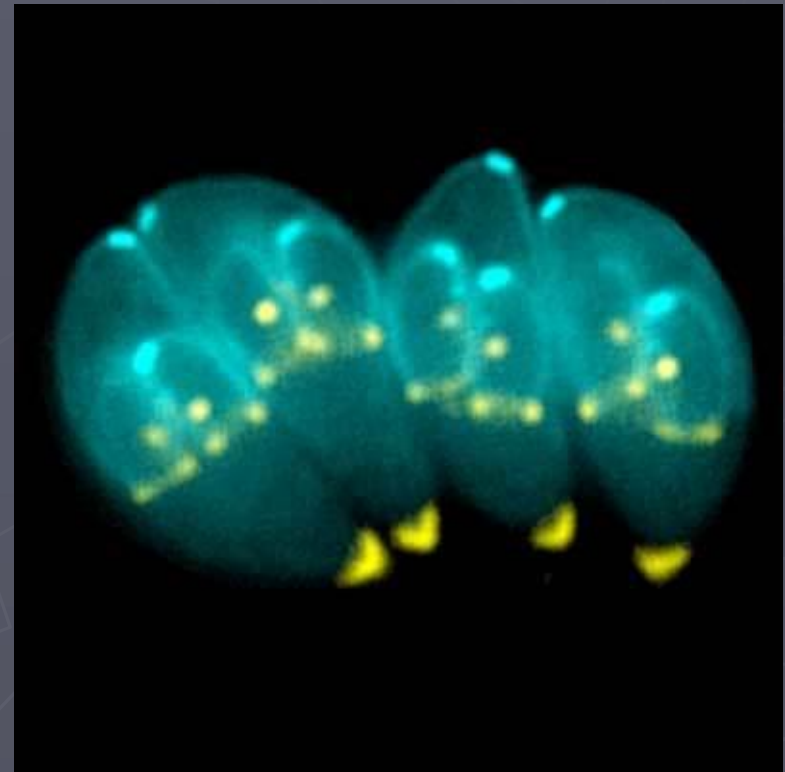


# Toxoplasma gondii

T. Gondii was first discovered in 1908 in desert rodent ,the gondi, in a colony maintained at the Pasteur institute in Tunis.



T. gondii constructing daughter scaffolds within the mother cell

# T.gondii

- ▶ T.gondii is a intracellular parasite in many tissues, such as intestinal epithelium and muscle.
- ▶ The organisms can be found also free in the blood and peritoneal exudate.
- ▶ In the fetal life, the parasite infection can lead to death (Human & sheep)

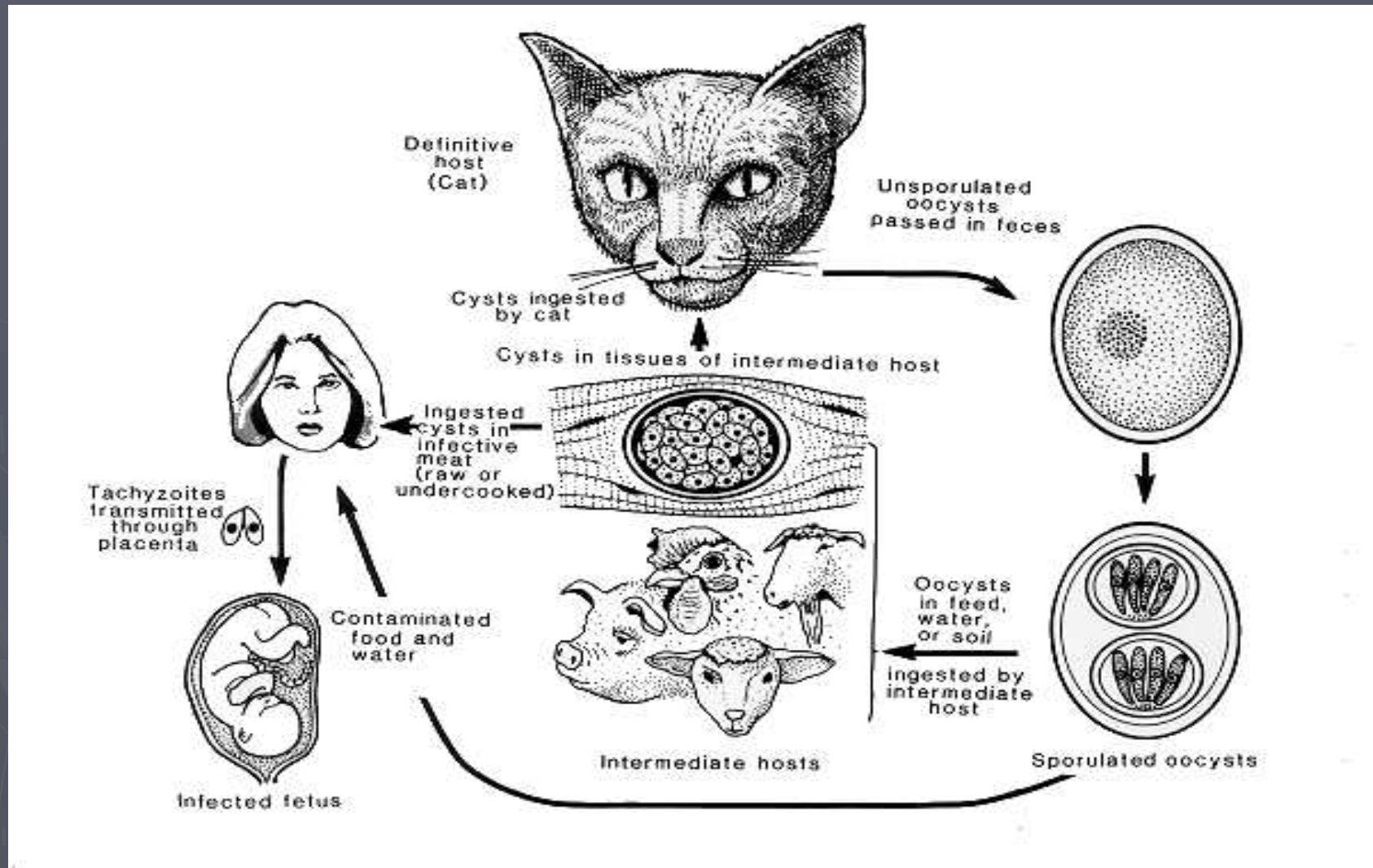
# Definitive host

- ▶ Mainly domestic and wild cats.
- ▶ Cats can become infected by ingesting sporulated oocyst or infected rodent or a bird.

# Intermediate host

- ▶ Human, cattle, birds, rodents, pigs, and sheep.
- ▶ Humans get the disease through ingestion of a cyst, infected raw meat, transplacental, organ transplatantion or blood transfusion.

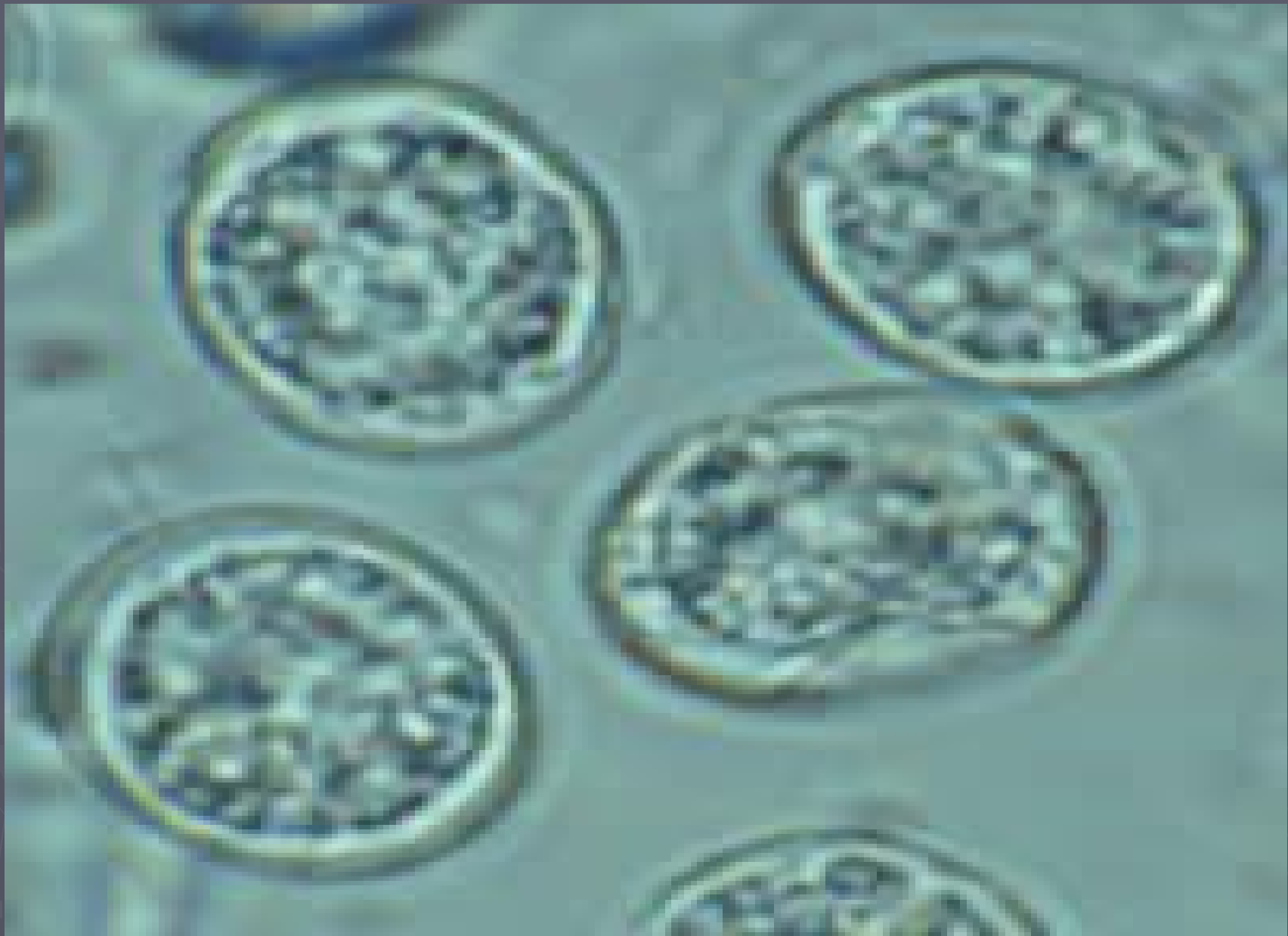
# Life cycle



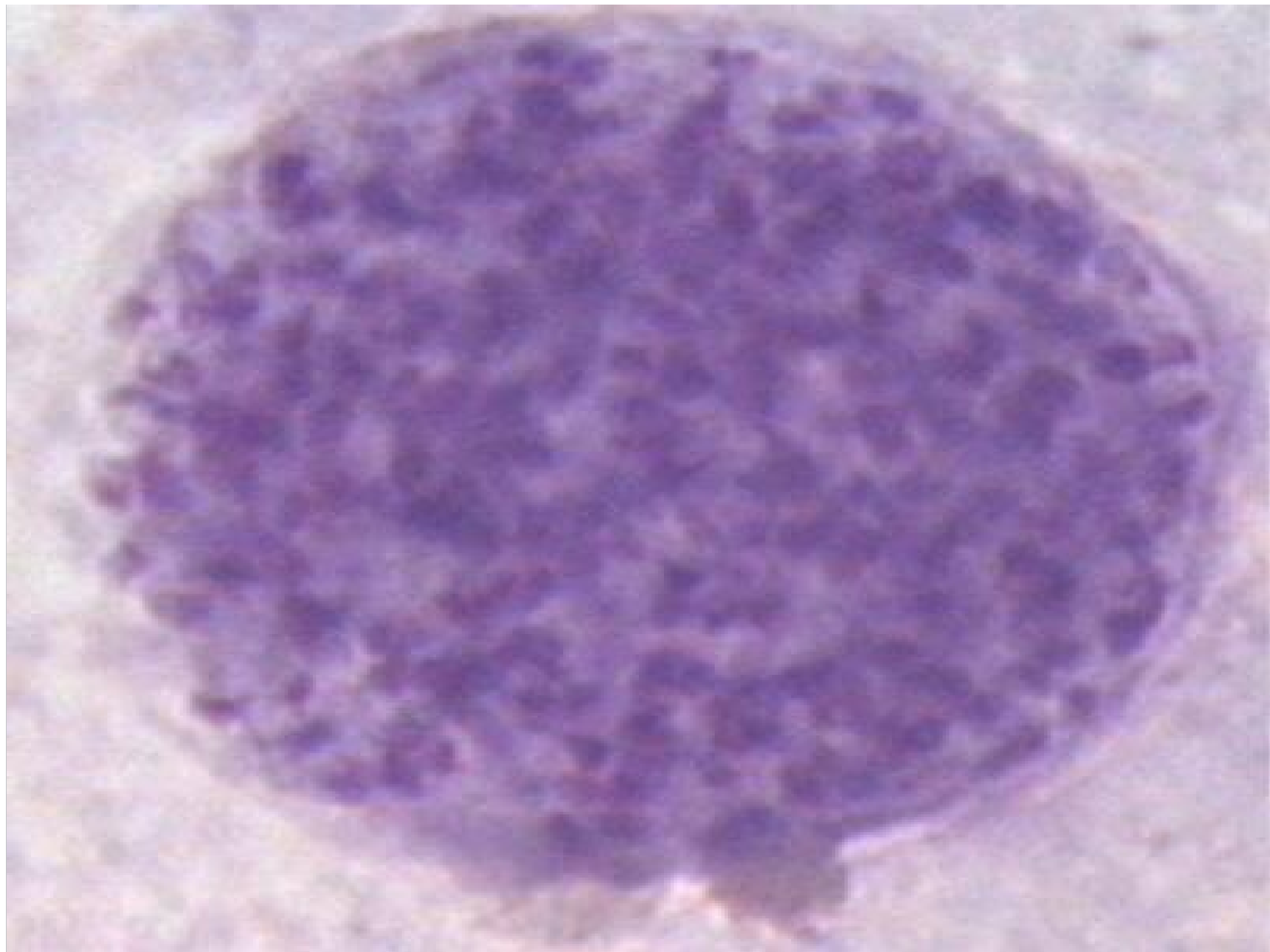
- ▶ The protozoa multiplies sexually in the cat's intestinal and asexually in a many mammals and even birds.
- ▶ Cats are infected by eating infected rodent.the zoitocyst which contains bradyzoites travel to the intestine via digestive tract.

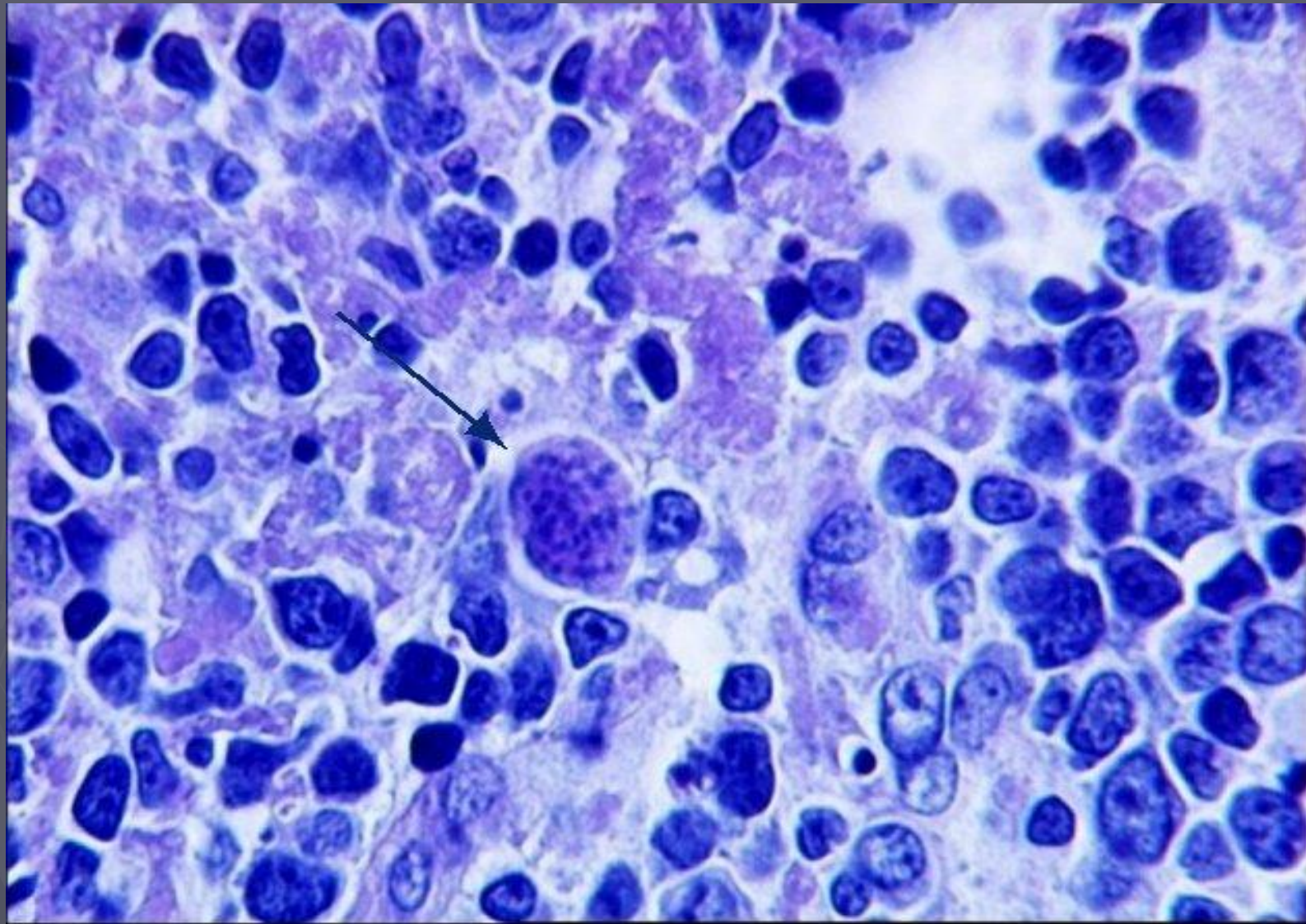
## Cont. life cycle

- ▶ Bradyzoites are released in the intestine.
- ▶ Bradyzoites infect cells and become trophozoites.
- ▶ Fertilization occurs in the intestine and immature oocysts are passed in the cat's feces.
- ▶ The Oocysts are contaminated with water, food and soil and are ingested by an intermediate host.





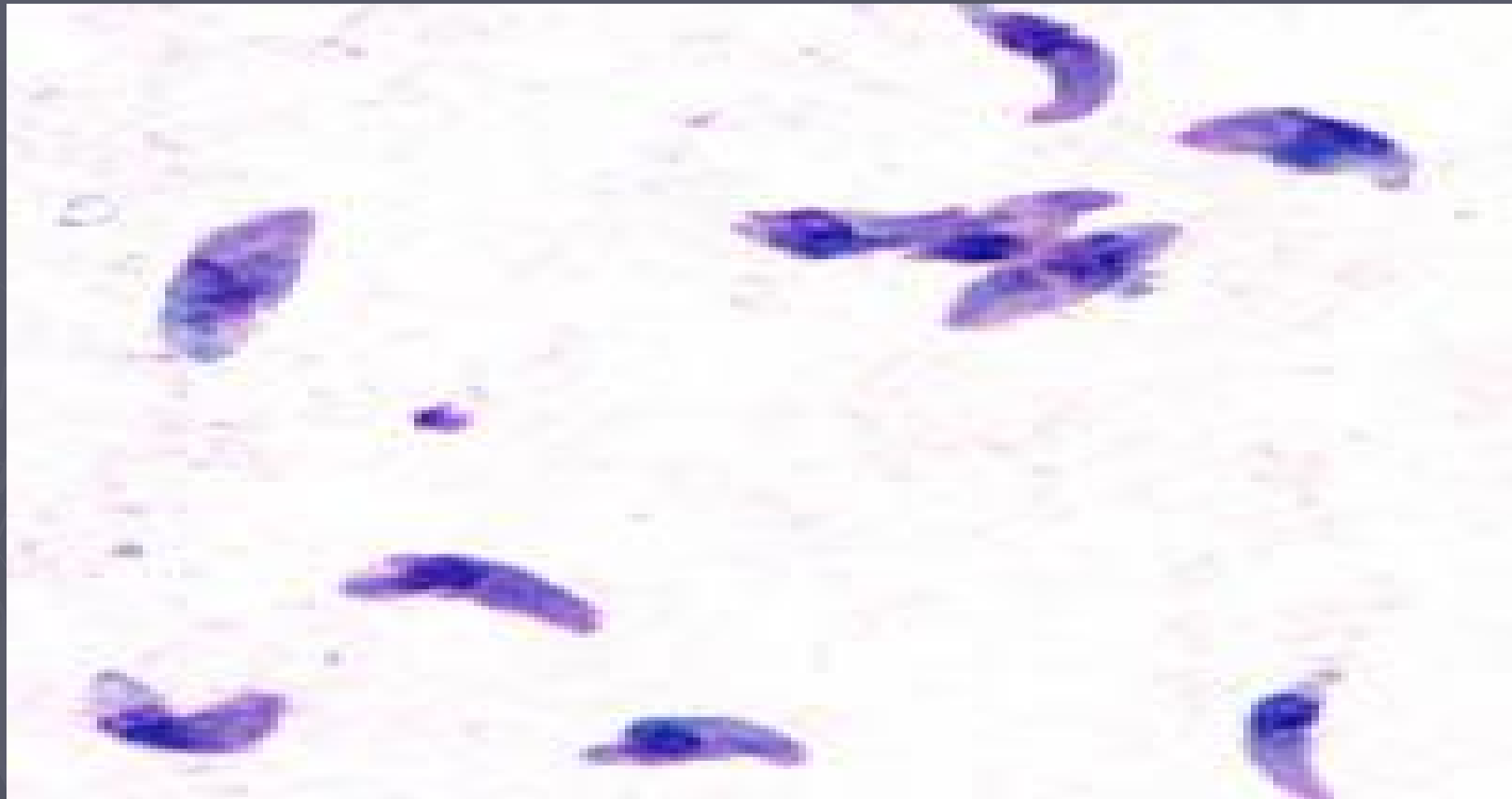




# The protozoa reproduces asexually in the intermediate host.

- ▶ Ingested oocyst goes to the digestive tract.
- ▶ It is here that they are engulfed by macrophages.
- ▶ In the macrophage tachyzoites develop and travel to various parts of the body via blood stream (Heart, spleen, liver and brain).
- ▶ once immune response is triggered, tachyzoites encyst into zoitocysts and pseudocysts which contain bradyzoites(inactive).

# Tachyzoite stage



Tachyzoites are typically crescent shaped with a prominent, centrally placed nucleus."

# Economic impact

- ▶ *Toxoplasma gondii* has a devastating economic impact on the countries who export livestock.
- ▶ Toxoplasmosis is leading cause of abortion in sheep and goats.

# Geographic range

- ▶ Worldwide
- ▶ Infection is more common in warm climates and lower altitudes than cold climates and mountainous regions.
- ▶ In the U.S a survey (NHANES III) between 1988 and 1994 was found to be 22.5%, with seroprevalence among women of childbearing age (15 to 44 years) of 15%

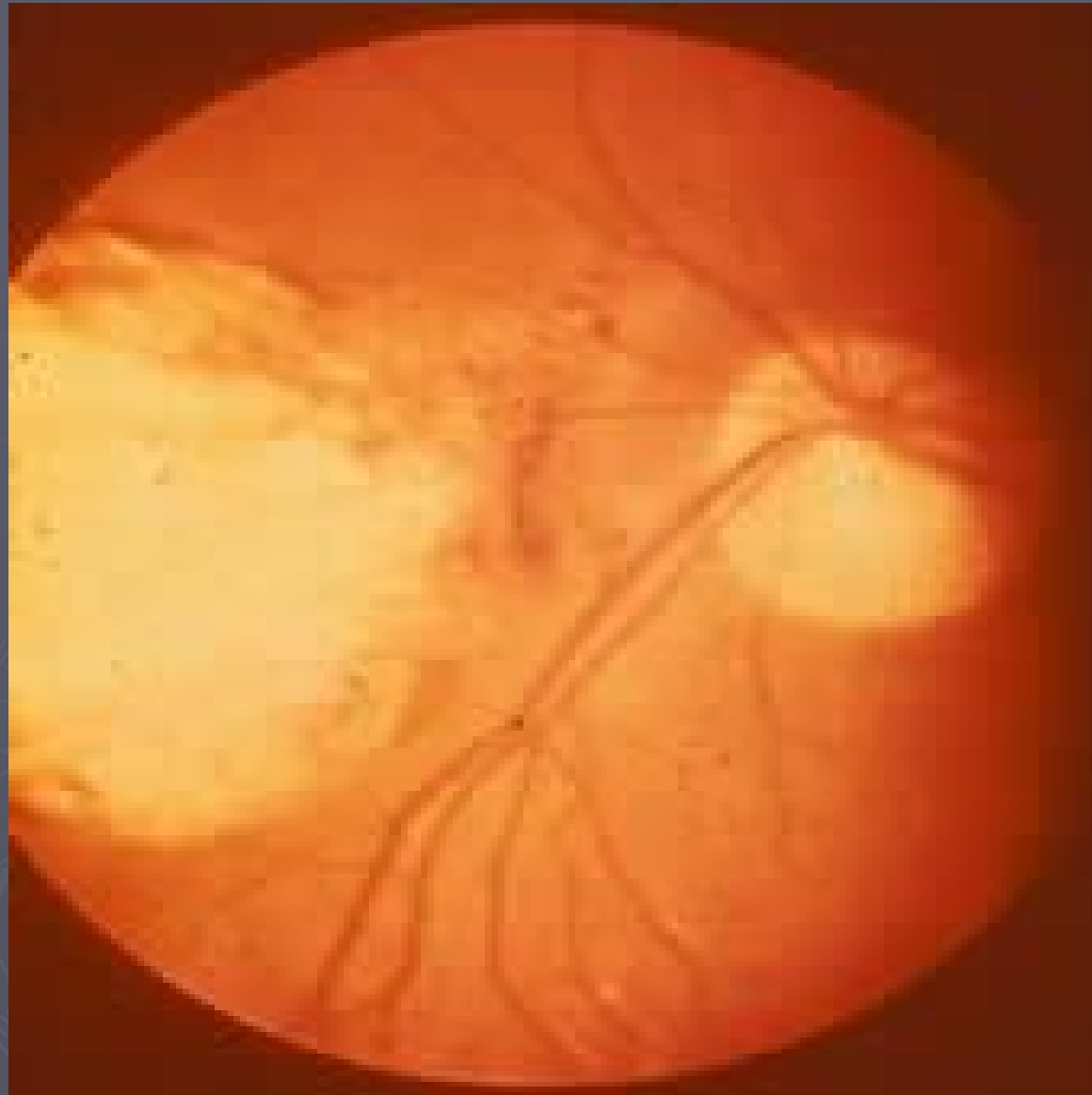
# Pathogenesis

- ▶ Infection with *Toxoplasma* in immunocompetent persons is generally an asymptomatic infection.
- ▶ The clinical course is benign and self-limited; symptoms usually resolve within a few months to a year.
- ▶ Immunodeficient patients often have central nervous system (CNS) disease but may have retinochoroiditis, or pneumonitis. In patients with AIDS, toxoplasmic encephalitis is the most common cause of intracerebral mass lesions and is thought to be caused by reactivation of chronic infection.

# Pathogenesis

- ▶ Causes Encephalitis for immunosuppressed patients and people infected with (AIDS).
- ▶ Lymphadenitis is the most common in humans.
- ▶ Children exhibit Hydrocephalus, retinochoroiditis, convulsion and intracerebral calcifications.
- ▶ Congenital neurological defects in infants.





Severe, active retinochoroiditis

# Diagnosis

- ▶ Biopsy of humans.
- ▶ (ELISA) Enzyme-Linked Immunoabsorbent Assays.
- ▶ (IFAT) Indirect Fluorescent Antibody tests.

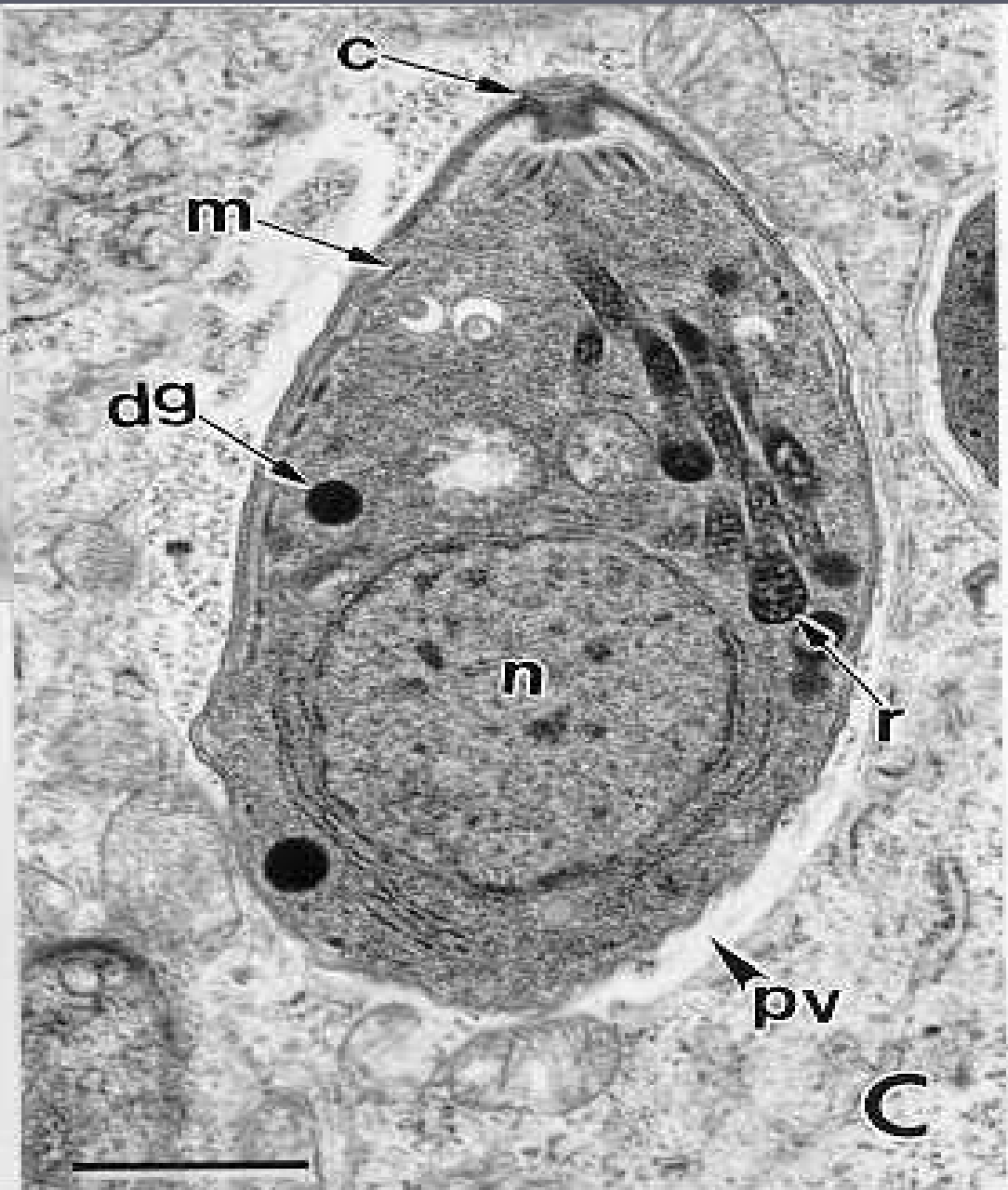
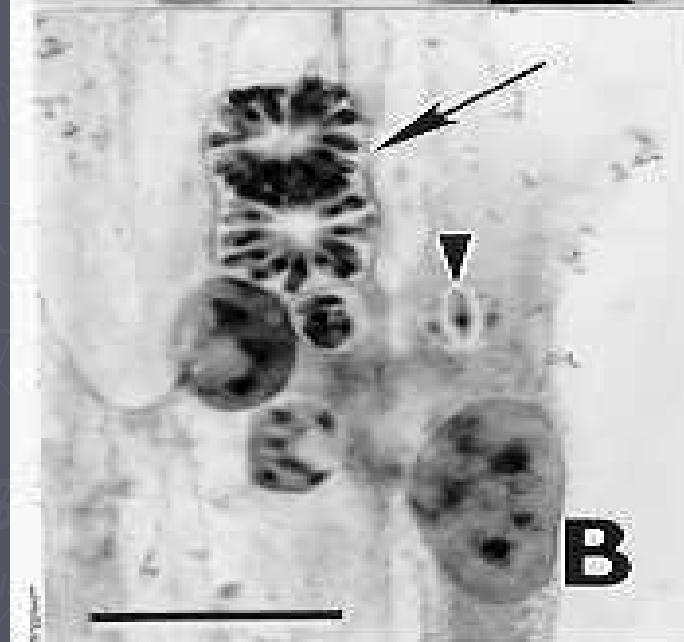
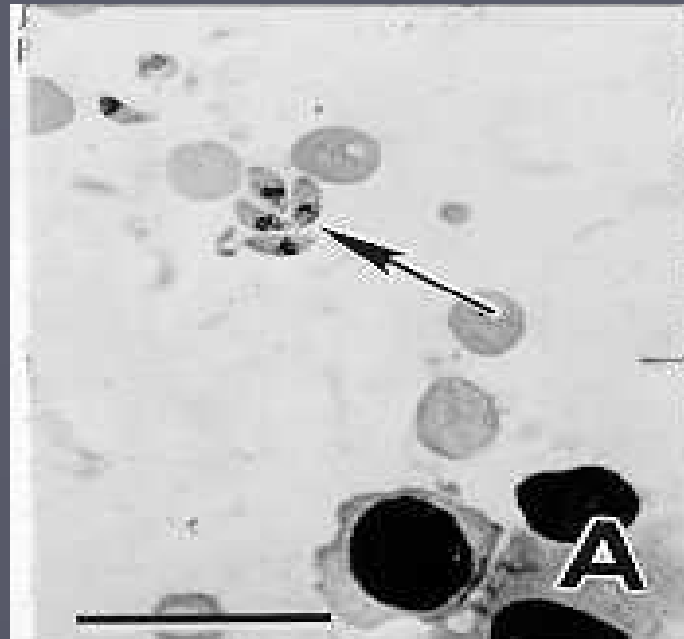
# Treatment

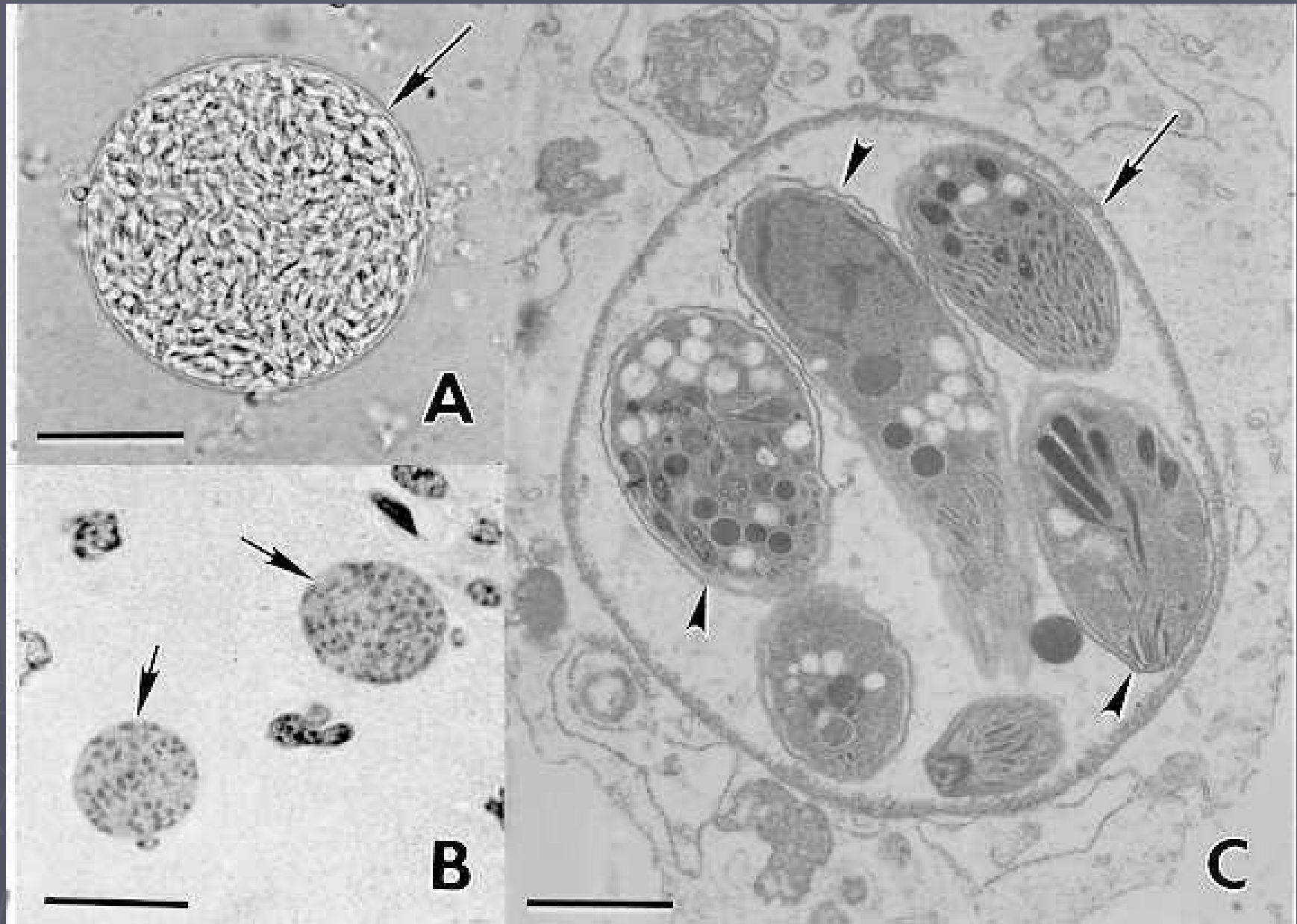
- ▶ Sulfonamides
- ▶ Pyrimethamine(daraprim)

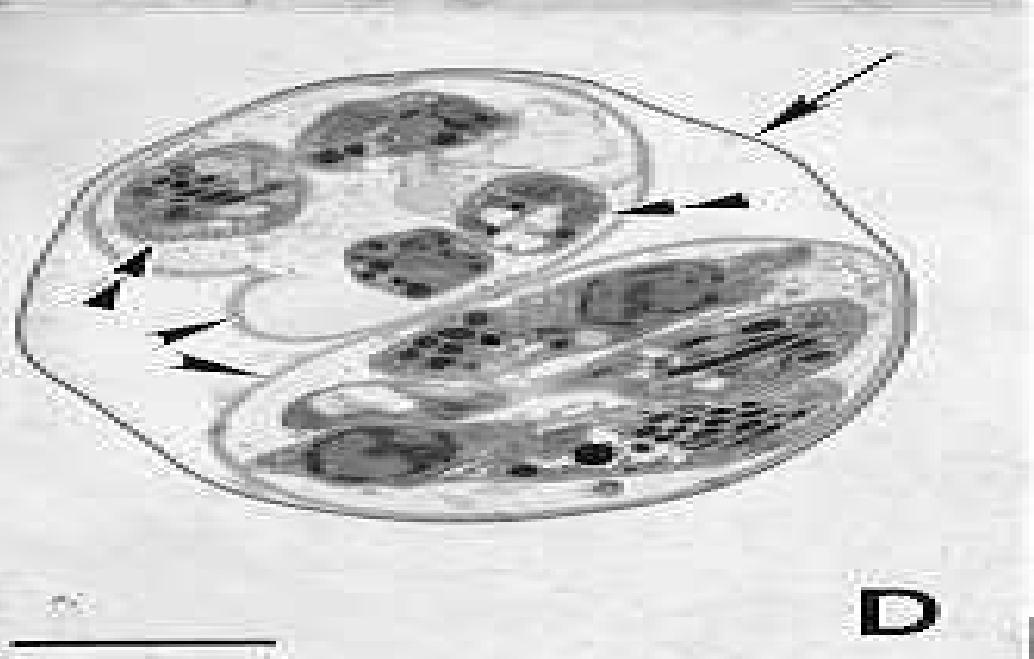
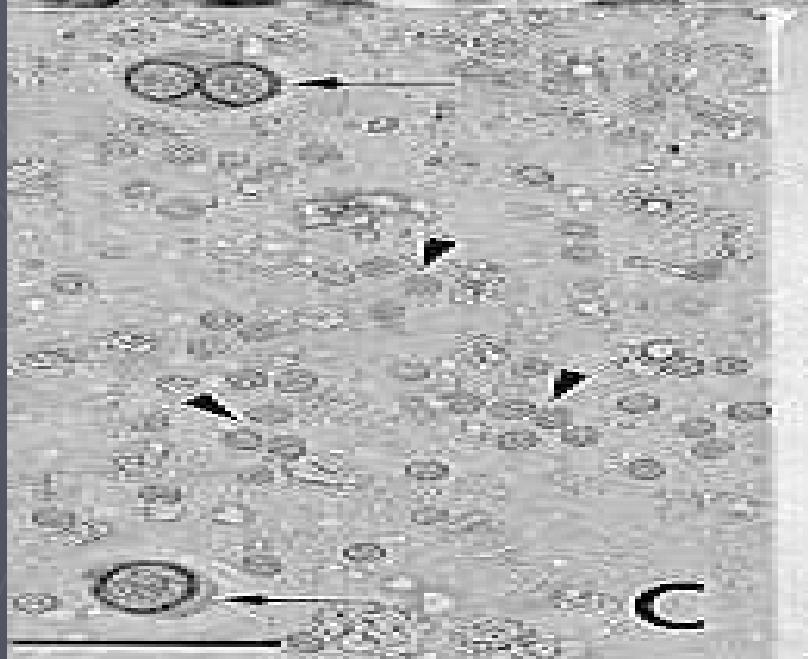
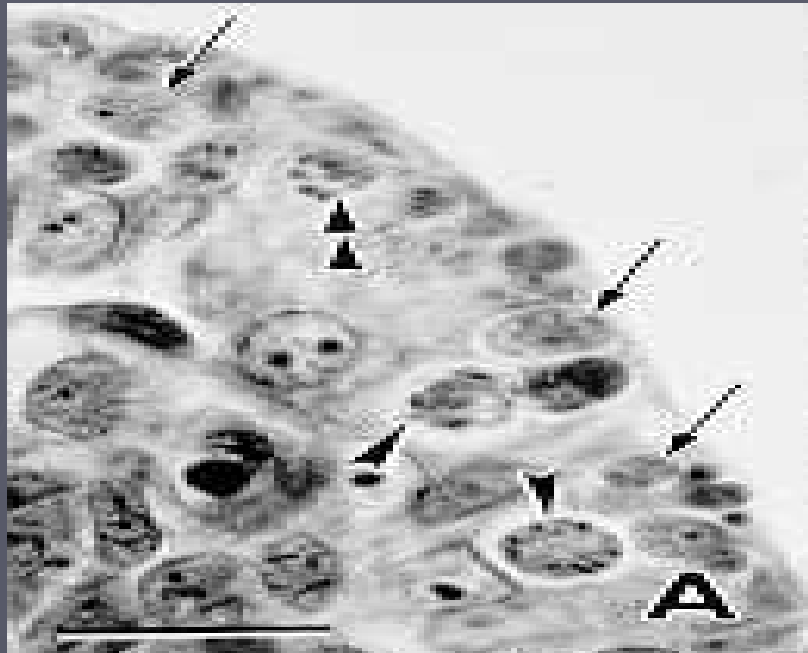
# Control

- ▶ Pets should be checked and cured.
- ▶ Wash hands thoroughly with soap
- ▶ Cats should be kept indoors and litter boxes changed daily.
- ▶ Better cook your meat well.
- ▶ Cat feces should be flushed down the toilet or burned.

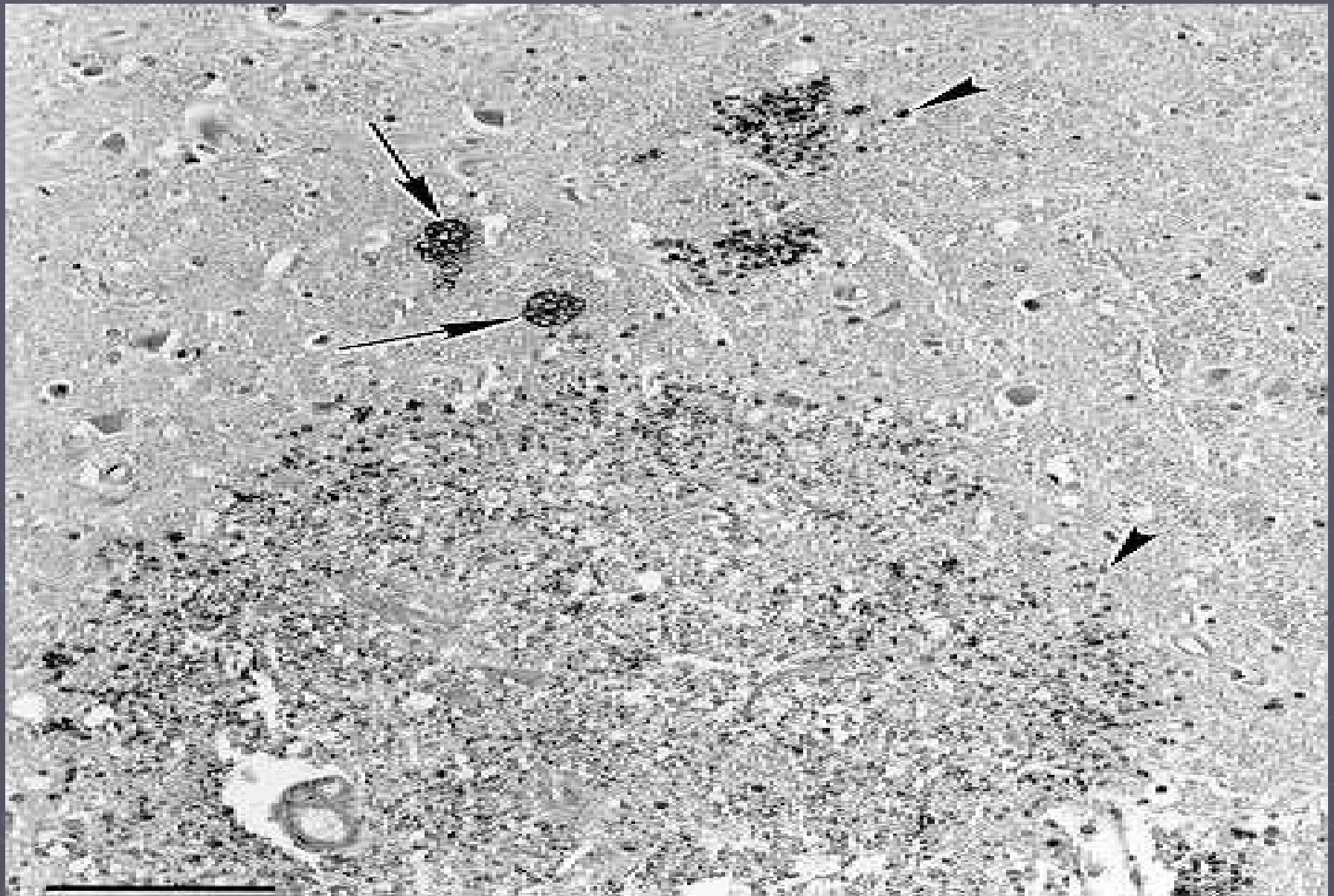








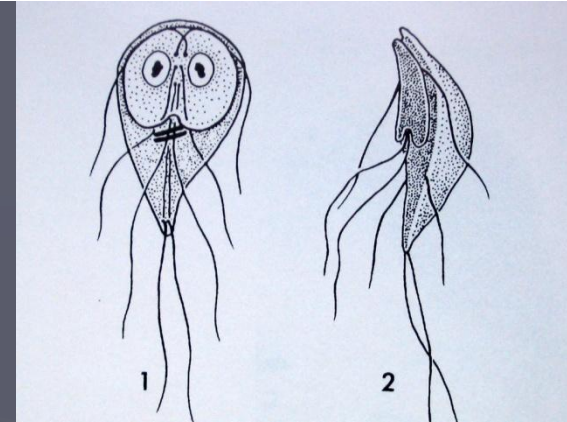




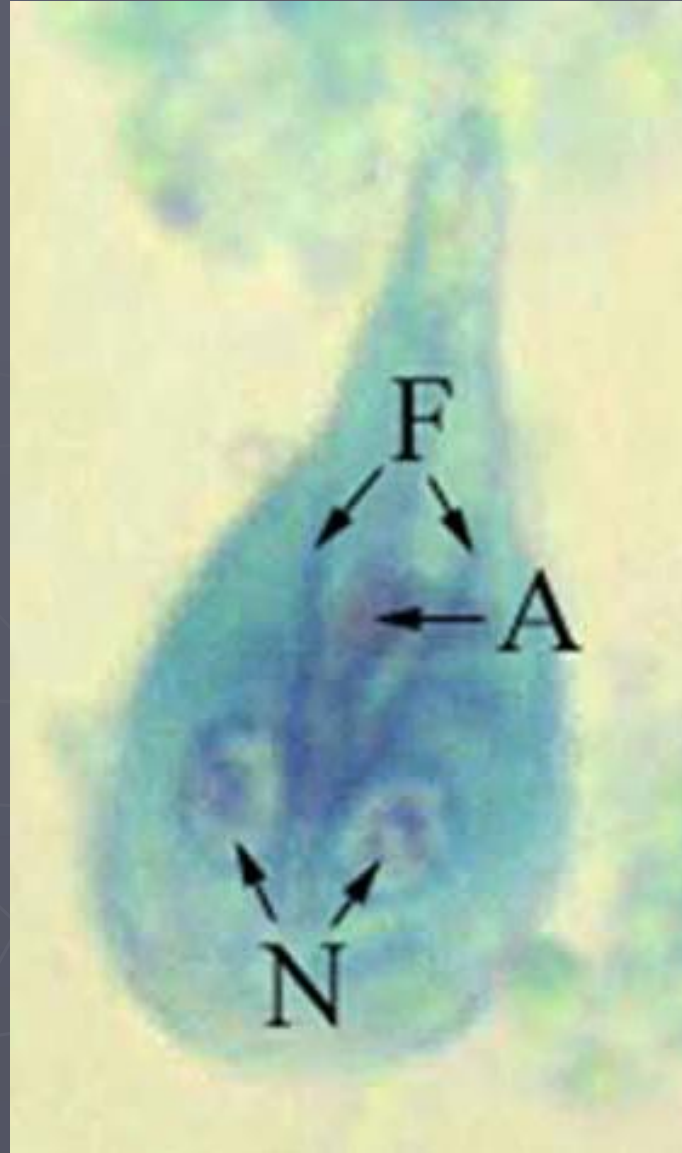
# Giardia lamblia

- ▶ Harboring intestine tract, also called Giardia intestinalis
- ▶ Giardiasis show diarrhea, but lack of blood, mucus and cellular exudate. Differentiate from amebiasis
- ▶ Worldwide, more prevalent in warm climate, and in children.

# Morphology----- Trophozote

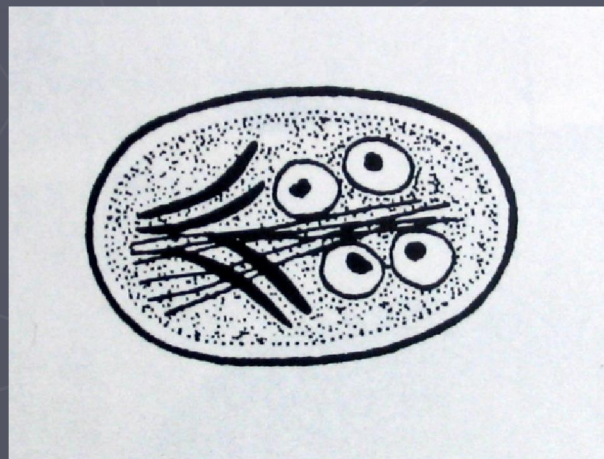
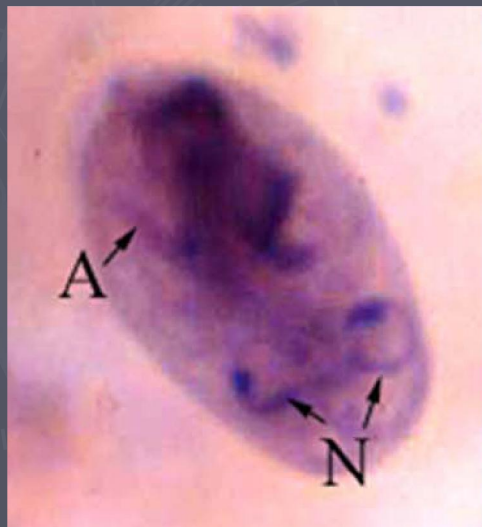


- ▶ Teardrop shaped from the front. It resembles the curved portion of a spoon from the side. 10~20 X 5~15 $\mu$ m in size
- ▶ The dorsal surface is convex; the ventral surface is usually concave and there is a sucking disc with a nucleus in the center of each half
- ▶ Four pairs of flagella, two nuclei, two axonemes (axostyle), and two slightly curved bodies called the median bodies

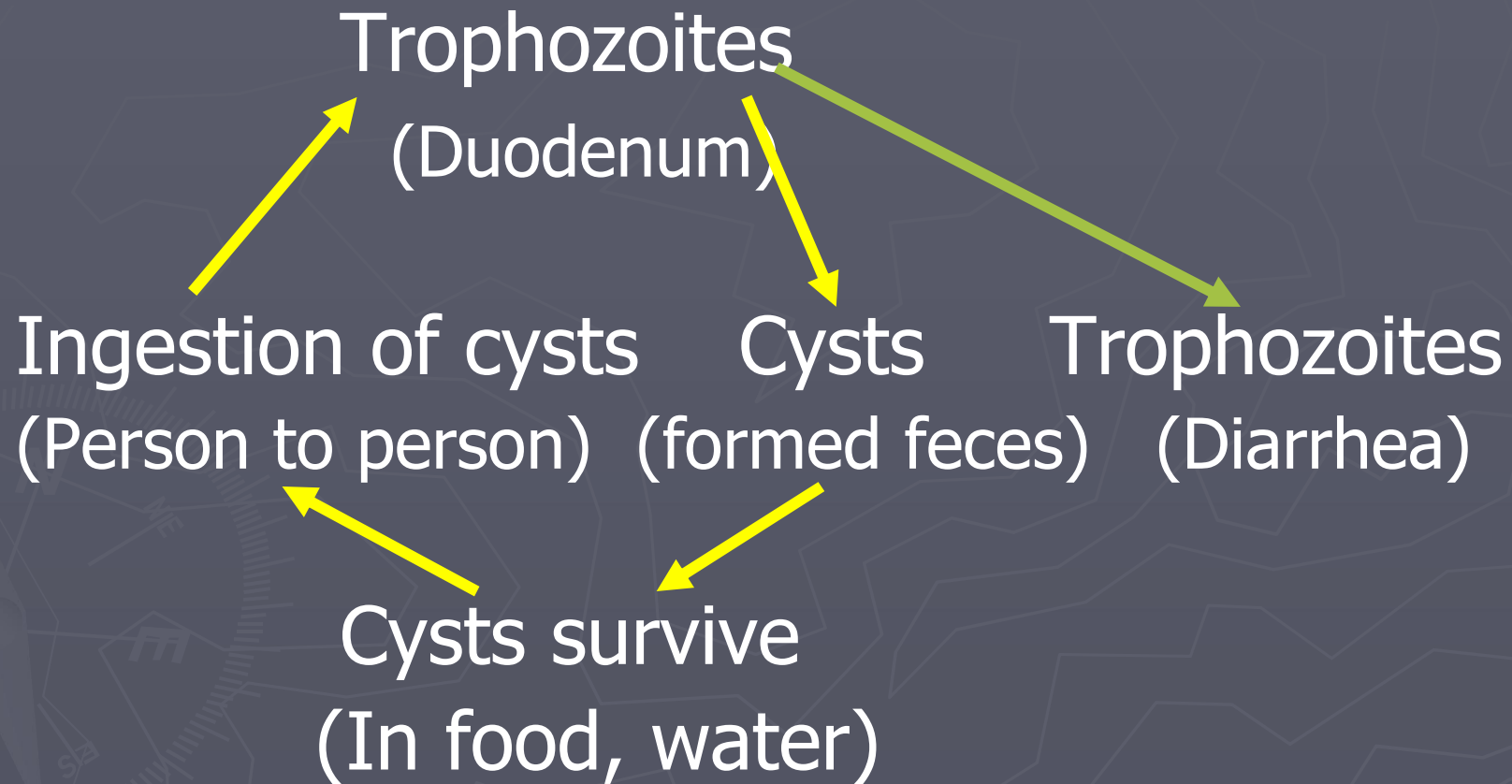


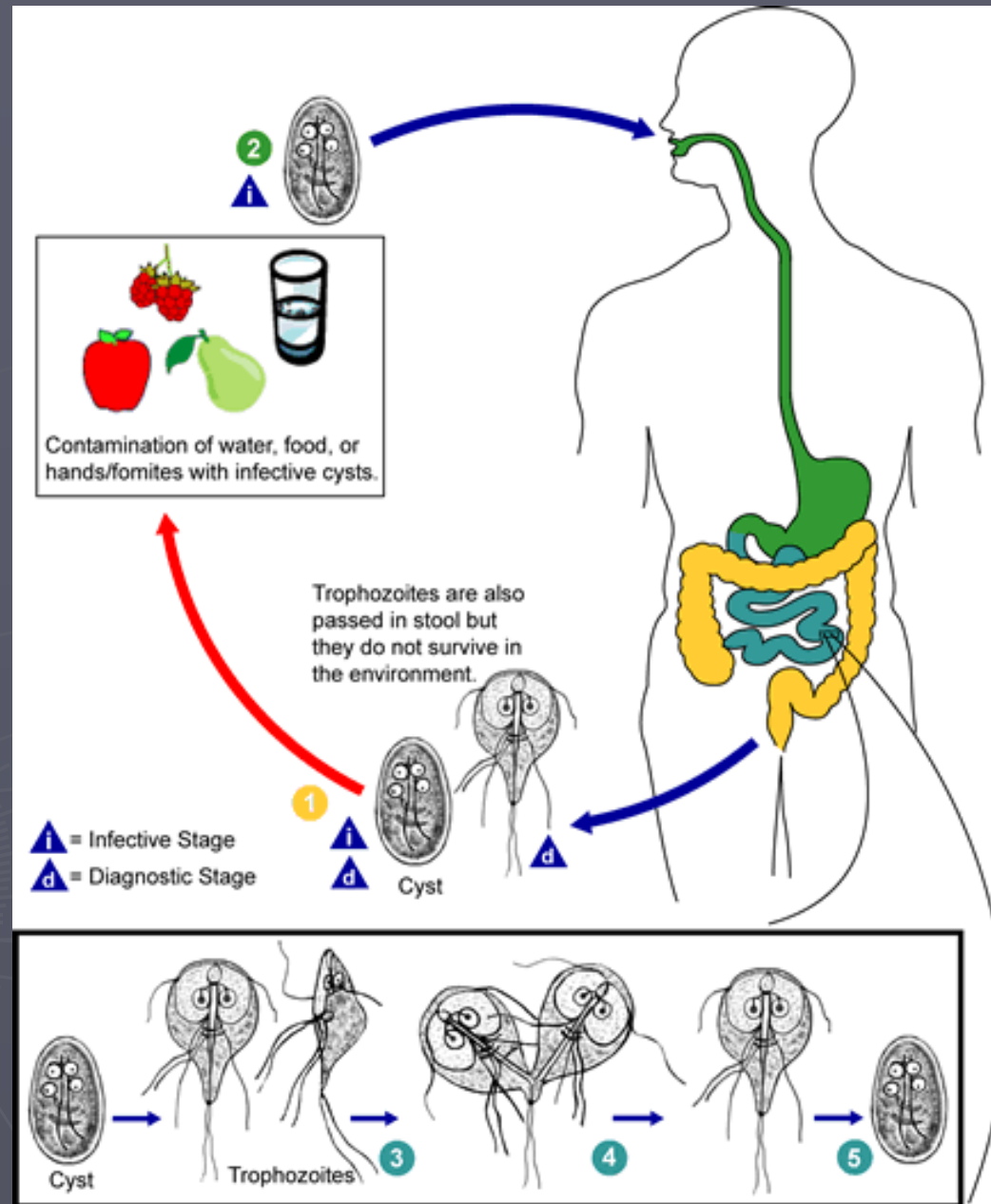
# Morphology -- Cyst

- ▶ Either round or oval
- ▶ Contain 2~4 nuclei (immature or mature cyst), axonemes (axostyle), and median bodies
- ▶ 11~14  $\mu\text{m}$  in length and 7~10  $\mu\text{m}$  in width



# Life cycle





# Characteristic of life cycle

- ▶ The most common location: duodenum
- ▶ Trophozoites attach to the epithelium (villi) of the host by the sucking disc.
- ▶ Encystation occurs as the trophozoites transit toward the colon. The cyst are passed in non-diarrheal (formed) feces
- ▶ Under the lower immune function, they multiple division and attach the villi. Cause diarrhea (Trophozoites, not cyst).



# Giardiasis – Manifestation I

Maybe from asymptomatic carriage to severe diarrhea and malabsorption

- ▶ Acute giardiasis develops often an incubation period of 1~14 days and usually lasts 1~3 weeks
  - Diarrhea (**explosive, watery, foul-smelling diarrhea / diarrhea with increased amounts of fat and mucus in the stool but no blood, called stearrhea**),

# Giardiasis – Manifestation II

----bloating (flatulence / abdominal distension), abdominal pain, nausea and vomiting, weight loss and asthenia.

----jaundice and colic.

▶ Chronic giardiasis often shows malabsorption and debilitation.

----intermittent diarrhea, abdominal distention, weight loss.

----chronic cholecystitis

# Giardiasis -- Pathogenesis

- ▶ Attachment of the trophozoite to the mucosal surface causes inflammation of the crypts and lesions on mucosal cells.
- ▶ The trophozoites coating the mucosal lining may act to prevent fat-soluble substances absorption and reduce secretion of a number of intestinal digestive enzymes (disaccharidase)

# Laboratory diagnosis

- ▶ Fecal examination

- Wet mounts : Trophozoites in diarrhea feces.

- Wet mounts stained with iodine : Cyst in formed feces.

- ▶ Duodenal fluid or duodenal biopsy examination : Trophozoites

# Treatment

- ▶ Metronidazole is the drug of choice.
- ▶ Nitazoxanide has provided some encouraging results in the management of giardiasis.