

Name _____

EEB 4274
Lecture Exam #1

Protozoa

October 2009

Read through the exam once before you begin. Be certain to provide all of the information requested in each question. In instances in which you are asked to answer only a SUBSET of the questions, if you answer more questions than indicated, your answers will be graded in order, and you will be graded only on the number of questions you are required to answer. Note: for HOST species, the common name is sufficient; for parasite taxa the correct scientific name is required.

1. Circle ALL of the life-cycle stages of *Plasmodium vivax* from the following list that you would expect to find living **WITHIN** the red blood cells of the **HUMAN** host at some point in the life-cycle of this protozoan species. (4 points)

oocysts	merozoites	microgametes	ookinetes
macrogametocytes	sporozoites	schizonts	trophozoites

2. For **FOUR (4)** of the following protozoan species, identify both the life-cycle stage of the parasite that is **INFECTIVE TO** the definitive host and also the stage that **EXITS** the definitive host (note: in the cases of heteroxenous species, this would be the stage infective to the intermediate host) (8 points)

	stage infective to definitive host	stage exiting definitive host
a. <i>Trypanosoma brucei gambiense</i>	_____	_____
b. <i>Giardia lamblia</i>	_____	_____
c. <i>Plasmodium vivax</i>	_____	_____
d. <i>Trypanosoma cruzi</i>	_____	_____
e. <i>Isospora belli</i>	_____	_____
f. <i>Balantidium coli</i>	_____	_____

3. Identify where you would expect to find **SIX (6)** the following parasites or processes; be certain to give specific **SITE** and **HOST** if applicable (12 points).

a. exoerythrocytic merogony of *Plasmodium falciparum*.

b. metacyclic trypomastigotes of *Trypanosoma brucei brucei*.

c. trophozoites of *Opalina*.

d. gametocytes of *Toxoplasma gondii*.

e. sporogony in *Plasmodium vivax*.

f. amastigotes of *Leishmania donovani*.

g. trophozoites of *Entamoeba histolytica*.

h. trophozoites of *Giardia duodenalis*.

i. unsporulated oocysts of *Eimeria tenella*.

4. Identify the disease, and describe in detail the pathology caused in the **HUMAN** host by **TWO (2)** of the following protozoan species. (6 points)

a. *Plasmodium falciparum*

b. *Leishmania braziliensis*

c. *Naegleria fowleri*

d. *Entamoeba histolytica*

5. For **FOUR (4)** of the following, identify a protozoan GENUS that fulfills the criteria listed (8 points):

a. Includes a species that is venereally transmitted in cattle. _____

b. A haemosporidan genus other than *Plasmodium*. _____

c. Includes species that undergo syzygy. _____

d. Its species exhibit oocysts that contain 4 sporozoites but NO sporocysts. _____

e. A genus that exhibits the epimastigote stage in the tse-tse fly _____

f. A rhizopodan genus that includes a commensal species that is transmitted the trophozoites of which are transmitted by oral contact. _____

6. Define, and provide an example, of **THREE (3)** of the following terms. (12 points)

a. Definitive host

b. Reservoir host

c. Etiological agent

d. Heteroxenous

e. Zoonosis

7. Describe **THREE (3)** differences between *Trypanosoma brucei rhodesiense* and *Trypanosoma brucei gambiense*. Be certain to indicate which subspecies possesses which of the features you have identified (6 points)

(i)

(ii)

(iii)

8. Identify a phylum of parasitic protozoans that includes species that dwell in the guts of their definitive hosts. Describe **TWO (2)** of the general features of that phylum and identify 1 species that belongs to the phylum you have chosen. (6 points)

(i) Phylum:

(ii) General features (describe 2):

(iii) Species (list 1):

9. Diagram the complete life-cycle of **EITHER** *Toxoplasma gondii* OR *Eimeria tenella*. Be as complete as possible. Be sure to indicate which species you have chosen to illustrate. (8 points)

10. Tina had a blood smear taken by her doctor as part of routine blood work. When the results of the lab work were returned, Tina was informed that she was infected with both an extracellular protozoan species and an intracellular protozoan species! With respect to Tina's protist infections, in each case, identify a species (or subspecies if appropriate) of protist and the phylum to which it belongs. (8 points)

Protozoan species/subspecies

Phylum

(i) extracellular species: _____

(ii) intracellular species: _____

- (iii) Tina has only ever been outside of the USA on one occasion. Identify the continent to which she would have traveled to acquire infections with both of the protozoans you have listed above.

11. Equipped only with a microscope and slides, coverslips, etc., describe how you would go about diagnosing an infection of **FOUR (4)** of the following protozoan species. In each case, be certain to indicate what sort of sample you would take and the stage of the parasite you would be seeking to allow you to make a definitive identification. Note: the non-human hosts would not necessarily have to survive your examination (8 points)

a. *Monocystis lumbrici* in earthworm

b. *Ichthyophthirius multifiliis* in a fish

c. *Toxoplasma gondii* in a human

d. *Plasmodium vivax* in an *Anopheles* mosquito

e. *Trypanosoma brucei rhodesiense* in a human

f. *Nosema apis* in a honey bee

12. You have obtained a position as a technician at a parasitology diagnostics lab. Your first week on the job you examine faecal samples from 4 different people, which collectively yield the following parasites. **Select TWO (2)** of the 4 parasite stages listed below and indicate a species of protozoan represented by the cyst or oocyst indicated and describe how the person from which the faecal sample was taken likely became infected with the species you have listed. In each of the 2 cases you select, be certain to indicate the stage infective to the person. In addition, indicate whether or not the species you have indicated represents a zoonotic infection. (8 points)

a. Sporulated oocysts with 2 sporocysts, each with 4 sporozoites.

(i) Species:

(ii) Mode of infection to human:

(iii) Zoonotic infection (circle one): YES NO

b. Cysts containing organisms with 4 nuclei and multiple pairs of flagella/undulopodia (and possibly with a ventral adhesive disc, but that is tricky to see in the cyst)

(i) Species:

(ii) Mode of infection to human:

(iii) Zoonotic infection (circle one): YES NO

c. Cysts containing organisms with 4 nuclei but no flagella/undulopodia or adhesive disc, and that appears to bear sausage shaped chromatoid bars.

(i) Species:

(ii) Mode of infection to human:

(iii) Zoonotic infection (circle one): YES NO

d. Cysts containing organisms with a macronucleus, a micronucleus and multiple cilia.

(i) Species:

(ii) Mode of infection to human:

(iii) Zoonotic infection (circle one): YES NO

13. Distinguish between **THREE (3)** of the following pairs of terms. (6 points)

a. relapse vs. recrudescence

b. cephaline gregarine vs. Acephaline gregarine

c. obligate parasite vs. facultative parasite

d. sporulated oocyst vs. unsporulated oocyst

e. self-limiting vs. non self-limiting infections

14. Select one of the protozoan species covered in class and describe why you would **LEAST** like to acquire an infection with that species (i.e., relative to the others we have covered). (3 points)