymphoid malignancy***
(e) ***behaves as a yeast and a***s a mould

48. Concerning fungal infection p398-400
(a) the presence of hyphae ***rules out*** Cryptococcus infection, ***as they do not produce hyphae***
(b) serious sinusitis, fungaemia and pneumonia is a finding in ***immunocompromised individuals***
(c) Cryptococcus and aspergillus produces melanin, which is thought to act as an antioxidant, preventing oxidative killing
(d) Candida pneumonia is usually ***bilateral nodular infiltrates***
(e) Aspergillus enters the body ***via airborne conidia. The small size allows entry to the alveoli***

49. In malaria ***(old paper)*** p401-403
(a) plasmodium vivax causes ***mild*** anaemia
(b) parasites mature in red blood cells
(c) inoculated sporozoites immediately ***invade the liver***
(d) plasmodium falciparum ***causes splenomegaly***
(e) cerebral malaria is caused by ***parasites adhering to endothelial cells in the brain, causing clumping rosettes***

50. In malaria p401-3

(a) *P falciparum* causes clumping of red blood cells in blood vessels, the main cause for death in children, and the cause of cerebral malaria

(b) ***P falciparum*** is able to infect red blood cells of any age, making it far more likely to cause severe anaemia

(c) ***P vivax*** infection is prevented by the absence of Duffy antigen, which the parasite uses for entry into the red blood cell

(d) the ***sporozoite*** is the infectious stage, found in the salivary glands of mosquitoes

(e) the *P vivax, ovale* ***hypnozoite*** form lies latent in hepatocytes, which causes relapses of malaria

Vivax, ovale and *malariae* cause mild anaemia, low parasite counts, and rarely splenic rupture and nephrotic syndrome. *Falciparum* causes severe anaemia, high parasitaemia, cerebral symptoms, renal failure, pulmonary oedema and death.

51. Concerning protozoans p403-404

(a) Leishmaniasis uses a ***sandfly*** vector

(b) Mucocutaneous Leishmaniasis is only found in the ***NEW World***

(c) *Babesia microti* ***grow well in refrigeration, and are sometimes passed in blood transfusion***

(d) Babesiosis uses the same vector as Lyme disease

(e) *Malaria malariae* ***infection rarely*** causes nephrotic syndrome

52. Concerning metazoan infection p407-8

(a) Echinococcus, which cause hydatids, use dogs as the definitive host, and sheep as the intermediate host. ***Humans are incidental hosts***

(b) Strongyloidiasis is ***spread through skin from the soil***

(c) Trichinosis is spread through the ingestion of ***undercooked pork***

(d) Hydatid cysts most likely to be found in the liver (33%), 5-15% in the lung, and the rest in other organs

(e) Schistosomiasis of the type found in ***Africa*** often infects the bladder, causing chronic obstructive uropathy. The eggs cause granuloma.