

# Entamoeba histolytica

*Entamoeba histolytica* is one of the most widespread human parasites. It is cosmopolitan, occurring mostly in developing countries (Mexico, Vietnam, India, Egypt) where it is widespread due to poor hygiene and a warm and humid climate. The main host is humans, but dogs, cats and rodents can also be infected on rare occasions. It is transmitted by alimentary transmission by highly resistant cysts (faecal contamination of food and drinking water). It has no intermediate host or animal reservoir. If it invades the intestinal mucosa, it causes **intestinal amoebiasis**; invasive strains can penetrate tissues and cause **extraintestinal amoebiasis**. Most infections are asymptomatic, with only 10% of cases being symptomatic. In children, invasive amoebiasis is very rare.<sup>[1]</sup>

## Morphology

*Entamoeba histolytica* belongs to the Protozoa, Rhizopoda (hookworms).

Virulence factors: adhesin - lectin Gal/GalNAc, amebapor, cysteine proteases.

## Trophozoite

- Active motile stage,
  - amoeba, usually 15-30 µm in diameter, invasive strains are slightly larger<sup>[1]</sup>,
  - one nucleus with a very small central karyosome,
1. **Minute form** - lives in the lumen of the colon where it feeds on bacteria
- can encyst or change into form magna under certain circumstances (host stress, change in gut microflora)
2. **form magna** - unable to encyst - blind line of development
- capable of attacking intestinal epithelial cells,
  - destruction of cells by contact cytolysis and proteolytic enzymes,
  - deep ulcerations form extending into the submucosa (characteristic shape of a wide bottle with a narrow neck)
  - in the lesion feeds on tissue crumbs and erythrocytes,
  - hematogenous spread to other organs (liver, lungs, brain, spleen) - secondary lesions (trophozoites in infected tissues, never cysts)

## Cyst

- Infectious stage,
- spherical shape, 1-4 nuclei,
- resistant chitin wall - resistant to external influences,
- excreted in stool.

## Life cycle

Infection is transmitted by ingestion of cysts from fecally contaminated food. The cyst is resistant to gastric juices and travels to the small intestine where it excysts. It divides into 4 and then 8 amoebae, which travel to the colon. Most amoebae (the minuta form) feed on bacteria in the intestine and are excreted as cysts in the stool, but in larger infections some attach to the mucosa and form lesions shaped like a wide bottle with a narrow neck (the magna form).<sup>[1]</sup>

### Life cycle in a nutshell:

Ingestion of the cyst → excystation in the small intestine → multiplication of trophozoites in the large intestine (form minuta) →:

- encystation in the colon descendens (mononuclear cyst → tetranuclear cyst) → excretion of cysts by stool.
- form magna (invasive).

## Clinical picture

- **Acute** infection: severe diarrhea, dysentery, right abdominal pain (cecum)
  - not accompanied by fever or PMN leukocytosis,
  - complications: toxic megacolon, amoebic appendicitis, bowel perforation, perforation into hollow organs, massive hemorrhage, amoeboma (granuloma),
- **chronic** infection: episodes of dysentery with blood and mucus in stool, constipation,
- **extraintestinal** infections: abscesses in the liver, lungs and brain,
  - liver abscess - liver enlargement, fever, weight loss, right lower back pain,
  - pneumonitis, encephalitis,
- untreated amoebiasis can be fatal.

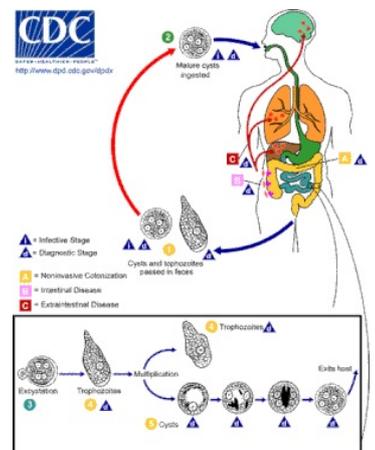
Clinical forms of intestinal amoebiasis

Clinical form	Stool	Parasitological finding
Asymptomatic colonization	Formed stool	Cysts
Non-dysenteric colitis	Loose stool	Trophozoites „minuta“
Amoebic colitis=dysentery	Loose stool- liquid with blood and mucus	Trophozoites „magna“
Chronic amoebic colitis	Formed or loose stools	Cysts, Trophozoites „minuta“

## Diagnostics

- Clinical picture, history and epidemiology,
- Microscopic - detection of trophozoites (within 1 hour) and cysts (within 24 hours) in stool in native and stained slides,
- culture - on special media,
- serological - detection of IgG (indirect hemagglutination, indirect immunofluorescence, ELISA) - positive only in extraintestinal amoebiasis,
- PCR - fresh unfixed stool.

## Therapy



Entamoeba life cycle

- Drug of choice: **metronidazole** (Entizol) 3×750 mg p.o. (3×10-15 mg/kg) 5-7 days (intestinal); 10 days (hepatic),
- asymptomatic carriage: metronidazole (3 × 500 mg for 10 days) + tetracycline (4 × 500 mg for the first 5 days) + Endiaron (3 × 250 mg for the next 5 days),
- extraluminal forms - 5-nitroimidazoles; severe cases + tetracycline,
- liver abscesses - medically or surgically.

## References

### Related articles

- Gastrointestinal parasitosis
- Amphizoid amoebae
- General characteristics of parasites

### External links

- Microbiology and Immunology online (with many pictures) ([http://www.sc.edu/study/colleges\\_schools/medicine/education/basic\\_science\\_departments/pathology\\_microbiology\\_and\\_immunology/index.php](http://www.sc.edu/study/colleges_schools/medicine/education/basic_science_departments/pathology_microbiology_and_immunology/index.php),))
- Parasite Image Library (<https://www.cdc.gov/dpdx/>)
- Entamoeba histolytica (Czech Wikipedia)

### Source

1. {University of South Carolina, School of Medicine. *Microbiology and Immunology On-line : PARASITOLOGY* [online]. The last revision 2010, [cit. 2010-09-05]. <[http://www.sc.edu/study/colleges\\_schools/medicine/education/basic\\_science\\_departments/pathology\\_microbiology\\_and\\_immunology/index.php](http://www.sc.edu/study/colleges_schools/medicine/education/basic_science_departments/pathology_microbiology_and_immunology/index.php)>.

### References used

- BEDNÁŘ, Marek. *Lékařská mikrobiologie*. 1. edition. Praha : Marvil, 1996. 558 pp. ISBN 80-238-0297-6.

### Source

- ws:Entamoeba histolytica