

# Giardiasis & Trichomoniasis

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# Objectives

## Giardiasis & trichomoniasis

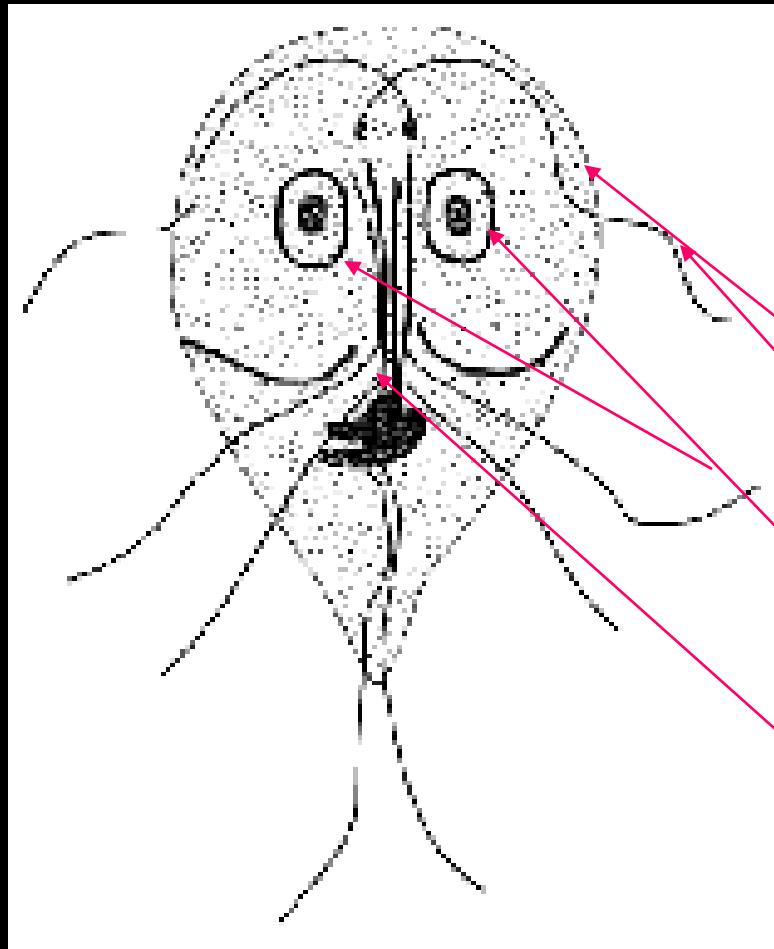
- Scientific names of the causative organism
- Morphology, lifecycle & modes of transmission
- Clinical features & pathogenesis
- Diagnosis
- Treatment
- Epidemiology (globally & Sri Lanka)
- Prevention & control

# Giardiasis

- Causative organism
- *Giardia lamblia* (*G.intestinalis*, *G. duodenalis*)
- flagellate
- Inhabits the upper small intestines of man
- 2 morphological forms
  - trophozoite
  - cyst

# Morphology

- Trophozoite



- Habitat: Attached to the mucosa of upper small intestines
- Size: 10-12 $\mu\text{m}$
- Shape: = Pear/ leaf laterally = spoon (dorsally convex & ventrally concave-sucking disc)
- 4 pairs of flagellae
- 2 nuclei with large karyosomes
- Central axostyle

# Morphology

- **Giardia Cyst**

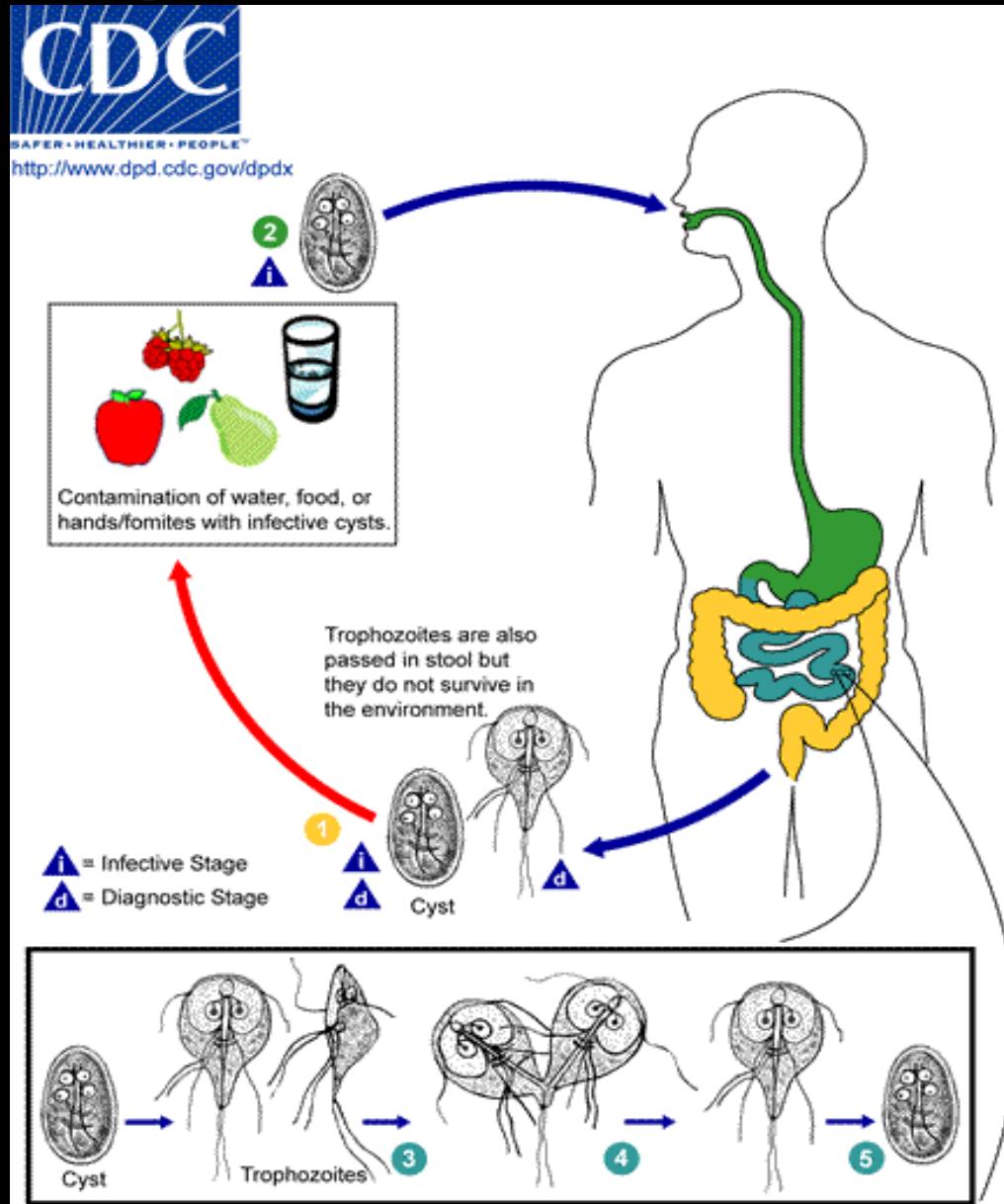


Giardia lamblia

Oregon State Public Health Laboratories

- Shape: oval
- Size: 9-12 $\mu\text{m}$
- Nuclei: 2-4
- Smooth cyst wall
- Resistance: very high
- Infectivity: Very high  
Infective dose = 10 cysts

# Life cycle of *G. lamblia*



# Transmission

- Stage: cysts
- Modes of transmission = similar to *E. histolytica*
- Indirect faeco- oral (common) Contaminated water & food
- Direct faeco- oral (seen among children)
- Water borne outbreaks very common as cysts withstand chlorination
- Asymptomatic cyst passers important in transmission

# Epidemiology

- Most commonly reported pathogenic protozoan throughout the world
- Frequently seen among children (<3y)
- Associated with poor hygienic cond. & consumption of unpurified water (developing countries)
- Prevalence rates in Sri Lanka vary from 1-17% among pre-schoolers

# Cyst resistance

- Survive > 2 wks in cool moist habitats
- Survive normal chlorination
- ✓ Killed by heat  $> 50\text{C}^\circ$  & prolonged freezing
- ✓ Sand filtration recommended for large scale water purification

Animal reservoir of infection (beavers)

# Clinical features

- Asymptomatic carriage very common
- 20% symptomatic
- ICP 1-2 wks
- Chronic diarrhoea with malabsorption (4-6wks)
- Steatorrhoea-stools **pale, bulky, frothy, foul smelling & floats** in the lavatory pan
- Abdominal cramps, bloating
- Nausea, anorexia & wt loss
- Children-failure to thrive

# Pathogenesis

- **Mucosal factors**
- Distortion of the normal villous architecture of small intestines



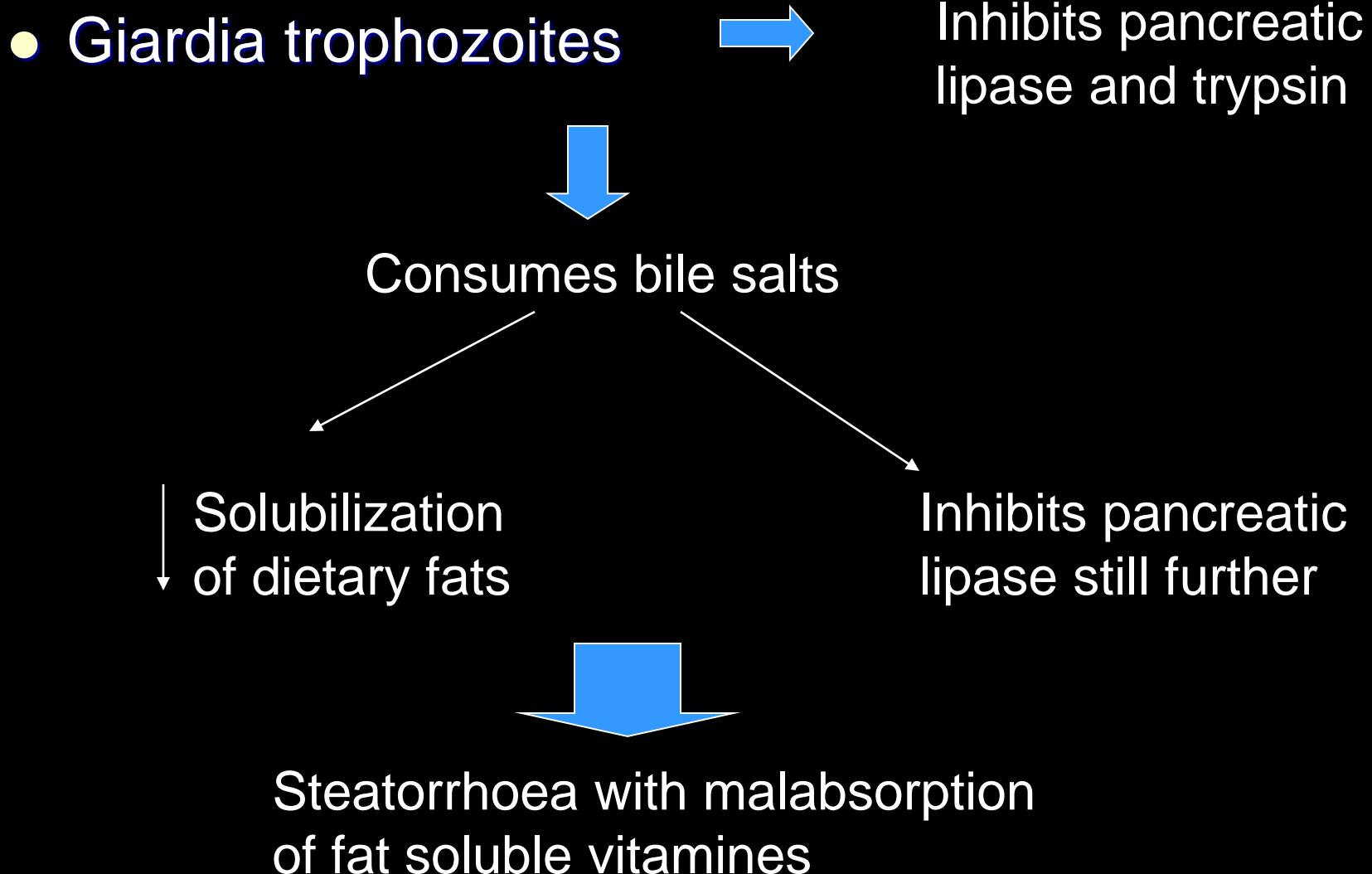
- Mechanical damage by attached trophozoites
- Secreted cytopathic subs.
- Mucosal T cell activation

↓ Brush border enzymes  
(disaccharidases & lipase)



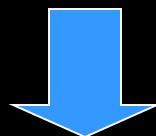
Carbohydrate & lipid digestion impaired

# Pathogenesis ..

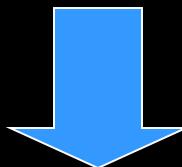


# Pathogenesis

- Luminal factors
- Associated bacterial over growth



Deconjugation of bile salts



Further mucosal damage

# Immunology

- Humoral immune response impt. for elimination of infection

**secretary IgA**

Pts with hypogammaglobulinaemia at an increased risk of severe giardiasis

Not a problem in AIDS

# Diagnosis

- History + macroscopic appearance of stool
- Parasitological Dx-
- microscopic examination of stool for cysts & trophozoites (direct stool smears)
- Saline (trophozoites) & iodine (cysts) smears
- Concentration techniques improve sensitivity (ZnSO<sub>4</sub> flotation & formol ether sedimentation)
- To exclude infection examine 2-3 stool specimens (cyst excretion is irregular)

# Diagnosis cont...

- Examination of duodenal aspirate for trophozoites
- Entero test (string test) –trophozoite

## Immunological

- Examine stool for giardia Ag ELISA / kit (not available in SL)
- Serology not useful for individual pt Dx

# Treatment

- ✓ Nitroimidazole derivatives important
  - Metronidazole (x 5 days) DOC in SL
  - Tinidazole ( single dose)
- ✓ Furozolidone
- ✓ Asymptomatics treated to prevent transmission to others

# Prevention & control

- Same as for *E.histolytica*
- Personal hygiene
  - ✓ Drink boiled cool water
  - ✓ Hand washing (before preparing & eating meals & after toilet)
  - ✓ Wash fruits & vegetables, eaten raw in clean running water
  - ✓ Protect food from flies & other insects
  - ✓ Safe disposal of excreta

# Community measures

- Provision of purified drinking water
- Sanitary disposal of excreta
- Screening of food handlers
- Health education

# Summary

- *Giardia lamblia*, causes giardiasis
- Pear shaped flagellated protozoa in the small intestines
- Cause a chronic diarrhoea with steatorrhoea
- Pathology due to Mucosal & luminal factors
- Diagnosed by detecting the infective cyst stage in direct faecal smears
- Treated with metronidazole
- Prevention – personal hygiene & sanitation

# Trichomoniasis

- Causative organism : *Trichomonas vaginalis*
- Flagellate
- Habitat: Vagina of females & urethra of males
- Genus Trichomonas

- 3-5 anterior flagellae
- An undulating membrane
- An axostyle
- Cytostome

# Morphology

- Only a trophozoite stage - actively motile, multiply by binary fission



Shape = pear

Size: 27-18 $\mu$ m

Prominent nucleus

Short undulating membrane  
Central axostyle

4 anterior flagellae

5<sup>th</sup> flagellum extend post.  
from undulating membrane.

Geimsa stained smear

# Transmission

- Stage: Trophozoite

Methods:

- Sexual intercourse
- Contaminated fomites (very rarely)
- Trophozoite cannot withstand PH < 4.9
- Normal vaginal secretions (PH 3.8-4.4) does not facilitate colonization

# Epidemiology

- Worldwide distribution
- ~ 10-25% of the females of the reproductive age group are infected

# Pathology & clinical features

- Females → vaginitis
- Males → urethritis & prostatitis
- Clinical features
- Females; Only 1/7<sup>th</sup> symptomatic
- Symptoms of vaginal inflammation

Vaginal itching, burning, profuse irritating, offensive leukorrheic discharge & dysuria & frequency

# Clinical features cont....

Speculum examination of the vagina

- Hyperaemic walls with petechial haemorrhages covered with discharge – profuse, greenish, watery, frothy & foul smelling
- Pool of discharge in the post. fornix
- Associated with other STD

# Clinical features cont..

- Males:
  - Majority asymptomatic
- urethritis, prostovesiculitis

# Diagnosis

- Females;
- Examine the vaginal discharge (fresh) for motile trophozoites
- Use a speculum & a cotton tipped applicator dipped in saline to obtain specimens
- Males;
- Examine urine / prostatic secretions for trophozoites

# Treatment & prevention

- Nitroimidazole derivatives
- Metronidazole – 250 mg tid x 7 days
- Tetracycline
- Contacts should be traced and treated

# Summary

- *T.vaginalis* a flagellated organism causes trichomoniasis
- Life cycle –only trophozoite, transmitted by sexual intercourse
- Causes vaginitis & urethritis
- Diagnosed by detecting the trophozoite in fresh vaginal discharge
- Treatment-metronidazole