CHAPTER 2 – QUESTIONS

All of the multiple choice questions comprise five options, one of which is the correct answer.

Most of the questions require the reader to identify the correct statement from among a list of options. Some of these options are totally fictitious.

1. Which of the following statements is correct?

   a) Protozoa belonging to the Rhizopoda are characterised by the presence of pseudopodia and absence of flagellae.
   b) *Entamoeba histolytica* and *Entamoeba coli* are morphologically identical.
   c) *Entamoeba moshkovskii* is a harmless commensal.
   d) *Entamoeba histolytica* lacks mitochondria but does contain mitosomes and glycosomes.
   e) *Entamoeba histolytica* lacks a contractile vacuole.

2. Which of the following contributes to the pathology of *Entamoeba histolytica*?

   a) Over-expression of genes coding for lysine-rich proteins.
   b) Over-expression of genes coding for lysergic acid.
   c) Under-expression of gamma hydroxyl butyric acid.
   d) Presence of *Escherichia coli* in the intestine.
   e) Absence of lactic acid bacteria in the diet.

3. Which of the following would one find within the cyst stage of *Entamoeba histolytica*?

   a) Chromatoidal bodies.
   b) Ray bodies.
   c) Red blood cells.
   d) An axostyle.
   e) Pseudopodia.

4. Which of the following species of insects is associated with the transmission of *Entamoeba histolytica*?

   a) *Anopheles gambiae*.
   b) *Glossina morsitans*.
   c) *Musca domestica*.
   d) *Phlebotomus papatasi*.
   e) *Pediculus humanus*.
5. Which of the following statements is correct?

a) *Entamoeba histolytica* always gives rise to amoebic dysentery.
b) *Entamoeba histolytica* can be a sexually transmitted disease.
c) Amoebic dysentery is associated with the development of flask-shaped ulcers in the duodenum and small intestine.
d) Secondary ulcers associated with amoebic dysentery most commonly develop in the small intestine.
e) Hepatic amoebiasis is characterised by the development of numerous small ulcers. Each ulcer represents the arrival of a separate batch of trophozoites.

6. Which of the following statements is correct?

a) *Entamoeba gingivalis* is a zoonotic infection.
b) *Naegleria fowleri* infections are associated with the development of osteomyelitis.
c) *Naegleria fowleri* infections are usually contracted through faecal-oral contamination.
d) *Balamuthia mandrillaris* tends to cause chronic amoebic meningoencephalitis in humans.
e) *Acanthamoeba* spp. infections usually cause a mild form of granulomatous amoebic encephalitis.

7. Which of the following statements about *Giardia duodenalis* is correct?

a) It causes bloody diarrhoea.
b) Infections are often complicated by the development of meningoencephalitis.
c) Infections can result in the patient suffering from steatorrhoea.
d) It gives rise to periodontitis.
e) It can result in the development of pernicious anaemia.

8. Which of the following statements is correct?

a) *Histomonas meleagradis* causes sulphur-yellow coloured diarrhoea in pigs.
b) *Trichomonas vaginalis* does not infect men.
c) *Trichomonas tenax* is especially pathogenic in pigeons.
d) *Trichomonas gallinae* causes ‘blackhead disease’ in turkeys.
e) *Trichomonas foetus* can cause diarrhoea in cats.

9. Which of the following structures can be found in the apical organ of protozoans belonging to the Apicomplexa?

a) Micronemes.
b) Mitosomes.
c) Microstyles.
d) Micronuclei.
e) Microglia.

10. Which of the following statements about the Apicomplexan apicoplast is correct?

a) It is a relict organelle that no longer performs any useful functions.
b) It contains chlorophyll and therefore apicomplexans can survive in the absence of their host.
c) It contains functional DNA.
d) It once contained DNA but the genes that code for proteins have now been transferred to the nucleus.
e) It metabolises haemoglobin to haemoglobin.

11. Which of the following statements is correct?

a) Human malaria has always been a tropical disease.
b) Birds do not get malaria.
c) *Plasmodium falciparum* preferentially invades red blood cells that express the Duffy antigen.
d) *Plasmodium vivax* can cause cerebral malaria.
e) *Plasmodium ovale* only invades mature red blood cells.

12. Which of the following stages of the life cycle of *Plasmodium falciparum* takes place in the mosquito host?

a) Formation of microgametocytes.
b) Exoerythrocytic schizogony.
c) Merozoite proliferation.
d) Hepatic sporogony.
e) Sporozoite formation.

13. Which is the first cell type *Plasmodium falciparum* invades after being injected by a mosquito?

a) Hepatocyte.
b) Reticulocyte.
c) Leucocyte.
d) Dendrocyte.
e) Macrophage.
14. Which of the following statements about *Theileria parva* is correct?

a) It is a zoonotic disease.
b) It is transmitted by culicine mosquitoes.
c) It parasitizes red blood cells but not lymphocytes.
d) The vector contracts the disease by ingesting infected red blood cells.
e) It does not exhibit schizogony.

15. Which of the following statements about *Babesia bigemina* is correct?

a) It is usually transmitted by ticks belonging to the genus *Rhipicephalus*.
b) It develops within lymphocytes but not red blood cells.
c) It is vertically transmitted in cattle but not in the vector.
d) The vector becomes infected through ingesting the merozoite stage.
e) It cannot be transmitted by one-host ticks.

16. Which of the following statements about *Babesia microti* is correct?

a) It interferes with the feeding of its tick host thereby increasing the frequency with which feeding events take place.
b) It is primarily a parasite of humans.
c) It causes periodic fevers.
d) It causes haemolytic anaemia in cattle.
e) It only infects humans who have become immunocompromised.

17. Which of the following statements about the genus *Eimeria* is correct?

a) Most species of *Eimeria* have a wide host range.
b) The genus contains relatively few species.
c) Humans who are immunocompromised are especially vulnerable to *Eimeria* infections.
d) The transmission dynamics of many *Eimeria* species are heavily dependent upon the availability of suitable vectors.
e) Birds can be simultaneously co-infected with two or more species of *Eimeria*.

18. Which of the following statements about *Eimeria tenella* is correct?

a) This species infects rabbits and other lagomorphs.
b) It is transmitted by soft-bodied ticks, such as *Argas persicus*.
c) The infective sporozoites first invade hepatocytes where they undergo exoerythrocytic schizogony.
d) Fusion of the macrogametocytes and microgametocytes takes place in the vector.
e) The oocysts are shed with the host’s faeces.

19. Which of the following statements about *Isospora* is correct?

   a) The merozoites of *Isospora* are spread by faecal-oral contamination.
   b) The oocysts of *Isospora belli* are immediately infective after being shed.
   c) Some species of *Isospora* utilise paratenic hosts to effect transmission.
   d) *Isospora belli* gets its name from its characteristic bell-shaped oocysts.
   e) The parasite is an important cause of respiratory disease in AIDS patients.

20. Which of the following statements about *Cyclospora cayetanensis* is correct?

   a) It is restricted to South-East Asia.
   b) It is spread by person-to-person contact.
   c) It is a zoonotic infection.
   d) It causes ‘red water fever’.
   e) The oocysts undergo sporolation after they are shed.

21. Which of the following statements about the genus *Sarcocystis* is correct?

   a) They are monoxenous parasites.
   b) Humans can act as both an intermediate host and a definitive host for the parasite.
   c) Herbivores typically become infected by consuming sarcocysts containing the bradyzoites.
   d) Sexual reproduction takes place during the sarcocyst stage.
   e) Dogs usually acquire *Sarcocystis bovicanis* by consuming sarcocysts containing the metrocyte stage.

22. Which of the following statements about the genus *Toxoplasma* is correct?

   a) There are numerous species of *Toxoplasma*.
   b) The genus name is derived from the toxin released by the parasite and is responsible for much of the pathology.
   c) Sexual reproduction only takes place in the small intestine of cats.
   d) Asexual reproduction only takes place in the intermediate hosts.
   e) It never invades red blood cells.

23. Which of the following statements about the genus *Toxoplasma* is correct?

   a) Humans are only infected with *Toxoplasma* if they are immunocompromised.
   b) The parasite can be transmitted vertically in cats.
c) Birds are never infected with *Toxoplasma*.
d) Members of the genus lack an apicoplast.
e) It tends to cause short-lived infections.

24. Which of the following statements about the genus *Toxoplasma* is correct?

a) Within the host cell, the parasites live free within the cytoplasm.
b) Within a geographical region, *Toxoplasma* can be maintained in populations of intermediate hosts for many years in the absence of sexual reproduction.
c) The intermediate hosts are unable to mount a protective immune response and therefore remain infected for life.
d) In mammals, vertical transmission can occur through the oocysts passing across the placenta.
e) The earlier a developing human foetus is infected with *Toxoplasma* the less pathology it tends to cause.

25. Which of the following statements about *Neospora caninum* is correct?

a) It is only found in dogs, cats, and cattle.
b) Sexual reproduction only takes place in the small intestine of cats and other felids.
c) Calves born to infected cows are often infected at birth because the tachyzoites of *Neospora caninum* are able to cross the placenta.
d) *Neospora caninum* only causes abortion in cattle.
e) The parasite is highly pathogenic in cattle because they are unable to mount a protective immune response.

26. Which of the following statements about the genus *Cryptosporidium* is correct?

a) Snakes can suffer from cryptosporidiosis.
b) The genus contains a single species that exists as a variety of morphotypes in different host animals.
c) The microgamonts and macrogamonts fuse within the intestine of the vector.
d) The definitive host becomes infected by ingesting the infective sporocyst stage.
e) Humans are not infected by those *Cryptosporidium* parasites that infect other species of mammals.

27. Which of the following statements is correct?

a) The kinetoplast of *Trypanosoma evansi* consists of a length of single-stranded DNA.
b) The kinetoplast of *Trypanosoma brucei* is located at the base of the flagellum.
c) In *Leishmania*, the kinetoplast is found within the mitochondrion.
d) The structure of kinetoplast DNA and nuclear DNA is the same.
e) The kinetoplast DNA of *Toxoplasma gondii* is arranged as a disc of interlocking DNA circles.

28. Which of the following statements is correct?

a) The terms ‘kinetoplast’ and ‘kinetosome’ are synonymous.
b) The kinetosome is a degenerate form of kinetoplast.
c) The kinetosome is located within the mitochondrion.
d) The kinetoplast is involved in the formation of the flagellum.
e) Like mitochondria, the kinetosomes contain their own DNA.

29. Which of the following statements about glycosomes is correct?

a) They are a characteristic feature of metabolically active protozoa.
b) They produce glycogen that is then stored as a metabolic reserve.
c) They are relict plastids from the time the protozoa were free-living.
d) They contain glycolytic enzymes.
e) They are absent from the bloodstream stages of *Trypanosoma brucei*.

30. Which of the following statements is correct?

a) The *Leishmania* species that currently infect mammals probably evolved from species that infected reptiles.
b) In mammals, *Leishmania* is an intracellular parasite of macrophages and reticulocytes.
c) The promastigote stage of *Leishmania major* has a free flagellum.
d) The life cycle of *Leishmania tropica* consists of the amastigote, promastigote, and trypomastigote stages.
e) Within its vector, *Leishmania major* begins its development in the hind gut.

31. Which of the following insects is a vector of *Leishmania*?

a) *Phlebotomus papatasi*.
b) *Pieris brassicae*.
c) *Triatoma infestans*.
d) *Periplaneta americana*.
e) *Anopheles gambiae*.
32. Which of the following statements about PKDL is correct?

a) It develops as a sequel to visceral leishmaniasis.
b) It is a disfiguring condition caused by *Leishmania braziliensis* that destroys the mucous membranes and palate.
c) It is an abbreviation for a commonly used antimonial drug used to treat leishmaniasis.
d) It is a metabolic disease that develops as a consequence of the destruction of white blood cells.
e) It is a cancerous condition that develops through exposure to a teratogen secreted by the *Leishmania* amastigotes.

33. After a sandfly has ingested macrophages containing the amastigotes of *Leishmania*, which of the following events takes place?

a) The amastigotes go through a series of divisions culminating in the production of metacyclic trypomastigotes.
b) The amastigotes fuse and undergo a type of sexual reproduction.
c) The amastigotes multiply until they block the sandfly pharynx.
d) The amastigotes transform into infective metacyclic promastigotes that invade through the gut wall and move to the salivary glands from which they are ingested the next time the sandfly feeds.
e) The amastigotes transform into the procyclic promastigote stage.

34. Which of the following is a major cause of Human African Trypanosomiasis?

a) *Trypanosoma conglobense*.
b) *Trypanosoma brucei rhodesiense*.
c) *Trypanosoma brucei brucei*.
d) *Trypanosoma brucei equiperdum*.
e) *Trypanosoma evansi*.

35. Which of the following is the best definition of ‘nagana’?

a) It is the Swahili name for ‘sleeping sickness’.
b) It is a chronic form of Human African Trypanosomiasis.
c) It is a wasting condition of cattle.
d) It is a sexually transmitted disease of horses.
e) It is a breed of trypanotolerant African cattle that resembles the Zebu in appearance.

36. Which of the following statements is correct?
a) *Trypanosoma equinum* is a sexually transmitted disease of horses.
b) Dyskinetoplastidy is the term used to indicate that a species of trypanosome does not have a kinetoplast.
c) Trypanosome species that are unable to form a kinetoplast are unable to develop in mammals.
d) *Trypanosoma congoense* is the largest species of African trypanosomes that infect mammals.
e) *Trypanosoma brucei brucei* is a polymorphic species.

37. Which of the following parasites is responsible for Chagas disease?

a) *Trypanosoma equiperdum*.
b) *Trypanosoma cruzi*.
c) *Trypanosoma congoense*.
d) *Trypanosoma brucei brucei*.
e) *Trypanosoma evansi*.

38. Which of the following is the best definition of stercorarial transmission?

a) The infective stage is transmitted via the vector’s faeces.
b) It is alternative term for faecal-oral transmission.
c) The parasite enters via the host’s anus.
d) The parasite is transmitted back to its original host.
e) The young are infected are infected at birth.

39. Which of the following statements concerning *Trypanosoma cruzi* is correct?

a) Within the vertebrate host it only invades phagocytic cells.
b) Within the vertebrate host it does not invade phagocytic cells.
c) Within smooth muscle cells, the parasite is enclosed by a parasitophorous vacuole.
d) In nerve cells, the parasite lies free within the cytoplasm.
e) It induces anaemia through invading red blood cells within which it replicates until the cells are destroyed.

40. Which of the following statements concerning *Trypanosoma cruzi* is correct?

a) In humans, it is found in both the amastigote and trypomastigote stage.
b) Only the amastigote stage is found in mammals.
c) Both the amastigote and the trypomastigote stages undergo asexual reproduction and therefore a high parasitaemia develops very quickly.
d) The parasite cannot be transmitted vertically in mammals.
e) In armadillos, it is found in the amastigote, promastigote, and trypomastigote stages.

41. Which of the following statements concerning *Prototheca* spp. is correct?

a) The genus was once thought to belong to the protozoa but it is now known to be a fungus.
b) All members of the genus are parasitic.
c) Certain species cause ringworm in humans.
d) Parasitic species are transmitted through vector-assisted stercorarial transmission.
e) Some species cause mastitis in cows.

42. Which of the following statements about microsporidia is correct?

a) Molecular sequencing indicates that they are closely related to the brown algae.
b) They lack mitochondria but do contain mitosomes.
c) They are characterised by their extremely small genome size.
d) Some species are vertically transmitted in mammals.
e) They are usually transmitted through faecal-oral contamination with the oocyst stage.

43. What is the function of the polar filament in microsporidia?

a) It injects the sporoplasm into the host cell.
b) It absorbs water and this increases the hydrostatic pressure in the spore, thereby expelling the infective stage.
c) It extracts the host cell cytoplasm which is then consumed by the parasite.
d) It represents a degenerated mitochondrion.
e) It is an organelle that functions a bit like the axostyle in *Giardia duodenalis* and provides structural support.