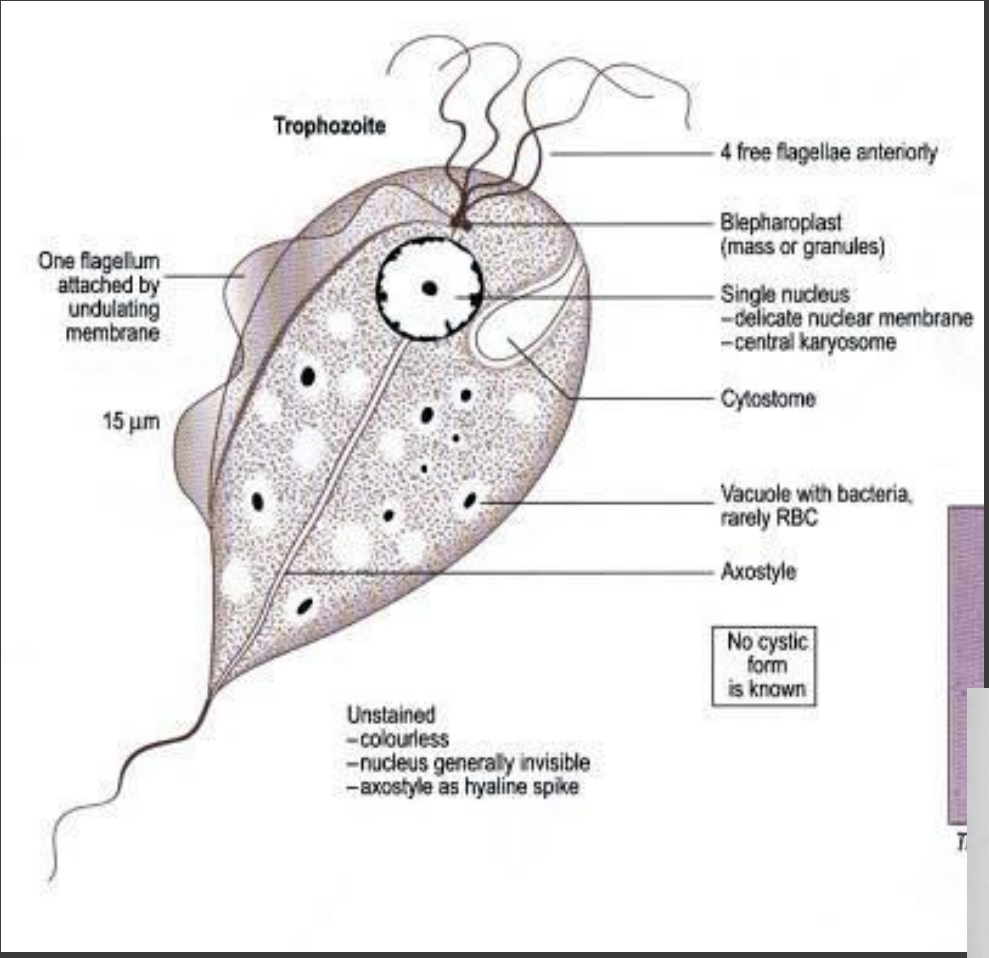
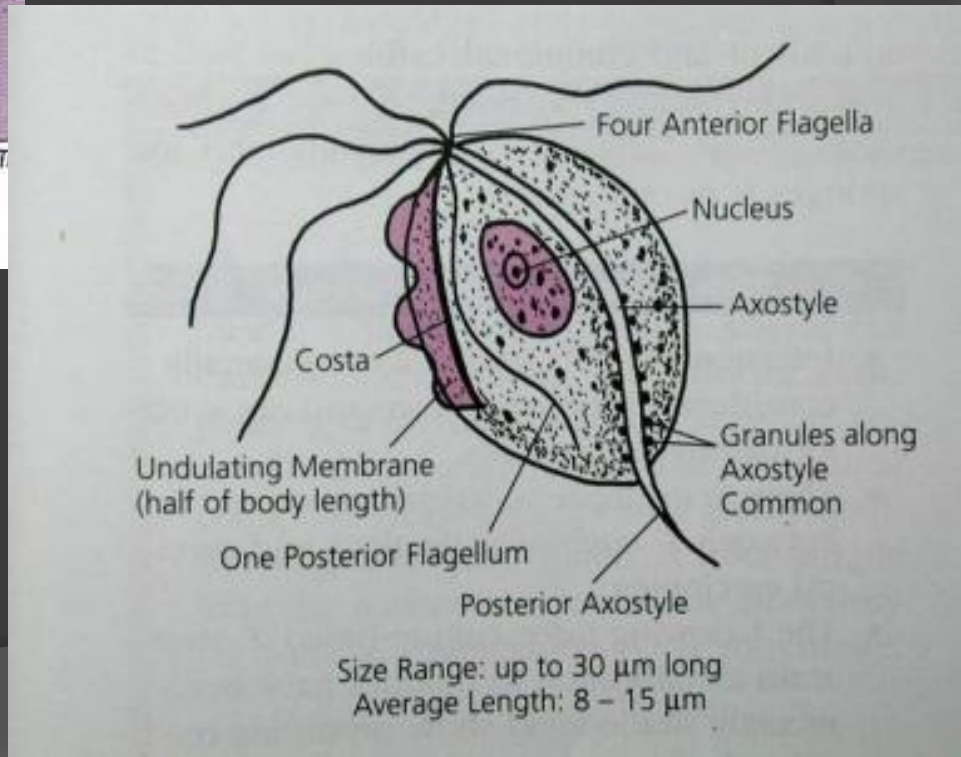
Trichomonas vaginalis

Morphology :

A distinctive feature of the trichomonads is an axostyle (ax) which runs the length of the organism and appears to protrude from the posterior end . The axostyle is a cytoskeletal element composed of concentric rows of microtubules and is believed to function in the attachment of the parasite to epithelial cells. Trichomonads are also characterized by 4-6 flagella (fg) emerging from the anterior end.


Trophozoite
4 free flagellae anteriorly
Blepharoplast
(mass or granules)
One flagellum
attached by
undulating
membrane
Single nucleus
–delicate nuclear membrane
–central karyosome
Cytostome
15 µm
Vacuole with bacteria,
rarely RBC
Axostyle
No cystic
form
is known
Unstained
–colourless
–nucleus generally invisible
–axostyle as hyaline spike


Four Anterior Flagella
Nucleus
Axostyle
Costa
Granules along
Axostyle
Common
Undulating Membrane
(half of body length)
One Posterior Flagellum
Posterior Axostyle
Size Range: up to 30 µm long
Average Length: 8 – 15 µm

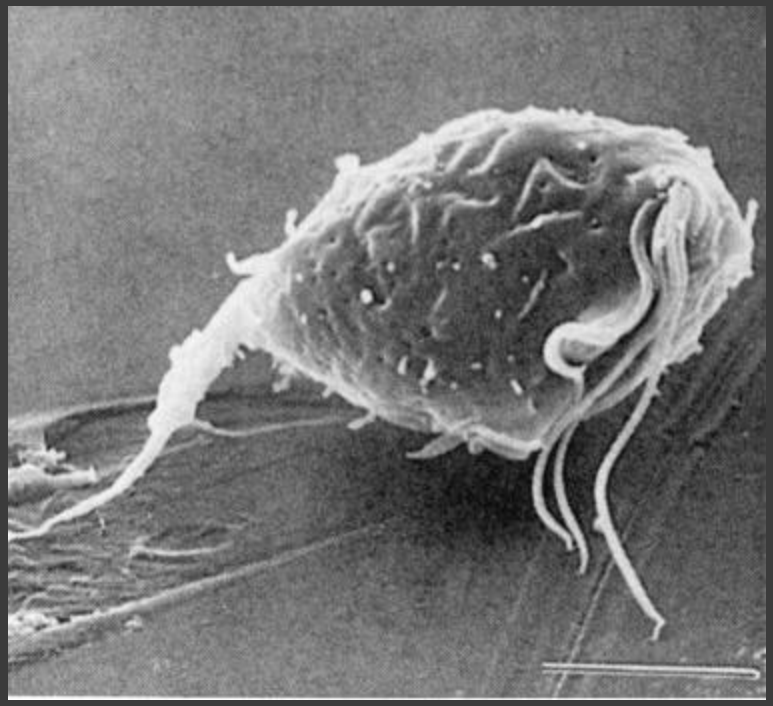


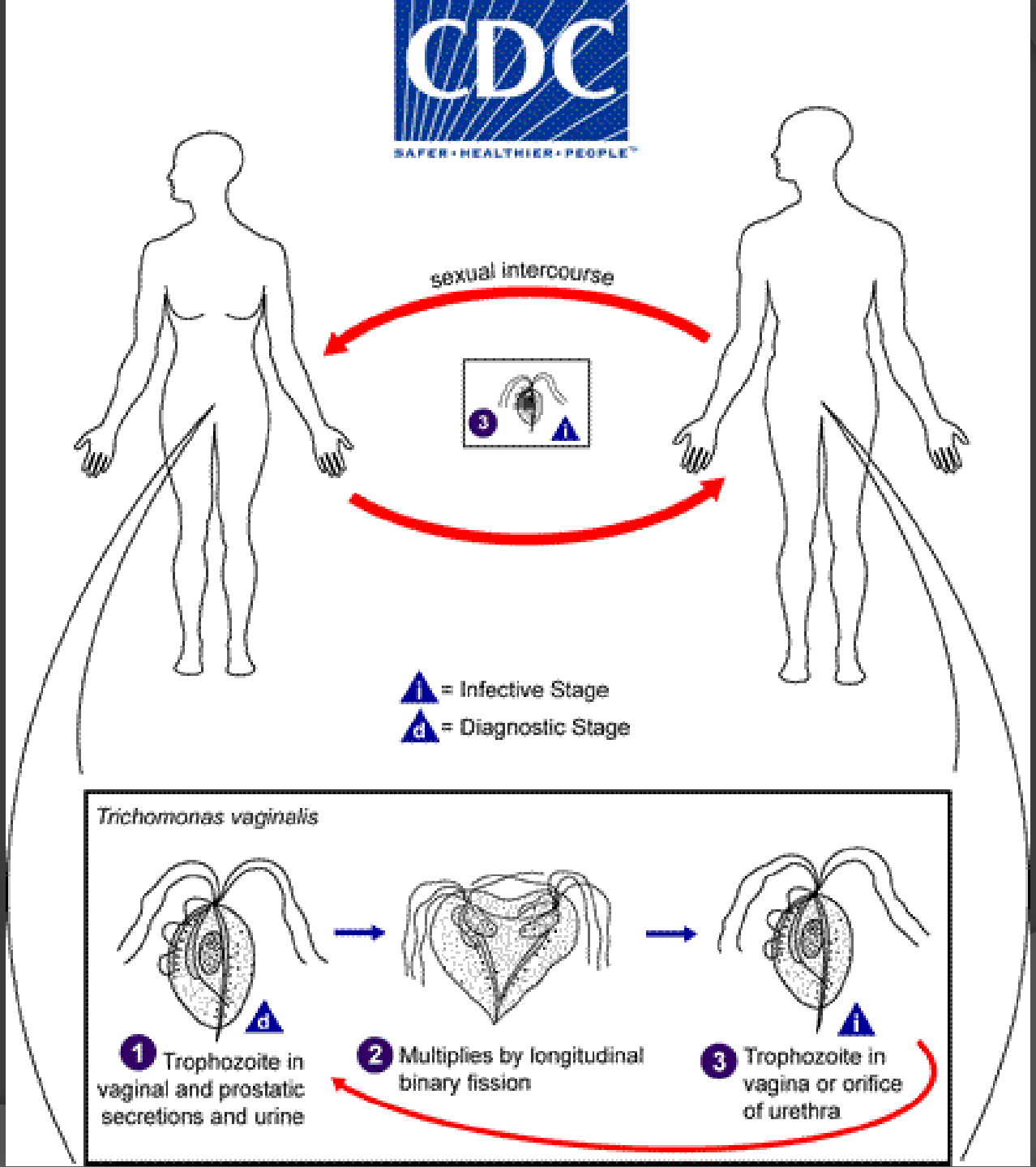
Figure 1. ***T. vaginalis parasite as seen in broth*** culture (Petrin et al., 1998).

One of the flagella is attached to the body of the organism and forms a posteriorly-directed undulating membrane (um), whereas the remaining flagella are free. The combined basal bodies (bb) and the base of the undulating membrane, called the costa (cs), are often seen in stained preparations. Less frequently seen is the cytostomal groove (cy). A single nucleus (nu) is found at the anterior end of the parasite.

T. vaginalis trophozoite is 15 to 18 micrometers in diameter and is half pear shaped with a single nucleus, The organism does not encyst.

Life cycle

T. vaginalis colonizes the vagina of women and the urethra (sometimes prostate) of men. Infection occurs primarily via sexual contact, although non-venereal infections are possible. Non-sexual transmission includes sharing of clothing like towels. The organism divides by binary fission which is favored high PH (pH > 5.9)There is no non-human reservoir.


CDC
SAFER • HEALTHIER • PEOPLE™
sexual intercourse
= Infective Stage
= Diagnostic Stage
Trichomonas vaginalis
1 Trophozoite in vaginal and prostatic secretions and urine
2 Multiplies by longitudinal binary fission
3 Trophozoite in vagina or orifice of urethra

Symptoms

T. vaginalis infection is rarely symptomatic in men, although it may cause mild urethritis or occasionally prostatitis. In women, it is often asymptomatic, but heavy infections in a high pH environment may cause mild to severe vaginitis with foul-smelling yellowish, sometimes frothy discharge .

Chronic infection can cause also infertility, premature labour, premature rupture of the placental membranes, and low birth weight infants

Pathology:

The organism causes contact-dependent damage to the epithelium of the infected organ

Diagnosis

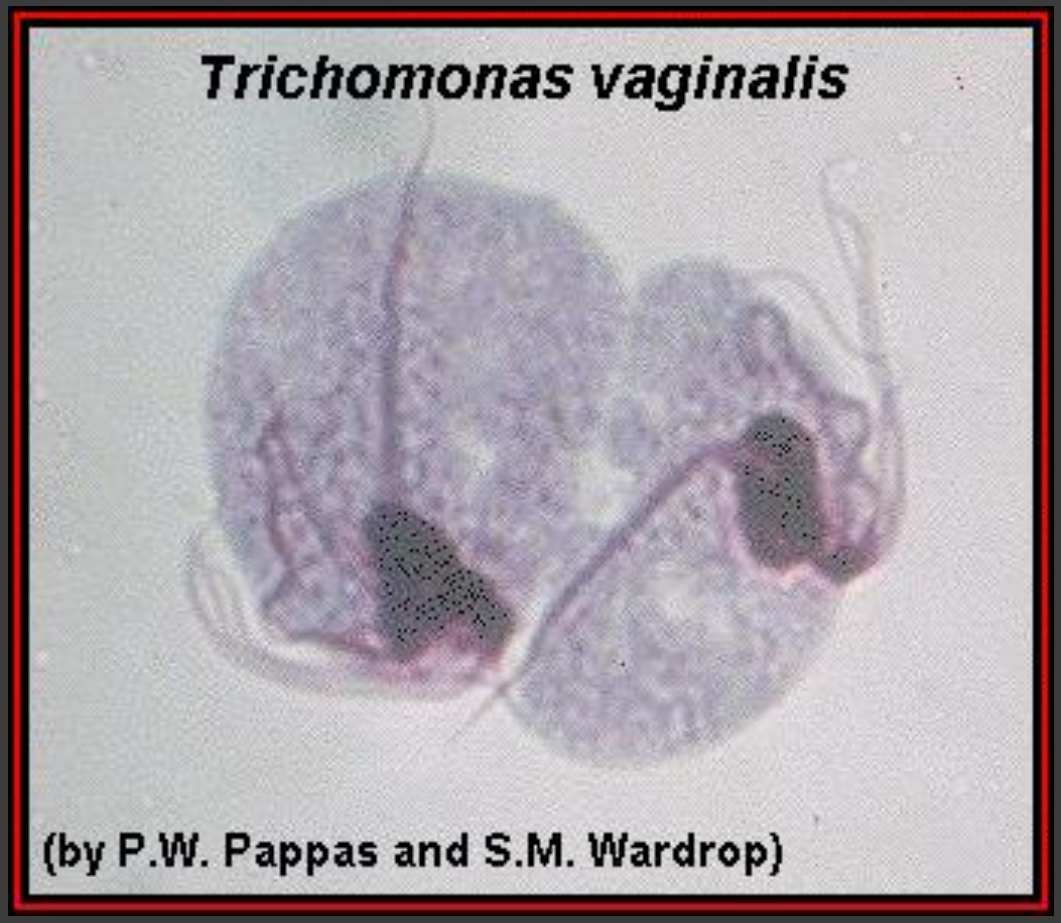
Clinical suspicion may be confirmed by finding the organism in Giemsa-stained smears of vaginal discharge or, in difficult cases, by cultivation of a swab sample in Diamond's medium. Trophs must be distinguished from the non-pathogenic flagellate *Trichomona hominis*, which is an asymmetrical flagellate with an undulating membrane.

Treatment

Metronidazole (although teratogenic) is effective in both males and females.

Vinegar douche may be useful. Personal hygiene and the use of condoms are helpful

Teratogenic: Able to disturb the growth and development of an embryo.



Two trophozoites of *Trichomonas vaginalis* from culture. The flagella and single nucleus are visible

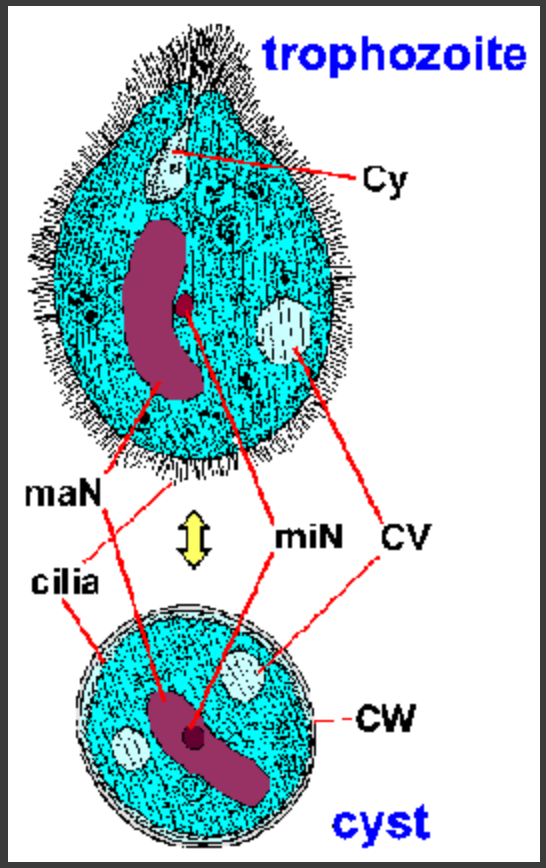
Balantidium coli

This is a parasite primarily of cows, pigs and horses. The organism is a large (100 x 60 micrometer) ciliate with a macro- and a micro-nucleus. The infection occurs mostly in farm workers and other rural dwellers by ingestion of cysts in fecal material of farm animals.

Symptoms and pathogenesis of balantidiasis are similar to those seen in entamebiasis, including intestinal epithelial erosion. However, liver, lung and brain abscesses are not seen.

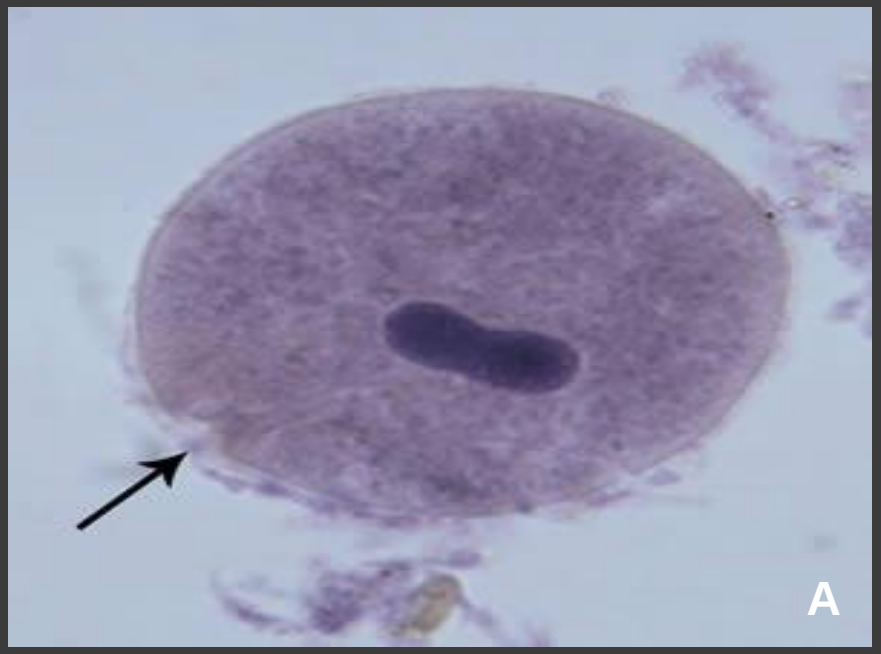
Treatment:

Metronidazole and iodoquinol are effective.



B. coli trophozoite

maN (macronucleus), miN (miconucleus), cv (contractile vacuole), cy (cytosome), cw (cyst wall).

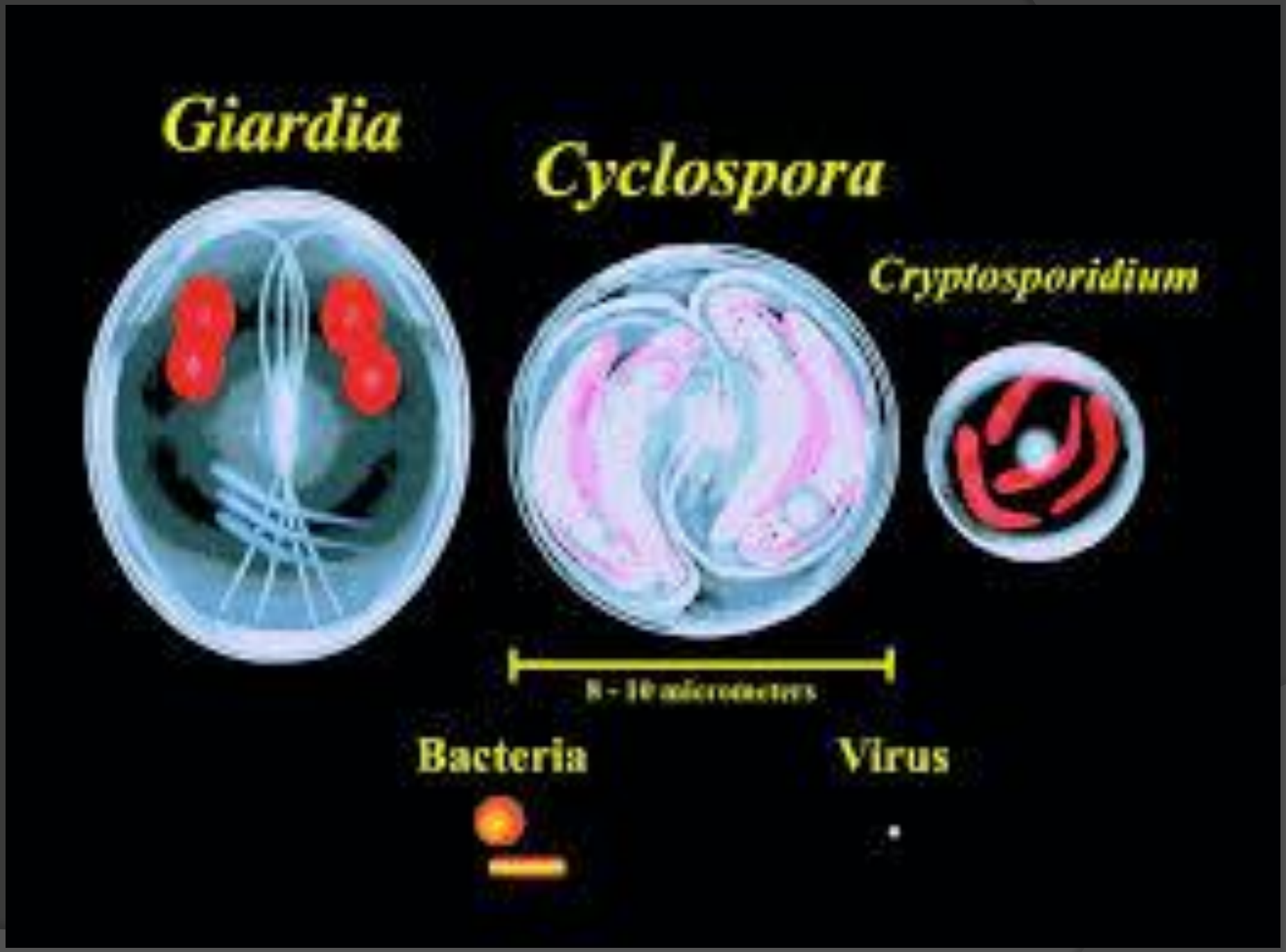


(A) *B. coli* trophozoite (hematoxylin stained smear,) Note the cytosome (black arrow) and the bean shaped macronucleus.

(B) *B. coli* trophozoite in a wet mount. Note the visible cilia on the cell surface.

Summary

Organism	Transmission	Symptoms	Diagnosis	Treatment
Entameba histolytica	Oro-fecal	Dysentery with blood and necrotic tissue. Chronic: abscesses	Stool: cysts with 1-4 nuclei and/or trophs.	GI: Iodoquinol or Metronidazole Abscess: Metronidazole
Giardia lamblia	Oro-fecal	Fowl-smelling, bulky diarrhea; blood or necrotic tissue rare.	Stool: giardia troph and/or cyst.	Iodoquinol or Metronidazole.
Balantidium coli	Oro-fecal zoonotic	Dysentery with blood and necrotic tissue but no abscesses.	Stool: ciliated trophs and/or cysts.	Iodoquinol or Metronidazole.
Cryptosporidium parvum	Oro-fecal	Diarrhea	Ooocysts in stool	Paromycin (investigational)
Isospora belli	Oro-fecal	Giardiasis-like	Ooocysts in stool	Sulpha drugs
Trichomonas vaginalis	Sexual	Vaginitis; occasional urethritis/prostatitis	Flagellate in vaginal (or	Mebendazole;


Giardia
Cyclospora
Cryptosporidium
8 - 10 micrometers
Bacteria
Virus

TOXOPLASMA GONDII

General Features

- A world wide distribution：1/3 population
- Opportunistic parasite
- Intracellular parasite
- Zoonotic parasite

Life Cycle and Morphology

- Two host pattern with alternation of generation
- Definitive host: cat (acts also as I.H.)
- Intermediate host: human being and other animals (herbivores, carnivores, omnivores)

Development in Cat

- Intestinal phase (sexual and asexual stage)

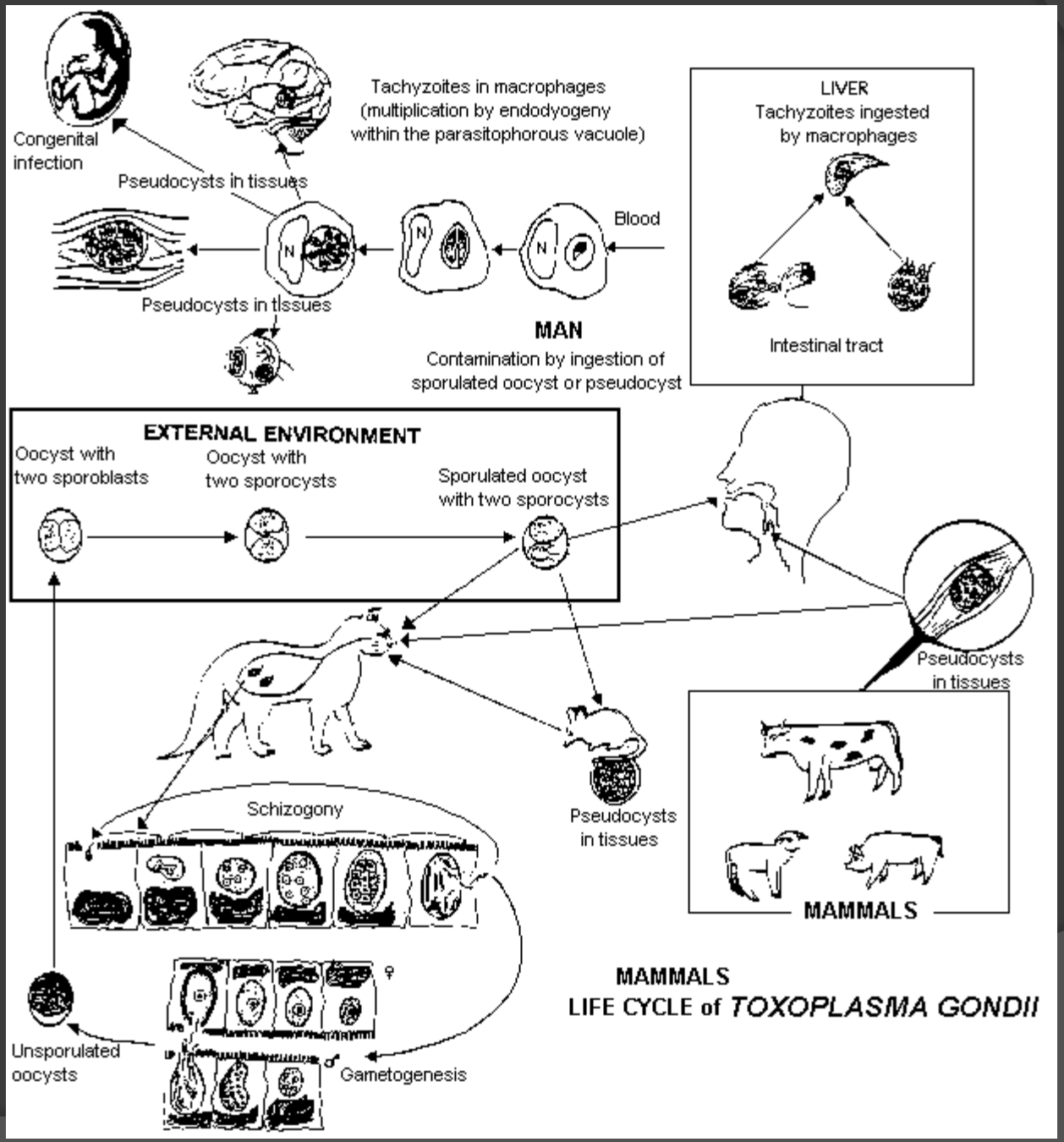
  Schizogony→ merozoites (schizont)

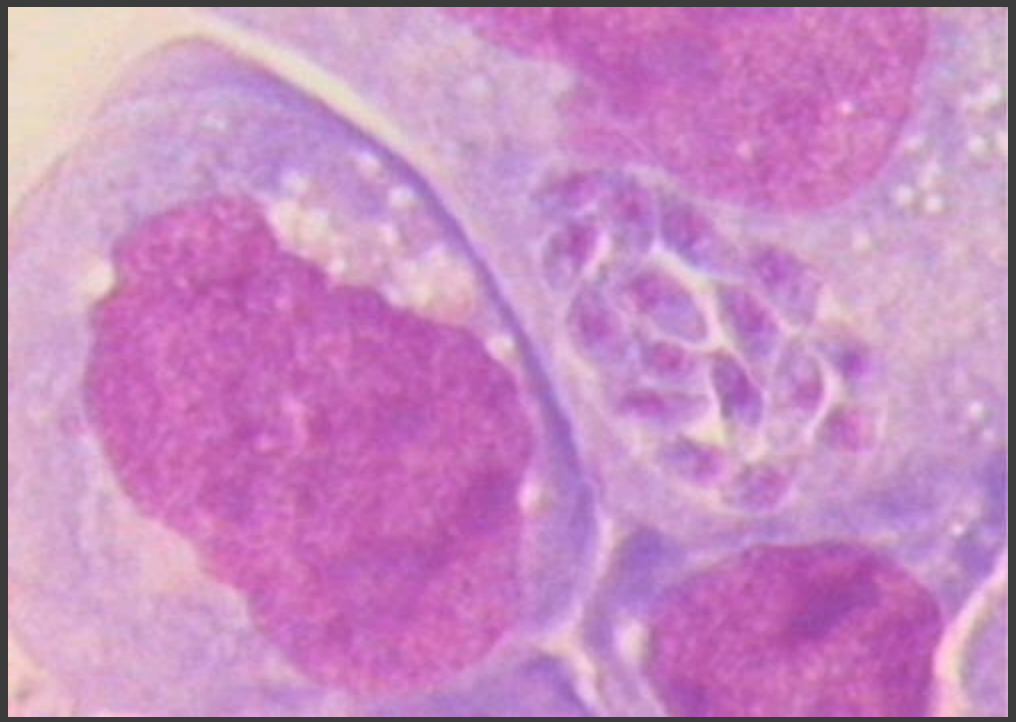
  Gametogony: →micro and macrogametocyte → micro and macrogamete → zygote → oocyst

  Sporogony: →sporozoites (mature oocyst) (outside of the cat)

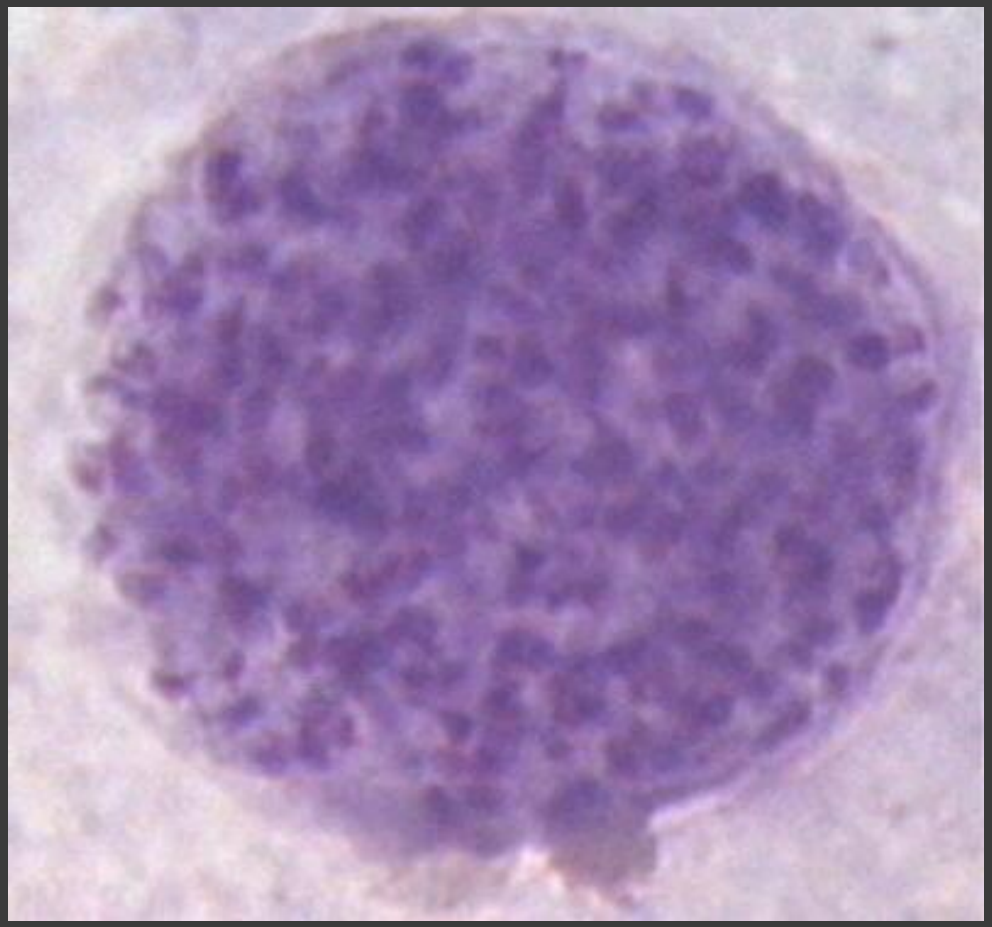
Development in Man

- Extraintestinal phase (asexual)
  - Infective stage
    - Oocyst
    - Tachyzoite
    - Cyst
- Infective route: mouth
- Residing site: tissue cells


Congenital infection
Pseudocysts in tissues
Tachyzoites in macrophages (multiplication by endodyogeny within the parasitophorous vacuole)
LIVER
Tachyzoites ingested by macrophages
Intestinal tract
Blood
Pseudocysts in tissues
MAN
Contamination by ingestion of sporulated oocyst or pseudocyst
EXTERNAL ENVIRONMENT
Oocyst with two sporoblasts
Oocyst with two sporocysts
Sporulated oocyst with two sporocysts
Pseudocysts in tissues
Pseudocysts in tissues
Schizogony
MAMMALS
♀
♂
Gametogenesis
Unsporulated oocysts
MAMMALS
LIFE CYCLE of TOXOPLASMA GONDII



In cell cultures, *T.gondii* proliferates to form a pseudocyst of 8-20 parasites.



T. gondii: **tissue cysts, 100-300 µm, may contain up to 3 000 bradyzoites.**

Pathogenesis

- Acquired toxoplasmosis: eye lesion (uveitis, choroiditis, choroidoretinitis); lymphadenopathy
- Congenital toxoplamosis:
  - Abortion;
  - Still birth (abnormities): hydrocephalus, mental retardation

Pathogenesis

- Toxoplamosis in immunoincompetent hosts
  - Encephalitis
  - Pneumonitis
  - Myocarditis
  - Hepatitis, etc.

Diagnosis

- Immunological diagnosis of specific IgG or IgM (first choice), eg:
  DT, ELISA, IFA, IHA, etc
- Histological exams
- Animal inoculation
- PCR

Main Points

- Multi-cellular parasitism
- Transmission mode
  - Congenital
  - I.H. $\rightarrow$ I.H
  - D.H $\rightarrow$ I.H
  - I.H $\rightarrow$ D.H

Epidemiology

- Cosmopolitan
- Saudi Arabia: 24-51%
- France: 45-85%
- Africa: 46%
- USA : 25-36%
- China : 30%

Epidemiological Factors

- Consuming raw or undercooked meat containing cyst
- Contact with cats (oocyst consumption)

Prevention Control

- Avoid contact with the cats ?
- Avoid eat raw or undercooked meat
- Drug: pyrimethamine +sulfadiazine
  spiramycin (for pregnant women)