

Foundation Block

Introduction to Parasitology

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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.**

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:
 - 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:

- 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

- pathogenesis:

- Production and development of disease.

- pathogenicity:

- Capability of an infectious agent to cause disease in a susceptible host.

DEFINITIONS

- Parasitism:

- 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:

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

DEFINITIONS

- **Ectoparasite:** parasite that lives on the outer surface of its host.
- **Endoparasite:** Parasite that lives inside its host.
- **zoonosis:** 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

PROTOZOA

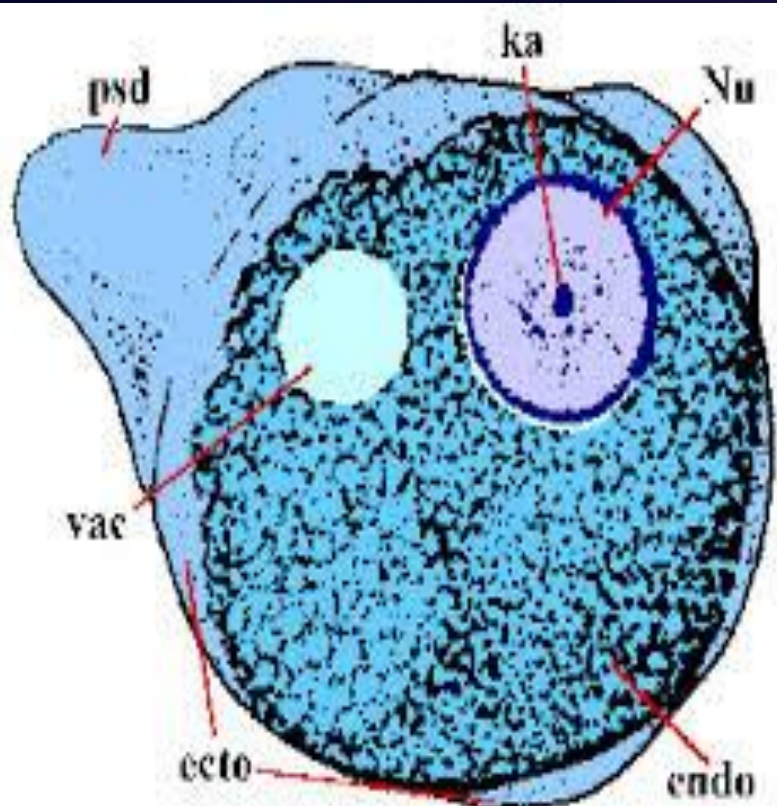
Unicellular
Single cell for all functions

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

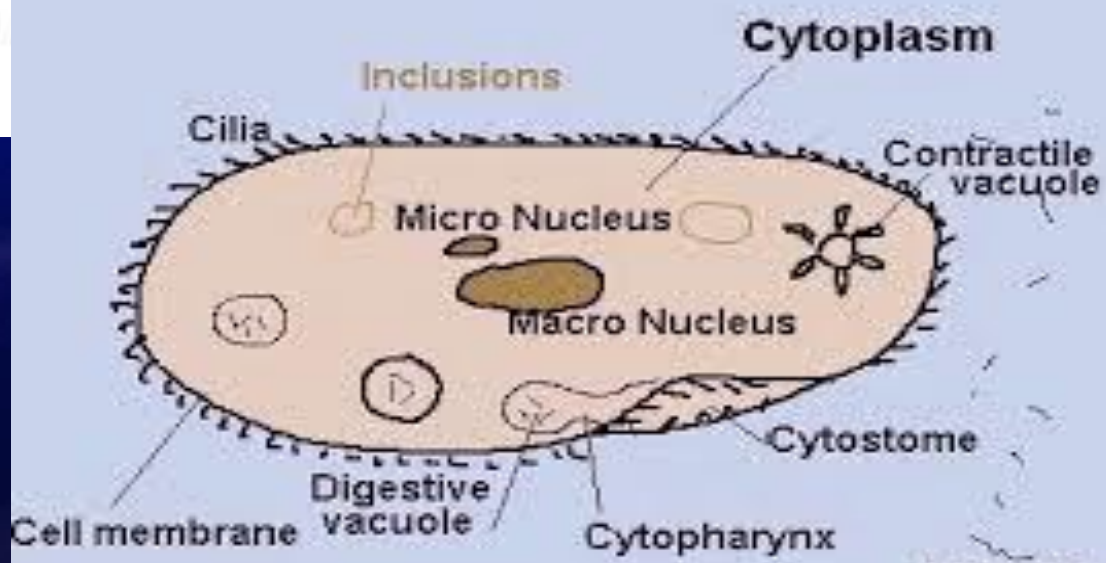
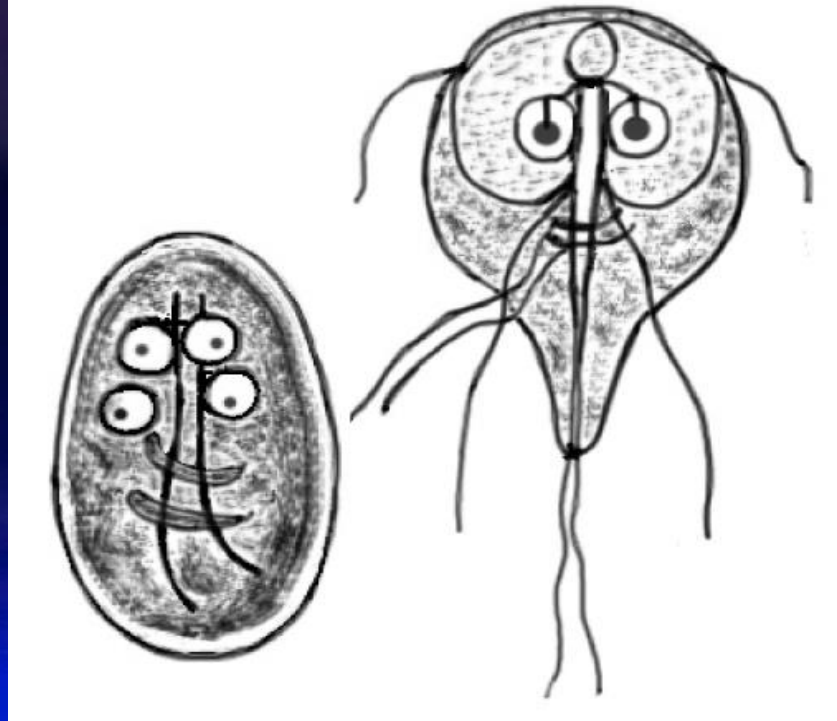
HELMINTHS

Multicellular
Specialized cells

- Round worms (Nematodes):
- elongated, cylindrical, unsegmented.
- Flat worms :
- Trematodes: leaf-like, unsegmented.
 - Cestodes: tape-like, segmented.

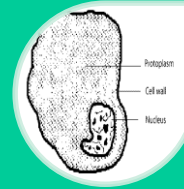


Trophozoite



CILIATE SCHEMATIC

Parasitic Protozoa



Intestinal



Blood and tissues



Examples of Diseases caused by Intestinal Protozoa

Parasite

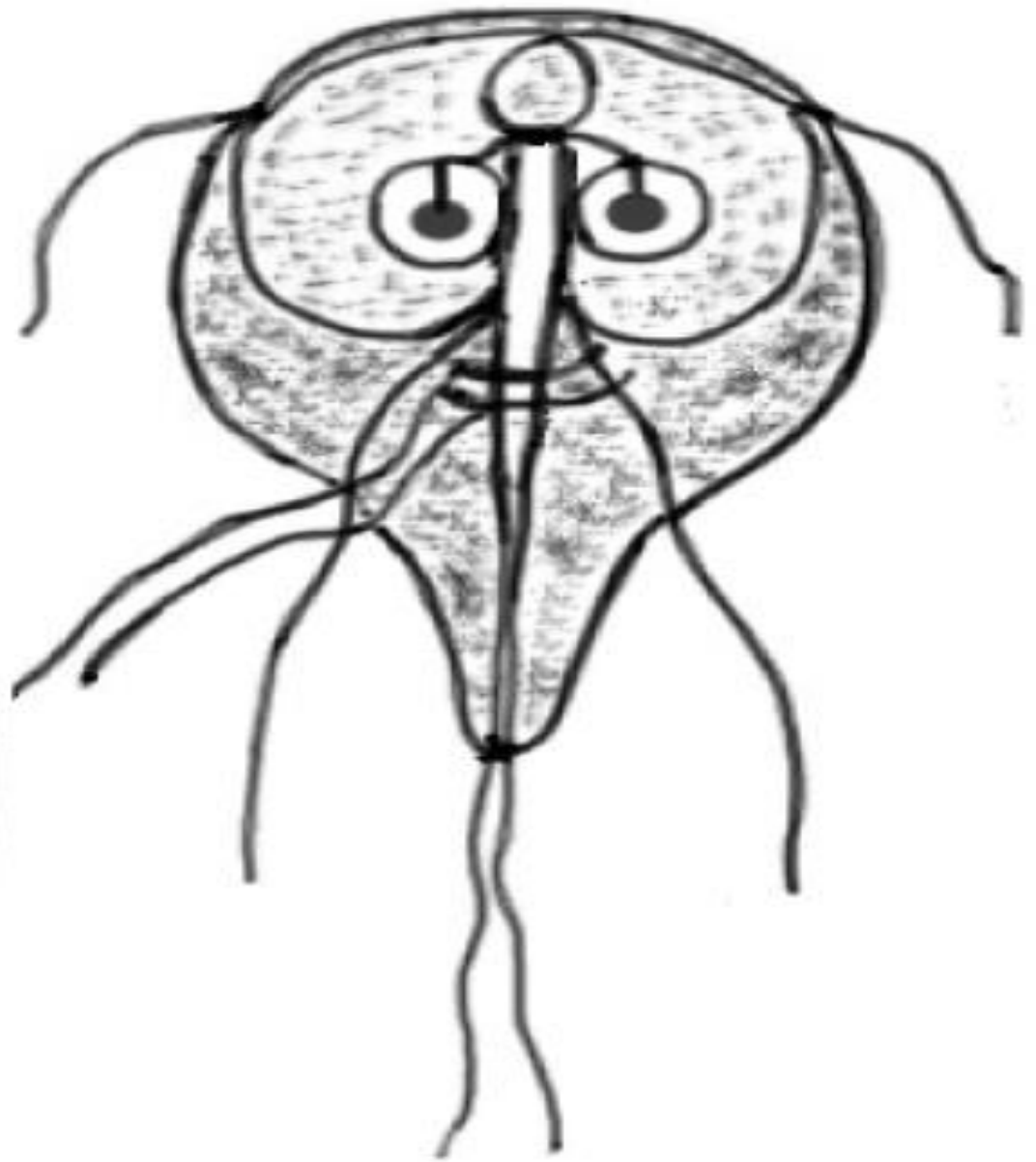
Disease

Giardia lamblia

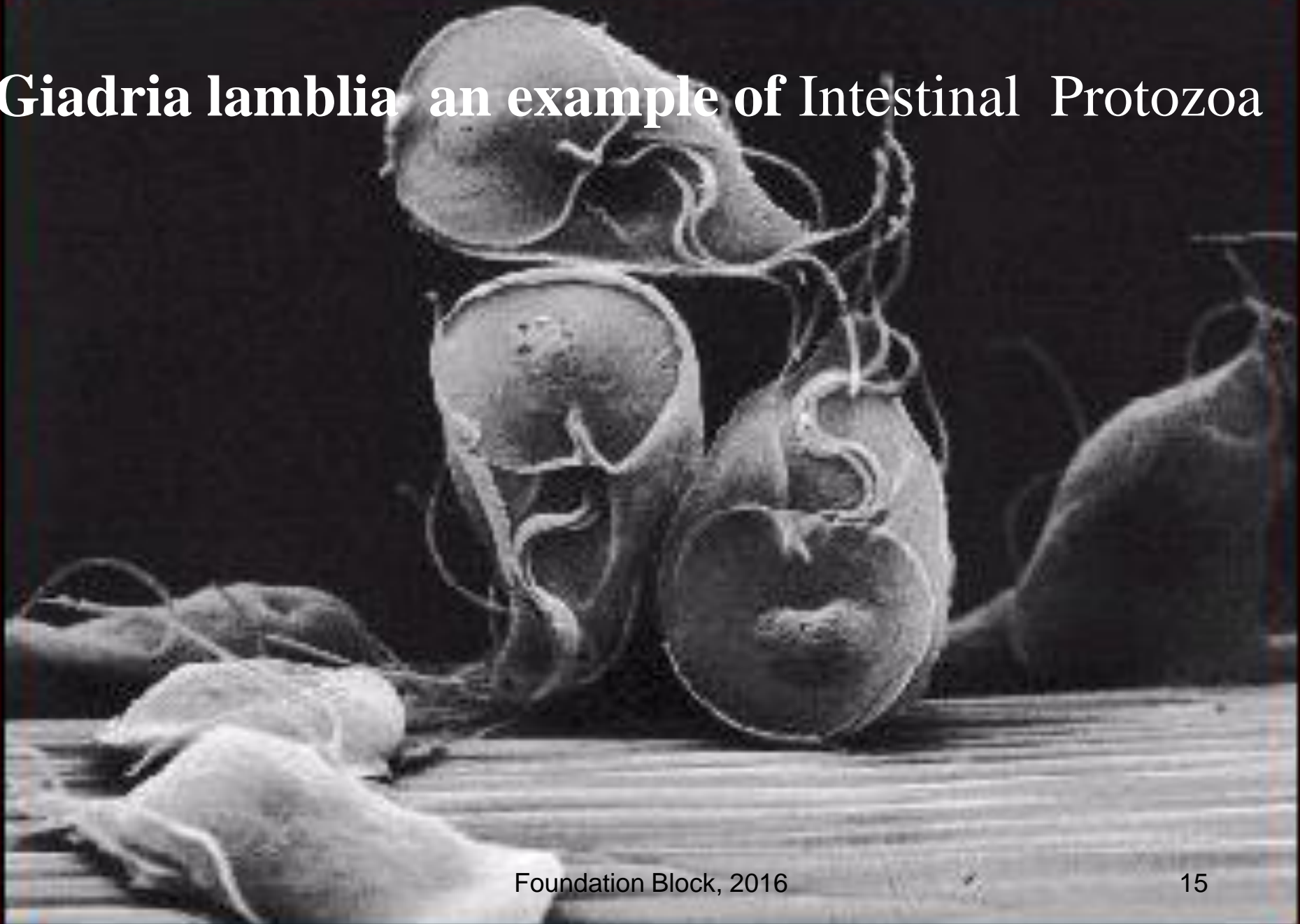
giardiasis

Entamoeba histolytica

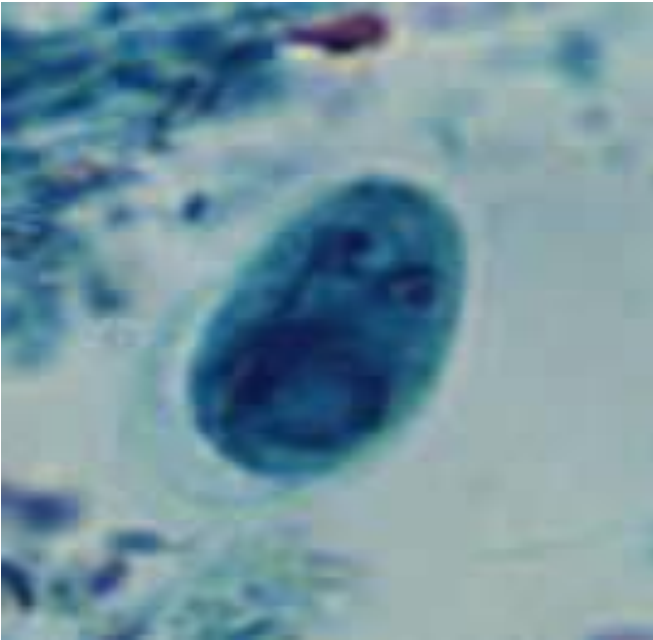
amoebiasis



Giardia lamblia an example of Intestinal Protozoa



***Giardia* cyst
(infective stage)**



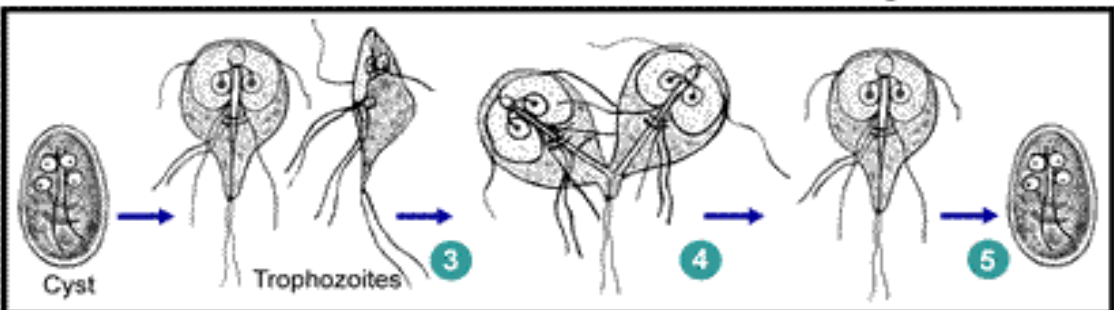
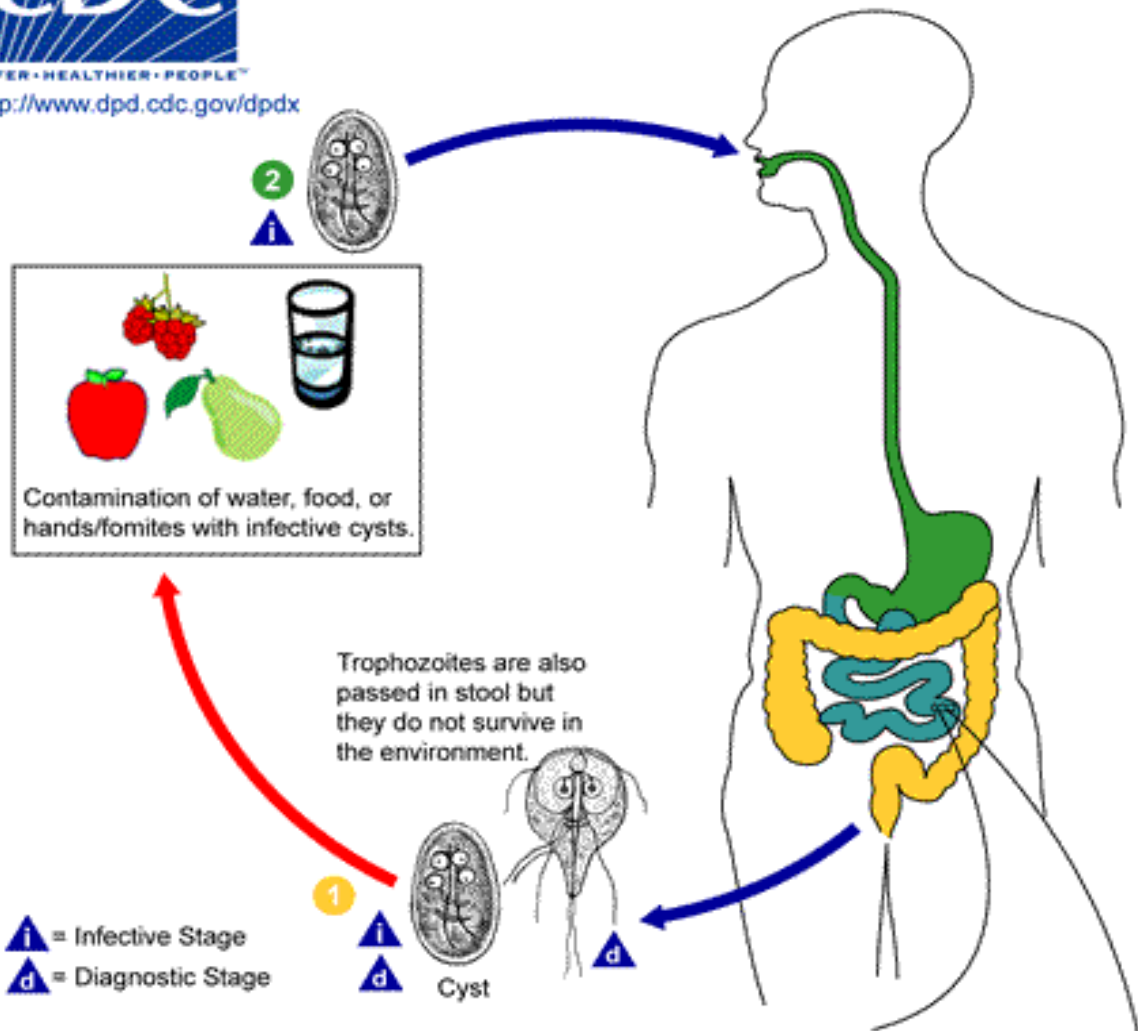
***Giardia* trophozoite**



Giardia lamblia

Can cause diarrhea with poor absorption of the nutrient, loss of appetite, stomach cramp, vomiting.

Giardia infect the cells of the duodenum and jejunum.



1-. Giardia **cysts** are the infective stage of *G. intestinalis*. As few as 10 cysts can cause infection , These cysts are ingested by consuming contaminated food or water, or fecal-orally. They can survive outside the body for several months, and are also relatively resistant to chlorination, UV exposure and freezing.

2_. When cysts are ingested, the low pH of the stomach ,the acidity produces excystation . Excystation means the releases of **trophozoites** ,

3. Within the small intestine, the trophozoites reproduce asexually (longitudinal binary fission) and either float free or are attached to the mucosa of the lumen.

4. Some trophozoites then encyst in the small intestine, Both cysts and trophozoites are then passed in the feces, but only the

cyst is infectious , Person-to-person transmission is possible, Animals can also be infected with Giardia .

Examples of Diseases caused by Blood and Tissue Protozoa

Parasite

Disease

Plasmodium spp

malaria

Malaria Species

Four main species of malaria :

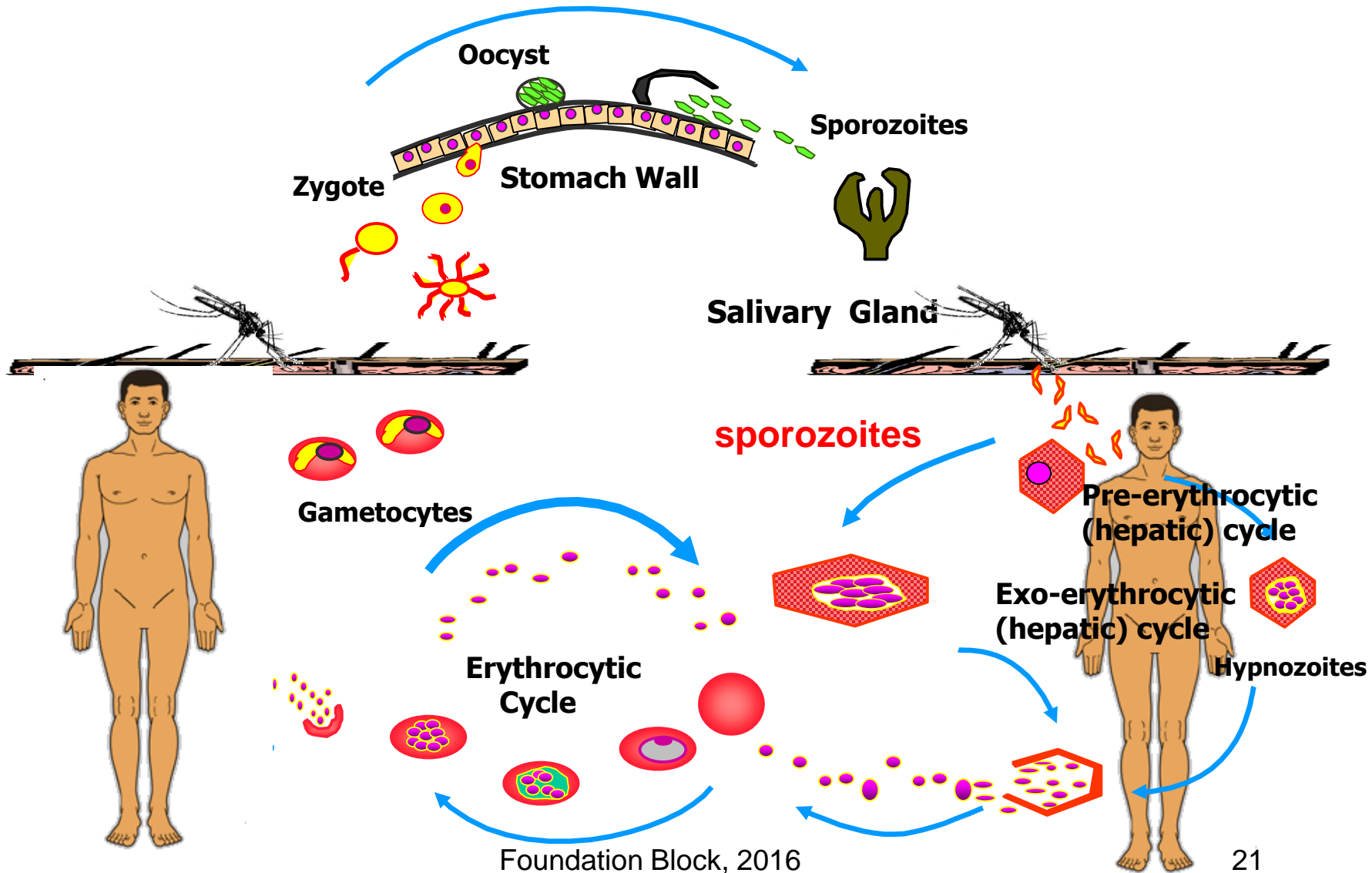
Plasmodium falciparum

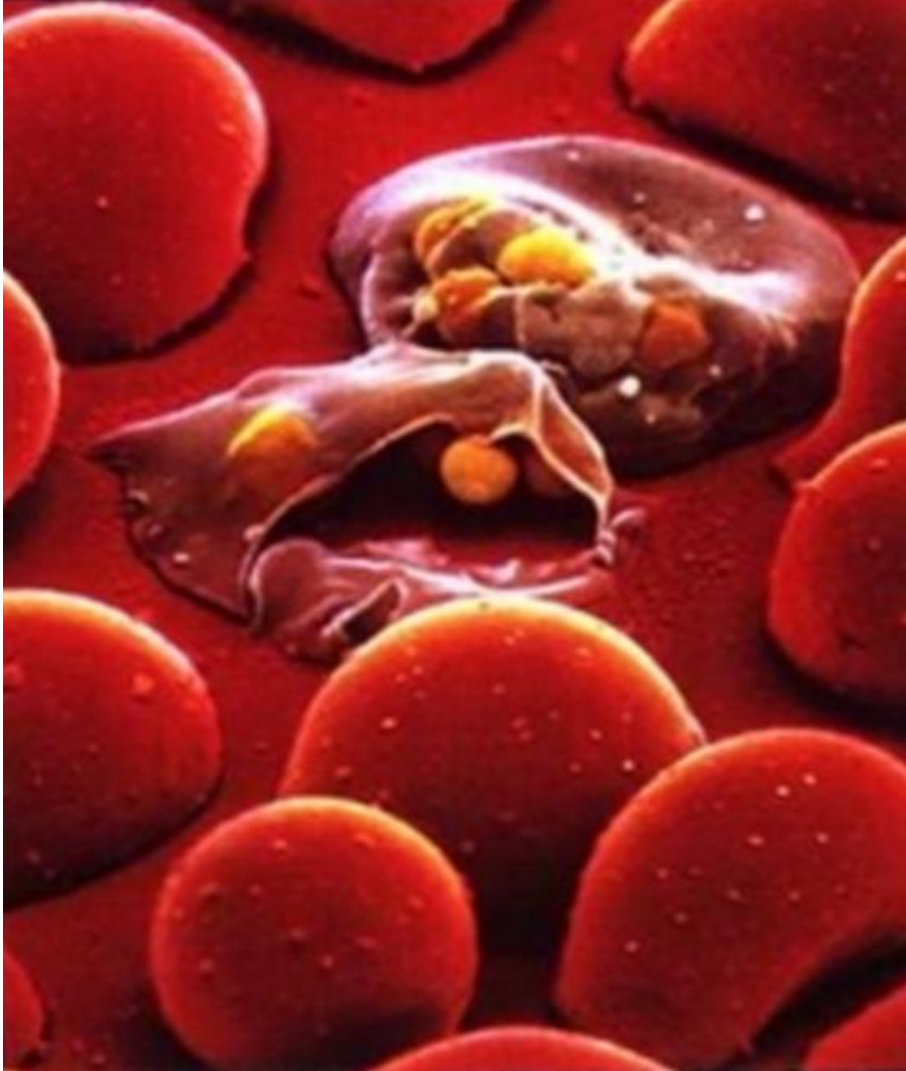
Plasmodium vivax

Plasmodium ovale

Plasmodium malariae

LIFE CYCLE OF MALARIA





**Malaria parasites
inside red blood cells**

Main pathology of malaria is due to invasion of the RBCs

Examples of Diseases caused by Blood and Tissue Protozoa

Parasite

Disease

Leishmania major

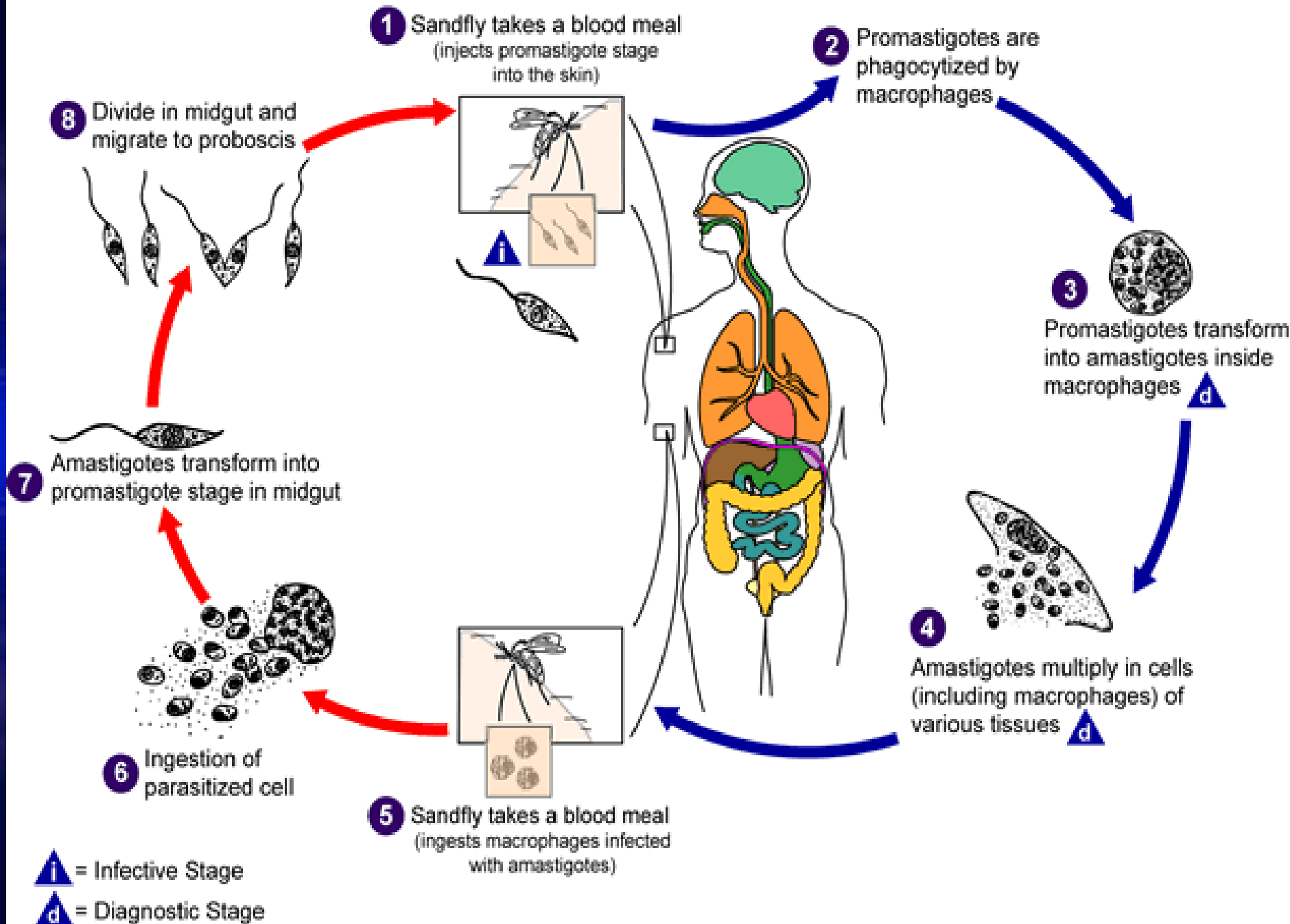
Cutaneous leishmaniasis

Cutaneous leishmaniasis caused by *Leishmania major*

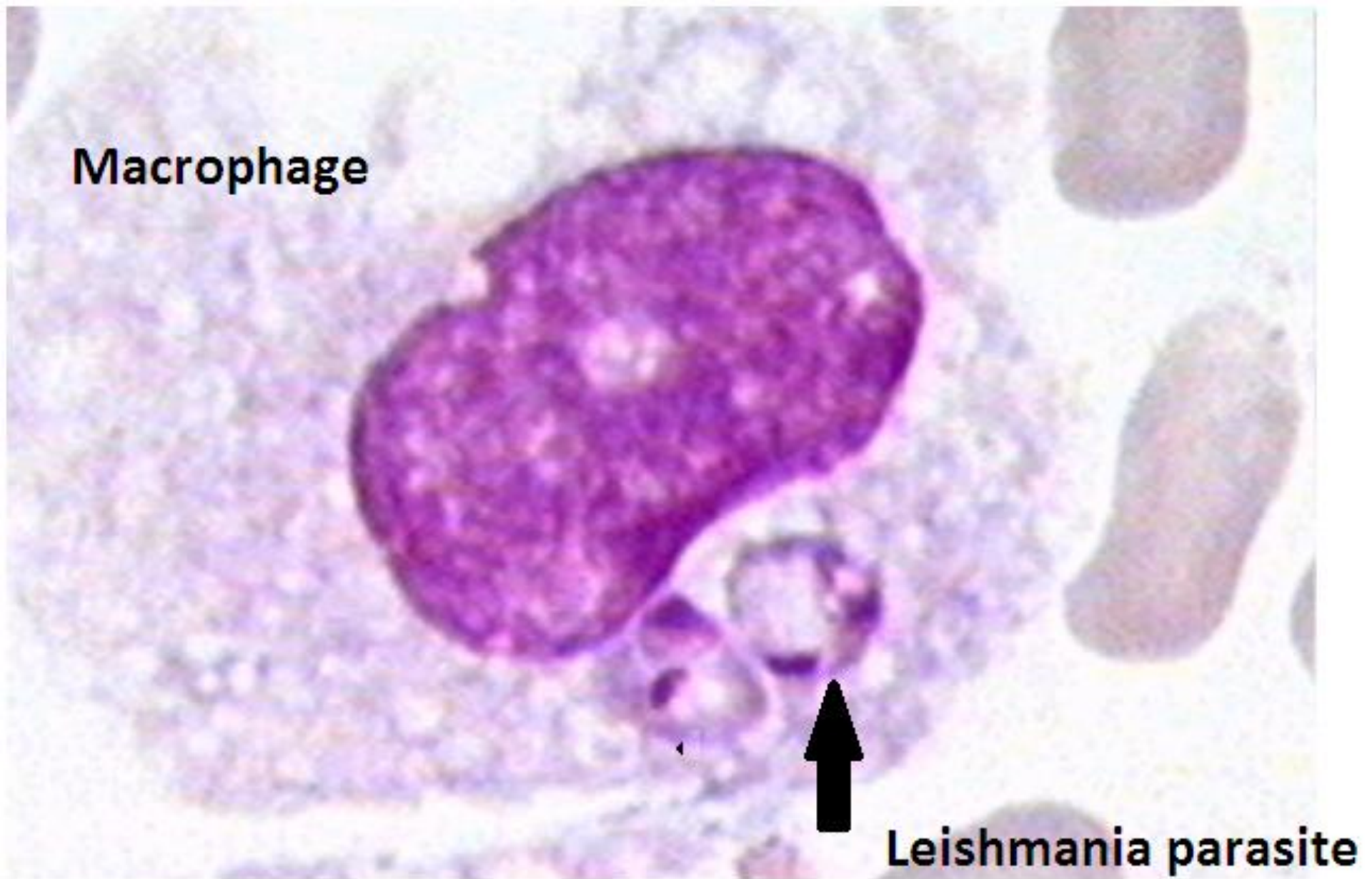


Sandfly Stages

Human Stages

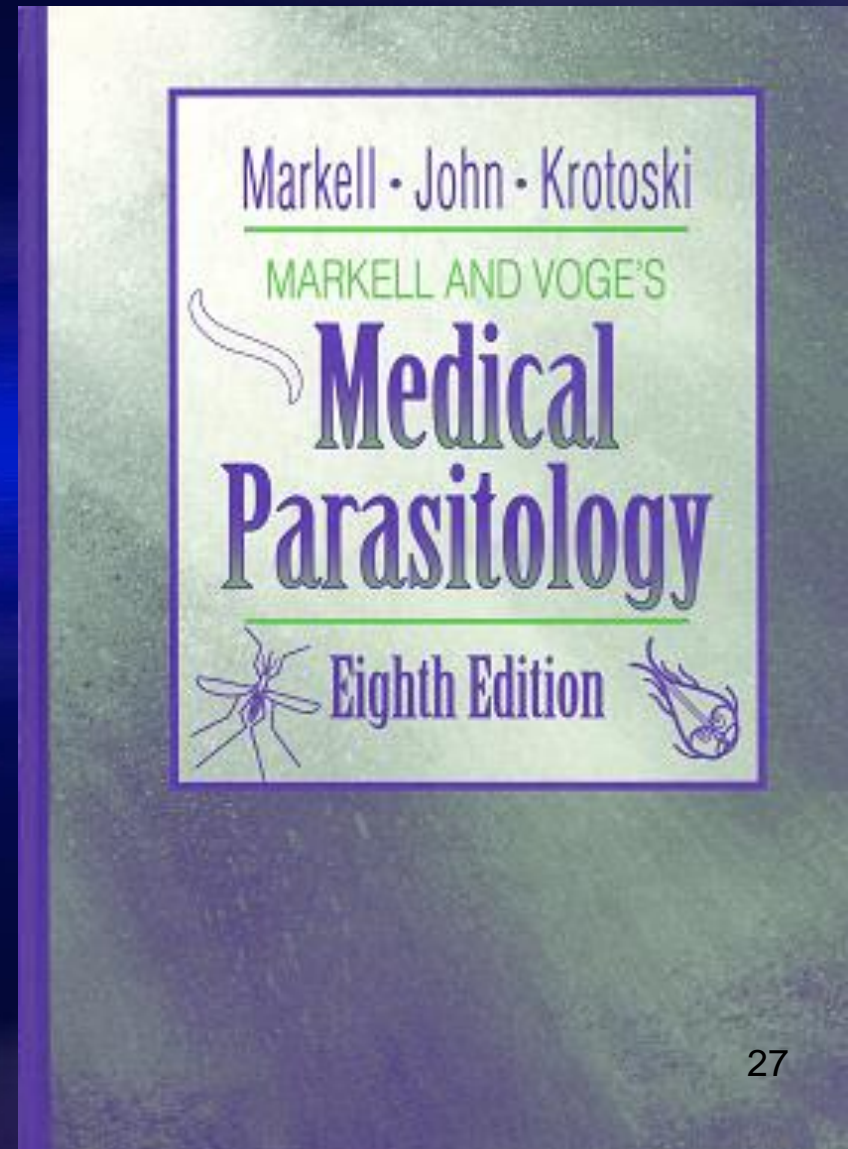
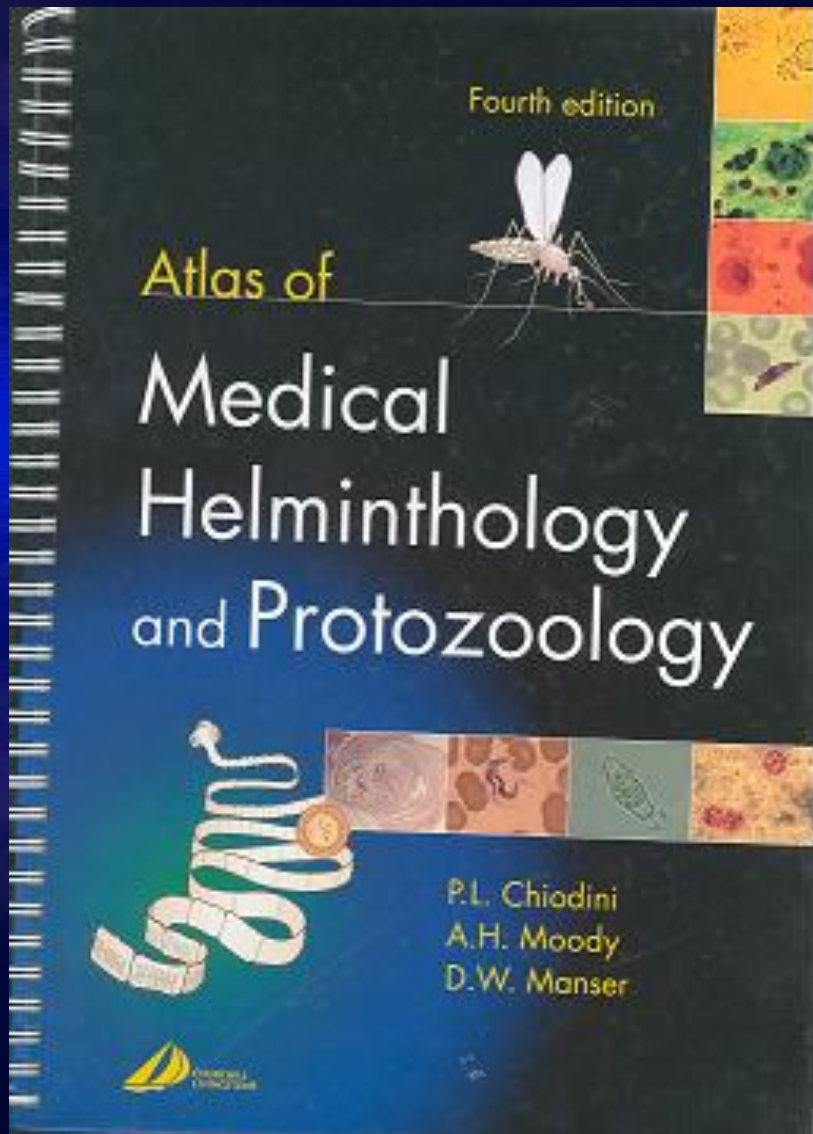


Macrophage



Leishmania parasite

Resources on Parasitology



Resources on Parasitology

Centre for Disease Control and Prevention (CDC) :

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