a. ***Epidemiology:-*** Occurs worldwide; the highest incidence and prevalence is found in areas with poor sanitation where as many as 80% of a population may be infected. Highest in children >5 years of age; more prevalent in males than in females; common in mental hospitals, prisons, orphanages.

b. ***Pathology and Clinical Manifestations:-*** the 1- The typical manifestation of intestinal amoebiasis is amoebic dysentery The stools are large, foul-smelling, and brownish black, often with bloodstreaked mucus intermingled with feces. The RBCs in stools are clumped and reddish-brown in color,fever vomiting; can become extra-intestinal (liver, lungs, etc.; can be fatal.

c. Small superficial ulcers involving only the mucosa. • Round or oval-shaped with ragged and undermined margin and flask-shaped in cross-section.

Formation of tumor-like masses of granulation tissue (amoeboma).

Mode of transmission: Man acquires infection by swallowing food and water contaminated with cysts. As the cyst wall is resistant to action of gastric juice, the cysts pass through the stomach undamaged and enter the small intestine.

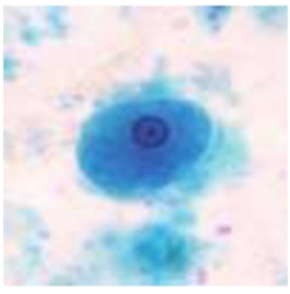
Life Cycle

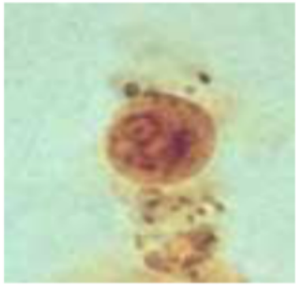
Excystation: When the cyst reaches caecum or lower part of the ileum, due to the alkaline medium, the cyst wall is damaged by trypsin, leading to excystation. The cytoplasm gets detached from the cyst wall and amoeboid movements appear causing a tear in the

cyst wall, through which quadrinucleate amoeba is liberated. This stage is called the metacyst.

Metacystic trophozoites: The nuclei in the metacyst immediately undergo division to form 8 nuclei, each of which gets surrounded by its own cytoplasm to become 8 small amoebulae or metacystic trophozoites. If exystation takes place in the small intestine, the metacystic trophozoites do not colonize there, but are carried to the caecum. The optimal habitat for the metacystic trophozoite is the submucosal tissue of caecum and colon, where they lodge in the glandular crypts and grow by binary fission. Some develop into precystic forms and cysts, which are passed in feces to repeat the cycle. The entire life cycle is, thus completed in one host. In most of the cases, E. histolytica remains as a commensal in the large intestine without causing any ill effects

3. ***Entamoeba hartmanni***





Entamoeba hartmanni rophozoitet

Entamoeba hartmanni cyst (iodine stain)

Formerly called the "**small race"** of *Entamoeba histolytica.*

Technologists must be able to differentiate this organism from *E. histolytica* because *E. hartmanni* is **non-pathogenic**.

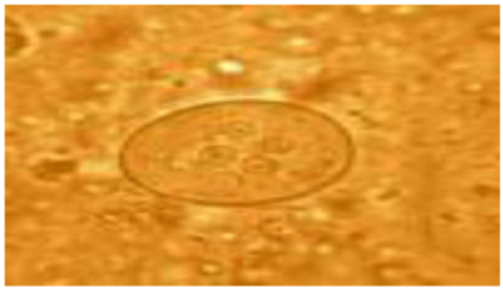
Morphology & Laboratory Identification –

It is much smaller than *E. histolytica*, the trophozoite measuring 4–12 µm and cyst 5–10 µm in size.

Trophozoites: do not ingest red cells and their motility is less vigorous.

The cyst :resembles that of *Endolimax nana*

4. Entamoeba coli



E. coli cyst (iodine)

Entamoeba coli trophozoite

It is worldwide in distribution and a nonpathogenic commensal intestinal amoeba.

Morphology :-

Trophozoites It is larger than *E. histolytica* about 20–50 µm with sluggish motility and contains ingested bacteria but no red cells. The nucleus is clearly visible in unstained fi lms and has a large eccentric karyosome and thick nuclear membrane lined with coarse granules of chromatin.

cysts :Cysts are large, 10–30 µm in size, with a prominent glycogen mass in the early stage. The chromatoid bodies are splinterlike and irregular. The mature cyst has 8 nuclei. The life

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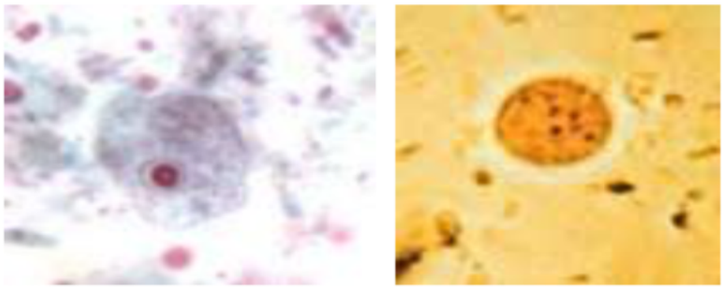
cycle is the same as in *E.histolytica* except that it remains a luminal commensal without tissue invasion and is nonpathogenic.

	E. histolytica	***E. coli***	***E. hartmanni***
Trophozoite			
	Size (µm) 12–60	Size (µm) 20–50	Size (µm) 4–12
Motility	Active	Sluggish	Active
Pseudopodia	Finger-shaped, rapidly extruded	Short, blunt slowly extruded	Finger-shaped, rapidly extruded
Cytoplasm	Clearly defi ned into ectoplasmand endoplasm	Diff erentiation not distinct	Clearly defi ned into ectoplasm and endoplasm
Inclusions	RBCs present, no bacteria	Bacteria and other particles, no RBCs	Bacteria and other particles, no RBCs
Nucleus	Not clearly visible in unstained fi lms	Visible in unstained fi lms	Not visible in unstained fi lms
Karyosome	Small, central	Large, eccentric	Small, eccentric
Nuclear Membrance	Delicate, with fine chromatin dots	Thick, with coarse chromatin granules	Coarse chromatin granules
Cyst			
Size (µm)	10–15	10–30	5–10
Nucleiin mature cyst	4	8	4
Glycogen mass	Seen in uninucleate, but not in quadi nucleate stage	Seen up to quadrinucleate stage	Seen in uninucleate, but not in quadi nucleate stage
chromidial	1–4 with crounded ends	Splinter like with angular ends	Many with irregular shape

5. ***Endolimax nana:-***



Endolimax nana trophozoite E. nana cyst (iodine)

This common commensal amoeba is widely distributed. It lives in the human intestine.

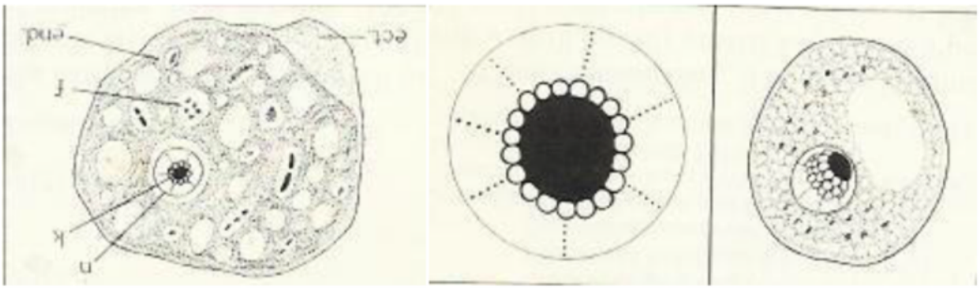
The trophozoite: is small (nana: small), less than 10 µm in size with a sluggish motility. The nucleus has clear karyosome connected to nuclear membrane by one or none coarse strands.

The cyst :is small, oval, and quadrinucleate with glyocgen mass and chromidial bars, which are inconspicuous or absent. .

Pathogenicity: - It is non-pathogenic

Diagnosis: by demonstrate troph. or cyst stage in stool specimen.

6. ***Iodamoeba butschlii:-***



Iodamoeba butschlii trophozoite I. Butschlii cyst

It is cosmopolitan amoeba, but it is less common than *E. coli*, it is non pathogenic commensal living in the lumen of large intestine. This amoeba has trophozoite and cyst stages

Pathogenicity: - none.

Morphology:

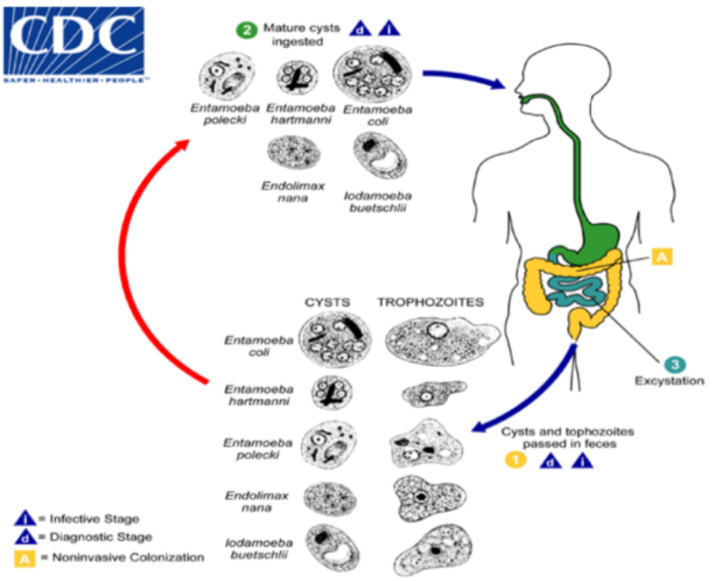
Trophozoite:- small, sluggish, ectoplasm no well differentiated from endoplasm. The nucleus spherical, characterized by having central large karyosome surrounded by achromatic granules. There are 1 or 2 glycogen mass in cytoplasm.

The cyst:- is irregular in shape with single nucleus only, cyst contain well distinct glycogen mass which stain golden brown with iodine solution so this

amoeba called Iodamoeba. The nucleus has large compact eccentric karyosome and around this karyosome there are achromatic granules.

Life Cycles:-

Entamoeba coli, E. hartmanni, E. polecki, Endolimax nana, **and** ***Iodamoeba buetschlii***



Entamoeba coli, *E. hartmanni, , Endolimax nana,* and *Iodamoeba buetschlii* are generally considered nonpathogenic and reside in the large intestine of the human host. Both cysts and trophozoites of these species are passed in stool and considered diagnostic. Cysts are typically found in formed stool, whereas trophozoites are typically found in diarrheal stool. Colonization of the nonpathogenic amebae occurs after ingestion of mature cysts in fecally-contaminated food, water, or fomites. Excystation occurs in the small intestine and trophozoites are released, which migrate to the large intestine. The trophozoites multiply by binary fission and produce cysts, and both stages are passed in the feces.