

Foundation Block 2020

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INTRODUCTION TO PARASITOLOGY

MONA BADR

DEFINITIONS

▶ Infection:

- ▶ The entry , development and multiplication of an infectious agent in the body of humans or animals. The result may be:
 - ▶ inapparent (asymptomatic) infection, or
 - ▶ manifest (symptomatic) infection..

DEFINITIONS

▶ Host: المضيف

- ▶ A human or animal which harbors an infectious agent under natural conditions .

▶ Definitive host (primary host):

- A host in which the parasite passes its **sexual stage**.

▶ Intermediate host (secondary host):

- ▶ A host in which the parasite passes its **larval or asexual stages**.

DEFINITIONS

▶ carrier: حامل المرض لفته طويله

- ▶ A person or animal that harbors a specific infectious agent in the absence of symptoms and signs of a disease and serves as a potential source of infection, asymptomatic carrier e.g hepatitis B, HIV.

▶ pathogenesis:

- ▶ Production and development of disease.

▶ pathogenicity:

- ▶ Capability of an infectious agent to cause disease in a
- ▶ host ,highly pathogenic as Giardia lamblia only about 10 cyst can cause the disease.
- ▶ ,low pathogenic as Endameba coli needs at least 100 cysts to cause disease.

DEFINITIONS

▶ Parasitism: مؤذي التطفل

- ▶ A relationship in which an organism (the infectious agent, the parasite) benefits from the association with another organism (the host) whereas the host is harmed in some way.

▶ commensalism: منفعة مشتركة معايشة

- ▶ Kind of relationship in which one organism , the commensal , is benefited whereas the other organism , the host , is not harmed or even benefited by the association.

DEFINITIONS

- ▶ **Ectoparasite:** طفيلي خارجي
Parasite that lives on the outer surface of its host.
- ▶ **Endoparasite:** طفيلي داخلي
Parasite that lives inside its host.
- ▶ **zoonosis:** حيواني المنشأ
Disease of animals that is transmissible to humans .

Scientific names of parasites follow Zoological Classification

Kingdom

Division

Class

Order

Family

Genus

Species

CLASSIFICATION OF PARASITES

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PROTOZOA

HELMINTHS

Unicellular
Single cell for all functions

Multicellular
Specialized cells

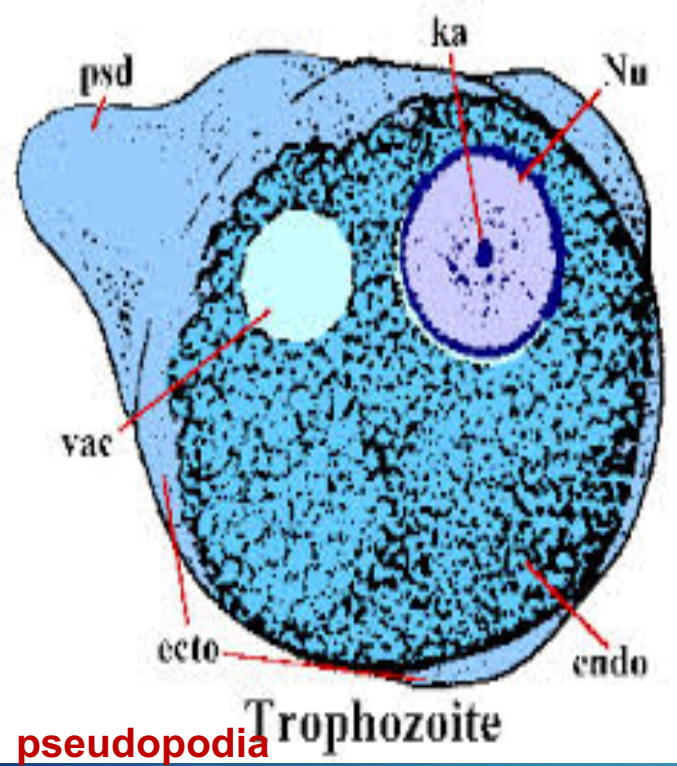
1:Amoebae: move by pseudopodia.
2:Flagellates: move by flagella.
3:Ciliates: move by cilia
4:Apicomplexa(Sporozoa) tissue parasites

Round worms (Nematodes):

- elongated, cylindrical, unsegmented.

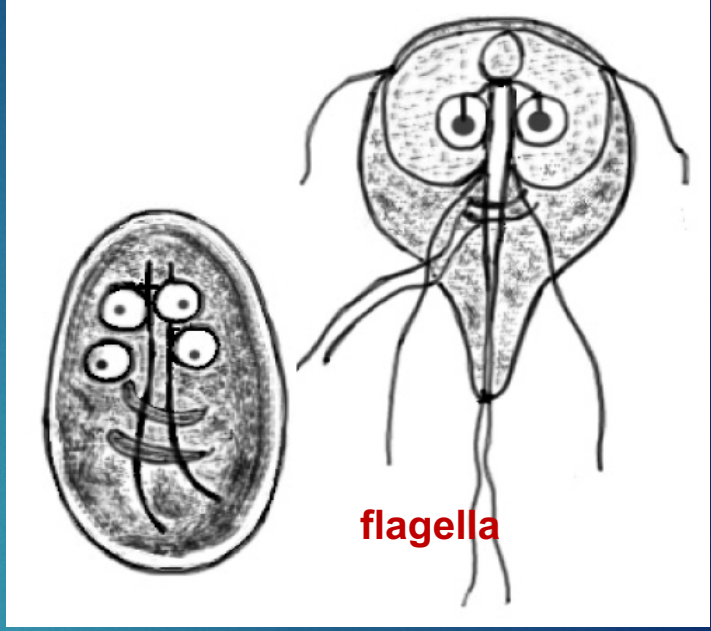
Flat worms :

- **Trematodes:** leaf-like, unsegmented.
- **Cestodes:** tape-like, segmented.

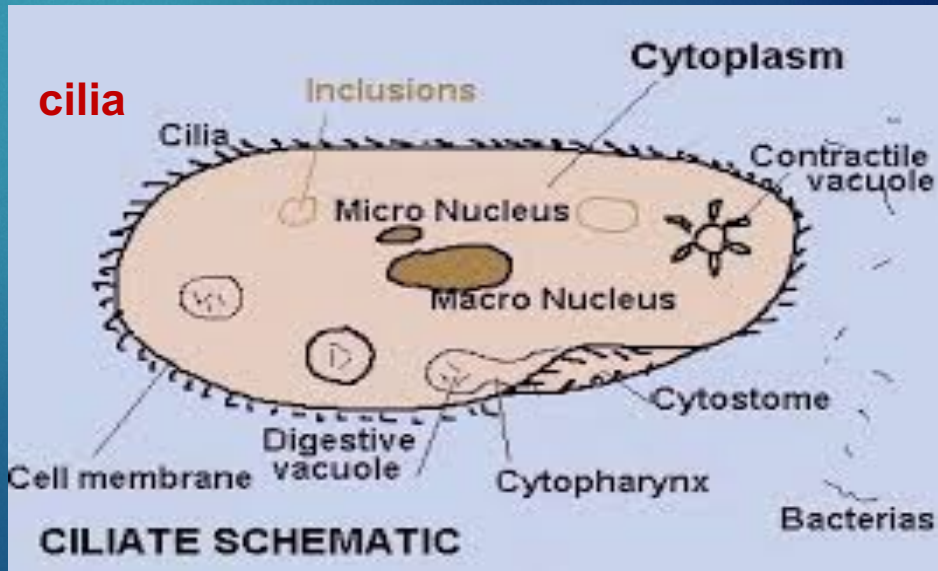


pseudopodia

Trophozoite



flagella



cilia

CILIATE SCHEMATIC

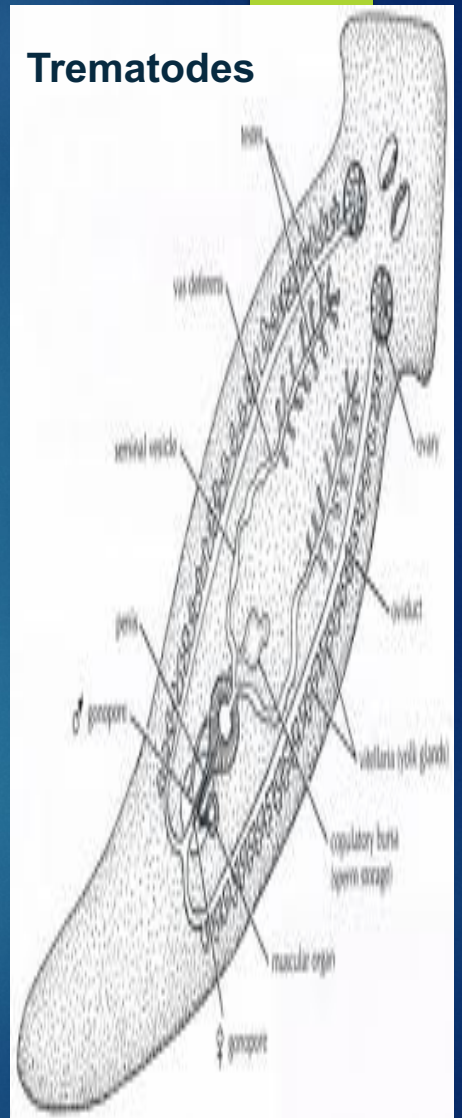
Bacteria



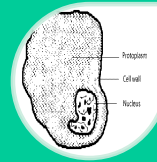
Nematodes



Cestodes



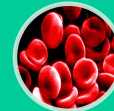
Parasitic Protozoa



Intestinal



Blood and tissues



Examples of Diseases caused by Intestinal Protozoa

Parasite

Disease

Giardia lamblia

giardiasis

Entamoeba histolytica

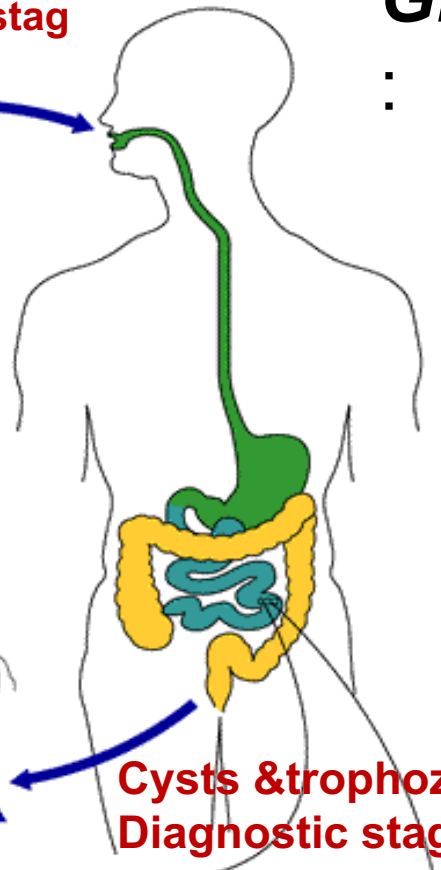
amoebiasis

Giardia lamblia

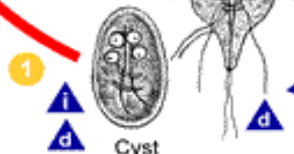
**Infective stag
cysts**



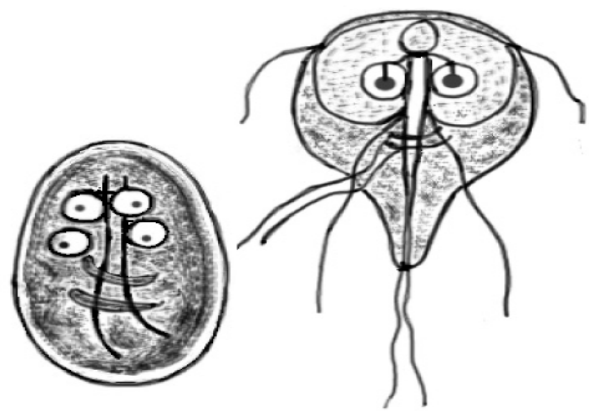
Contamination of water, food, or hands/fomites with infective cysts.



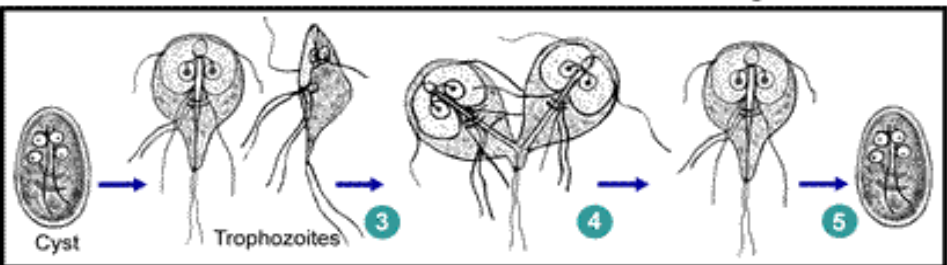
Trophozoites are also passed in stool but they do not survive in the environment.



**Cysts & trophozoites in stool
Diagnostic stage**



i = Infective Stage
d = Diagnostic Stage



Giardia Lamblia causes Giardiasis

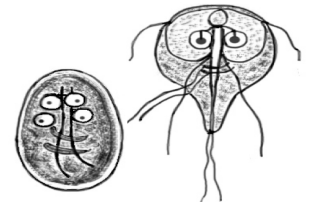
1-. Giardia **cysts** are the **(infective stage)** of *G. lamblia*. As few as 10 cysts can cause infection **(highly pathogenic)** , These cysts are ingested with fecally contaminated food or water.

2_When cysts are ingested, cysts can resist the low pH of the stomach acidity and pass to the **duodenum** where excystation take place , Excystation means releases **trophozoites**, with each cyst producing two trophozoites. The trophozoites cause inflammation but(without nivation) of the duodenal mucosa leading to malabsorption of protein and fat.

3- Some trophozoites then encyst in the small intestine to become cysts. Both cysts and trophozoites are then passed in the feces **(diagnostic stage)** , Person-to-person transmission is possible.

Clinical finding: watery diarrhea ,nausea and abdominal cramp but no fever.

Laboratory diagnosis: detecting cysts and trophozoites in the stool.



Examples of Diseases caused by **Blood Protozoa**

Parasite

Disease

Plasmodium spp

malaria

Malaria Species

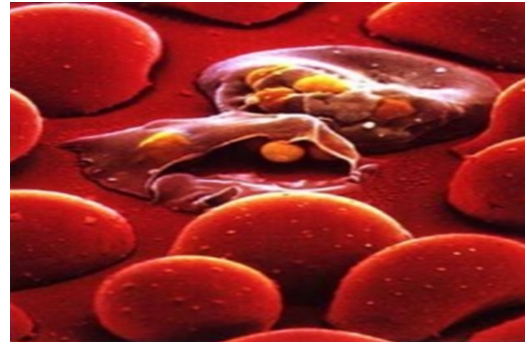
Four main species of malaria :

Plasmodium falciparum

Plasmodium vivax

Plasmodium ovale

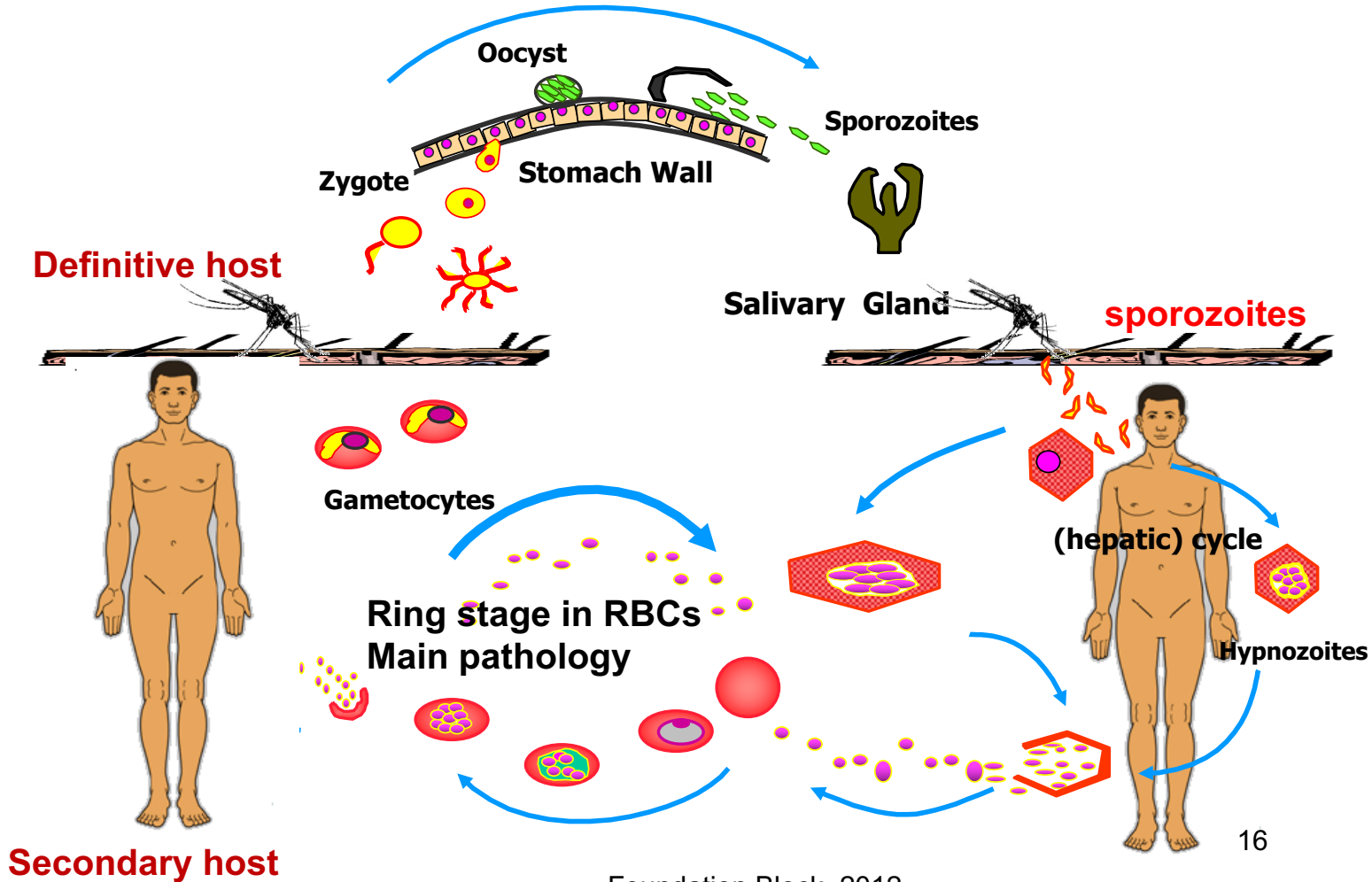
Plasmodium malariae



Malaria parasites
inside red blood cells

**Main pathology of malaria is due to
invasion of the RBCs**

LIFE CYCLE OF MALARIA



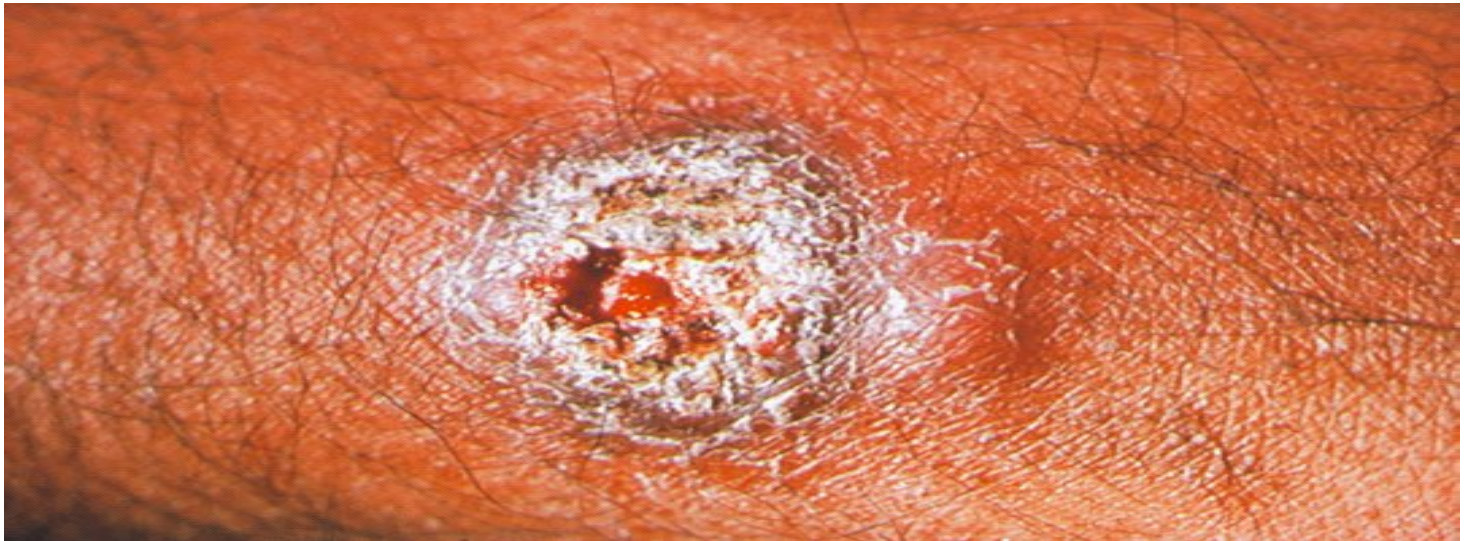
Examples of Diseases caused by Tissue Protozoa

Parasite

Disease

Leishmania major

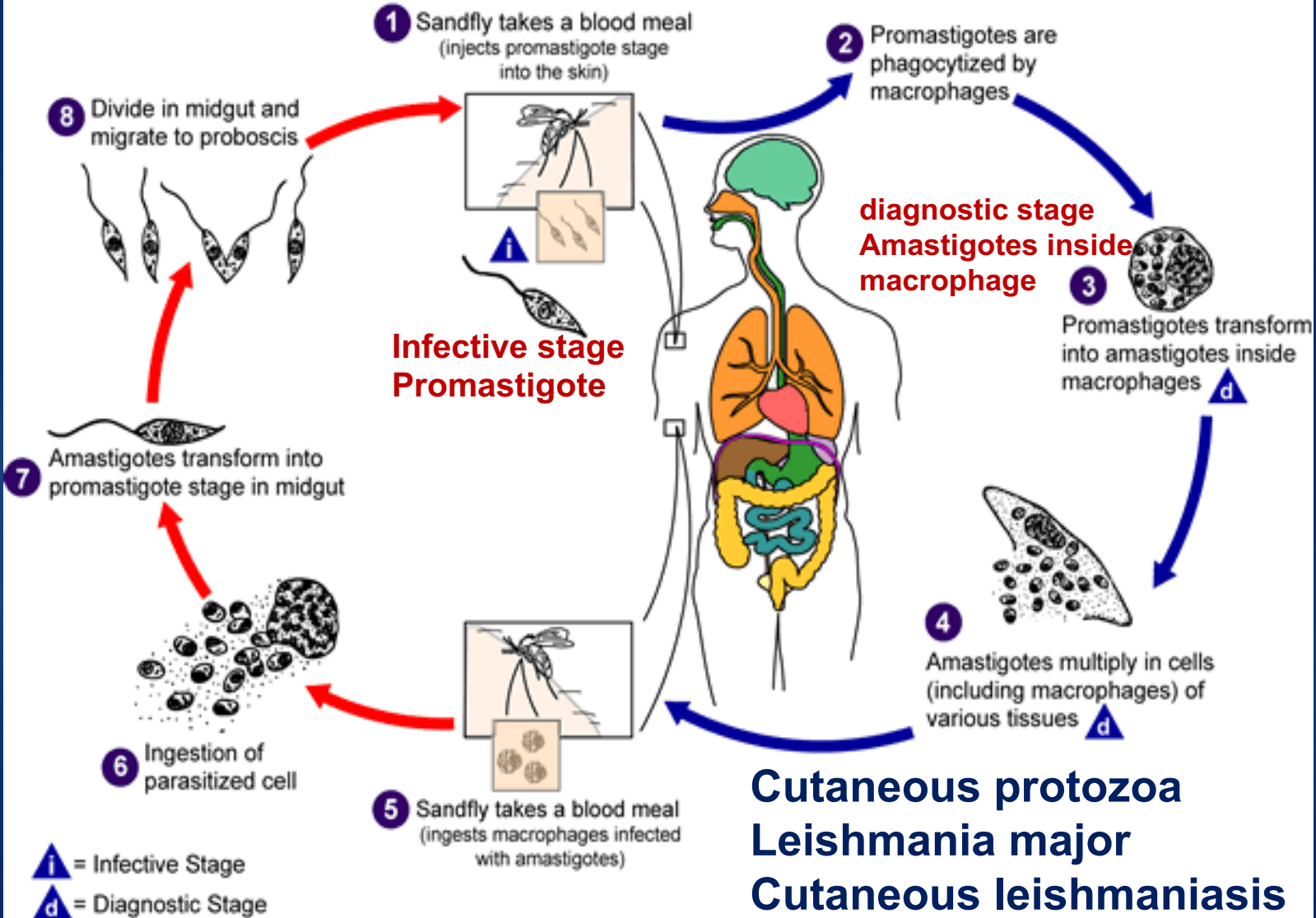
Cutaneous leishmaniasis



Vector

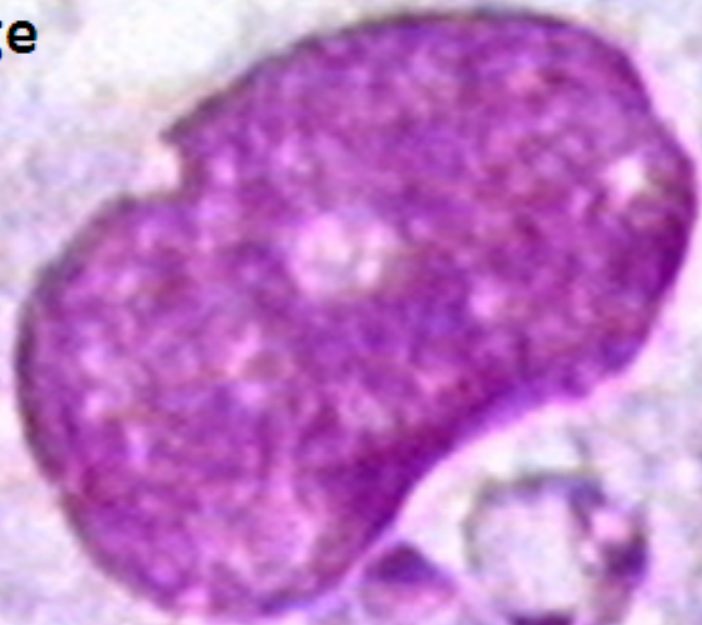
Sandfly Stages

Human Stages



**Cutaneous protozoa
Leishmania major
Cutaneous leishmaniasis**

Macrophage



Leishmania parasite

The diagnostic stage is the Amastigote in the macrophage

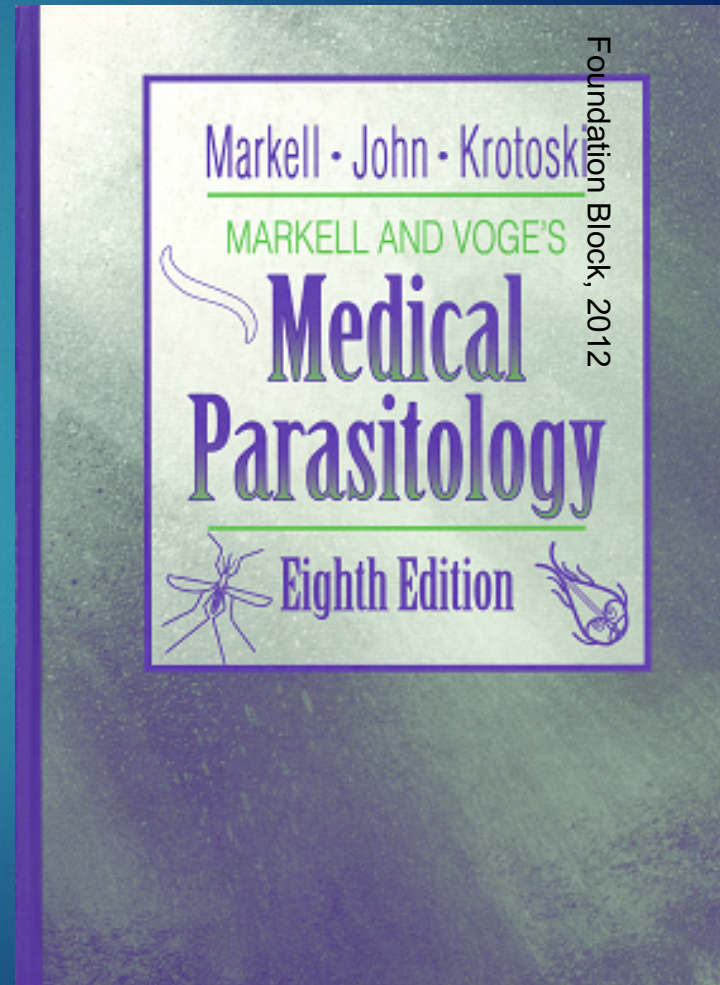
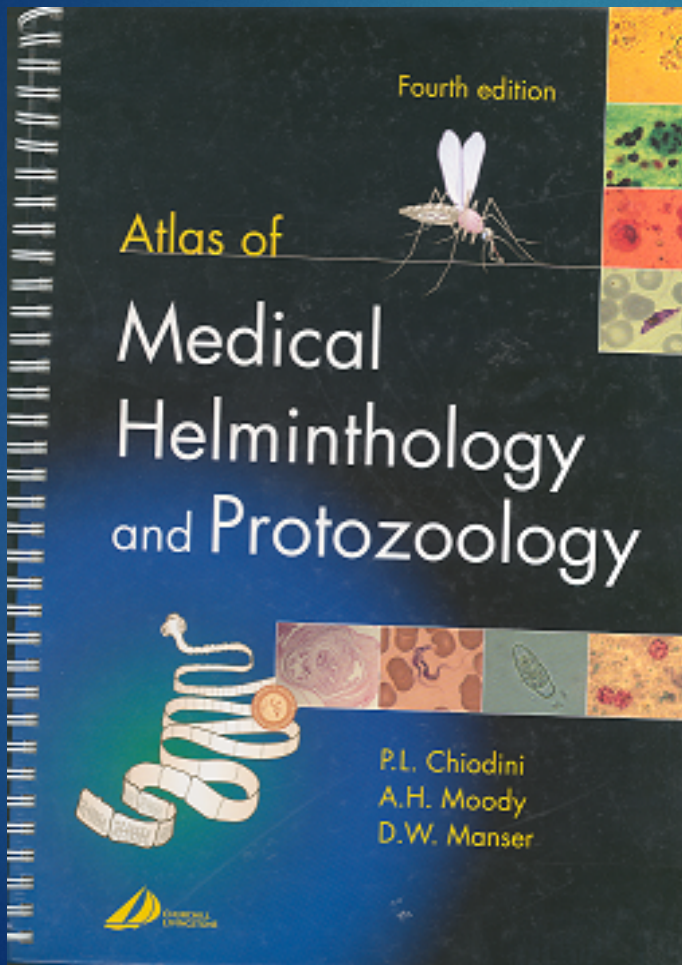
OBJECTIVES

By the end of this lecture the student should be able to:

- 1. Define common terms describing host-parasite relationship.**
- 2. Outline the broad classification of parasites.**
- 3. Name examples of protozoan parasites.**
- 4. Describe the life-cycle of *Giardia lamblia* as an example of intestinal protozoa.**
- 5. Describe the main stages of the life-cycle of *Plasmodium* as an example of blood and tissue protozoa.**

Resources on Parasitology

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Resources on Parasitology

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Centre for Disease Control and Prevention (CDC) :

http://www.dpd.cdc.gov/DPDx/HTML/Para_Health.htm