Giardia Lamblia

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*Giardia duodenalis* (*G. lamblia; G. intestinalis*)

- Giardiasis.
- Most distinctive of the flagellates.
- Has both a trophozoite and cyst stage.
**Giardia duodenalis** Trophozoite

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Median bodies occur behind adhesive disk - function is unknown.
*Giardia duodenalis* Trophozoite

Light microscope photos of trophozoites
**Giardia duodenalis**

- Lives in the upper part of the small intestine (duodenum, jejunum, and upper ileum).

- Here the trophozoites attach to the epithelial cells.
Giardia duodenalis Trophozoite

Scanning EM view of trophozoite surface showing the adhesive disk.
• Feeds on mucous that forms in response to irritation.
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- Interferes with absorption in host especially lipids.
- *Giardia* can also interfere with vitamin/nutrient absorption.
  - Vitamin A $\rightarrow$ vision
  - Vitamin D $\rightarrow$ rickets: Both of these are due to long standing infections.
Cyst of *Giardia duodenalis*

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**Morphology:**
- ovoid in shape; 8-12 µm long x 7-10 µm wide
- thin cyst wall.
- Four nuclei present, often concentrated at one end.
- Flagella shorten and are retracted within cyst.
- Axonemes provide internal support.
Cyst of *Giardia duodenalis*

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- 14 billion cysts can be passed in 1 stool sample

- Moderate infections: 300 million cysts.
Cyst of *Giardia duodenalis*
Symptoms

- Range from none to abdominal discomfort causing acute or chronic diarrhea and other GI signs.

- Gray, greasy, voluminous malodorous diarrhea!

- Flatulence.
Giardia duodenalis

- *Giardia* trophs are attracted to bile salts: so sometimes you can get infections in bile ducts and gall bladder, causing jaundice and colic.

- This is irritating but not life threatening infection like *E. histolytica*.
Pathogenesis and Pathology

- Nutrient malabsorption and physical blockage and damage to microvilli.

- Trophs attach to small intestine → cause damage (mechanical and toxins).
Giardia trophozoite

Trophozoite attaches to surface of epithelial cells with its adhesive disk.
Pathogenesis and Pathology

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3) Malabsorption and maldigestion causes diarrhea.
4) Physical damage: clubbing of villi; decreases villus-to-crypt ratio; brush borders of cells are irregular.
Epidemiology

• Get infected by ingesting cysts through contaminated water.
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• World wide distribution; prevalence ranges from 2.4-67.5%.