

University of Nebraska Medical Center
CLS419 Clinical Microbiology II: Parasitology
Parasitology Case Study Review Worksheet - Key

Directions - to be used with the Blackboard Course component: Parasitology Case Study Review. Within CLS419 Clinical Microbiology II, go to Assignments, Parasitology, the Thursday folder and then Parasitology Case Study Review. Go to the corresponding case study to view the microscopic examples for each case. Click on an image to see an enlarged view. Answer the following short answer or single answer multiple choice questions for each case.

Case 1 - This organism was isolated from a loose stool collected from a 4-year-old that attends a day care center. The child's mother indicated that the boy had experienced diarrhea and abdominal pain for approximately one week.

1. **Identify this organism. Giardia lamblia**
2. Besides stool, other specimen(s) acceptable for recovery of this organism include:
 - A. Anticoagulated blood
 - B. **Duodenal aspirate, biopsy, or contents as obtained with the string test**
 - C. Genital specimens, urine
 - D. Liver aspirate or biopsy
3. Chronic infections with this organism often exhibit:
 - A. Extraintestinal development
 - B. Inflammatory reaction secondary to deposition of organism as it invades intestinal mucosa
 - C. **Malabsorption**
 - D. Vitamin B₁₂ deficiency

Case 2 - This organism was recovered from the stool of a 48-year-old AIDS patient. The organism was detected with a modified-acid fast stain.

4. Identify this organism. **Cryptosporidium parvum**
5. Humans acquire this infection via:
 - A. Contact with cat feces
 - B. **Fecal/oral route**
 - C. Ingesting undercooked, infected meat
 - D. Penetration of larval form
6. In immunocompromised hosts, this organism clinically exhibits as a/an:
 - A. Extraintestinal tissue infection
 - B. Parasitemia
 - C. **Prolonged diarrhea that worsens progressively**
 - D. Vitamin B₁₂ deficiency

Clinical symptoms include nausea, low-grade fever, abdominal cramps, anorexia and diarrhea. The stools are mainly water with flecks of mucous and contain very little fecal material. Respiratory cryptosporidiosis has been reported in AIDS patients. Currently, there is no consistently effective treatment for cryptosporidiosis. In the immunocompetent population, the disease is self-limiting.

Case 3 - This organism was detected in the blood of a 20-year-old student upon returning from a 3-month clinical rotation in Africa.

7. Identify this organism. Trypanosoma sp. (From the info & blood smear, probably Trypanosoma brucei gambiense or Trypanosoma brucei rhodesiense) The kinetoplast is small.

8. What life cycle form is exhibited in this blood smear?

- A. Amastigote
- B. Microfilariae
- C. Trophozoite
- D. **Trypomastigote**

Trypanosoma cruzi's kinetoplast is large as compared to Trypanosoma brucei gambiense or rhodesiense. T. cruzi causes Chagas disease and is transmitted by the bite of an infected reduvid (kissing) bug.

9. Humans acquire this infection via the:

- A. Bite of an infected anopheles mosquito
- B. **Bite of an infected tsetse fly**
- C. Bite of an infected phlebotomist fly
- D. Fecal/oral route

Trypanosoma brucei gambiense or rhodesiense cause African Sleeping Sickness

Case 4 - This organism was detected in stool submitted from a 64-year-old, male farmer.

10. Identify this organism. Iodamoeba butschlii - both trophs & cysts contain a single nucleus, characteristic glycogen vacuole in the cyst

11. Clinically, this organism is considered to be a/an:

- A. **Commensal, non-pathogenic organism**
- B. Contaminant, possible association with allergies
- C. Etiologic agent of chronic diarrhea
- D. Primary cause of intestinal ulceration & colitis

Case 5 - This organism was detected in the blood of a 20-year-old foreign exchange student from Kenya. The patient exhibited a hemoglobinuria and a microcytic, hypochromic anemia.

12. Identify the organism. - Plasmodium falciparum - malignant tertian malaria, characteristic cigar-shaped, sickle-shaped gametocytes

13. Humans acquire this infection via:

- A. **Bite of an infected anopheles mosquito**
- B. Bite of an infected tsetse fly
- C. Bite of an infected phlebotomist fly
- D. Fecal/oral route

14. Clinical manifestations of this infection include:

- A. African sleeping sickness, death
- B. **Blackwater fever, cerebral malaria, death**
- C. Epilepsy due to organism encysted in the brain
- D. Smooth muscle deterioration, especially heart tissue

Most severe form of malaria.

Case 6 – This organism detected in a blood smear of a 50-year-old immigrant from India.

15. Identify the organism. **Plasmodium vivax** (amoeboid trophs with Schüffner's dots or stippling, schizont w/>14 merozoites)

16. This organism is able to infect:

- A. Aging or old RBCs
- B. All RBC stages
- C. All RBC stages and brain tissue
- D. **Reticulocytes**

Infected cells are enlarged as reticulocytes are larger than mature RBCs

Case 7 – These organisms were detected in stool of 45-year-old male complaining of low-grade fever and abdominal pain. The stool was described as loose and blood-tinged.

17. Identify this organism. **Entamoeba histolytica** - even peripheral chromatin, centrally-located karyosome; cysts have smooth-ended chromatoidal bars

18. Clinically, this organism can present as a(an)

- A. **Asymptomatic, dysentery, or extraintestinal infection**
- B. Infection with localized intestinal lesions that often spread to the respiratory tract
- C. Nonpathogenic, commensal organism
- D. Vitamin B₁₂ deficiency

Organism can cause "flask-shaped" ulcers in intestinal mucosa and spread outside the intestinal tract. The most common site of extraintestinal infection is the liver.

Case 8 – These structures were detected in the stool of a 4-year-old boy. The stool was described as loose, with areas of mucus, pus and blood flecks.

19. Based on the given information and microscopic images, the structures seen are:

- A. Entamoeba coli cysts
- B. Entamoeba coli trophozoites
- C. Entamoeba histolytica cysts
- D. **Polymorphonuclear WBCs**

PMNs can be differentiated from amoebae based on: ratio of nuclear material to cytoplasm:
PMN 1:1, Entamoeba 1:10 in troph & 1:2 -1:3 in cyst;
nucleus of PMN = 2-4 segments connected by narrow, short chromatin bands,
nucleus of Entamoeba round, central karyosome & peripheral chromatin;
cytoplasm of PMN is granular and cytoplasm of Entamoeba is agranular

Case 9 - Structures detected in the stool of a 25-year-old male complaining of diarrhea and abdominal pain.

20. Based on the given information and microscopic images, the structures seen are:

- A. Artifact
- B. **Dientamoeba fragilis trophozoites**
- C. Endolimax nana trophozoites
- D. Iodamoeba butschlii trophozoite

D. fragilis' trophozoite is characterized by having two nuclei (in 60-80% of organisms). The nuclear chromatin is usually fragmented into 3-5 granules and there is no peripheral chromatin around the nuclear membrane. The cytoplasm is usually vacuolated, but may also appear uniform and clean with few inclusions. The pathogenic status of this flagellate is not well defined, but the most common symptoms are intermittent diarrhea and fatigue.

The morphology of this organism is quickly destroyed upon passage of the fecal specimen. It is very important to place the stool in an appropriate fixative soon after passage or the organism will not be detected.