

Intestinal Protozoa I

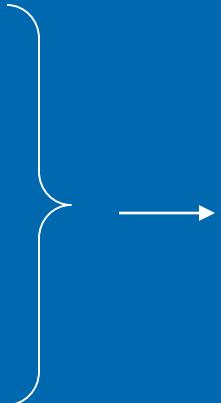
Amoebiasis

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Intestinal protozoa

4 Groups

- Amoebae
- Flagellates
- Ciliates



Simple life cycles

2 forms trophozoite & cyst

Reproduce by binary fission

- Coccidia



Complex life cycles

Several forms

Asexual & sexual multiplication

Intestinal amoebae of man

- **Entamoeba histolytica*
- *Entamoeba coli*
- **Entamoeba moshkovskii*
- **Entamoeba dispar* *identical morphology to E.h
- *Entamoeba hartmanni*
- *Endolimax nana*
- *Iadamoeba butschlii*
- *Dientamoeba fragilis*

Entamoeba gingivalis mouth

Objectives amoebiasis

- Scientific name of the causative organism
- Morphology, life cycle & transmission
- Clinical features & pathogenesis of intestinal & extra intestinal amoebiasis
- Diagnosis
- Treatment
- Prevention & control
- Epidemiology (globally & Sri Lanka)

Amoebiasis

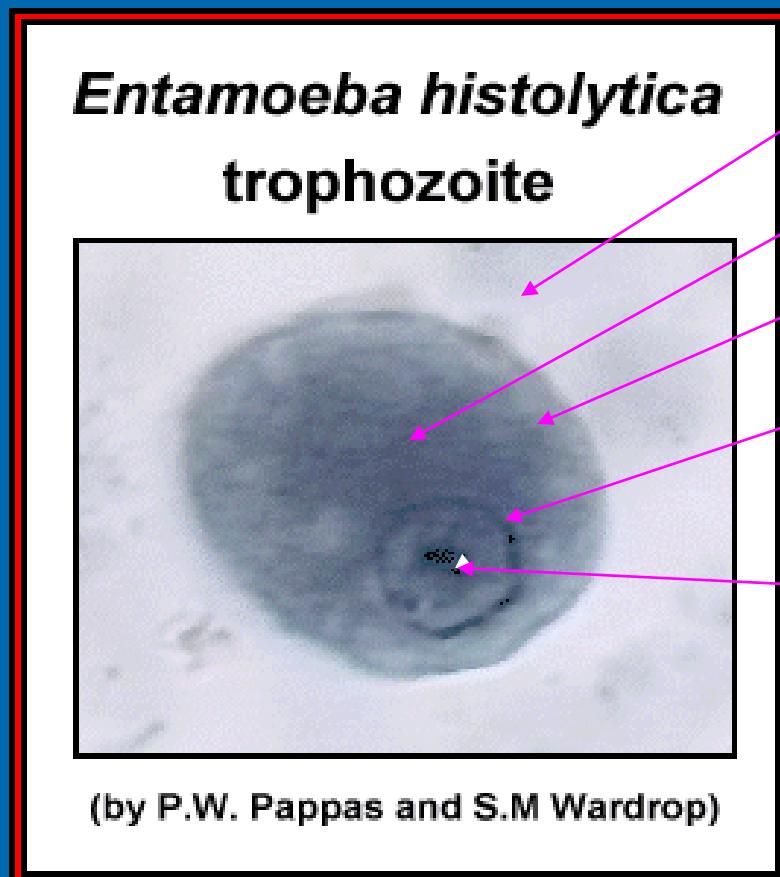
- Causative organism *E. histolytica*

Common disease manifestations

- Amoebic colitis
- Amoebic liver abscess
- 2nd leading cause of death from parasitic disease world wide
- Incidence in SL is low

Morphology *E.histolytica*

➤ Trophozoite



pseudopodia

endoplasm

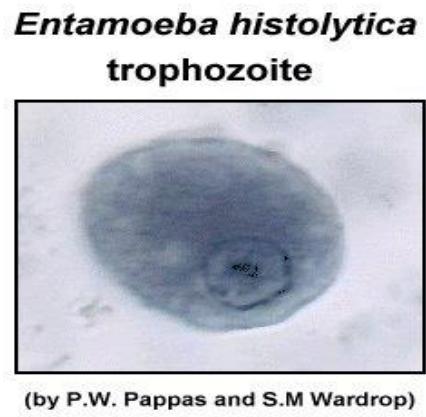
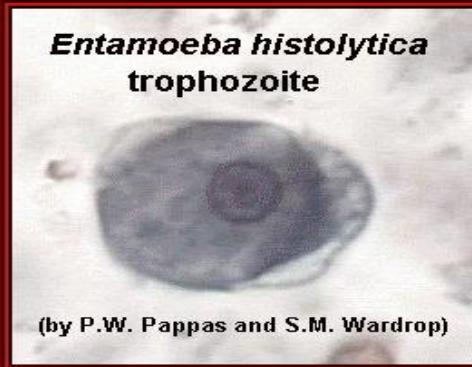
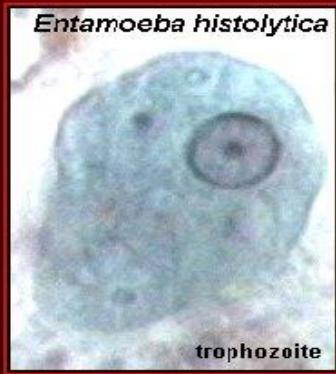
ectoplasm

nucleus

Karyosome

Iron haematoxylin stained
smear

Morphology *E.histolytica*



Habitat- wall & lumen of colon

Size- 15-30 μ m

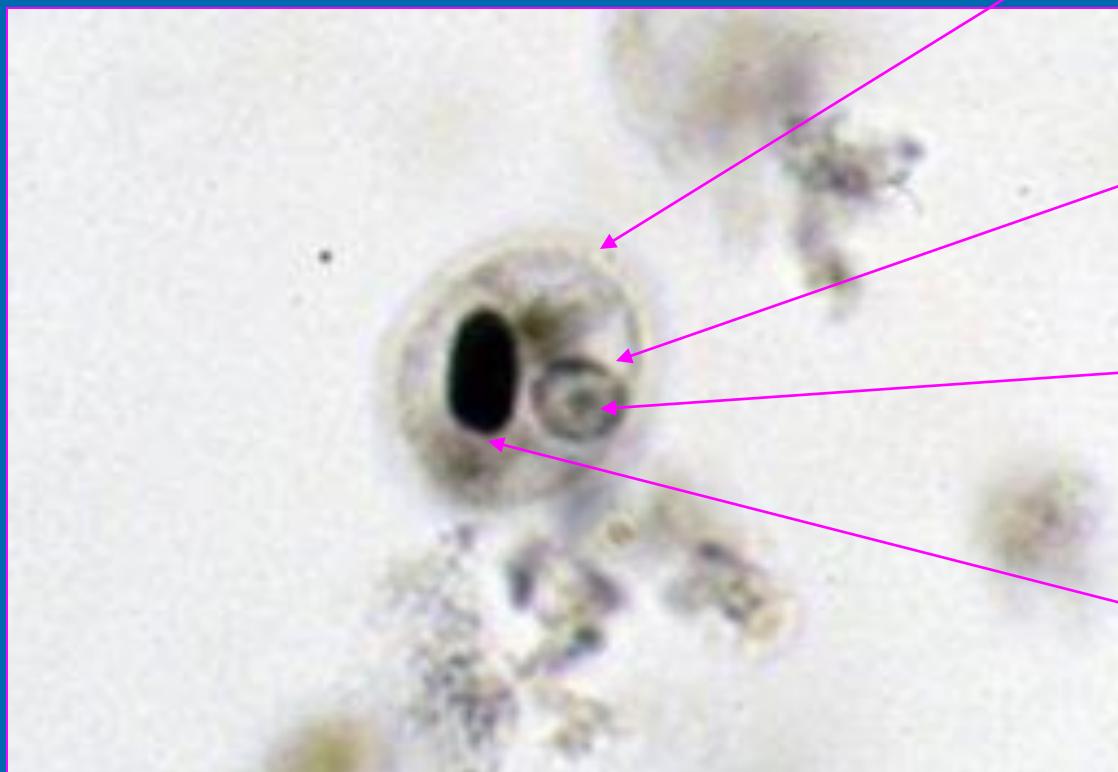
No definite shape

Nuclear mem. Has fine granules of chromatin arranged uniformly

Active progressive movement- pseudopodia

Morphology

- Cyst stage *E. histolytica*
- Size 10-15µm



Cyst wall

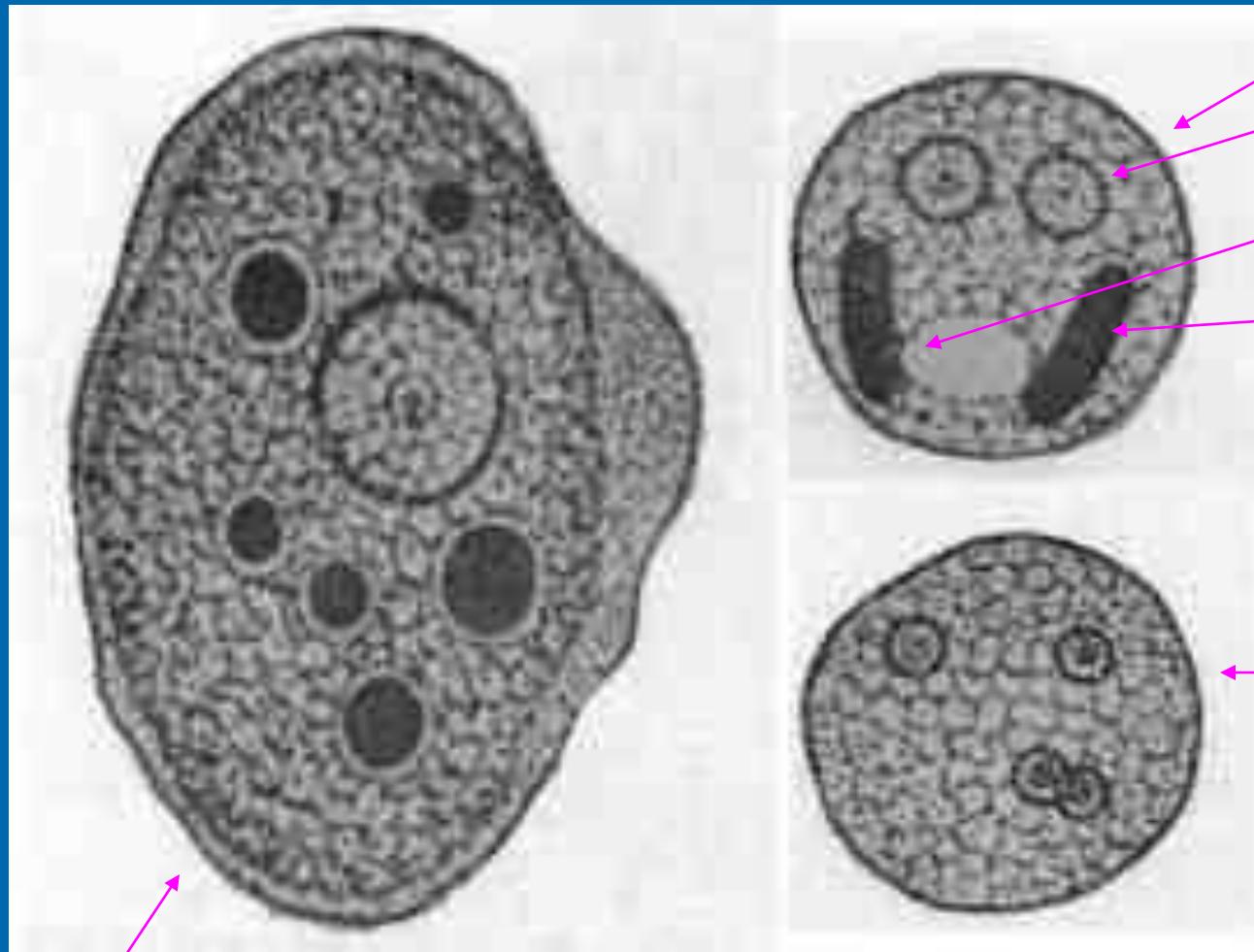
Nucleus (1-4)

Karyosome

Chromatoid bars

Iron haematoxylin stained smear

Morphology *E.histolytica*



Trophozoite

Immature cyst

Nuclei 2

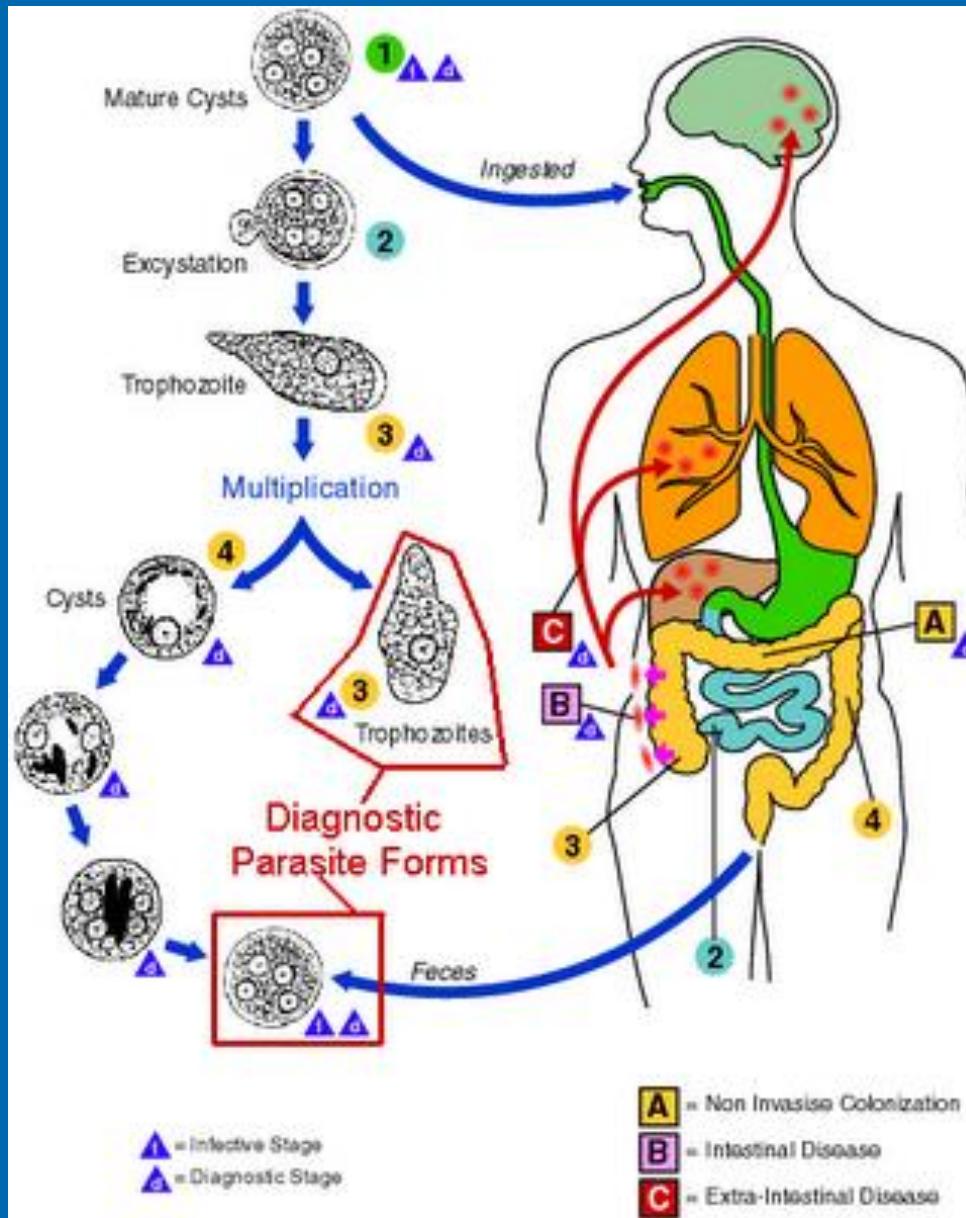
Glycogen
vacuole

Chromatoid
bars

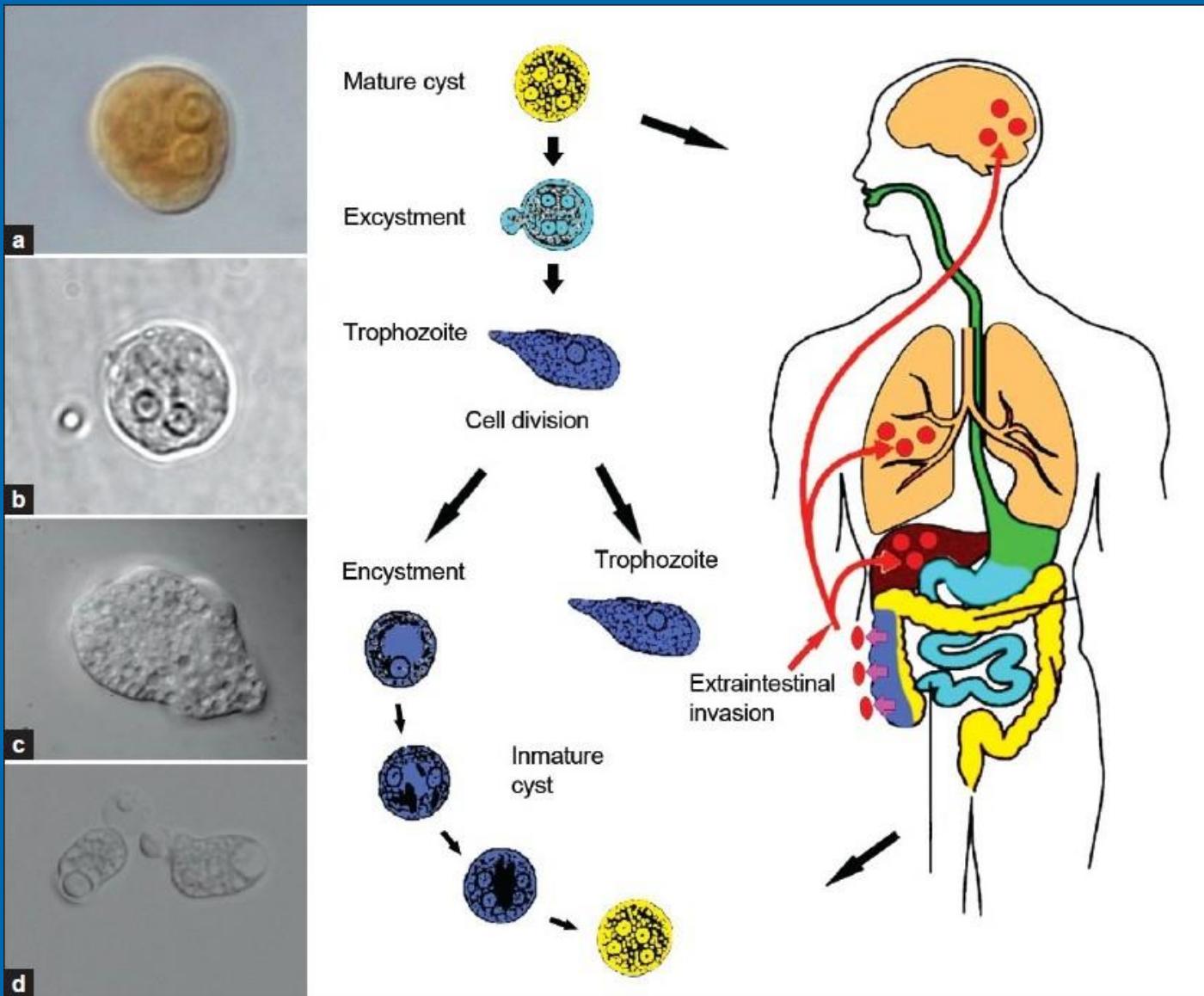
Mature cyst

Nuclei 4

Life cycle of *E. histolytica*



Life cycle of *E. histolytica*



Epidemiology

- Distribution –worldwide (tropics & temperate regions)
- Commoner in regions with poor sanitation
- Amoebic colitis affects all ages
- Amoebic liver abscess affects men (18-50yrs)
- SL incidence is low

Transmission

Transmission stage: **Mature cysts** passed by

- chronic patients
- asymptomatic carriers

Methods

- Indirect faeco oral- common
(contaminated food & water)
- Direct faeco oral (direct person to person)
rare

Amoebic colitis

Clinical features

ICP 1-4 wks

- Majority asymptomatic
- Diarrhoea with blood & mucus
- Abdominal pain & tenderness
- Wt. loss, anorexia
- Fever (< 40% of pts)

Fulminant amoebic colitis- profuse bloody diarrhoea with fever (mortality 40%)

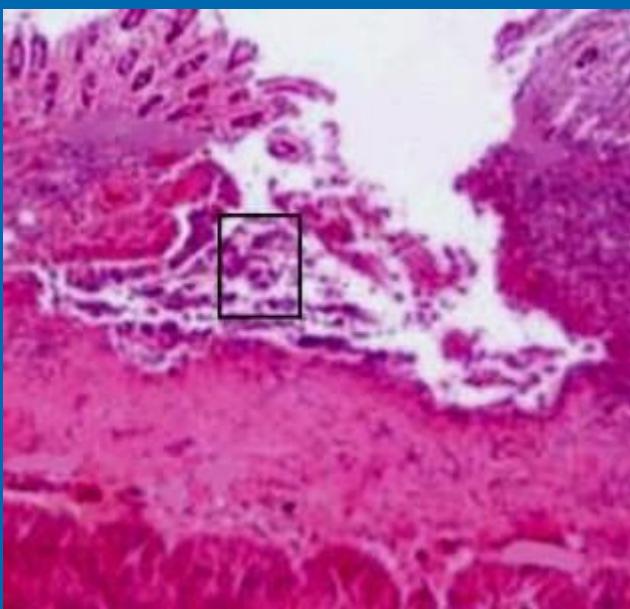
Pathology

- Causes an invasive colitis
- Trophozoites erode mucosa, penetrate mm. & invade submucosa,
- Ulcers (flask shaped)
- Lateral extension of ulcers- honeycomb app
- Sloughing off of mucosa
- Result- blood & mucus diarrhoea

Pathogenesis mechanisms of invasion

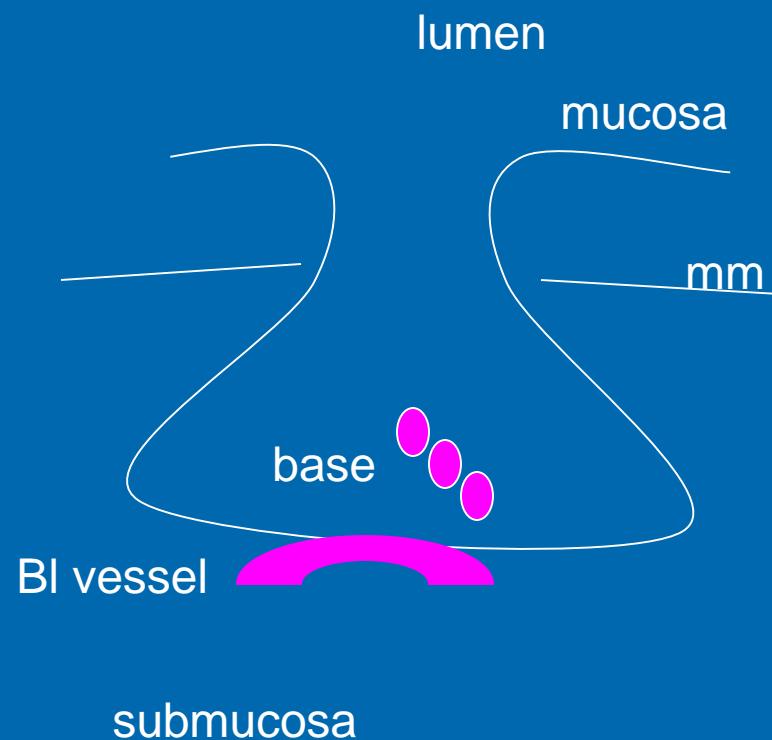
Trophozoites adhere to epithelium via lectins

- Cytolysis (**amoebapores**-holes in cell membranes)
- **Proteinases** (dissolve extracellular matrix proteins)
- Phagocytosis
- Induce apoptosis of host cells
- Host immune response worsen the inflammatory response



Pathology

Flask shaped ulcer with wide base and narrow opening



Complications of A.colitis

- Haemorrhage
- Fulminant amoebic colitis with perforation
- Toxic megacolon
- Peritonitis
- Strictures
- Amoeboma (granuloma)

Extra intestinal amoebiasis

Route of spread

Haematogenous (portal v)/ direct spread

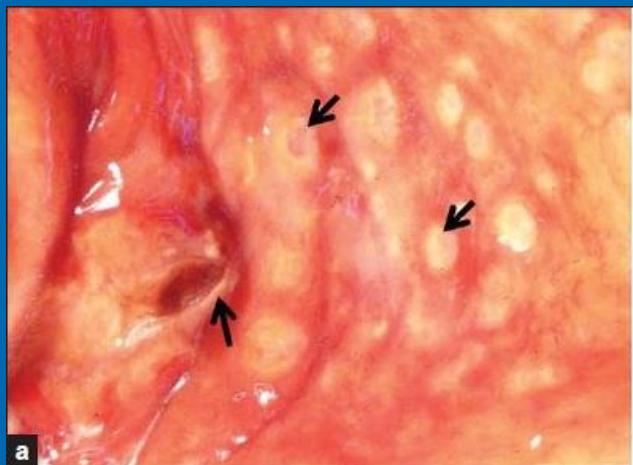
- Liver-amoebic liver abscess commonest
- Pleuropulmonary amoebiasis- lung abscess, empyema, hepatobronchial fistula
- Pericardium pericarditis. C. tamponade
- Brain <0.1%(SOL)

Symptoms & signs liver abscess

- Fever with chills
- R. hypochondrial pain radiating to R. shoulder/scapular region
- Tender hepatomegally
- R. intercostal tenderness
- Mild jaundice



- a. Colonic ulcers (rectosigmoidoscopy)
- b. Fulminant amoebic colitis (necropsy)
- c. Amoebic liver abscess (necropsy)
- d. Edge of ulcer showing many E.h. trophozoites (biopsy)
- e. Edge of amoebic liver abscess showing E.h. trophozoites



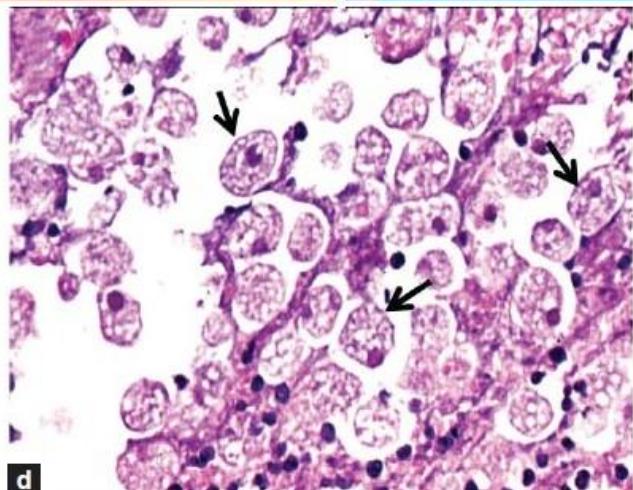
a



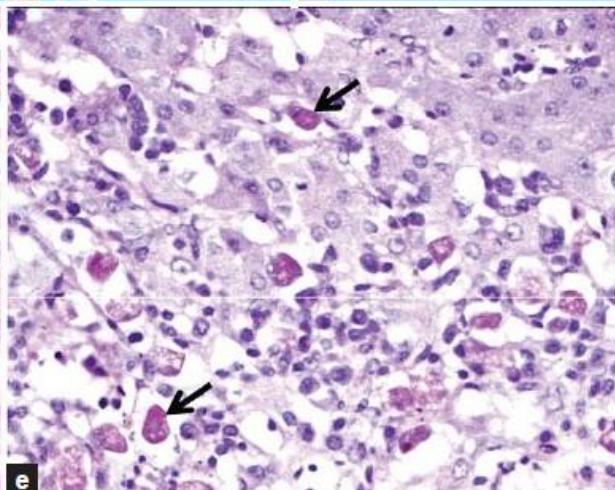
b



c



d



e

Diagnosis amoebic colitis

History

Macroscopic appearance of stool

Microscopic examination of stools for trophozoites & cysts (parasitological Dx)

Direct saline smears- trophozoites(0.5-2 hrs)

Iodine smears- cysts

Confirmation by **permanent stained smears** Iron haematoxylin/ trichrome

➤ **Exclude infection-** examine at least 3 stool samples within 10 days

Diagnosis cont.....

Stool concentration methods
ZnSO₄ flotation/ Formol ether sedimentation

E.histolytica Ag in stools by ELISA –not available in SL

Culture & PCR] Research settings only

Sigmoidoscopy –to visualise lesions & obtain material for smears & culture (not routine)

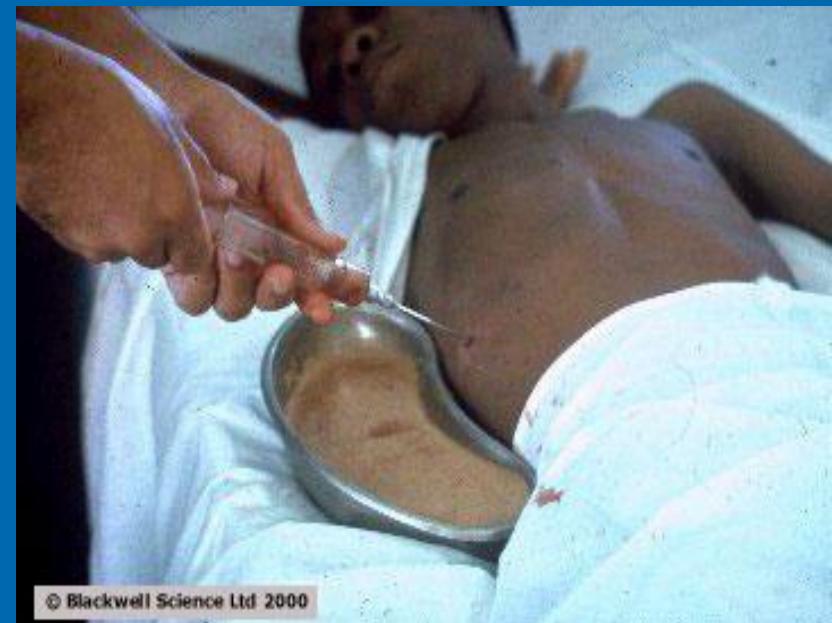
Diagnosis cont..... extra intestinal amoebiasis

Liver abscess

Radiology –US & CT
scans



- Amoebic serology-IFA, IHA, ELISA
- Aspiration, trophozoite in the last few drops of aspirated **pus**
Chocolate brown



Treatment

- Nitroimidazole derivatives kills tissue parasites
Metronidazole 500-700mg tid for 7-10 days (adults)

Tinidazole/ Ornidazole

- **Diloxanide furoate, Paramomycin, Nitazoxanide**
–kills luminal cysts (eliminates colonization)
- Other luminal amoebicides;/Paromomycin,
- **Liver abscess**
- Usually managed conservatively (metronidazole/ chloroquine)
- Large/resistant to chemotherapy- aspirated under US guidance

Prevention & Control

Treatment of cases & contact tracing

- Drink boiled cool water
- Good personal hygiene
- Food hygiene
- Sanitary disposal of excreta

Protect food from flies

Wash fruits & vegetables
eaten raw with clean
running water



Prevention & Control Cont...

- Community measures
- Sanitary removal of excreta
- Provision of purified water
- Screening of food handlers
- Health education of the community

E. histolytica Cyst characteristics

Survive for > a week in a cool moist environment

Destroyed by heat $>68^{\circ}\text{C}$

Destroyed by freezing at -10°C for 24 hrs

Survive ordinary chlorination

Morphology; *Entamoeba coli*



Trophozoite
Nucleus
eccentric nucleolus
Irregularly arranged granules
of chromatin

Cytoplasm
More granular
Ectoplasm & endoplasm not
clearly demarcated

Cyst
Size-10-35 µm
Nuclei > 4 (4-8)

Chromatoid bars ; splinter
shaped

Summary

- *E. histolytica* causes disease in colon & extra intestinal sites which manifests as dysentry/ amoebic liver abscess
- Transmitted by the mature cyst by faeco-oral methods
- Colon cause flask shaped ulcers
- Diagnosed by detection of cysts & trophozoites in stools/ serological methods
- Treated with metronidazole