

# “FACT OR ARTIFACT”

*LEARN THE KEYS TO  
DIFFERENTIATE PARASITES FROM  
ARTIFACTS*

# ACMLT CONFERENCE OCTOBER 1, 2005

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PRESENTED  
BY  
PAULINE TOMLIN  
Public Health Microbiology

# “FACT OR ARTIFACT”

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- Many body sites and specimens can be examined for parasites.
- The most difficult specimen to differentiate parasites from artifacts is fecal material.
- Feces consists of many components, which include:

## Cont'd

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- Undigested food residue
- Digestive by products
- Epithelial cells
- Microorganisms (bacteria & yeasts)
- Secretions from the digestive tract

## Cont'd

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- Due to the ratio between fecal debris and parasites, many artifacts have been incorrectly identified as:
  - Protozoan trophozoites & cysts
  - Helminth eggs & larvae

# Minimizing the Errors

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- Appropriate training (maintenance of competency)
- Adherence to protocols
- Use of quality control measures
- Availability of reference materials
- Availability of consultants (ProvLab)
- Involvement in Proficiency program

# Fact or Artifact?

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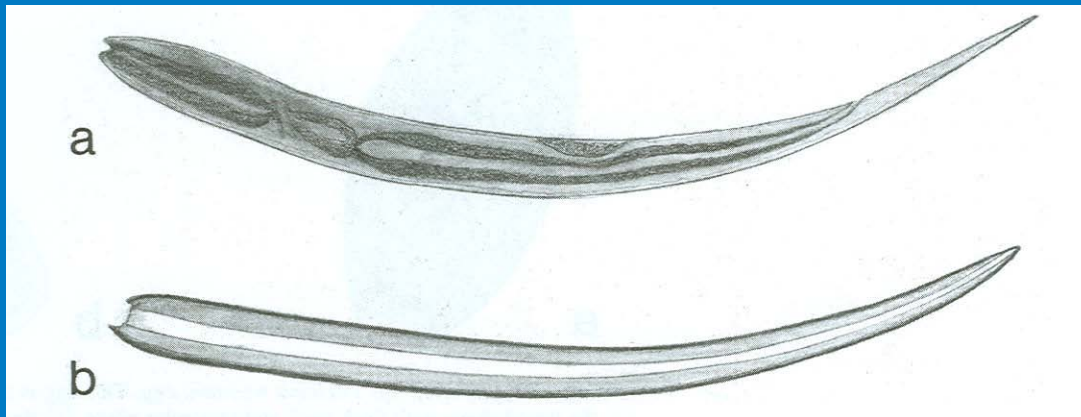
# Fact or Artifact?

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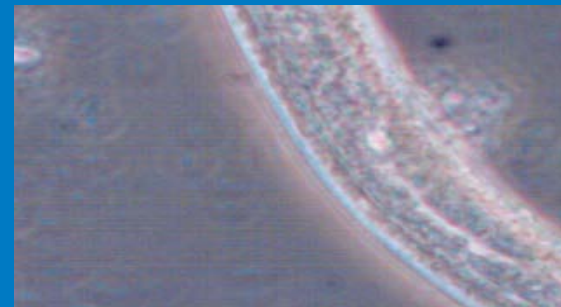
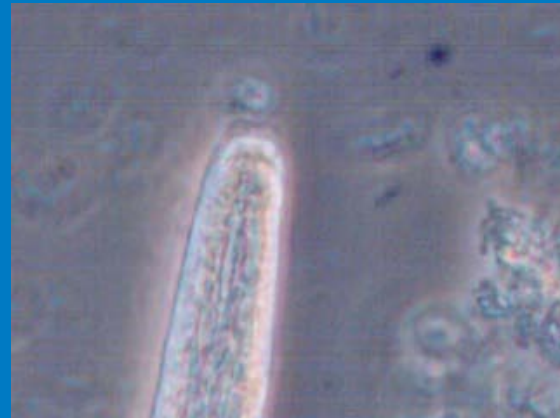


# Pencil Sketch

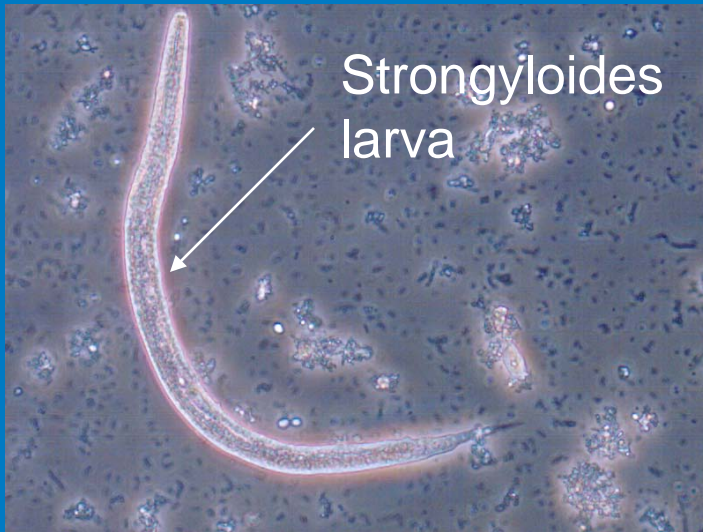


## Close-up View

- Note the short buccal cavity & the prominent genital primordium that distinguishes it from hookworm.
- In hookworm the (bc) is long & the (gp) is inconspicuous



# Side by Side



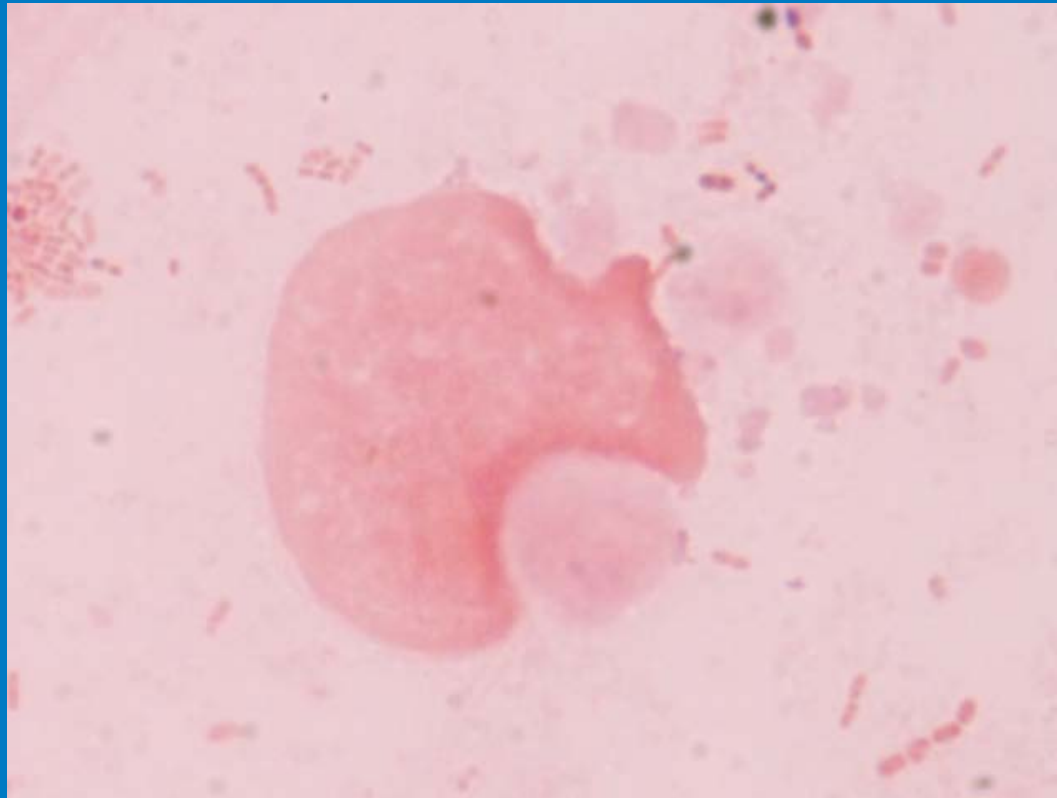
# Consequences of Error

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- Strongyloidiasis
- Larvae normally very scant in feces, many infections go undiagnosed
- Infections are frequently latent
- Hyperinfection due to “autoinfection” (could be fatal)
- Patients from endemic areas selected for immunosuppressive therapy should be screened for this infection.

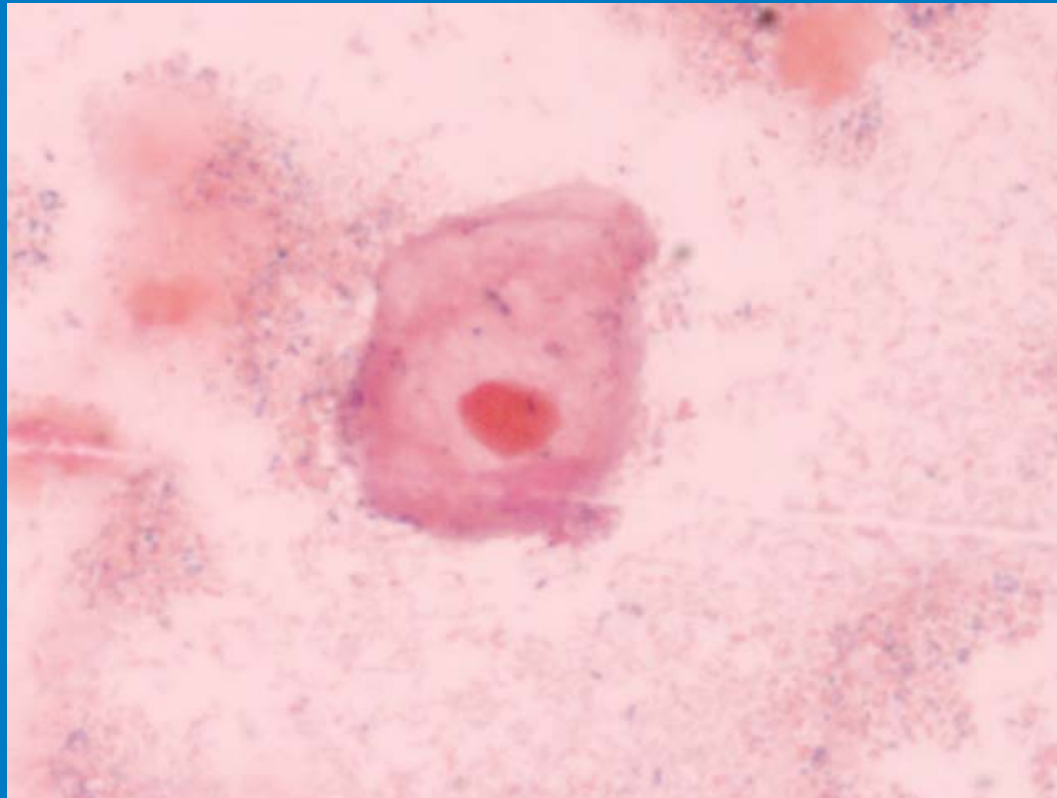
# Fact or Artifact?

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# Fact or Artifact?

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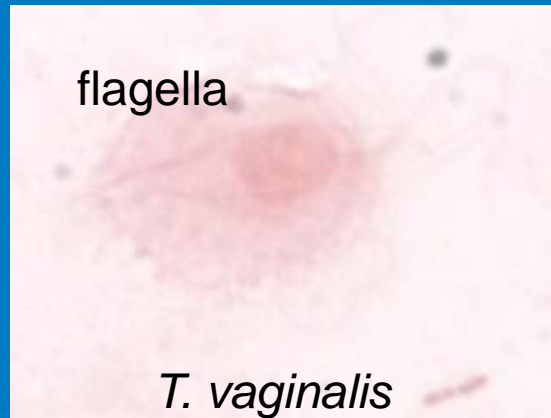
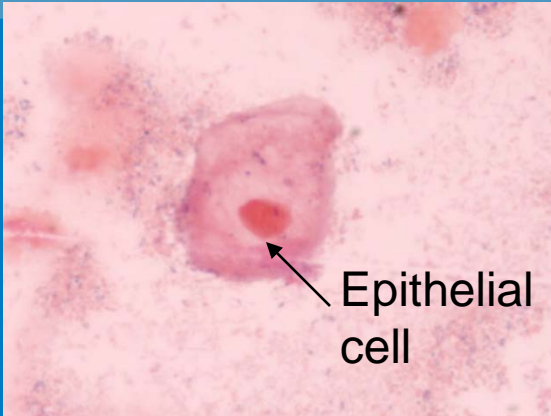


# Pathogenic or not?



- *T. hominis* is pyriform has both an axostyle & undulating membrane. The membrane extends to the entire length of the body, in contrast to that seen in *T. vaginalis*.
- Note the large anterior nucleus and the four anterior flagella of *T. vaginalis*.

# Compare!!





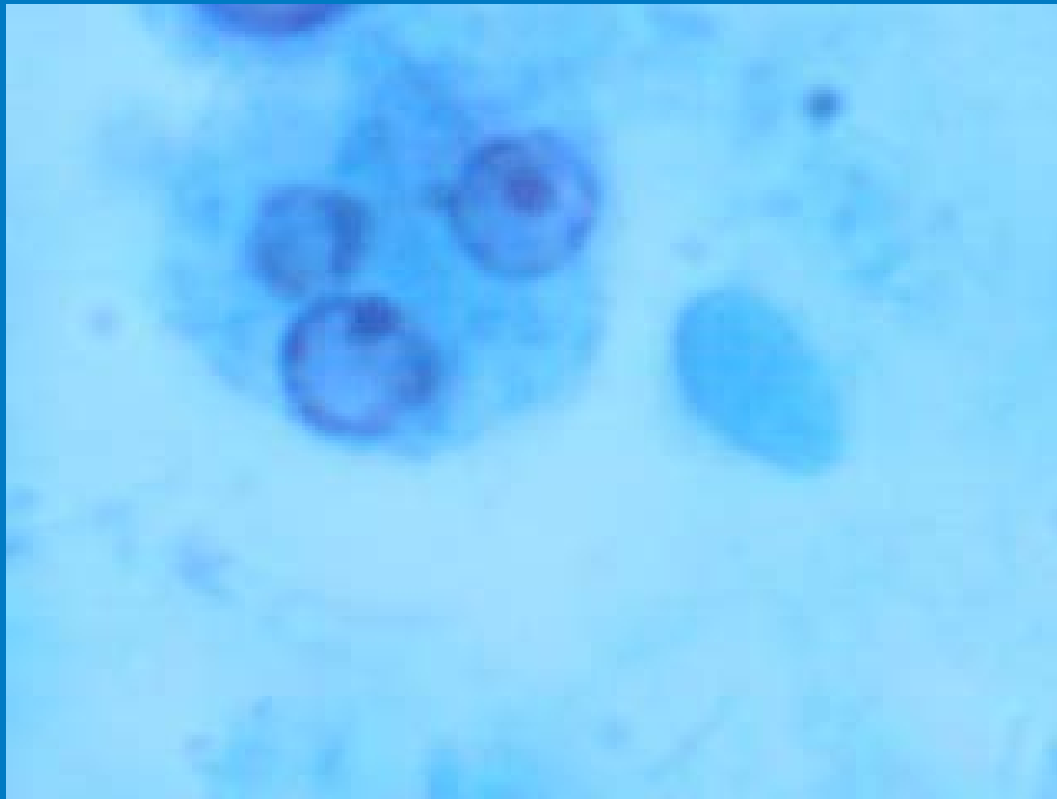
# Consequences of Trichomoniasis

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- Vaginal infections in female
- Infections of the prostate and the epididymis in males
- *T. vaginalis* infection is an important STD disease throughout the world.
- *T. hominis* is non-pathogenic

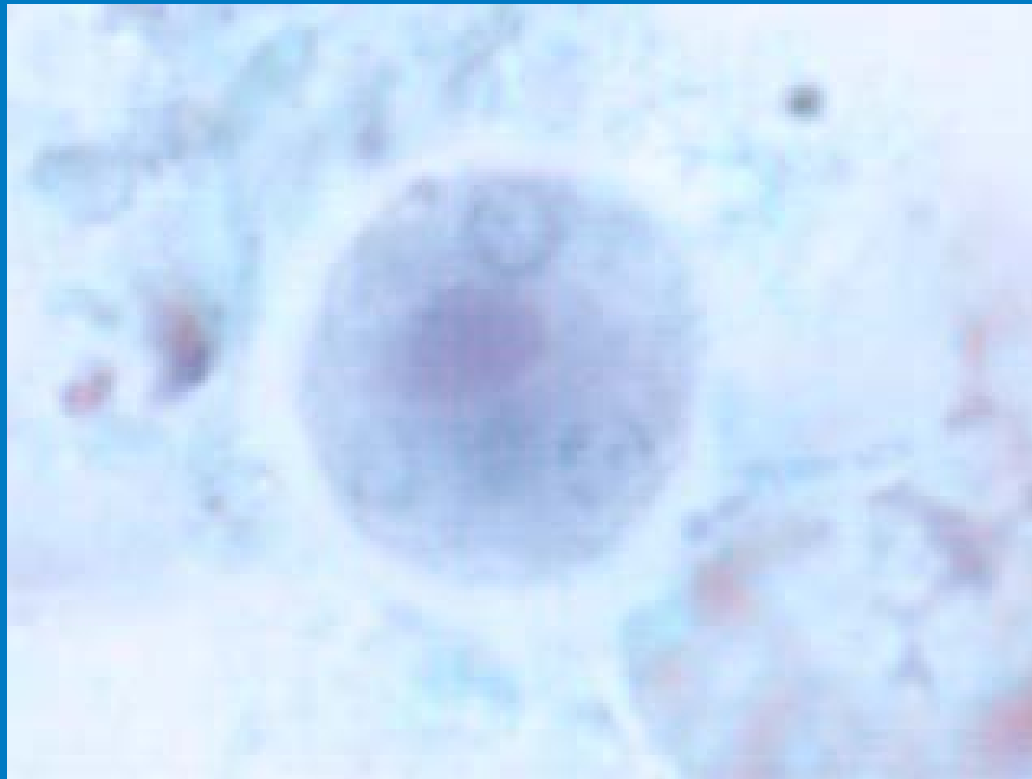
# Fact or Artifact?

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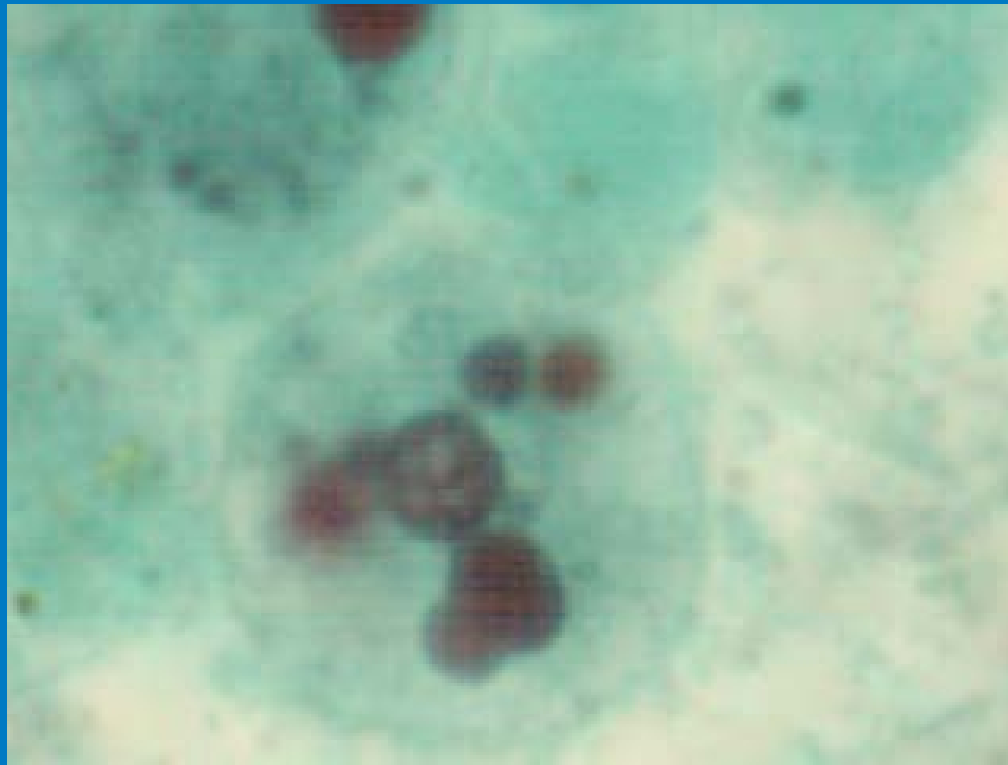
# Fact or Artifact?

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# Fact or Artifact?

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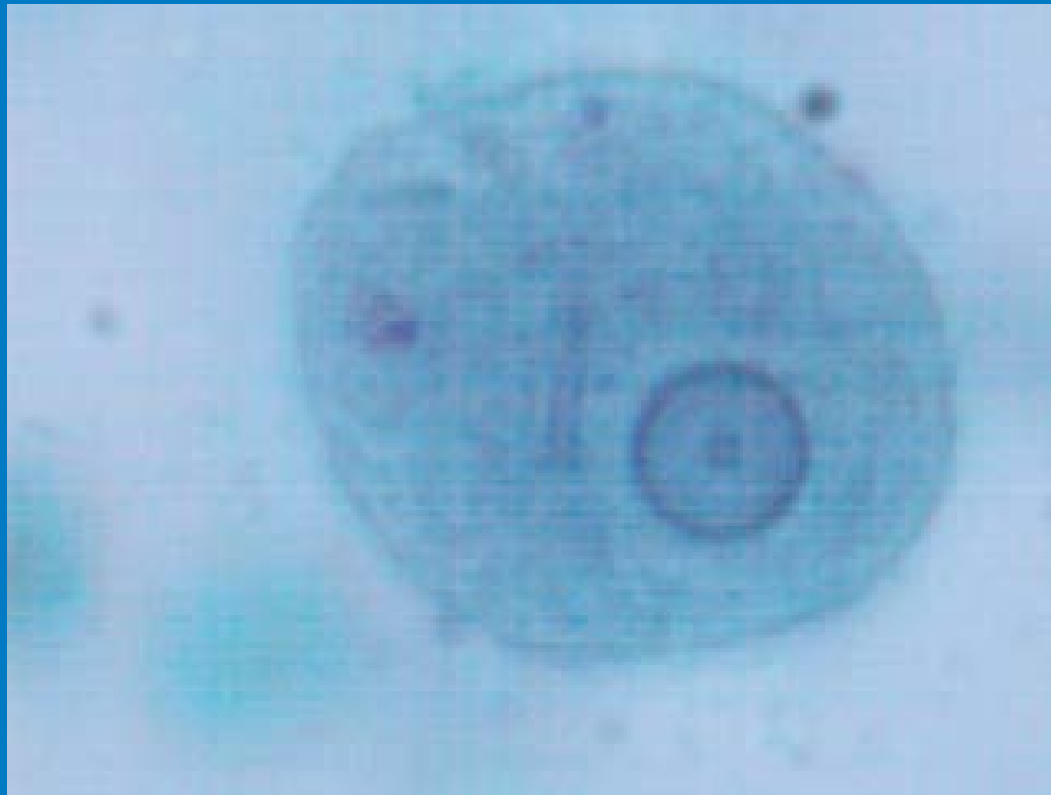
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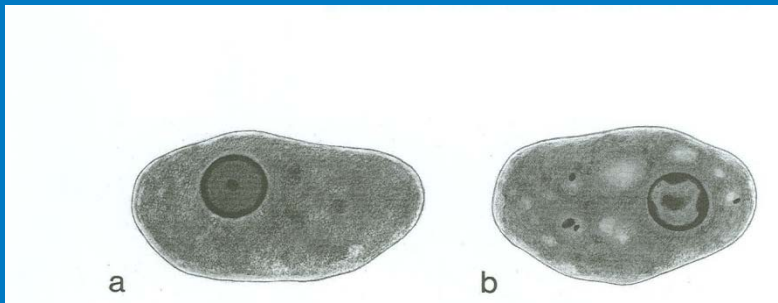


# Fact or Artifact?

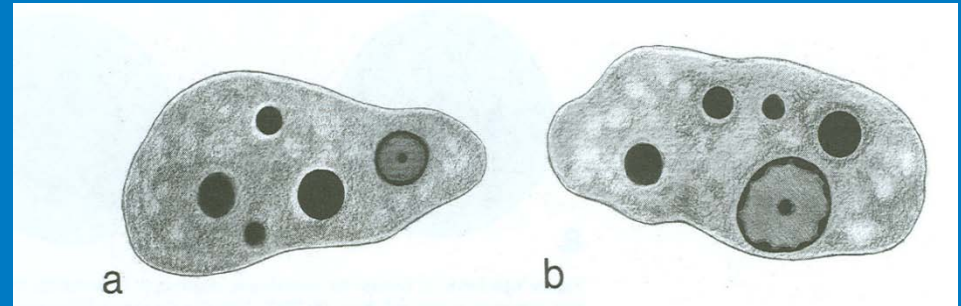
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# E. histolytica/dispar & Artifacts

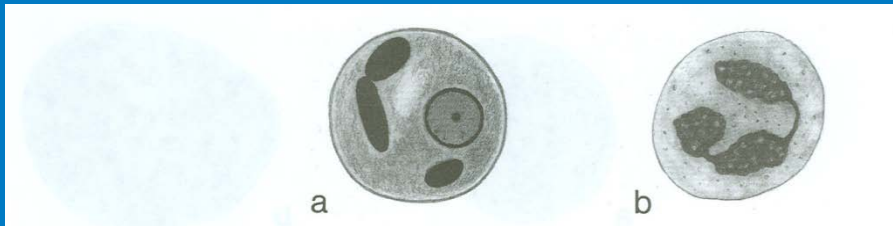


*E.coli*

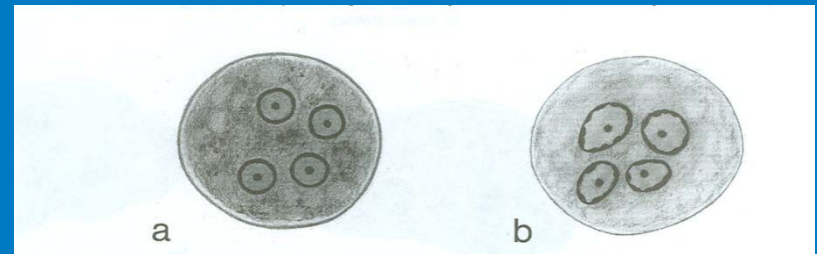


macrophage

PMN's

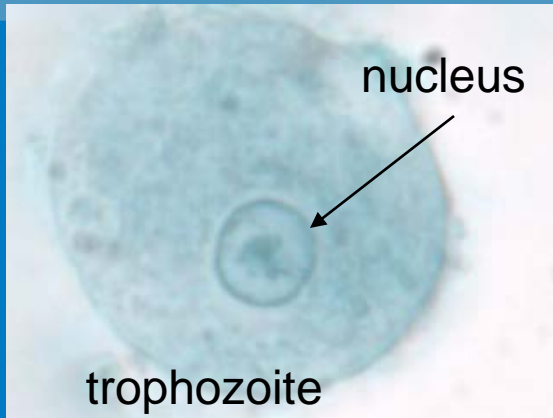


PMN's



Pencil Sketches

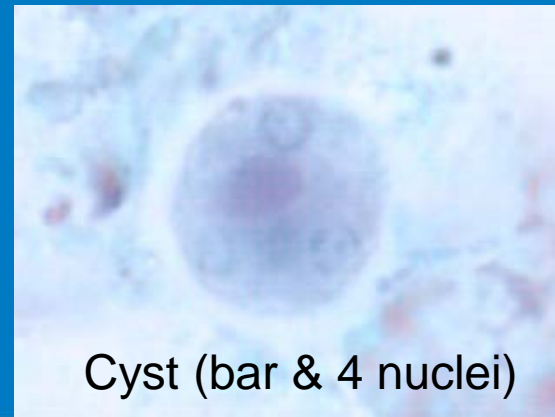
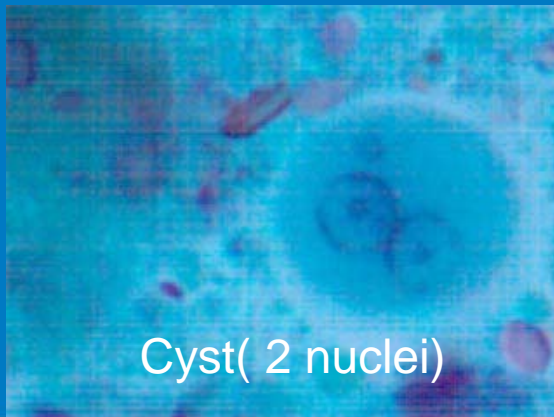
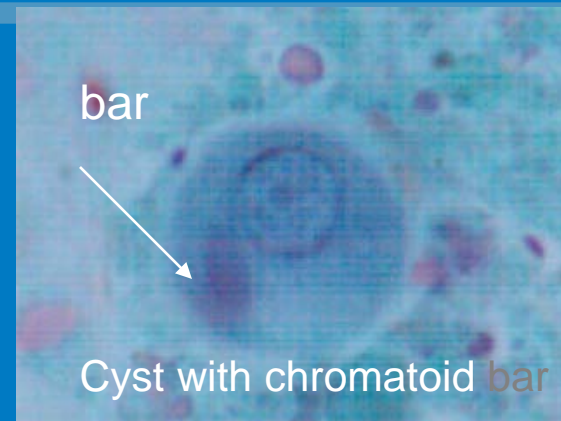
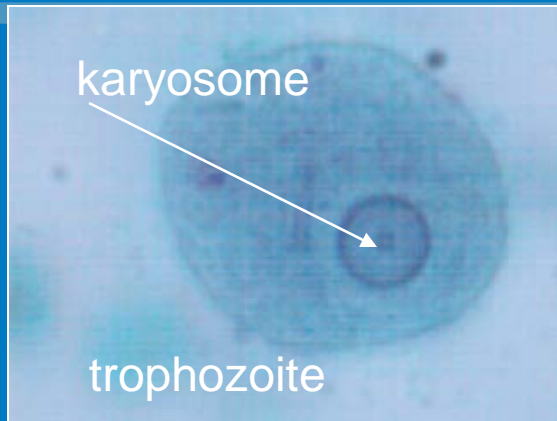
## Both Stages of E. coli



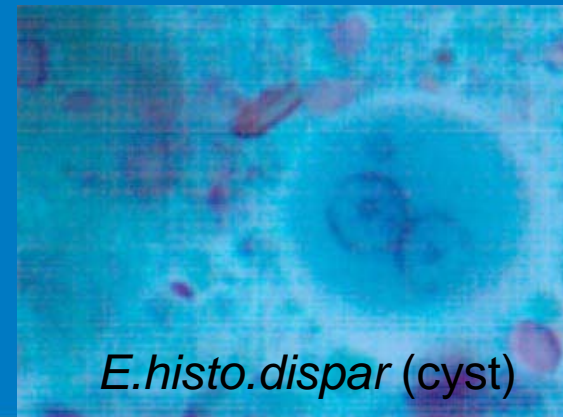
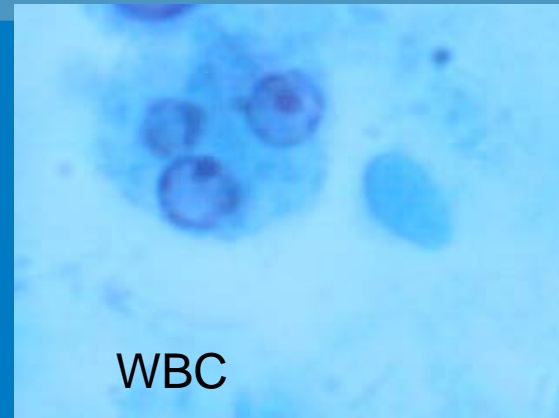
- Note the large diffuse eccentric karyosome
- Peripheral chromatin is block-like
- Cytoplasm is vacuolated
- Note the cyst with seven of its eight nuclei.
- A chromatoidal body(cb) is also present



# Phases of *E. histolytica*/dispar



# Fact & Artifact!!



# Consequences of *E.histolytica*

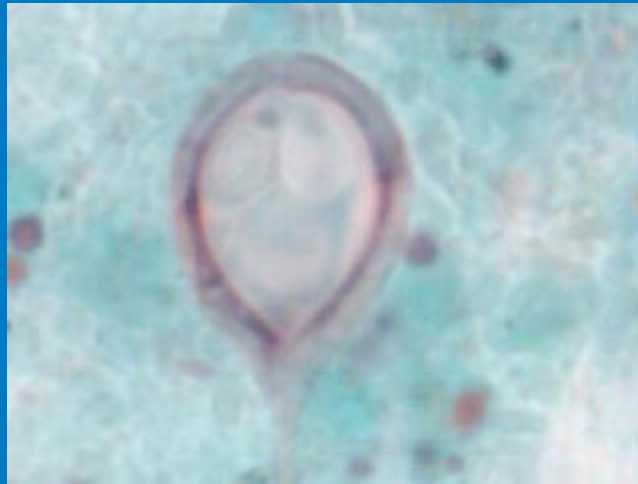


Amebiasis (amebic dysentery)  
Ulcers in the lumen of colon and cecum

Tissue invasion may involve colon & extraintestinal locations (liver, lung, brain, skin & other tissues).

# Fact or Artifact?

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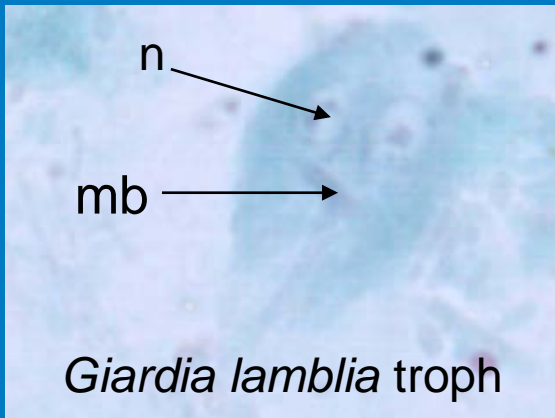


# Fact or Artifact?

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# Compare



The Giardia troph exhibit the pyriform shape & two anteriorly placed nuclei, located on either side of the axonemes.



The dark stained median bodies are also visible below the nuclei. Because they stain poorly, flagella are rarely seen

# Fact and Artifact!



# Consequences of Giardiasis

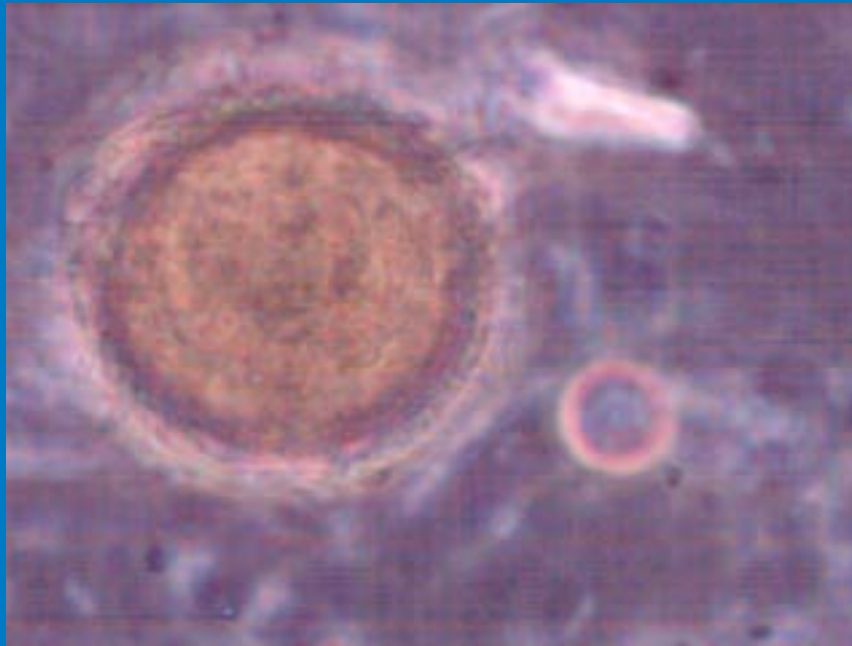
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- Trophozoites colonize the upper intestine & penetrate the mucosa and attach to the underlying epithelial cells
- Infection range from asymptomatic ----severe diarrhea
- Host factors play a role in the pathogenesis of the organism
- Usual symptoms are cramps & diarrhea, prolonged infections may result in malabsorption



# Fact or Artifact?

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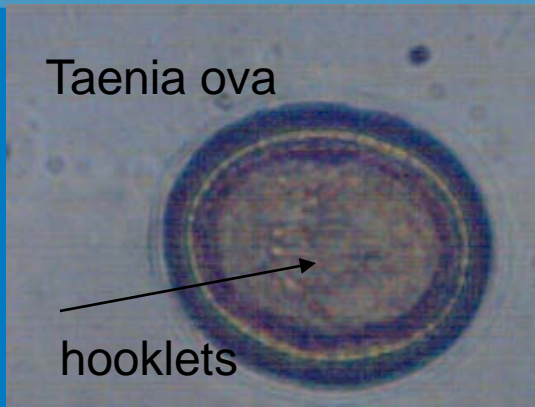


# Fact or Artifact?

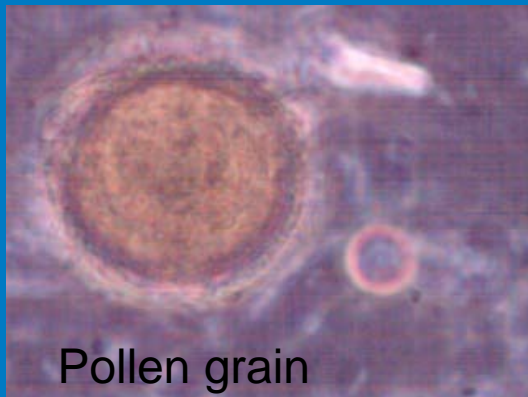
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# Description

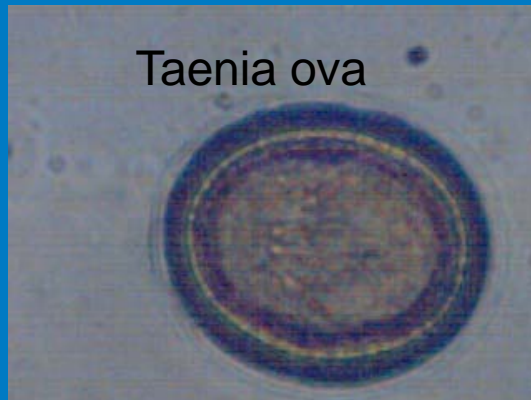
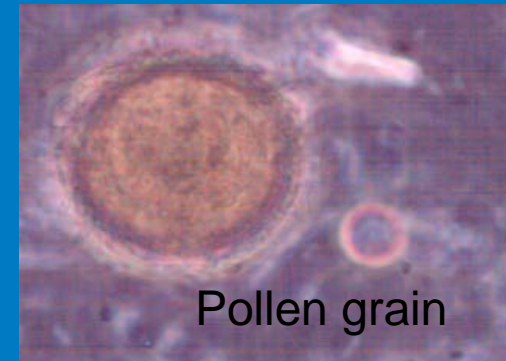
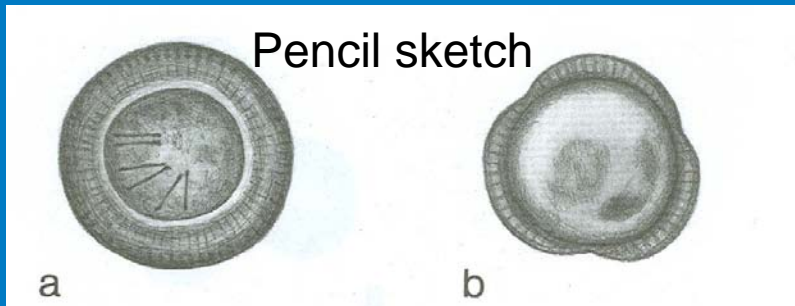


Note the thick radially striated shell, containing a six hooked embryo (oncosphere).

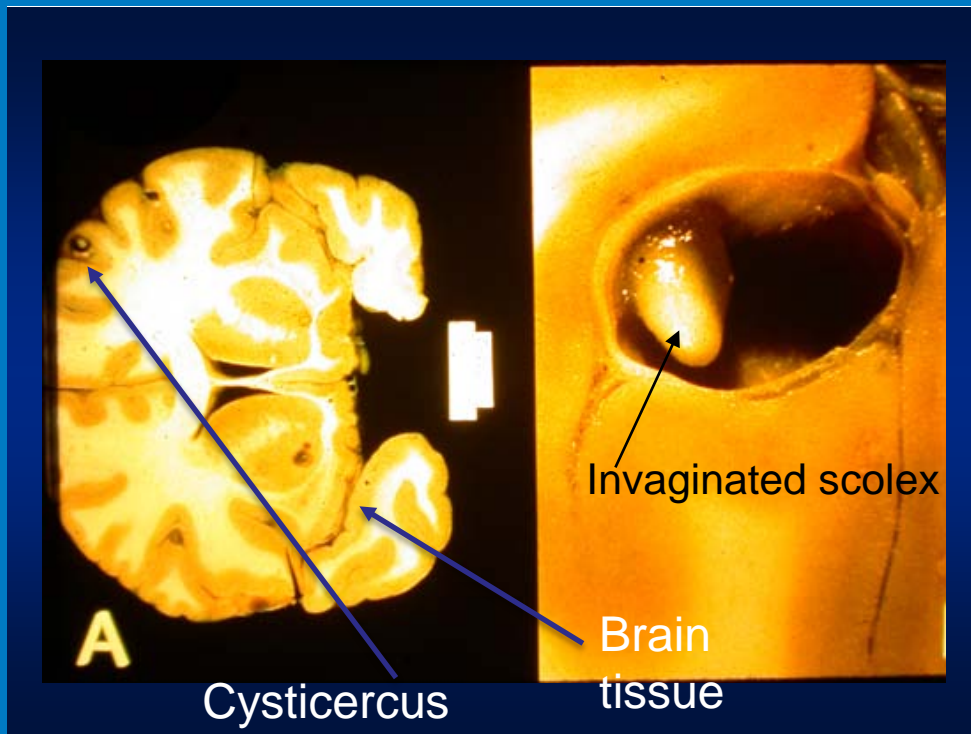


This pollen grain has a similar type of shell and could resemble a *Taenia* sp.

# Fact or Artifact

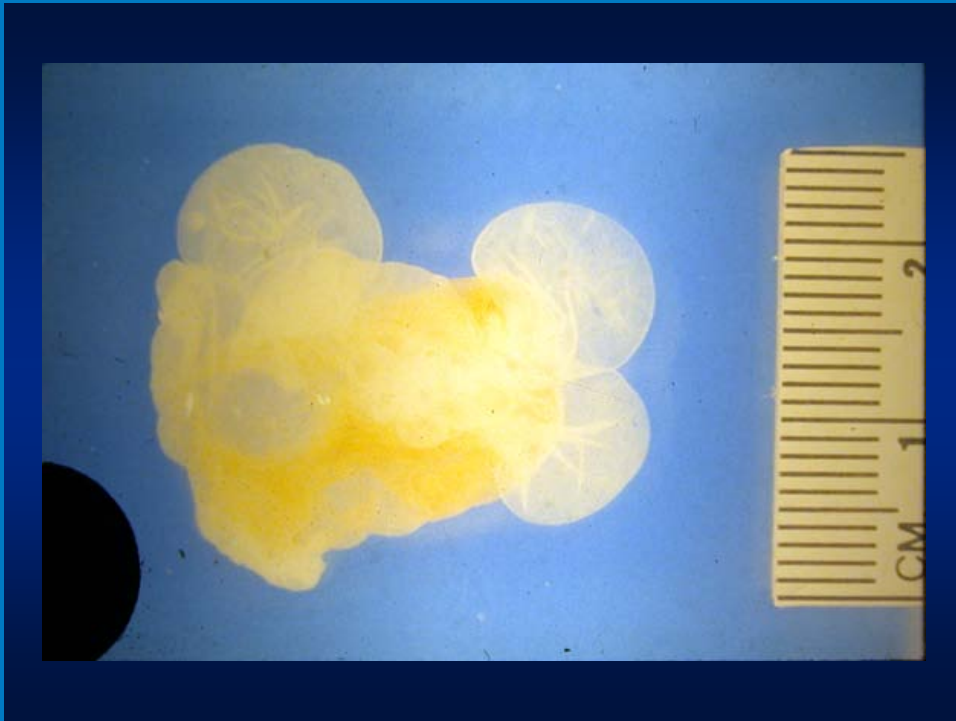


# Consequences



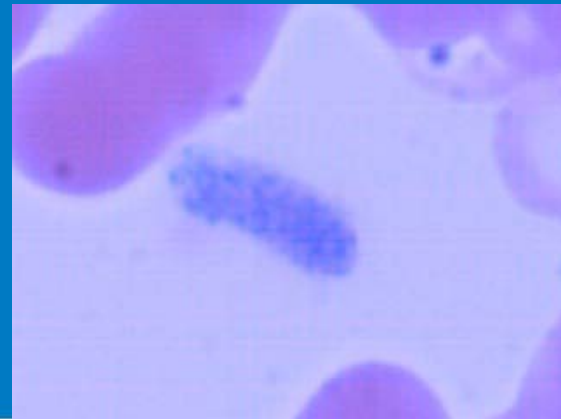
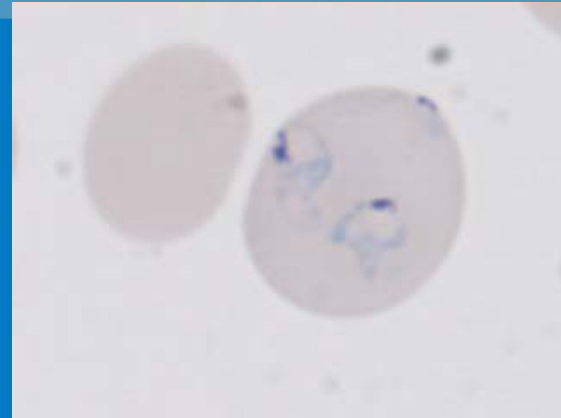
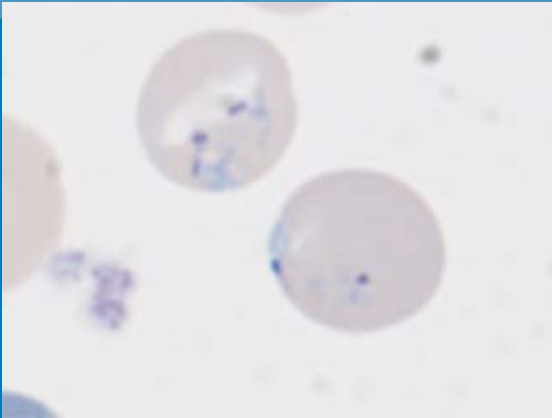
- Taeniasis or beef tapeworm (*T.saginata*)
- Taeniasis or pork tapeworm (*T. solium*)
- The eggs are identical for both species.
- (A)-The eggs of *T.solium* are infective to humans, and may cause human cysticercosis if ingested.

# Consequences

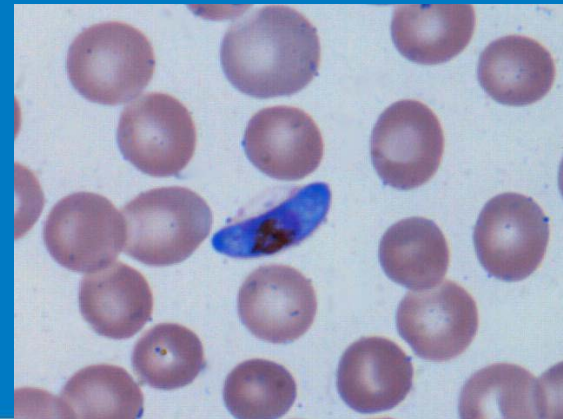
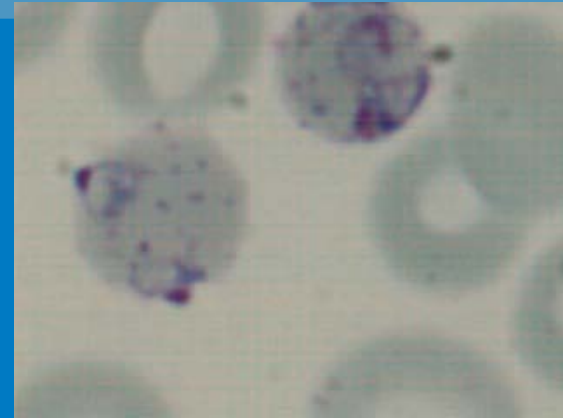


- Close up view of a Cysticerci caused by *T. solium*.
- It can measure up to 1 cm in diameter
- Any body tissue can harbour the cysticerci (cerebral is the most common site).

# Fact?

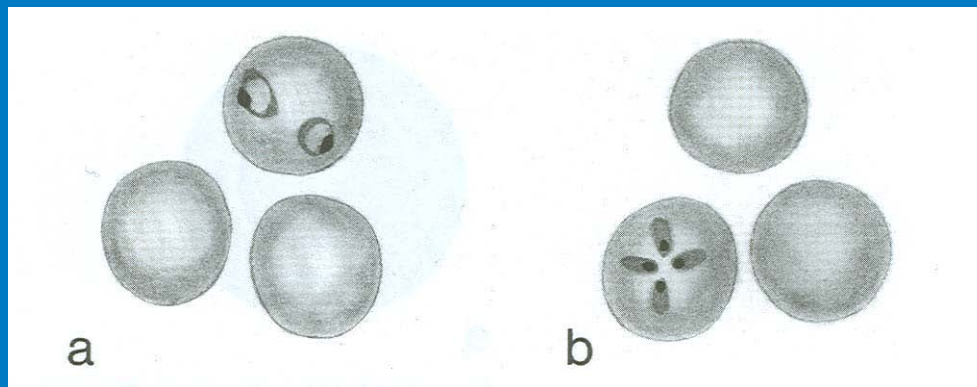


# Fact?



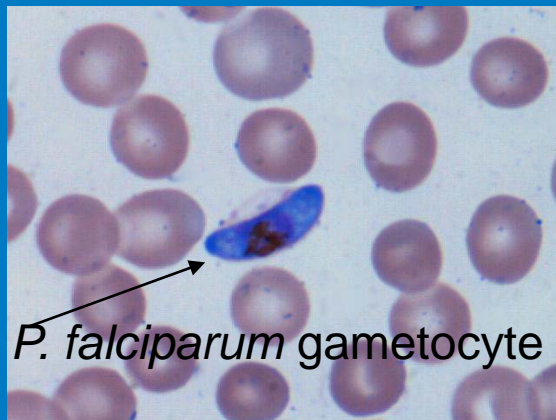
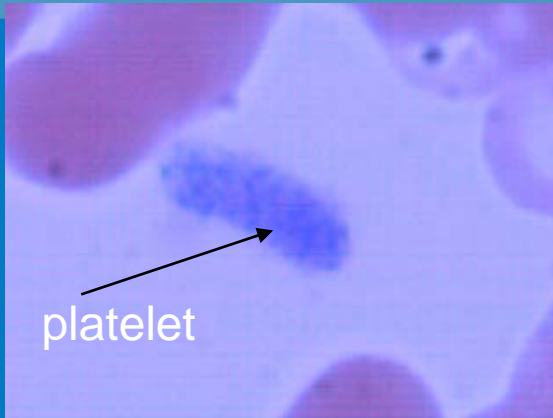


# Pencil Sketch



- A. *Plasmodium falciparum* rings: multiple rings per cell are typical of *P. falciparum* than the other species of malaria
- B. Babesia rings: “Maltese cross” arrangement when present is diagnostic for *Babesia sp.*

# Fact or Artifact?



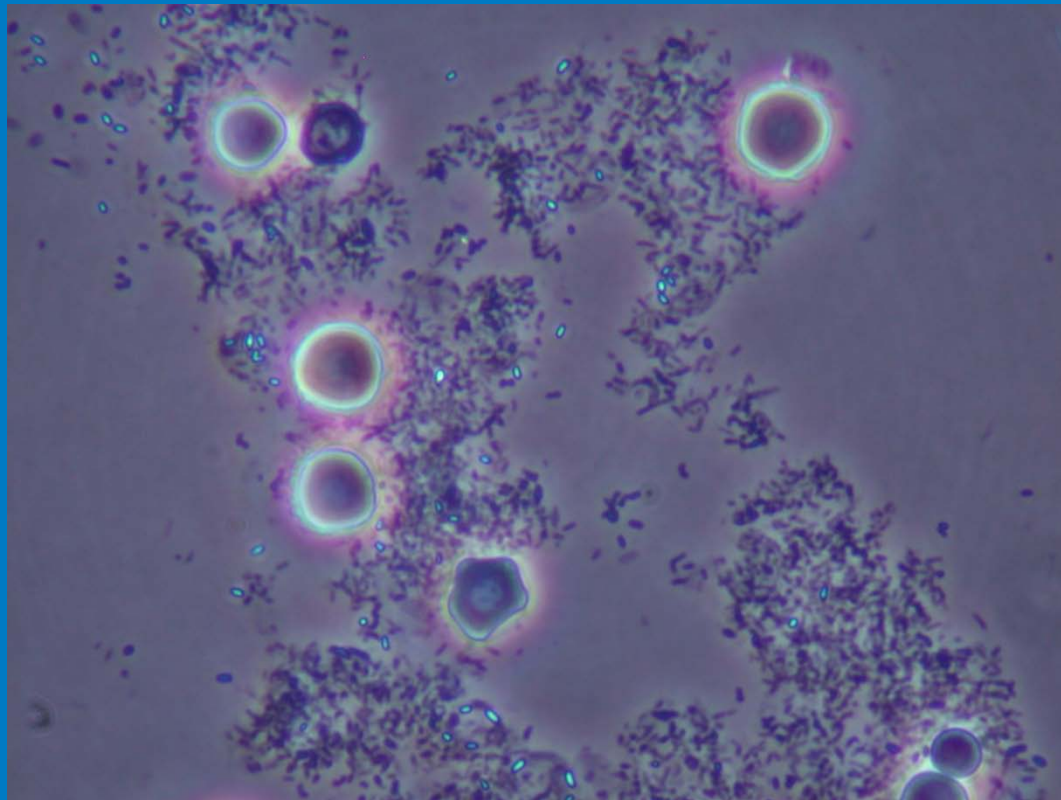
# Consequences of Malaria

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- Malaria caused by *Plasmodium falciparum* can be a life threatening disease.
- It is considered a medical emergency, and it is necessary to facilitate rapid and proper laboratory diagnosis.
- The potential fatal outcome is related to cerebral malaria and multiorgan failure.
- It is essential to distinguish between *P.falciparum* and the non-falciparum species due to specific therapeutic needs.
- Especially the wide spread drug resistance among *P.falciparum* strains.

# Fact or Artifact?

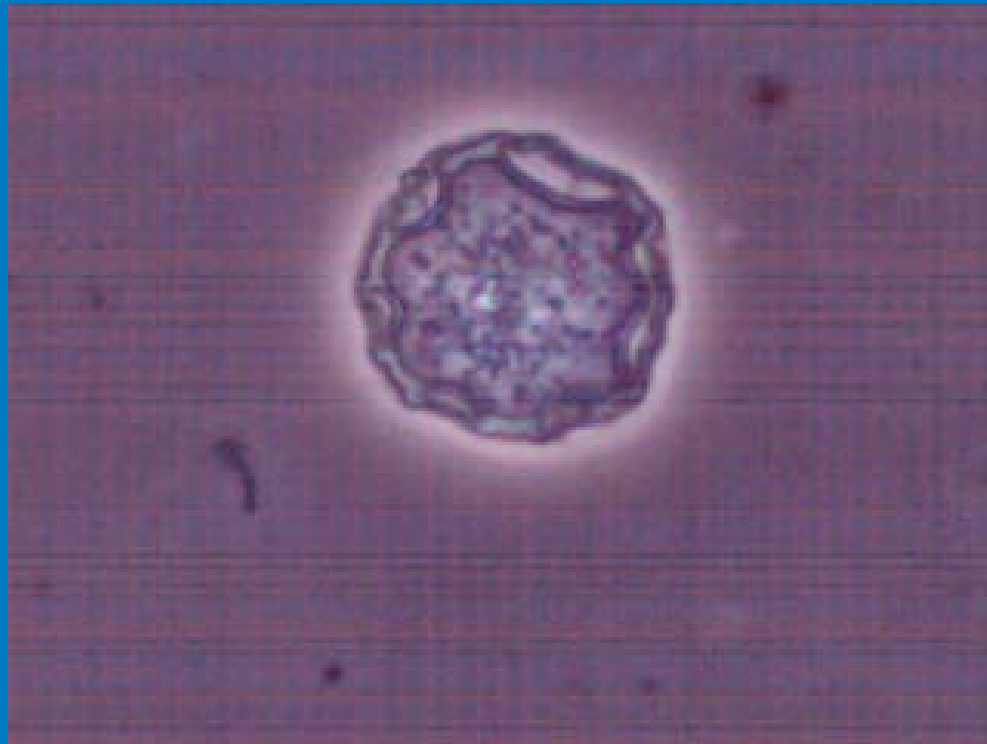
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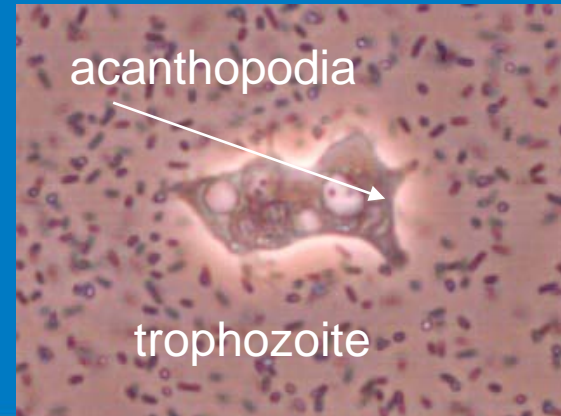
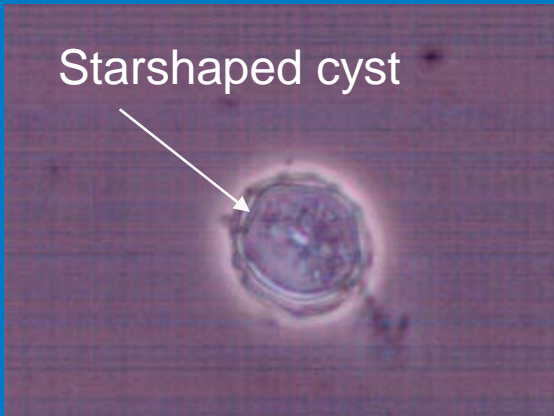
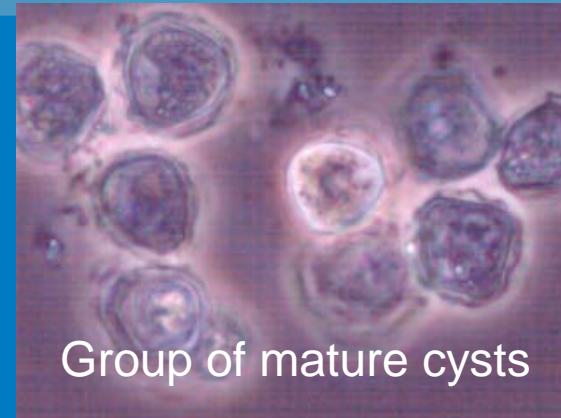
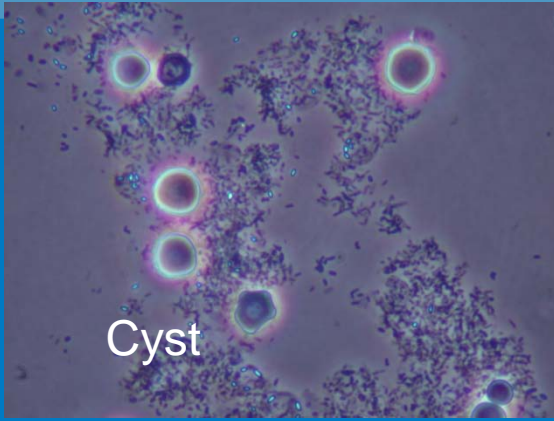
# Fact?

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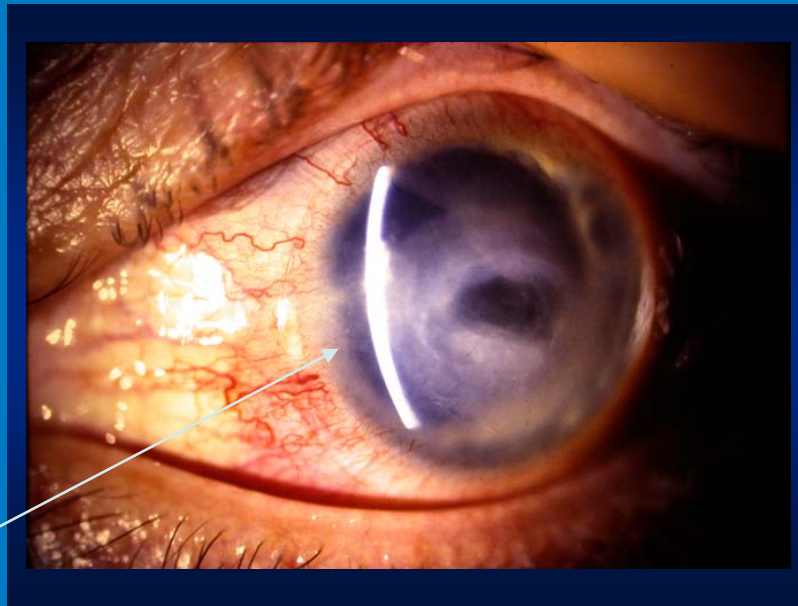


# All Fact!



# Consequences of Acanthamoeba Infection

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Contact lens wearer showing early stage of infection

# Consequences of Acanthamoeba Infection

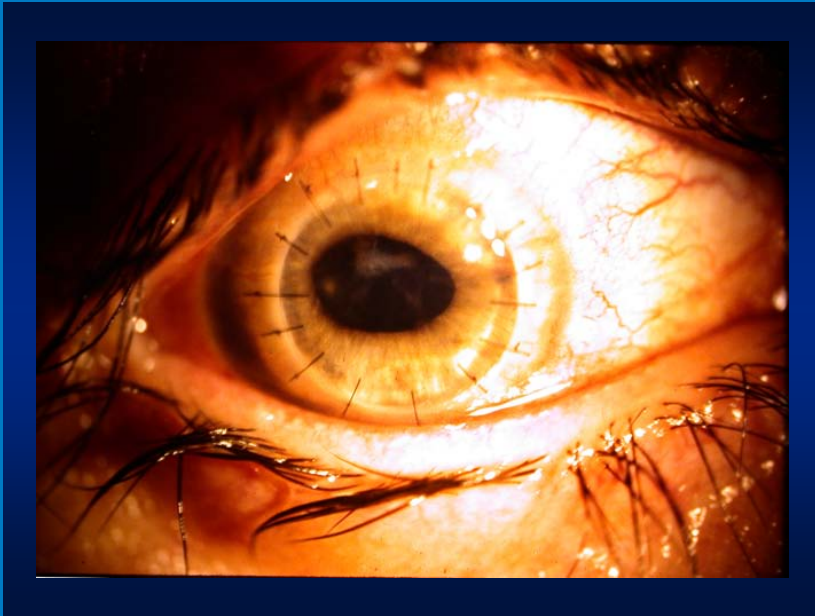


Final outcome can be loss of sight



## Consequences of Acanthamoeba Infection

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Acanthamoeba isolates vary in sensitivity to antimicrobial agents

Sight can be lost in spite of combination drug therapy  
A corneal transplant in this eye is the final attempt to restore sight.

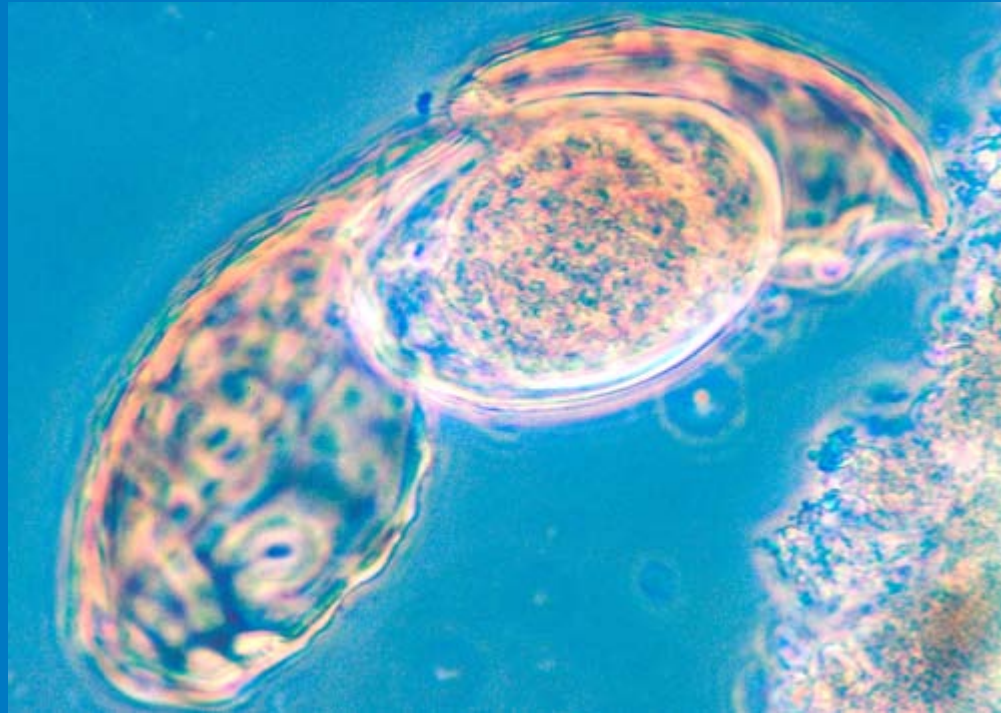
# Acknowledgments

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- Clinical pictures are from the archives of :  
The University of Alberta &  
The University of Alberta Hospital  
ASCP
- Pencil Sketches are from the ASM Manual
- Thanks to Dr's Kinga Kowalewska-Grochowska & Aaron Lee for their assistance.

# Fact or Artifact – can you identify this?

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# Answer: Fact!

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Broken *Ascaris lumbricoides* ova

