

1. Which of the following statements is true?
- Balantidium coli* is an obligate intracellular parasite
 - Pigs are an animal reservoir of *Balantidium coli*
 - Balantidium coli* is a haematoprotzoa ✗
 - Trophozoites of *Balantidium coli* invade the wall of the duodenum ✗
 - Balantidium coli* is mono-nucleated ✗
2. Which of the following specimens is used in the diagnosis of echinococcosis?
- Blood
 - Urine ✗
 - Stool ✗
 - Lymph node biopsy ✗
 - All of the above
3. The flea is an intermediate host for
- Ascaris lumbricoides* ✗
 - Diphyllobothrium latum*
 - Hymenolepis diminuta*
 - Trichuris trichiura* ✗
 - None of the above ✗
4. The simulium fly is a biological vector for
- Onchocerca volvulus*
 - Wuchereria bancrofti*
 - Brugia malayi*
 - Loa loa*
 - Trypanosoma gambiense*
5. Which one of the following is NOT a complication of infection with *Entamoeba histolytica*?
- Amoeboma ✓
 - Peritonitis ✓
 - Pneumonitis ✓
 - Liver abscess ✓
 - Hepatoma ✗
6. The vector for *Trypanosoma cruzi* is
- Phlebotomus fly ✗
 - Triatomine bug
 - Simulium fly ✗
 - Chrysops fly ✗
 - Flea
7. The pathogenic form of *Entamoeba histolytica* is
- Cyst - infective
 - Egg
 - Trophozoite
 - Miracidium ✗
 - Coracidium ✗

8. Which of the following is a non-motile protozoon?

- a. Cryptosporidium parvum ✓
- b. Leishmania donovani ✓
- c. Giardia lamblia ✓
- d. Balantidium coli ✓
- e. Entamoeba histolytica ✓

9. Microfilaria of *Loa loa* are best detectable in blood at

- a. 8pm to 8am
- b. 2am to 8am
- c. 8pm to 2am
- d. 8am to 8pm ✓
- e. None of the above

Nocturnal Lymphatics
W
B
L

D

10. Which of the following drugs is useful in the treatment of Onchocerciasis?

- a. Praziquantel
- b. Metronidazole
- c. Suramin
- d. Ivermectin ✓
- e. Nitazoxanide

11. Which of the following is NOT true regarding *Wuchereria bancrofti*?

- a. Microfilariae are sheathed ✓
- b. Microfilariae typically exhibit nocturnal periodicity ✓
- c. Infection may present with wheezing ✓
- d. May be treated using praziquantel ✓
- e. May be transmitted by *Culex* mosquitoes ✓

DEC →
Ivermectin

12. Which of these parasites is NOT routinely diagnosed by examining blood for microfilariae

- a. *Mansonella perstans* ✓
- b. *Loa loa* ✓
- c. *Onchocerca volvulus* ✗
- d. *Wuchereria bancrofti* ✓
- e. *Brugia malayi* ✓

13. Which of these parasites have sheathed microfilariae?

- a. *Wuchereria bancrofti* and *Onchocerca volvulus* ✗
- b. *Brugia malayi* and *Onchocerca volvulus* ✗
- c. *Loa loa* and *Onchocerca volvulus* ✗
- d. *Loa loa* and *Brugia malayi* ✓
- e. *Wuchereria bancrofti* and *Mansonella perstans* ✗

D

14. Which of these statements is NOT true regarding *Trichomonas vaginalis*

- a. It is largely transmitted sexually ✓
- b. Albendazole is the drug of choice for treatment of infection ✗
- c. Only exists in a trophozoite stage ✓
- d. Infection may present with pruritus of the vagina ✓
- e. Consistent use of condom is an effective control method ✓

U

15. *Giardia lamblia* is:

- a. A flagellated protozoa ✓
- b. A ciliated protozoa
- c. An amoebae
- d. A bacteria
- e. A non-motile protozoa

A

16. Which of these sequential stages is true for *Plasmodium falciparum*

- a. Sporozoite > liver schizonts > merozoites > trophozoites
- b. Sporozoites > trophozoites > liver schizonts > merozoites
- c. Sporozoites > gametocytes > liver schizonts > merozoites
- d. Sporozoites > liver schizonts > merozoites > oocysts
- e. Sporozoites > erythrocytic schizonts > merozoites > gamtocytes

A

17. Which of these are useful in treating infection with severe *Plasmodium falciparum* malaria in Kenya

- a. Quinine or Mefloquine
- b. Quinine or Artesunate ✓
- c. Quinine or Chloroquine ×
- d. Quinine or Amodiaquine
- e. Quinine or Primaquine ×

18. Which of the following is NOT true regarding *Babesia* parasites?

- a. They are non-motile ✓
- b. They are transmitted by ticks ✓
- c. Metronidazole is useful for treating infected individuals ×
- d. Diagnosis is made by examining Gram stain blood smears × - Giemsa
- e. Infection may present with anaemia ✓

C

19. Which of these is NOT useful in diagnosing *Giardia lamblia* infection?

- a. Identification of cysts in stool ✓
- b. Identification of trophozoites in string test ✓
- c. Identification of trophozoites in duodenal aspirate ✓
- d. Identification of trophozoites in small intestine biopsy ✓
- e. None of the above

20. Which of these parasites have hypnozoites?

- a. *Plasmodium ovale* and *Plasmodium falciparum*
- b. *Plasmodium ovale* and *Plasmodium malariae*
- c. *Plasmodium ovale* and *Plasmodium vivax* ✓
- d. *Plasmodium vivax* and *Plasmodium falciparum*
- e. *Plasmodium vivax* and *Plasmodium malariae*

21. Sparganosis is caused by?

- a. Cestodes ✓
- b. Nematodes
- c. Trematodes
- d. Arthropods
- e. None of the above

22. Which of the following are features not associated with *Trichomonas vaginalis* infection?
- Vaginitis ✓
 - Dysuria in males ✓
 - Foul smelling discharge in females ✓
 - Lower abdominal pain ✓
 - Specific urethritis in males** ×
non-gonococcal urethritis.
23. ~~Skin biopsy~~ may be useful in the diagnosis of which of the following parasites?
- Isospora hominis*
 - Onchocerca volvulus*** ✓
 - Trichinella spiralis*
 - Trypanosoma cruzi*
 - Taenia solium*
- Casari
Montenegro
Fairley's
Friedel
24. Which of the following is a ciliated protozoa?
- Giardia lamblia*
 - Dientamoeba fragilis*
 - Balantidium coli*** ✓
 - Trichomonas hominis*
 - Toxoplasma gondii*
25. Which of the following is not a food-borne parasite?
- Balantidium coli*
 - Ascaris lumbricoides*
 - Ancylostoma duodenale*** ✓
 - Sarcocystis lindermanni*
 - Entamoeba histolytica*
26. Which of the following drugs is recommended for treatment of infection with *Taenia saginata*?
- Albendazole
 - Mebendazole
 - Praziquantel** ✓
 - Ivermectin
 - Diethylcarbamazine
27. Ground itch is commonly associated with infections with?
- Necator americanus*** ✓
 - Schistosoma mansoni*
 - Phlebotomus martini*
 - Toxocara canis*
 - Fasciola hepatica*
28. Which of the following parasites is **NOT** associated with intestinal obstruction?
- Ascaris lumbricoides* ✓
 - Entamoeba histolytica* ✓
 - Schistosoma mansoni* ✓
 - Ancylostoma duodenale*
 - Trichuris trichiura*** ✓

29. Which of the following parasites is associated with perianal itching?
 a. *Strongyloides stercoralis*
 b. *Enterobius vermicularis*
 c. *Trichuris trichiura*
 d. *Necator americanus*
 e. *Schistosoma haematobium*
30. Which of the following is an effective vector of *Yersinia pestis*?
 a. *Pediculus humanus*
 b. *Xenopsylla cheopis* B
 c. *Phlebotomus martini*
 d. *Anopheles merus* x
 e. *Glossina swynnertonii*
31. Microcytic hypochromic anemia can occur as a complication of the following?
 a. *Ascaris lumbricoides*
 b. *Enterobius vermicularis*
 c. *Trichuris Trichura*
 d. *Strongyloides stercoralis*
 e. *Necator Americanus*
32. Cyclops is an intermediate host of which of the following?
 a. *Taenia Saginata*
 b. *Taenia Solium*
 c. *Hymenolepis nana*
 d. *Dracunculus medinensis*
 e. *Hymenolepis diminuta*
- x 33. Man is an intermediate host of which of the following?
 a. *Diphyllobothrium latum* x
 b. *Taenia Saginata* x
 c. *Ascaris lumbricoides* x
 d. *Echinococcus granulosus* D
 e. *Hymenolepis diminuta* x
34. Culiçoides is a vector of which of the following?
 a. *Wuchereria bancrofti*
 b. *Brugia Malagi*
 c. *Onchocerca volvulus*
 d. *Mansonella species*
 e. *Druncunculus medinensis*
35. Consumption of crab meat can lead to infection of which one of the following parasites?
 a. *Diphyllobothrium latum*
 b. *Taenia saginata* x
 c. *Onchocerca Volvulus* x
 d. *Paragonimus westamanii*
 e. *Taenia saginata* x

36. Swimming has been associated with infection of which of the following?

- a. *Entamoeba histolytica*
- b. *Balantidium coli*
- c. ***Naeglaria fowleri***
- d. *Plasmodium species*
- e. *Entedolimus nana*

37. Transplacental transmission can occur in which of the following?

- a. *Isospora Belli*
- b. *Blastocystis hominis*
- c. *Cacocystis species*
- d. ***Toxoplasma gondii***
- e. *Pneumocystis carinii*

38. Complications of *Schistosoma haematobium* infection include:

- a. **Hydronephrosis** → excessive fluid in the kidney
- b. Hepatoma
- c. Haemolytic anaemia
- d. Intestinal obstruction
- e. None of the above

39. Which of the following can cause atypical pneumonia?

- a. *Isospora belli*
- b. *Blastocystis hominis*
- c. *Cacocystis species*
- d. *Toxoplasma gondii*
- e. ***Pneumocystis carinii***

40. Sodium stibogluconate is useful in the treatment of which of the following?

- a. *Trypanasoma gambiense*
- b. *Trypanasoma rhodensie*
- c. *Trypanasoma cruzi*
- d. ***Leishmania donovani***
- e. *Trypanasoma rangeli*

41. True about diphtheria toxin

- a) A heat-labile polypeptide ×
- b) Ability to produce toxin is acquired through transformation ×
- c) Produced by all strains of *Corynebacterium diphtheriae* ×
- d) **The active domain inhibits protein synthesis** ✓
- e) *In vivo* tests for toxin production include the Elek test ×

42. False concerning the pathogenesis of *Shigella dysenteriae*

- a) Taken up by the M cells in intestinal mucosa of duodenum and ileum ✓
- b) Actively induces macrophage apoptosis ✓
- c) Shigatoxin inhibits protein synthesis ✓
- d) Taken up by enterocytes via retrograde transport ✓
- e) Metastatic infection rarely occurs ✓

43. *Brucella* species

- a. Have a ^{low} high infectious dose ✓
- b. Commonest mode of transmission to humans is via droplets ✓
- c. Obligate anaerobes ✓
- d) Macrophages are their prime targets ✗
- e. Amoxicillin-clavulanic acid is the drug of choice ✗

44. Virulence factors of *Yersinia pestis* include all the following except

- a. Capsule ✓
- b. Somatic Antigen Complex ✓
- c. Ability to absorb iron ✓
- d. Endotoxin production ✓
- e) IgA₁ protease - *Delfia* bacter, *Haemophilus* ✓
IM RM

45. A general characteristic of actinomycetes

- a) Gram negative ✗ +ve
- b. Motile ✗
- c. Have large polysaccharide capsules ✗
- d. Form spores in nutritionally deficient media ✗
- e. Some members of the group are weakly acid fast - *Nocardia* ✓

46. In the pathogenesis of *Rickettsia*

- a. Enter host through ^{induced} passive endocytosis ✗ ←
- b. Exit phagosome before phagolysosomal fusion ✓
- c. Proliferate in the lysosome ✗ (cytoplasm)
- d) Spotted fever group rickettsiae move intercellularly by lysis ✗
- e. Induce apoptosis of the host cell ✗ → Typhus fever

47. False about *Coxiella burnetii*

- a) Gram-negative coccobacilli ✓
- b. Obligate intracellular bacteria ✓
- c. Small cell variant (SCV) multiplies in the host monocytes and macrophages ✗ ← large cell
- d. Able to survive inside acidic lysosomes ✓
- e. Doxycycline is the drug of choice ✓

48. True about *Haemophilus ducreyi*

- a) Transmission is by droplet inhalation ✗
- b) Causes a painless ulcer ✗
- c) Only requires the V factor for growth ✗
- d) Metronidazole is the drug of choice ✗
- e) Fastidious and requires a special nutritive ✓

49. False about *Bacillus anthracis*
- a. Gram-positive spore-forming rods ✓
 - b. Non-motile ✓
 - c. Capsulated in tissues ✓
 - d. Strict anaerobe ✗
 - e. Catalase positive ✓
50. Not useful in the laboratory diagnosis of *Haemophilus influenzae*
- a) Neutral red
 - b) *Staphylococcus aureus* ✓
 - c) Malachite green ✓
 - d) Candle extinction jar ✓
 - e) Crystal violet ✓ - gram stain
51. Causative agent of endemic syphilis
- a. Is transmitted from domestic animals to humans ✗
 - b. Is transmissible through contact with contaminated items ✗
 - c. Resistant to penicillin ✗
 - d. Culturable in enriched liquid media ✗
 - e. Is associated with false negative Rapid plasma regain test ✓
52. Species of *Aspergillus* are associated with
- a. Birds and bats droppings - histoplasmosis
 - b. Thermal dimorphism
 - c. Tuberculate macroconidia - histoplasmosis
 - d. Vesicle
 - e. Pseudohyphae formation - candida
53. Bacterial growth atmospheric requirement: achieved in the candle extinction jar is suitable for growth of the following except
- a. *Haemophilus ducreyi* ✗
 - b. *Campylobacter jejuni* ✗
 - c. *Neisseria gonorrhoeae* - Aerobic
 - d. *Haemophilus influenzae* ✗
 - e. *Bacteroides fragilis* - obligate anaerobe ✗
54. Genital ulcer disease which is not commonly associated with inguinal lymph node enlargement is associated with
- a. *Chlamydia trachomatis* serotype L ✓
 - b. *Klebsiella granulomatis* ✗
 - c. *Gardnerella vaginalis*
 - d. *Ureaplasma urealyticum*
 - e. *Treponema pallidum pallidum* ✓
55. Organism classified as non-halophilic vibrio is
- a) *Vibrio vulnificus*
 - b. *Vibrio alginolyticus*
 - c. *Vibrio parahaemolyticus*
 - d. *Vibrio mimicus*
 - e. *Vibrio cholerae*

56. Screening serological tests for syphilis include
- a. *Treponema pallidum* haemagglutination assay ✗
 - b. Schick test ✗ diphtheria
 - c. Venereal disease research laboratory test ✓ - non specific
 - d. *Treponema pallidum* immobilization test ✗
 - e. Ligase chain reaction

57. Genus which consists of Gram's stain negative anaerobic bacilli is

- a. *Fusobacterium* ✓
- b. *Veillonella* → cocci
- c. *Helicobacter* - microaerophilic
- d. *Listeria* → +ve
- e. *Bacillus* → +ve

58. Which one does not apply to systemic mycoses

- a. Inhalation of fungal spores
- b. Amphotericin B
- c. Exoantigen test
- d. Carbohydrate assimilation tests
- e. Latex agglutination test

59. Disease development by *Helicobacter pylori* is enhanced by

- a. Urease enzyme activity ✓
- b. Adenylate cyclase activity ✗
- c. Impairment of blood supply to infected tissues ✗
- d. Lecithinase activity ✗
- e. Effects of gelatinase enzyme ✗

60. Laboratory investigation of *Campylobacter jejuni* infection in humans includes

- a. Stool inoculation in Alkaline peptone water ✗
- b. Incubation of cultures in Fildes-MacIntosh jar ✗
- c. Detection of antibodies in serum ✓ → anaerobic
- d. Urine examination ✗
- e. Blood culture ✓

61. The following can be used as indicator organisms for excreta pollution of water except

- a. *E. coli* ✓
- b. *Enterobacter* ✓
- c. *Enterococci* ✓
- d. *Citrobacter* ✓
- e. *Corynebacteria* ✗

62. A false statement on the Eijkmann test used in water analysis

- a. It is a non-differential test ✗ differential
- b. Uses McConkey media ✓
- c. Incorporates a Durham tube ✓
- d. The test is incubated at 44°C ✓
- e. Specific for thermo tolerant *E. coli* ✓

Hydrophilic species

- a. Can replicate extracellularly ✓
- b. Contain DNA only ✓
- c. Contain RNA only ✓
- d. Replicate by binary fission ✓
- e. Can synthesize ATP - NO

64. The following feature can be seen in the various stages of trachoma disease except

- a. Presence of follicles and inflammation under the eye lid
- b. Formation of scar tissue
- c. Excessive tearing and bleeding
- d. In-turning of the eyelids
- e. Corneal scarring

65. Differential media used in bacteriology includes

- a. Blood agar
- b. Nutrient agar
- c. Muller Hinton Agar
- d. Thayer Martin agar
- e. Salmonella Shigella agar ✓

66. The following specimen is normally sterile

- a. Throat swab
- b. Urethral swab
- c. Suprapubic urine specimen
- d. Stool
- e. Skin scrapings

67. Causative agents of trachoma can be transmitted to humans through

- a. Fecal oral route
- b. Body louse
- c. Cat scratch
- d. Dog bite
- e. House flies

68. Characteristics of mycoplasmas include

- a. Inability to grow on artificial media
- b. Lack of a cell wall
- c. Susceptibility to penicillin
- d. Requirement of cell culture line from primary isolation
- e. Resistance to all antibacterial antimicrobial agents

69. A false statement on urinary tract infections

- a. *E. coli* is a predominant causative agent of bacterial UTIs
- b. Polymicrobial infections are common in patients with structural abnormalities
- c. The bladder is fairly resistant to colonization due to the wide array of present commensals
- d. Coagulase negative staphylococci are a common cause of urinary tract infection among sexually active women
- e. *E. coli* causes UTI predominantly by the ascending route

70. Toxigenic infection of *Staphylococcus aureus*

- a. Mastitis
- b. Blepharitis
- c. Food poisoning
- d. Septic arthritis
- e. Flaccid paralysis

71. Which of the following does not affect a person's susceptibility to tuberculosis?

- A) Nutritional status
- B) Genetics
- C) Access to medical care
- D) Status of immune system
- E) Type of job

72. The specific infection sites that develop in primary tuberculosis are known as what?

- A) Fibroblasts
- B) Necrotic lesions
- C) Tubercles
- D) Caseous lesions
- E) Scars

73. How is *Mycobacterium leprae* cultured in the laboratory?

- A) It is grown on minimal media.
- B) It cannot be grown in the lab.
- C) It is grown using human tissue cultures.
- D) It is grown on complex media.
- E) It is a fastidious organisms that requires a variety of special conditions for growth.

74. Which is not a clinical manifestation of lepromatous leprosy?

- A) Many bacilli are present in lesions.
- B) Numerous deep lesions are concentrated in cooler areas of the body.
- C) Mutilation of the extremities is common.
- D) No skin nodules are present.
- E) Patients are not reactive to lepromin.

75. Primary infections caused by *Streptococcus pyogenes* are due to the organisms invading what two body sites?

- A) Nose and vagina
- B) Skin and eyes
- C) Eyes and gastrointestinal tract
- D) Mouth and urethra
- E) Skin and throat

76. What test allows for the differentiation of Group A streptococci from other -hemolytic streptococci?

- A) CAMP test
- B) Hippurate hydrolysis
- C) Esculin hydrolysis
- D) Bacitracin sensitivity
- E) Growth in 6.5% salt

What is the major virulence factor of Streptococcus pneumoniae?

- A) M protein
- B) Pyogenic exotoxins
- C) Capsule
- D) DNase
- E) Hyaluronidase

C

78. A positive indole test indicates cleavage of indole from what substrate?

- A) Lactose
- B) Glucose
- C) Tyrosine
- D) Tryptophan
- E) Sucrose

D

79. Why does urea medium turn pink during a positive reaction?

- A) The organism ferments lactose to acidic end-products which then lower the pH of the medium.
- B) The organism can utilize citrate as a carbon source and releases carbon dioxide which then combines with water and sodium to produce sodium carbonate and raises the pH of the medium.
- C) The organism produces urease, which accumulates and lowers the pH of the medium.
- D) The organism cannot grow in the presence of bile salts.
- E) The organism produces urease that cleaves urea into ammonium which then raises the pH of the medium.

80. What is the reservoir for Escherichia coli O157:H7?

- A) Humans
- B) Cattle
- C) Soil
- D) Wild rodents
- E) Ameba

B

81. This virologic test is used for studying RNA

- a. Western blot - virus protein
- b. Southern blot - DNA
- c. Northern blot - RNA
- d. Eastern blot - protein
- e. Immunofluorescence assay (IFA)

82. Recent viral infections are usually associated with laboratory detection of

- a. IgM
- b. IgG
- c. IgA
- d. IgE
- e. IgC

Registration No. _____

83. With a case-fatality rate of 10%, this virus epidemic occurred in S.E. Asia in 2002/2003 and is believed to have originated from horseshoe bats

- a. Swine flu - pig
- b. Avian flu - bird
- c. SARS
- d. Mad cow disease - cow
- e. Human flu -

84. Virus particles are known to have pentons and hexons as unique characteristics and two types are associated with gastroenteritis - which viruses are these?

- a. Rotaviruses
- b. Rabies viruses
- c. Herpesviruses
- d. Polioviruses
- e. Adenoviruses

40 - 41

85. "Swimming pool" conjunctivitis is associated with infection with this virus

- a. HSV
- b. Measles virus
- c. Calicivirus
- d. Adenovirus
- e. HHV-6

86. Burkitt's lymphoma (BL) is caused by this virus

- a. An alpha-herpesvirus
- b. A beta-herpesvirus
- c. A gamma-herpesvirus
- d. A delta-herpesvirus
- e. An epsilon-herpesvirus

EBV

HSV

87. The virus associated with causation of cervical cancer is

- a. An RNA virus
- b. A ssDNA virus
- c. A dsRNA virus
- d. Blood transmitted
- e. Sexually-transmitted

HPV - ds DNA

88. Antigenic shift is likely to occur with these viruses

- a. Influenza type B virus
- b. Retroviruses
- c. Parainfluenza viruses
- d. Parvoviruses
- e. Rotaviruses

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Esophageal carcinoma is caused by this virus

- a. HHV-1
- b. HHV-2
- c. HHV-3
- d. HHV-4
- e. HHV-5

90. Adult-T cell leukemia is caused by a virus classified by Baltimore classification system as group

- a. Two
- b. Three
- c. Four
- d. Five
- e. Six

HHV 8

91. Acyclovir is a drug of choice for

- a. Alpha-herpesviruses
- b. Beta-herpesviruses
- c. Gamma-herpesviruses
- d. Delta-herpesviruses
- e. Epsilon-herpesviruses

92. An example of a viral oncogene (v-onc) linked to degradation of tumor suppressor p53 in cervical cancer is

- a. V-src
- b. E6
- c. E7 - RAS
- d. A2
- e. p24

Hep. A (HAV)

93. Hepatitis viruses associated with causation of acute hepatitis ONLY are transmitted via

- a. Blood
- b. Urine
- c. Vertically
- d. Aerosol
- e. Fecal-orally

94. The most common virus associated with infant gastroenteritis is

- a. Adenovirus 40
- b. Calicivirus
- c. Norovirus
- d. Rotavirus
- e. Poliovirus

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95. Hepatitis C can be transmitted through the following except

- a. Feco-oral route - Hep A & E
- b. Sexual intercourse
- c. Sharing needles
- d. Blood transfusion
- e. Needle pricks

96. One of the following groups of viruses is most likely to be transmitted via ingestion

- a. Enveloped viruses
- b. Naked viruses
- c. All RNA viruses
- d. All DNA viruses
- e. Segmented viruses

97. The following are causes of respiratory infection except

- a. Orthomyxoviridae - influenza
- b. Paramyxoviridae - measles, mumps
- c. Togaviridae - rubella
- d. Coronaviridae - SARS, coronavirus
- e. Reoviridae - Rota

98. One of the following drugs is used to treat both hepatitis B and HIV

- a. Lamivudine
- b. Zidovudine
- c. Adefovir -
- d. Acyclovir - Herpes
- e. Ribavirin

B

99. HIV

- a. Has a segmented genome x
- b. Is non-enveloped x
- c. Replicates in the nucleus
- d. Is a double-stranded RNA virus x
- e. Is in the family Reoviridae x

100. The following viruses are zoonotic except

- a. Yellow fever virus ✓
- b. Rotavirus ✓
- c. Hepatitis B virus
- d. Rift Valley fever virus ✓
- e. Influenza virus ✓