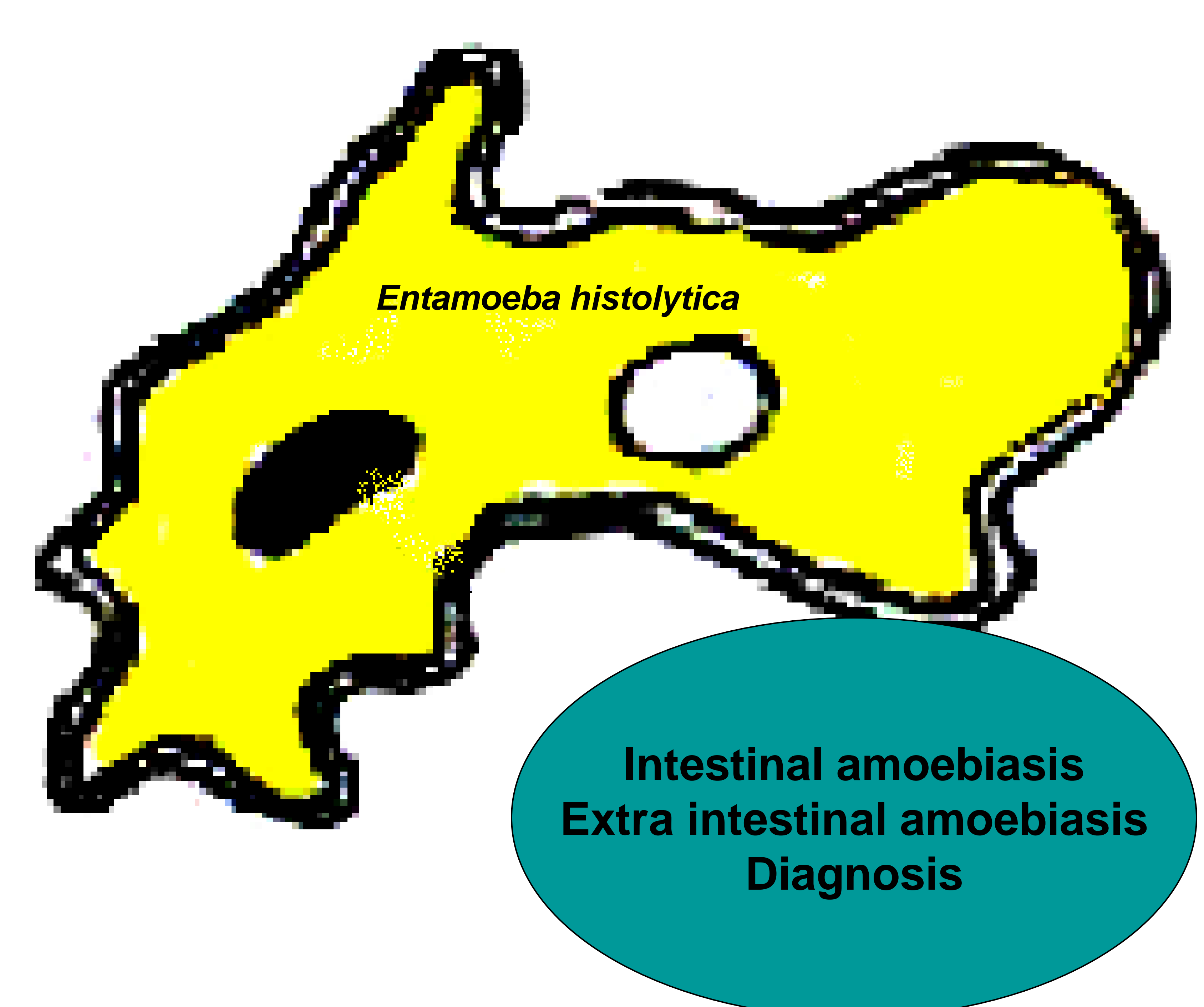
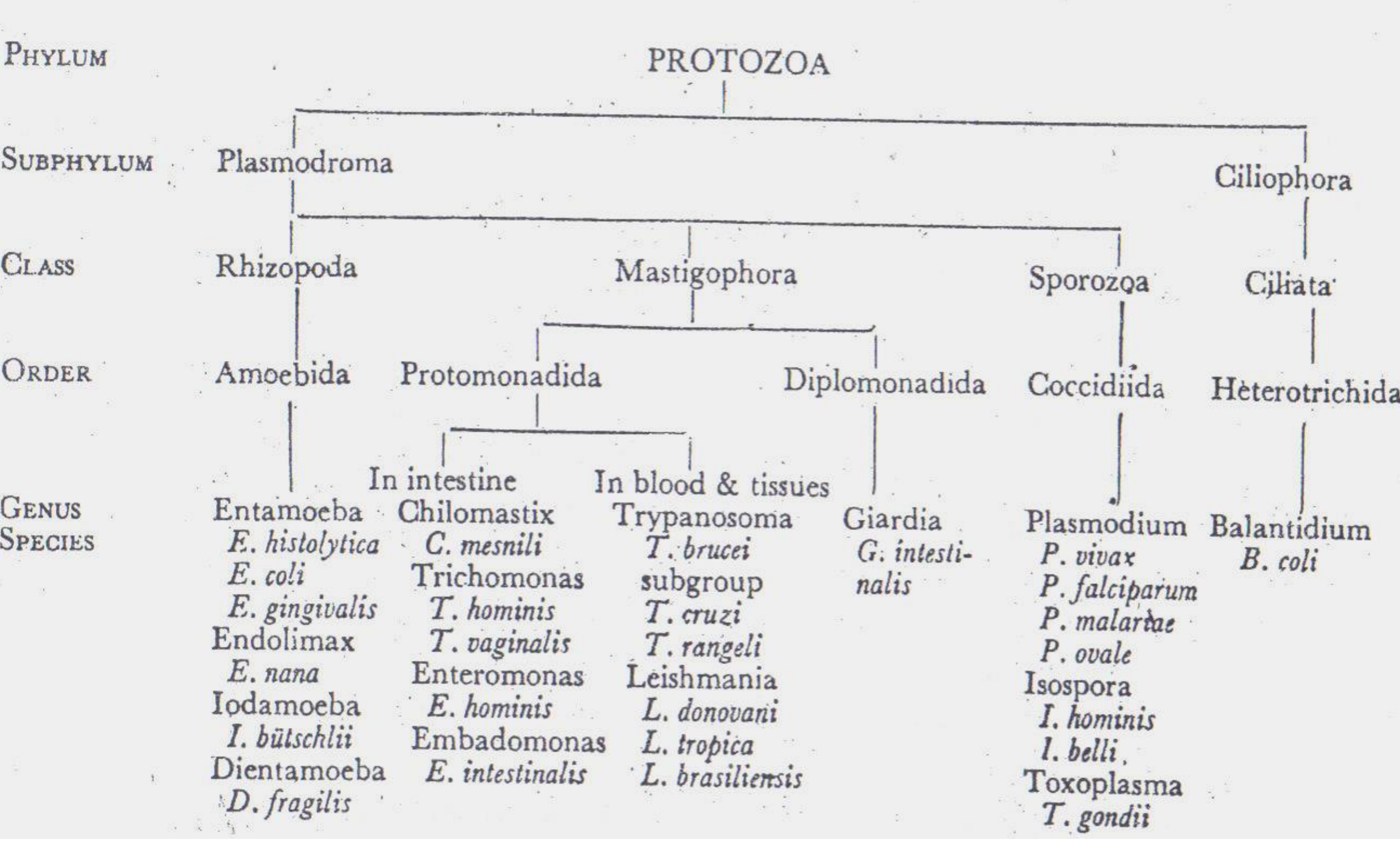

Entamoeba histolytica
Intestinal amoebiasis
Extra intestinal amoebiasis
Diagnosis

Systematic Classification



Morphology

Amebae

	Entamoeba histolytica	*Entamoeba hartmanni*	*Entamoeba coli*	*Entamoeba polecki**	*Endolimax nana*	*Iodamoeba bütschlii*
Trophozoite						
Cyst						

**Rare, probably of animal origin*

E. histolytica

- World wide, more common in tropics & subtropics
- Trophozoites resides in mucosa & submucosa of LI of man
- Exist in three morphological forms : Trophozoites,
  precyst,
  cyst

1) Trophozoites : 10-60μm (20-30μm)
   - cytoplasm : divided into clear ectoplasm & granular endoplasm.
   - Motile form Movement : Pseudopodia.
   - RBC may be absent if infection confined to the gut lumen.
   - Spherical shape nucleus.

   It is the only form present in the tissues

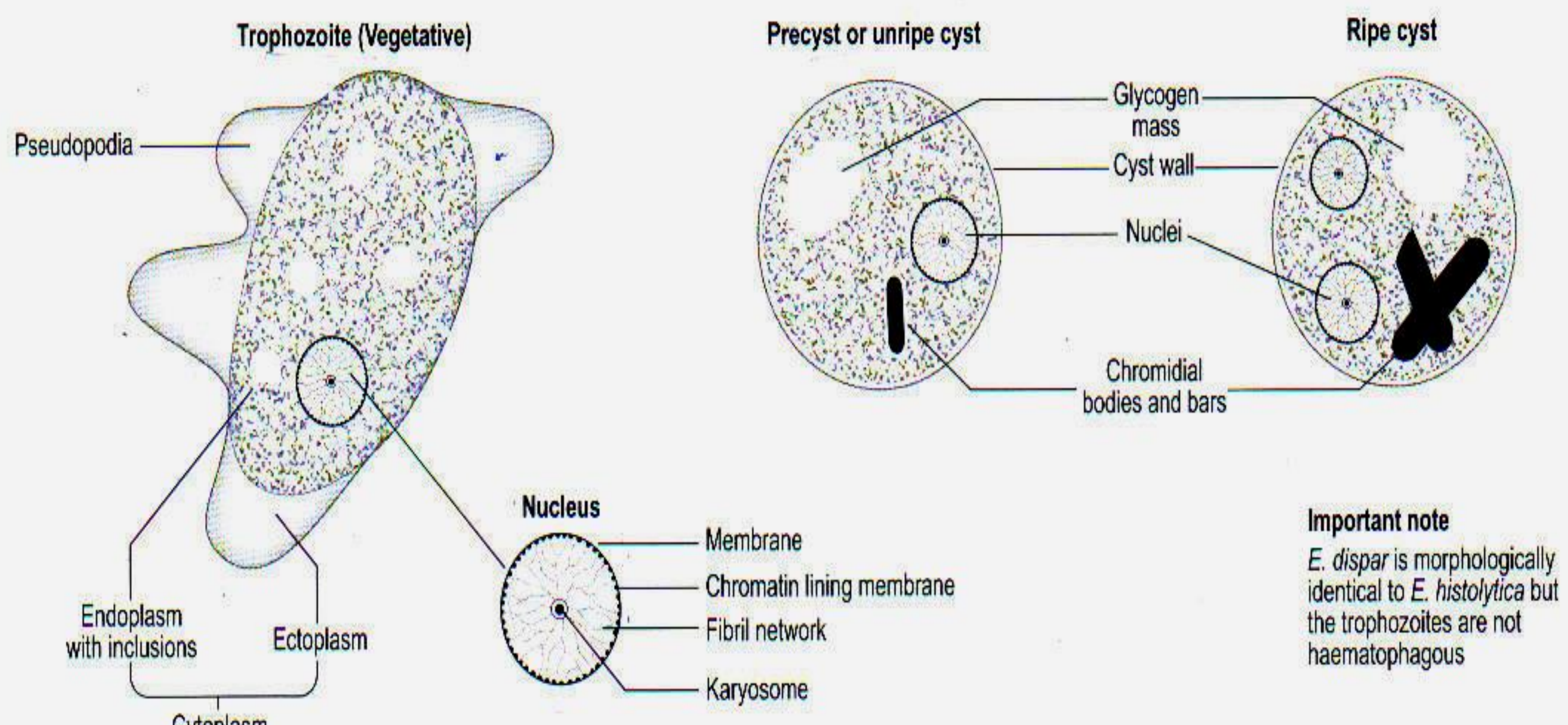
- Trophozoite divide by binary fission in every 8 hrs
- infection is not transmitted by Trophozoite
- if live Trophozoites are ingested they are rapidly destroyed in stomach

2) Pre-cyst: Small, 10-20μm, oval blunt pseudopodium

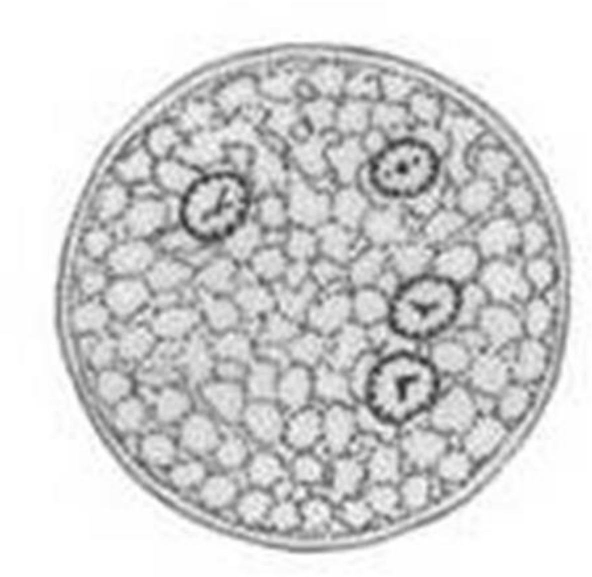
3) Cyst : Spherical 10-15μm
   - sourrended by thick chitinous wall which makes it highly resistant to gastric acid & adverse environmental condition & Chlorine concentration in water
   - Posses glycogen mass, chromatid bars.

   Present only in lumen of the colon & in formed feaces.

Morphology



Trophozoite



Quadrinucleated cyst - Infective form

CULTIVATION

Medium: 1) Boeck & Drbohlav diphasic medium

2) Liquid media : Enteric bacteria or flagellates with rice water / starch (polyxenic media)

3) Diamonds Medium : **Axenic medium**

Trypticase, ox-liver digest, glucose, cystenine, ascorbic acid & salts supplemented with horse serum & vitamin mixture.

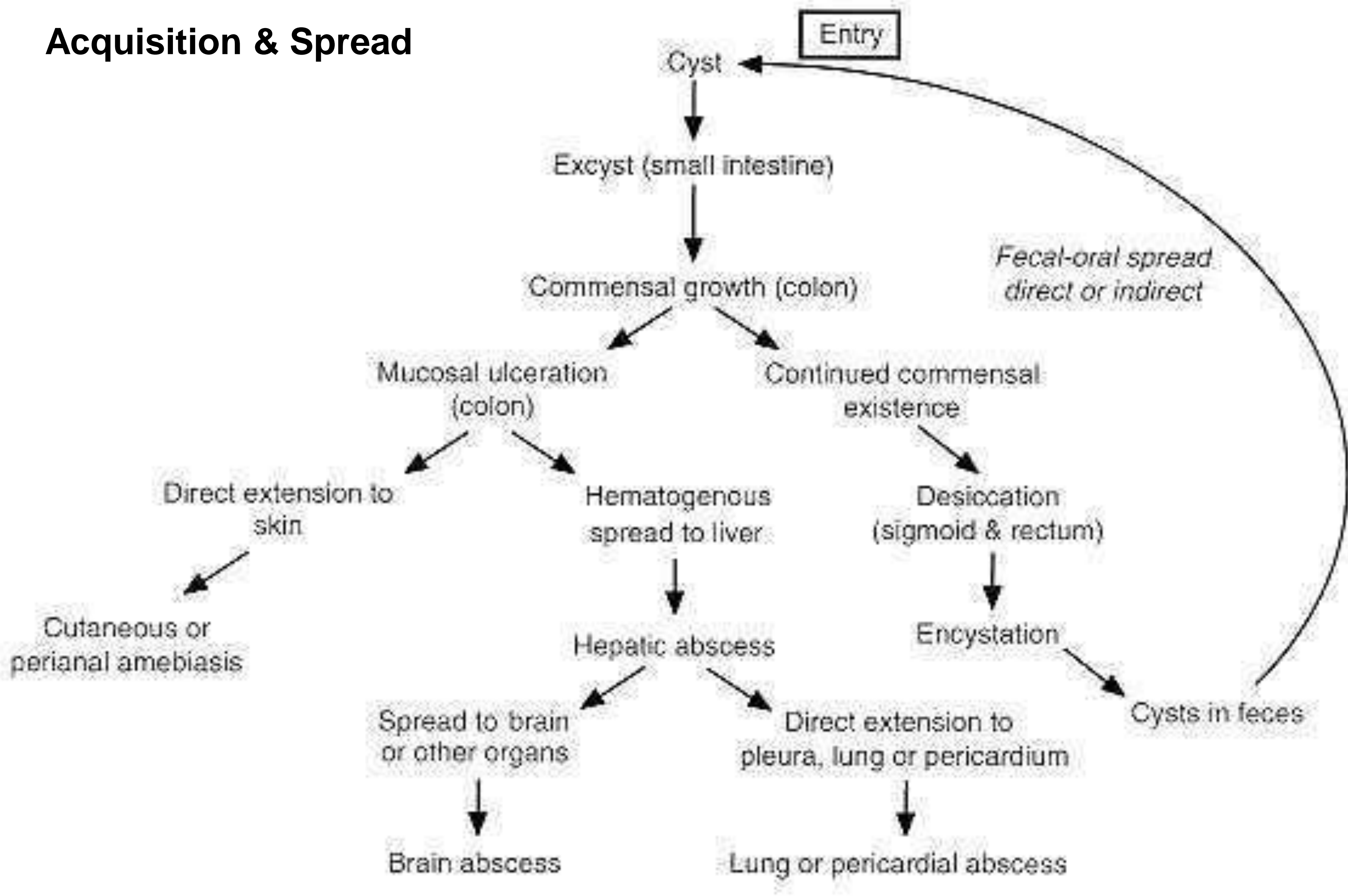
↓

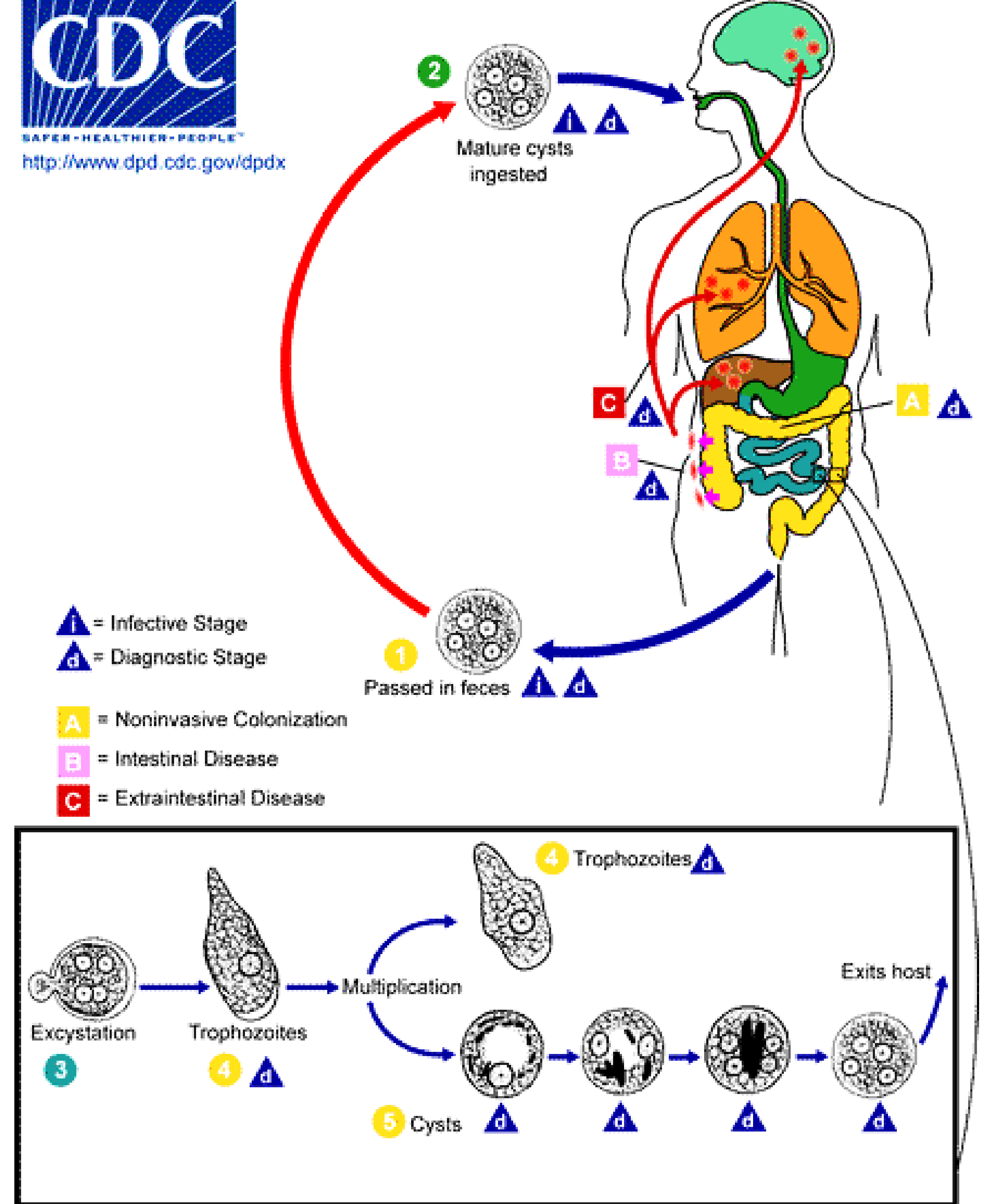
Yields 100-150 million amoebae from 10 million

Axenic medium : essential for the study of pathogenecity, immunological & biochemical properties, in vitro susceptibility test, in immunodiagnosis of amoebiasis

Culture of stool yields higher positivity for *E. histolytica* than direct examination

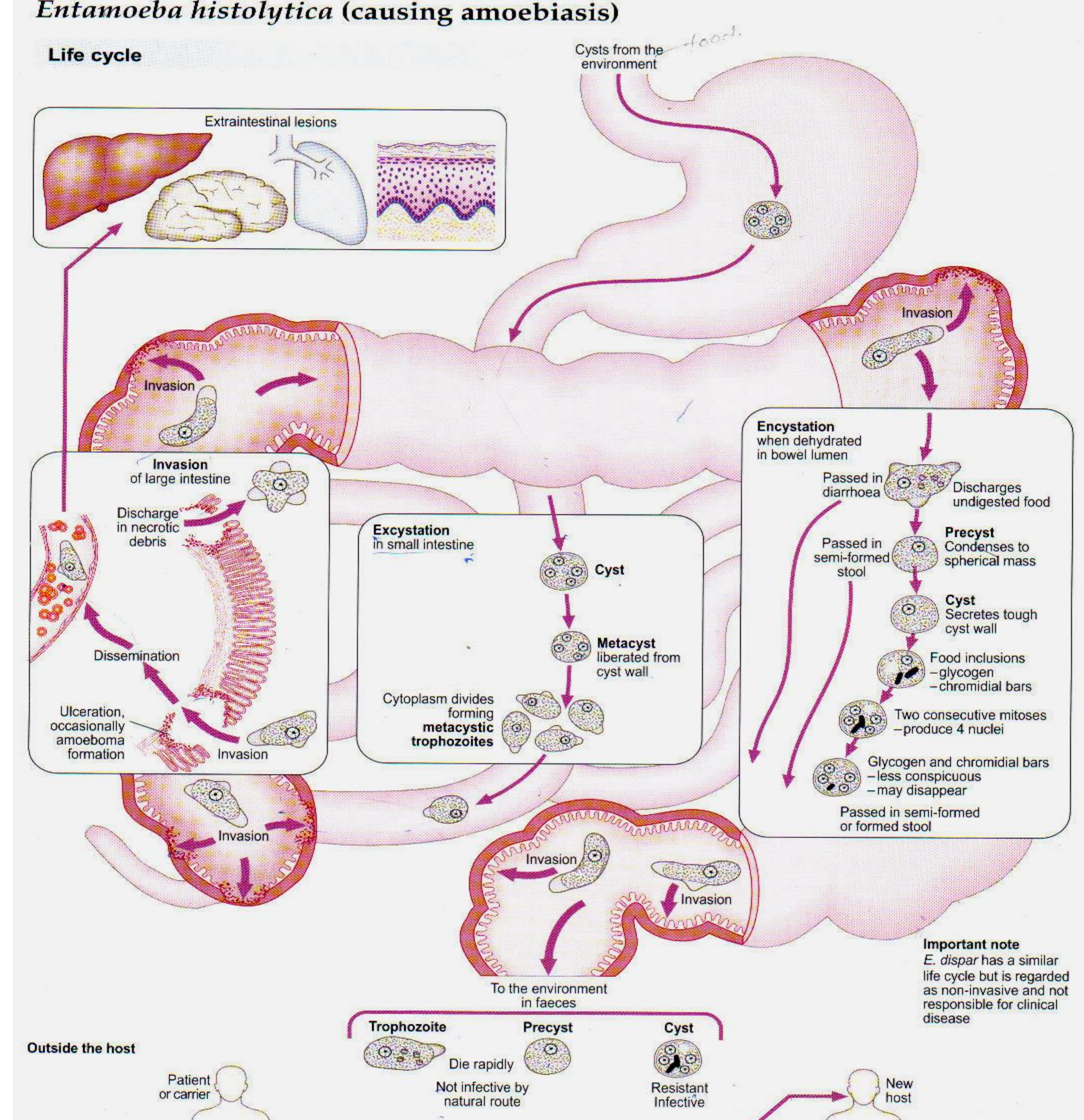
Acquisition & Spread

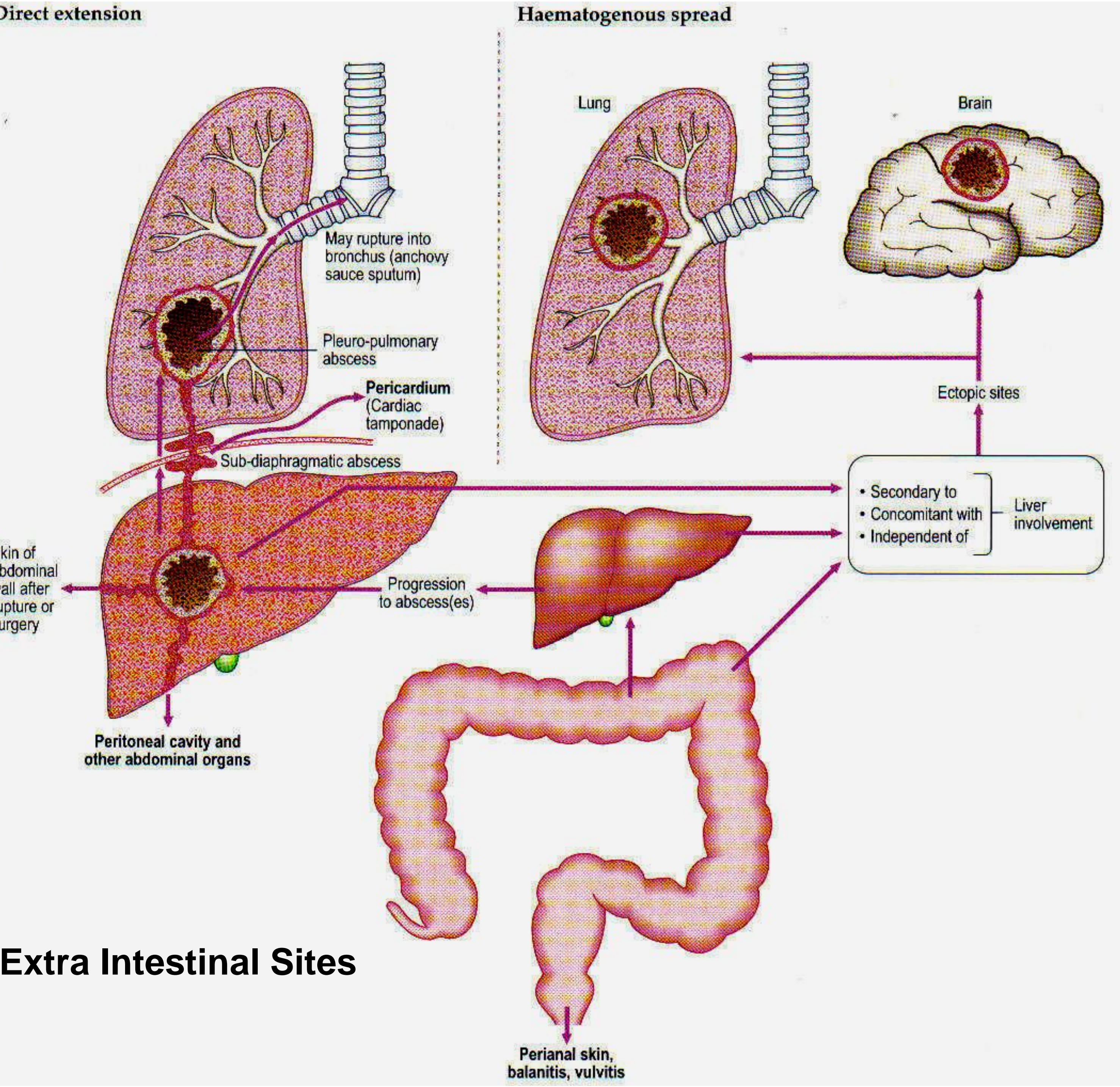




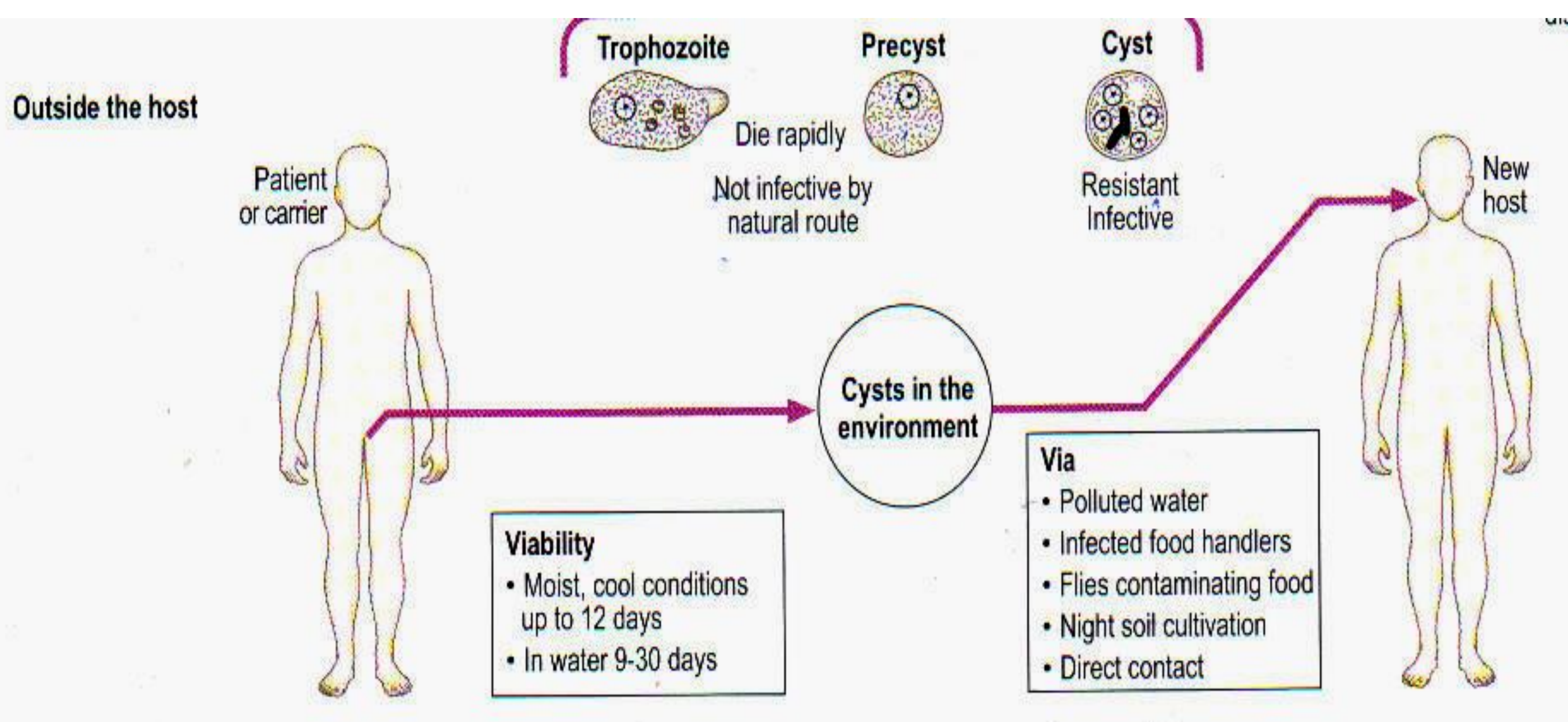
CDC
SAFER·HEALTHIER·PEOPLE™
http://www.dpd.cdc.gov/dpdx
2
Mature cysts ingested
i
d
A
d
B
d
C
d
1
Passed in feces
i = Infective Stage
d = Diagnostic Stage
A = Noninvasive Colonization
B = Intestinal Disease
C = Extraintestinal Disease
4 Trophozoites
Excystation
3
Trophozoites
4
Multiplication
Exits host
5 Cysts

Entamoeba histolytica (causing amoebiasis)





Extra Intestinal Sites



Outside the host
Trophozoite
Precyst
Cyst
Die rapidly
Not infective by natural route
Resistant
Infective
Patient or carrier
New host
Cysts in the environment
Viability
• Moist, cool conditions up to 12 days
• In water 9-30 days
Via
• Polluted water
• Infected food handlers
• Flies contaminating food
• Night soil cultivation
• Direct contact

TABLE 79-1 Classification of Amebiasis

WHO Clinical Classification of Amebiasis Infection (Modified)	Pathophysiologic Mechanisms
Asymptomatic infection	Colonization without tissue invasion
Symptomatic infection	Invasive infection
Intestinal amebiasis	
A. Amebic dysentery	Fulminant ulcerative intentional disease
B. Nondysentery gastroenteritis	Ulcerative intestinal disease
C. Ameboma	Proliferative intestinal disease
D. Complicated intestinal amebiasis	Perforation, hemorrhage, fistula
E. Post-amebic colitis	Mechanism unknown
Extraintestinal amebiasis	
A. Nonspecific hepatomegaly	Intestinal infection with no demonstrable invasion
B. Acute nonspecific infection	Amebas in liver but without abscess
C. Amebic abscess	Focal structural lesion
D. Amebic abscess, complicated	Direct extension to pleura, lung, peritoneum, or pericardium
E. Amebiasis cutis	Direct extension to skin
F. Visceral amebiasis	Metastatic infection of lung, spleen, or brain

Pathogenicity

Intestinal amoebiasis : IP : 1-4 weeks

Invasion : Characteristic ulcerative lesion & profuse blood diarrhea (amoebic dysentry)

Ulcers : may be generalized involving whole LI / localized in caecum, ascending colon, ileo-caecal valve & appendix / sigmoido-rectal region.

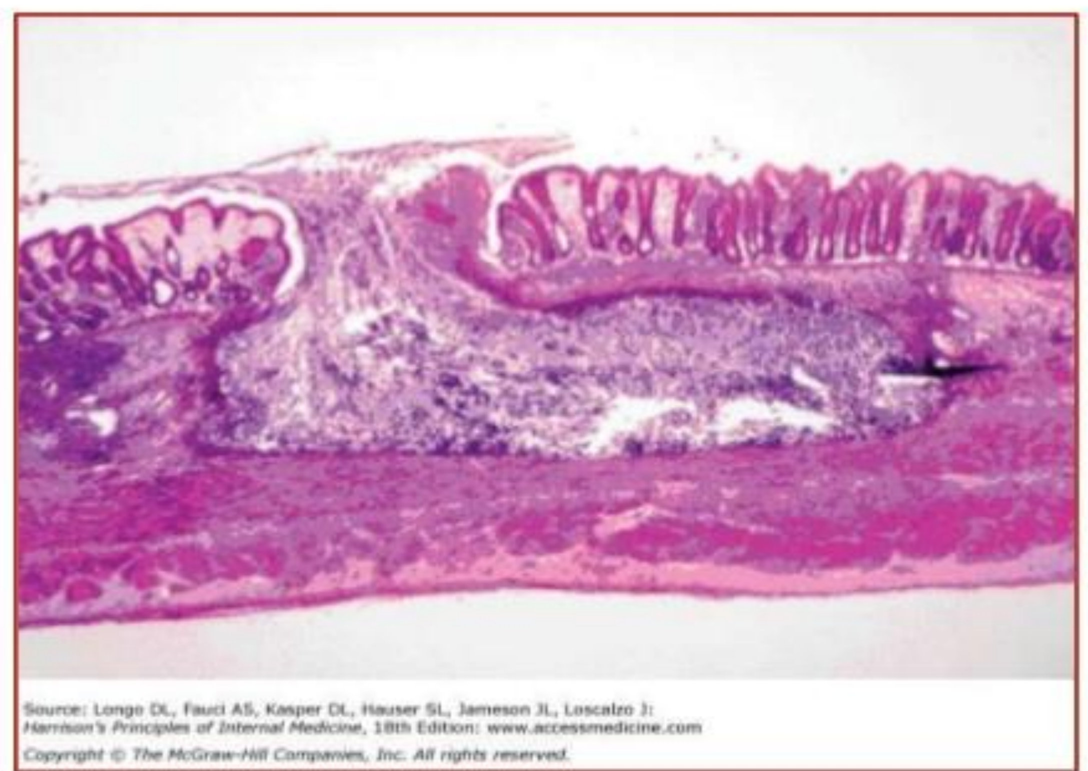
Ulcers : discrete with intervening normal mucosa

Size vary (pin head- more than 2.5cm)

Deep / superficial

Amoebomas : Pseudotumoural lesions associated with necrosis, inflammation & edema of the mucosa & sub-mucosa of the colon. usually single, occasionally multiple, usually present in vertical segments of the LI.

FLASK SHAPED ULCER



Source: Longo DL, Fauci AS, Kasper DL, Hauser SL, Jameson JL, Loscalzo J: *Harrison's Principles of Internal Medicine*, 18th Edition: www.accessmedicine.com

Copyright © The McGraw-Hill Companies, Inc. All rights reserved.

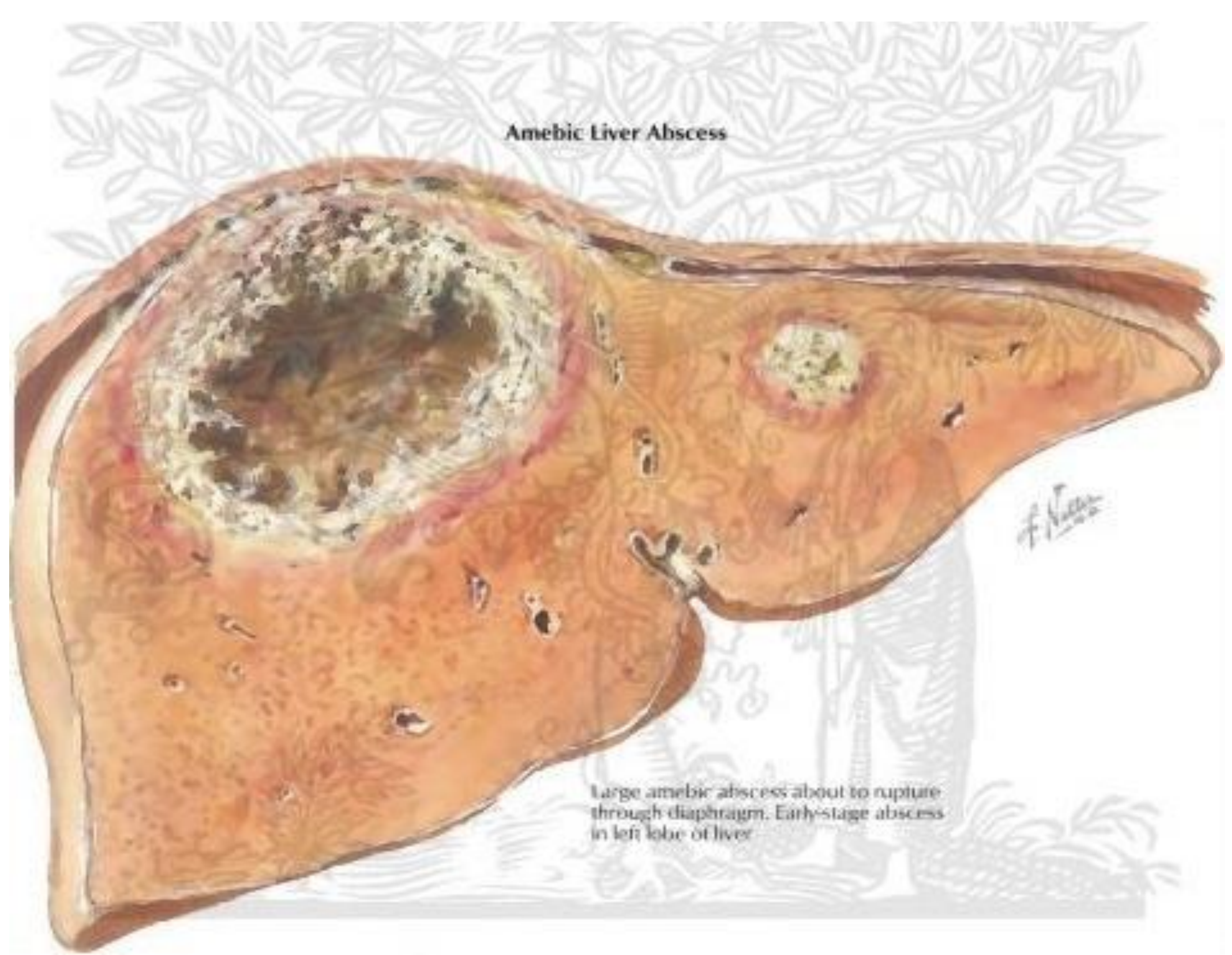
Pathogenesis : Extra intestinal amoebiasis

- In 5% individuals with intestinal amoebiasis
- 1-3 months after dysenteric attack ►**Hepatic**
- Trophozoites Carried as emboli by radicals of the portal vein from the base of ulcer in LI
- Capillary system of liver holds parasite : multiply
- Cytolytic action -> obstruction of portal venules
  -> necrosis of hepatic cells
  -> destruction continues in layers
  ->miliary abscesses→ big liver abscess

Amoebic liver abscess

- Varies in size
- May occur at any part of the liver
- Generally confined to postero-superior surface of the right lobe
- Wall of abscess cavity is ragged with shreds of connective tissue
- Section through margin of the liver abscess

- A necrotic centre filled with thick pus with no amoebae
- An intermediate zone containing degenerated liver cells & few RBCs, Leucocytes & occasional trophozoites
- An outer zone of nearly normal hepatic tissue just being invaded by amoebae


Amebic Liver Abscess
Large amebic abscess about to rupture through diaphragm. Early-stage abscess in left lobe of liver
F. Netter

Amoebic liver abscess & PUS

- Cytolysed liver cells
  leucocytes & RBCs,
- Red brown anchovy sauce appearance
- Right sided liver abscess may rupture externally, may cause granuloma cutis
- May rupture into lung, right pleural cavity (empyma thoracis), below diaphragm (subphrenic abscess), in peritoneal cavity (peritonitis), into stomach (haematemesis) into pericardial cavity (pericarditis)
- Posterior surface abscess rupture into inferior vena cava - is fatal

Pus aspiration

Immune Response

- AMI & CMI
- AMI : in invasive intestinal amoebiasis
- All classes of Ig involved
- Abs : not protective against E. histolytica
- CMI : Probably active role in Invasive Disease

Laboratory Diagnosis

INTESTINAL AMOEBIASIS

- Stool Examination : Macroscopic & Microscopic
- Blood Examination : Moderate Leucocytosis
- Serological test : IHA, IFA & ELISA

HEPATIC AMOEBIASIS

- Diagnostic aspiration of pus & Microscopy : Trophozoites
  (In 15% cases : Trophozoites)
- Liver biopsy – in miliary hepatic abscess
- Blood Examination : Leucocytosis (15000-30,000/uL)
- Stool Examination: cysts in <15% cases
- IHA, IFA, ELISA

1. Examination of stool: Acute Dysentery

- a. Macroscopic: offensive, dark brown, semifluid, mixed with blood & mucus, fecal matter present
- b. Microscopic:

  i) cellular exudate- scanty, "pyknotic bodies", few pus cells, macrophages, epithelial cells, RBCs clumped

  ii) Charcot – Leyden crystals
- c. Demonstration of *E. histolytica*:
- trophozoites – movement, ingested RBCs

2. Carriers / Cyst passers:

- a. Examination of stool: natural stool / concentration / sigmoidoscopy – demonstration of cysts
- b. Culture: often positive

Key features
Stool

Character	Amoebic dysentery	Bacillary dysentery
Macroscopic		
Number	6-8 motions a day	Over 10 motions a day
Amount	Copious	Small
Odour	Offensive	Odourless
Colour	Dark red	Bright red
Reaction	Acidic	Alkaline
Consistency	Not adherent to the container	Adherent to the container
Microscopic		
RBCs	In clumps	Discrete, sometimes in clumps due to rouleaux formation
Pus cells	Few	Numerous
Macrophages	Few	Numerous, many of them contain RBCs hence may be mistaken for *E. histolytica*
Eosinophils	Present	Scarce
Charcot-Leyden crystals	Present	Absent
Pyknotic bodies	Present	Absent
Ghost cells	Absent	Present
Parasites	Trophozoites of *E. histolytica*	Absent
Bacteria	Many motile bacteria	Few or absent

Treatment : Intestinal & Hepatic amoebiasis

Amoebicides with luminal action

- Diiodohydroxyquin
- Diloxanide furoate
- Paromomycin

Amoebicides effective in the liver, intestinal wall and other tissues

- Emetine
- Dehydroemetine

Amoebicides effective only in the liver

- Chloroquine

Amoebicides effective in both tissues and the intestinal lumen

- Metronidazole
- Nitroimidazole

THANK YOU !!!