CHAPTER 3 – 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 is the best definition of the term ‘digenetic’?

   a) Cells with two nuclei.
   b) An organism that exhibits two reproductive stages: an asexual cycle of reproduction in the larval stages and a sexual cycle in the mature stage.
   c) A digenetic organism is one that contains two copies of its DNA in every cell.
   d) It is a parasite that infects two species of host.
   e) It is a taxonomic term that indicates that the taxon is split into two divisions.

2. Which of the following is the correct sequence of life cycle stages (youngest to oldest) of a digenean trematode?

   a) Miracidium, sporocyst, redia.
   b) Cercaria, metacercaria, redia.
   c) Oocyst, redia, cercaria.
   d) Meront, schizont, metaschizont.
   e) Miracidium, sporocyst, sporozoite.

3. Which of the following trematode life cycle stages undergoes asexual reproduction?

   a) Egg.
   b) Miracidium.
   c) Redia.
   d) Cercaria.
   e) Metacercaria.

4. Which of the following statements about *Fasciola hepatica* is correct?

   a) Each cercaria divides to form four metacercariae.
   b) The rediae are motile and move around in the snail tissues.
   c) The adult flukes feed on bile as it is secreted into the bile ducts.
   d) The young flukes reach the bile ducts by crawling up the bile ducts.
e) The eggs cause a pronounced immune reaction that is responsible for much of the pathology.

5. Which of the following is thought to be the main reason large numbers of deformed frogs have been reported in parts of the USA?

   a) The cercariae of *Fasciolopsis buski* encyst within the adult frog’s pelvic girdle.
   b) The frog tadpoles are invaded by the cercariae of *Dicrocoelium dendriticum*.
   c) The rediae of *Alaria* spp. developing in the tadpoles release teratogenic compounds.
   d) The metacercariae of *Ribeiroia* spp. encyst within the developing limb buds.
   e) The increasing use of herbicides, such as atrazine, stimulates the growth of pathogenic algae (e.g. *Prototheca* spp.). Tadpoles feeding on the algae ingest harmful levels of toxins and this interferes with their normal development.

6. Which of the following parasites is associated with a change in behaviour of ants?

   a) *Ribeiroia* spp.
   b) *Alaria* spp.
   c) *Dicrocoelium dendriticum*.
   d) *Opisthorchis viverrini*.
   e) *Clonorchis sinensis*.

7. Which of the following parasites can be contracted through the consumption of pickled fish?

   a) *Fasciola hepatica*.
   b) *Clonorchis sinensis*.
   c) *Schistosoma japonicum*.
   d) *Schistosoma mansoni*.
   e) *Dicrocoelium dendriticum*.

8. In which of the following sites is one most likely to find the adults of *Schistosoma haematobium*?

   a) The vesical plexus around the urinary bladder.
   b) The veins serving the upper bile duct.
   c) The inferior mesenteric veins that drain the large intestine.
   d) The superior mesenteric veins associated with the small intestine.
   e) The external iliac artery.
9. Which of the following statements about schistosome eggs is correct?

a) All schistosome eggs have a spine although it varies in size and position between species.
b) The egg spine is sharp and this, coupled with the movements of the miracidium inside the egg, forces the egg through the host tissues.
c) The eggs secrete protease enzymes that digest the surrounding host tissues and this enables them to reach the lumen of the gut or bladder.
d) The eggs stimulate a granulomatous immune reaction.
e) The eggs hatch inside the host and the miracidium physically and chemically bores its way through the host tissues until it reaches the lumen of the gut or bladder.

10. Which of the following statements is correct?

a) Cestodes lack mouthparts.
b) Cestodes lack a gut but have relict mouthparts situated at the top of their rostellum.
c) Adult cestodes usually develop in the peritoneal cavity of their vertebrate host.
d) *Taenia* tapeworm proglottids are equipped with hooks because the scolex is not strong enough to anchor a worm several metres long in position.
e) Adult tapeworms usually reproduce asexually because it is unusual for the host to contain more than one worm.

11. Which of the following statements about tapeworms of the genus *Diphyllobothrium* is correct?

a) Worms of this genus have dispensed with a vertebrate definitive host and the life cycle takes places in tubificid worms.
b) The adult worms can grow to up to 10 metres in length and their scolex is therefore armed with hooks to enable the worms to keep a firm hold.
c) The eggs are operculate and smaller than those of *Fasciola hepatica*.
d) The procercoid stage of the life cycle actively searches and invades the fish intermediate host.
e) Human infections are usually associated with the consumption of poorly cooked pork.

12. Which of the following tapeworm lifecycle stages exhibits asexual reproduction?

a) Cysticercus.
b) Cysticercoid.
c) Plerocercoid.
d) Coenurus.
13. Which of the following is the typical length of adult *Echinococcus granulosus*?

a) 2–7 μm.
b) 2–7 mm.
c) 2–7 cm.
d) 20–70 cm.
e) 200–700 cm.

14. Which of the following statements is correct?

a) Humans can be definitive hosts of tapeworms of the genus *Taenia* but not intermediate hosts.
b) Those species of the genus *Taenia* in which the adult worms are relatively short are more likely to form larvae that reproduce asexually than those that form large adult worms.
c) The adult worms of the genus *Taenia* all have an armed rostellum.
d) Humans become infected with *Taenia saginata* through faecal-oral contamination.
e) The larvae of tapeworms of the genus *Taenia* usually have two intermediate hosts: an insect and a mammal.

15. Which of the following is a stage in the lifecycle of *Taenia solium*?

a) Trophozoite.
b) Redia.
c) Cysticercoid.
d) Coenurus.
e) Oncosphere.

16. Which of the following statements is correct?

a) The gravid proglottid of *Taenia solium* remains motile after it is shed with the host’s faeces.
b) The gravid proglottids of *Taenia solium* are typically 10–12 cm in length and 5–6 cm in width.
c) The gravid proglottids of *Taenia solium* tend to be shorter and contain fewer uterine branches than those of *Taenia saginata*.
d) The scolex of adult *Taenia saginata* is armed with hooks.
e) The proglottids of *Taenia solium* disintegrate in the gut and are therefore not seen in the host’s faeces.

17. Which of the following statements about *Echinococcus granulosus* is correct?
a) Humans can be both the intermediate and definitive host.
b) Humans are the only intermediate host of this parasite.
c) Large worm burdens in dogs are usually fatal.
d) Humans become infected by eating meat containing the larval stage.
e) The gravid proglottids disintegrate within the intestine of the definitive host.

18. Which of the following statements about *Echinococcus multilocularis* is correct?

a) Cysts developing in the lungs are referred to as alveolar cysts.
b) The cysts cause the formation of neoplasms.
c) The parasite is most common in countries with a hot dry climate.
d) The adult worms are usually found in the small intestine of cats and other felids.
e) The cysts lack a limiting membrane of host origin.

19. Which of the following can be used to distinguish an adult cestode from an adult acanthocephalan?

a) Tapeworms have interproglottidal glands but acanthocephalans do not.
b) Acanthocephalans have hooks at their anterior end.
c) Acanthocephalans have a mouth.
d) Acanthocephalans have a pseudocoelom.
e) Adult tapeworms are found in the small intestine of mammals while adult acanthocephalans are found in small intestines of snakes and reptiles.

20. Which of the following is an effective means of distinguishing an adult acanthocephalan from an adult nematode?

a) Acanthocephalans have a pseudocoelom while nematodes have a coelom.
b) Most nematodes have separate sexes while acanthocephalans are hermaphrodites.
c) Nematodes have amphids but acanthocephalans do not.
d) Acanthocephalans have spicules but nematodes do not.
e) Nematodes have symbiotic relationships with *Wolbachia* bacteria but acanthocephalans do not.

21. Which of the following species of parasite is commonly known as a ‘whipworm’?

a) *Trichuris suis*.
b) *Trichinella spiralis*. 
c) *Trichostrongylus colubriformis*.
d) *Toxocara canis*.
e) *Toxascaris leonina*.

22. Which of the following statements is correct? Whipworms derive their common name from ...

a) The thrashing movements of the adult worm.
b) The old English word for ‘white’.
c) The coiled shape of the larvae within the egg.
d) The shape of the adult worms.
e) The ‘whippet-like’ speed with which the worms move across the gut surface.

23. Which of the following species of parasite is commonly known as a ‘hookworm’?

a) *Nematodirus battus*.
b) *Nippostrongylus brasiliensis*.
c) *Necator americanus*.
d) *Haemonchus contortus*.
e) *Hymenolepis diminuta*.

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

a) The genus contains numerous species, each of which parasitises a narrow range of closely related hosts.
b) The larvae are intracellular parasites.
c) The adult worms invade muscle cells and release their larvae into the bloodstream.
d) The adult worms have a narrow, slender anterior portion and a much broader posterior that projects out of the muscle cell.
e) The definitive host becomes infected through faecal-oral contamination.

25. Which of the following statements about *Trichinella spiralis* larvae is correct?

a) They induce stem cells to develop into nervous tissue.
b) They cause muscle cells to de-differentiate into nurse cells.
c) Cells infected with *Trichinella spiralis* larvae undergo apoptosis as an anti-parasitic strategy. This results in the death of both the cell and the parasite.
d) Muscle cells infected with *Trichinella spiralis* larvae de-differentiate into connective tissue.
e) Liver cells infected with *Trichinella spiralis* larvae re-differentiate into connective tissue cells.

26. Which of the following statements about *Strongyloides stercoralis* is correct?

a) It is an opportunistic pathogen that is normally free-living.
b) It only infects people who are immunocompromised.
c) It is a facultative parasite that will continue to develop into a free-living adult if the ‘infective stage’ is unable to locate a suitable host.
d) The eggs are normally transmitted through faecal-oral contamination.
e) The filariform larvae actively invade the definitive host through the skin.

27. Which of the following statements is correct?

a) The term ‘hookworm’ is derived from Robert Hook (1635–1703) who was the first person to describe them.
b) The adults of *Necator americanus* feed using a pair of ventral cutting plates.
c) The adults of *Necator americanus* are usually stockier and longer than those of *Ancylostoma caninum*.
d) *Ancylostoma caninum* is only found in dogs and other canids.
e) The larvae of *Ancylostoma caninum* feed using a pair of ventral cutting plates.

28. Which of the following is the best definition of hypobiosis?

a) A stage of arrested development.
b) A type of asexual reproduction.
c) A type of pathology.
d) An immune reaction.
e) A period of rapid growth.

29. Which of the following statements is correct?

a) The third stage larvae of *Ancylostoma caninum* sometimes enter hypobiosis.
b) When third stage larvae of *Ancylostoma caninum* enter muscle cells, they cause them to transform into nurse cells.
c) The third stage larvae of *Necator americanus* undergo hypobiosis in skeletal muscle.
d) The second stage larvae of *Ancylostoma caninum* undergo hypobiosis in the flight muscle cells of the vector mosquito.
e) The eggs of *Necator americanus* undergo hypobiosis as a means of surviving overwinter.

30. Which of the following statements about *Ascaris lumbricoides* is correct?
a) The adult female worms reproduce by parthenogenesis.
b) The larvae migrate via the lungs to the liver and then enter the bile ducts to reach the small intestine.
c) The larvae enter hypobiosis when they reach the lungs.
d) The larvae can induce a condition known as Loeffler's pneumonia.
e) The migration of the larvae through the liver can induce the condition known as Black disease.

31. Which of the following statements about filarial nematodes is correct?

a) A characteristic feature of all microfilariae is the presence of a protective sheath.
b) The sheath of microfilariae is predominantly to protect them from desiccation.
c) Microfilariae are the equivalent of first instar larvae in other nematode species.
d) Microfilariae that are longer than 300 μm are referred to as 'macrofilariae'.
e) The sheath surrounding the microfilariae of Wuchereria bancrofti is derived from the egg membrane.

32. Which of the following species of nematode causes the condition known as ‘river blindness’?

a) Onchocerca gutturosa.
b) Onchocerca volvulus.
c) Brugia malayi.
d) Brugia pahangi.
e) Wuchereria bancrofti.

33. Which of the following nematode species is transmitted by Anopheles gambiae?

a) Wuchereria bancrofti.
b) Onchocerca gutturosa.
c) Dracunculus medinensis.
d) Trichuris trichiura.
e) Strongyloides gutturosa.

34. Which of the following nematode parasites has been associated with the development of ‘nodding disease’ in children?

a) Brugia malayi.
b) Dracunculus medinensis.
c) Wuchereria bancrofti.
d) *Onchocerca volvulus.*
e) *Ascaris lumbricoides.*

35. Which of the following statements about *Dracunculus medinensis* is correct?

a) The eggs hatch in the uterus of the female worm and she releases microfilariae.
b) The nematode larvae are transmitted by various species of *Culex* mosquitoes.
c) The male worms form blisters on the lower limbs from which they release spermatozoa into the water. These then fertilise the eggs as they are released.
d) Humans become infected by consuming crabs containing the infective larvae.
e) The parasite is primarily a problem in regions with low rainfall.