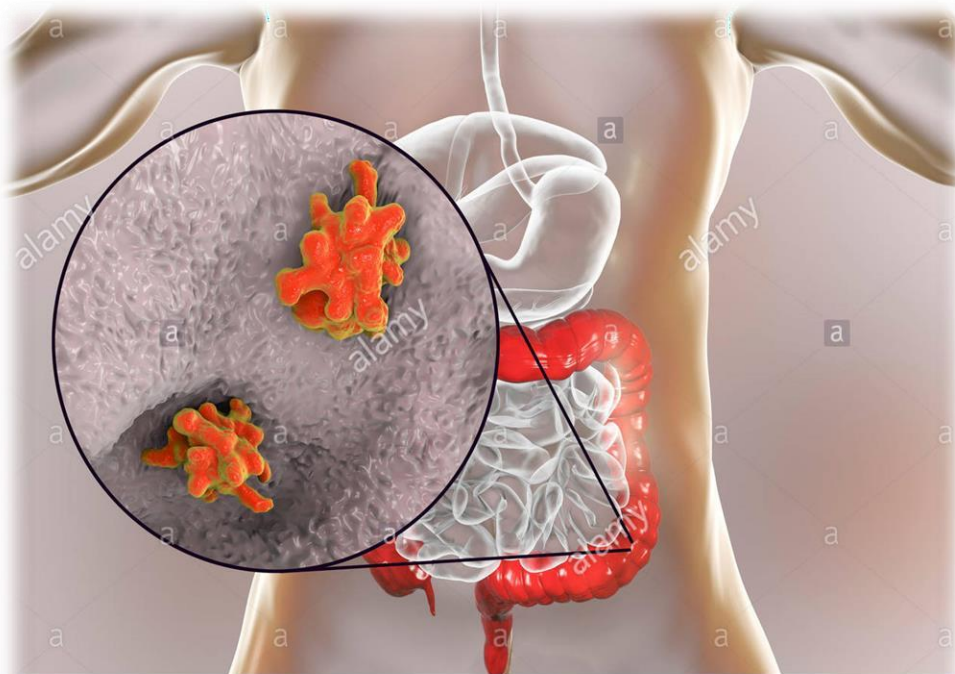


Protozoology

Genus Entamoeba



4th stage –Biology Dept.

2024-2025

Lecture 2

Protozoa:

Is defined as a microscopic unicellular eukaryotes organisms.

The single cell has a relatively complex internal structure and it performs various complex metabolic activities such as

digestion, reproduction, respiration, excretion, etc.

- **Reproduction: Asexually and Sexually**
 - Asexual reproduction by **binary fusion, multiple fusion** or **budding**.
 - Sexual reproduction by **conjugation** or by **fusion of gametes (syngamy)**.
 - Life history often completed with **alternation** of asexual and sexual phases.
 - **Encystment** is a common **protective phase**, commonly occurs to resist the unfavorable conditions of food.
-

- ❖ Nutrition by absorption of nutrients or ingestion of solid particles by the help of pseudopodia or cytosome.
- ❖ Respiration through diffusion of gases (aerobic and anaerobic).
- ❖ Excretion through diffusion through the body or by excretory vacuoles.

Systematic classification

The protozoa are classified into six phyla. This classification is based on the **morphology** of the protozoa as demonstrated by light and scanning electron microscopy.

Three of them important phyla, which contain species of medical important causing disease in human, and these are:

Phylum 1: Sarcomastigophora
(Flagella / pseudopodia)

Phylum 2: Apicomplexa

Phylum 3: Ciliophora (Ciliated)

Genus Entamoeba

Numerous amoebic protozoa can inhabit the gastro-intestinal tract of humans.

Entamoeba histolytica is the only species pathogenic to human.

Other species are non-pathogenic (*Entamoeba dispar*, *E. hartmanni*, *E. polecki*, *E. coli* and *E. gingivalis*).

Entamoeba histolytica

Schaudinn, 1903

Classification of the amoebae

The amoebae belongs to the

Phylum: Sarcomastigophora

Subphylum: Sarcodina

Class: Lobosea

Order: Amoebida

Genus: Entamoeba

E.g.: *Entamoeba histolytica*

Disease:

Entamoeba histolytica causes intestinal amoebiasis.

The infection is worldwide in distribution.

The parasite is the third leading parasitic cause of death in the developing countries. Also it's a causative agent of amoebic dysentery and amoebic liver abscess.

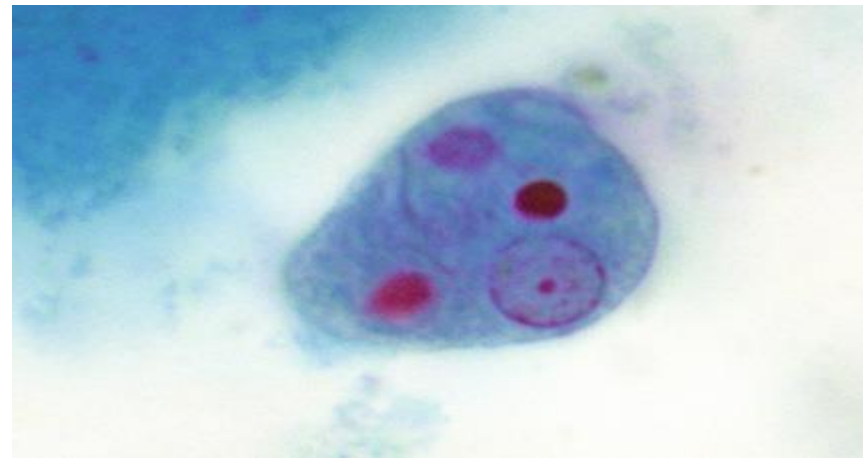
Habitat

The trophozoites of *Entamoeba histolytica* are present in the lumen and in the mucosa and submucosa of the large intestine.

Morphology

The parasite occurs in 3 stages:

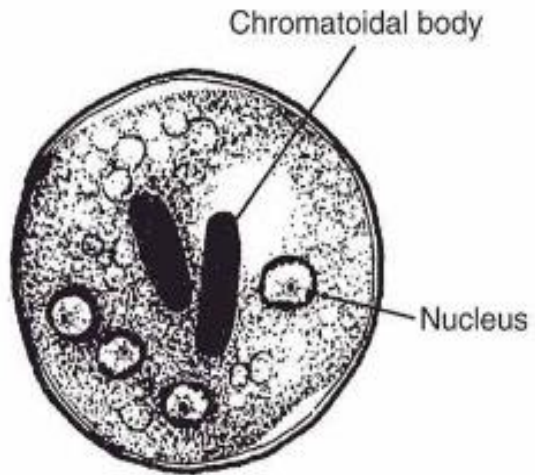
- Trophozoite
- Pre-cyst
- Cyst



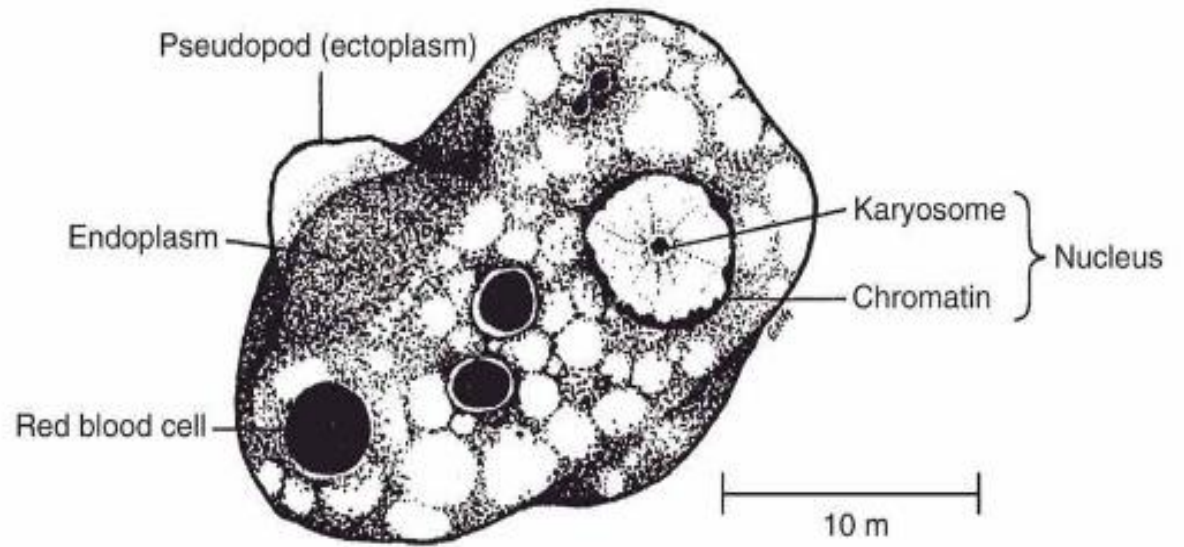
Morphology

❑ **Cyst (Infective form)**

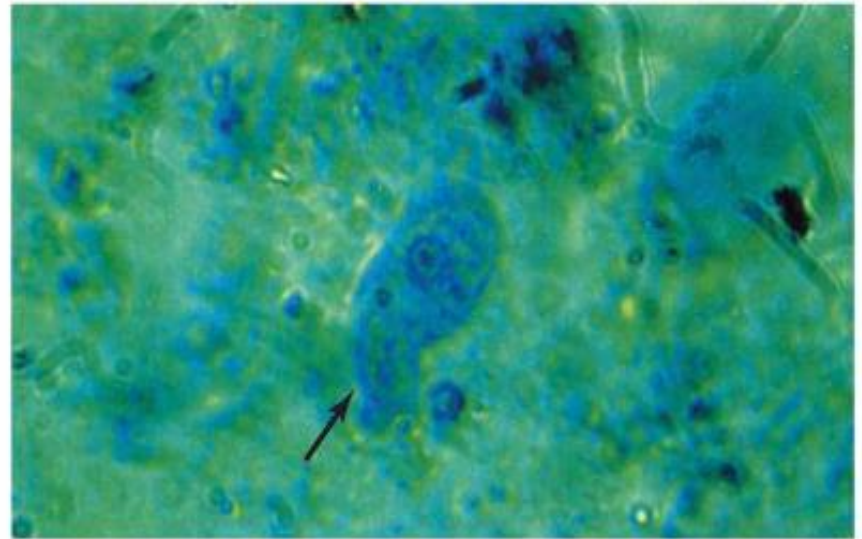
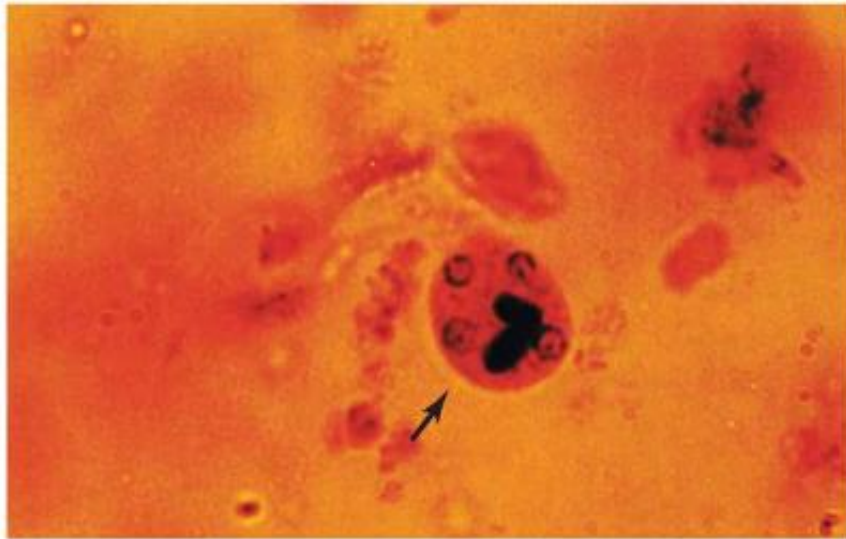
It is small and spherical, measures (10-16) μm in diameter. The mature cyst (quadrinucleate) contains four nuclei but does not contain any red blood cells or food particles..



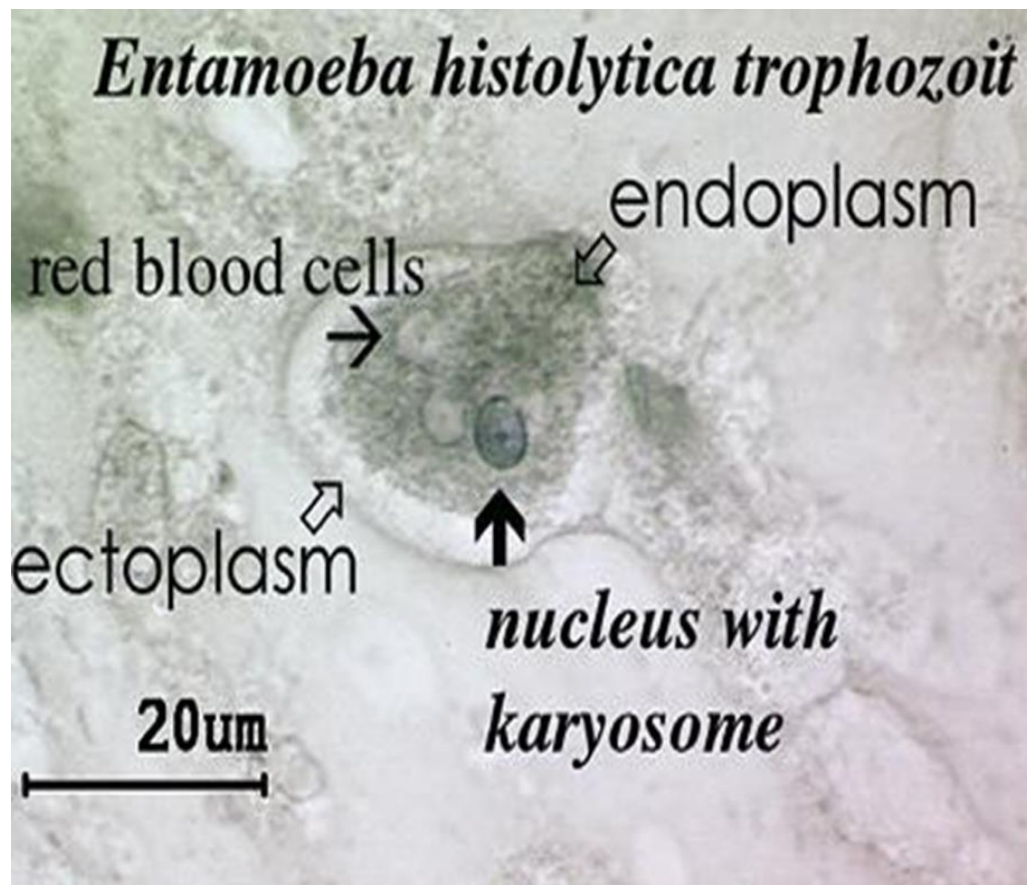
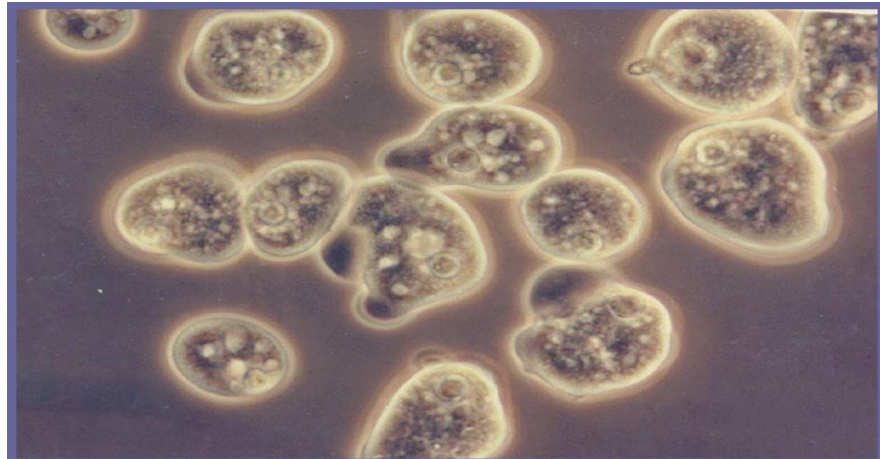
A Cyst



B Trophozoite

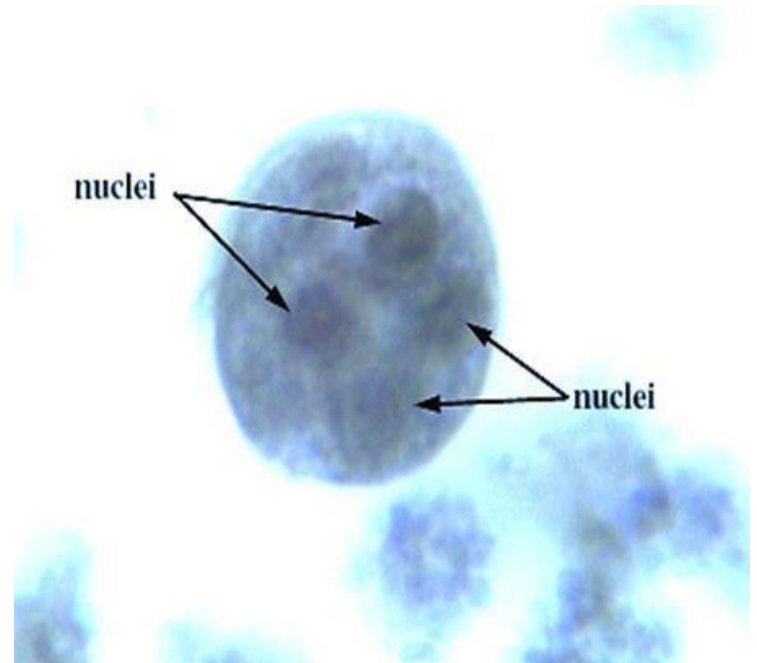
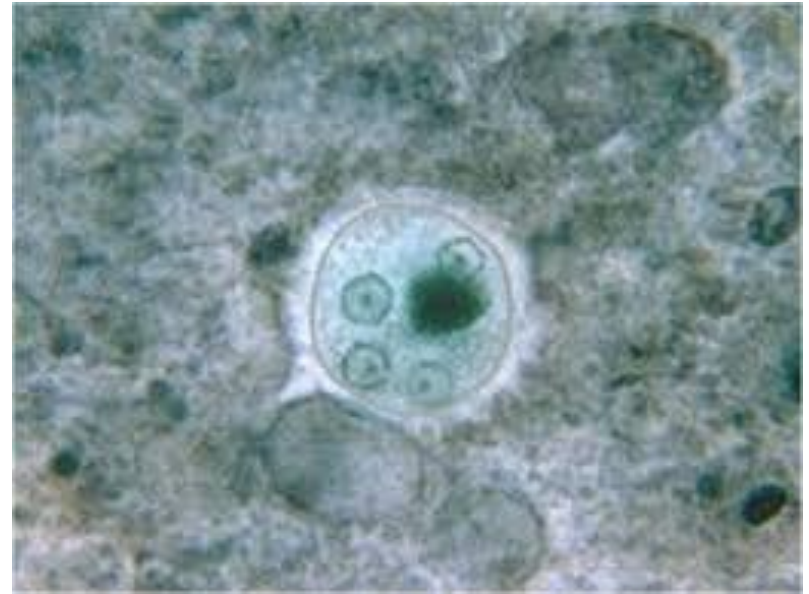
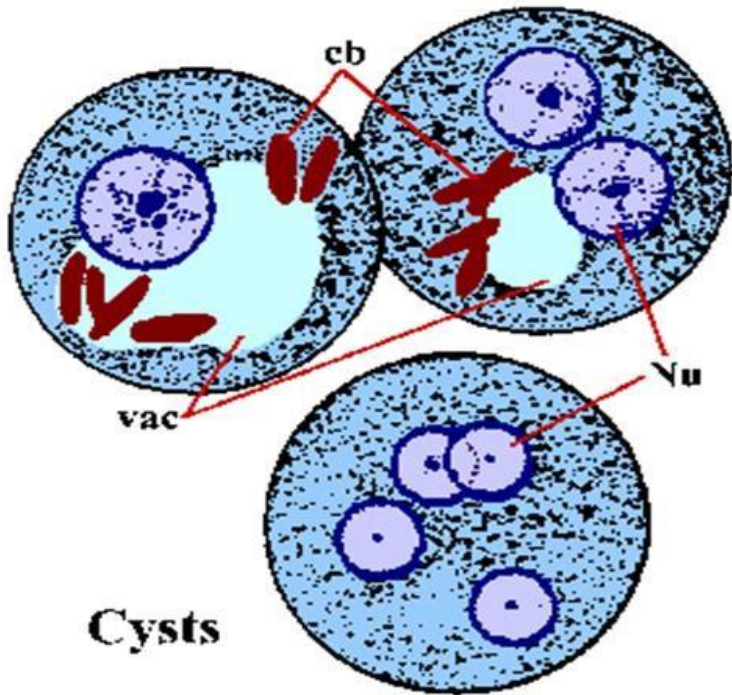


Morphology



Morphology

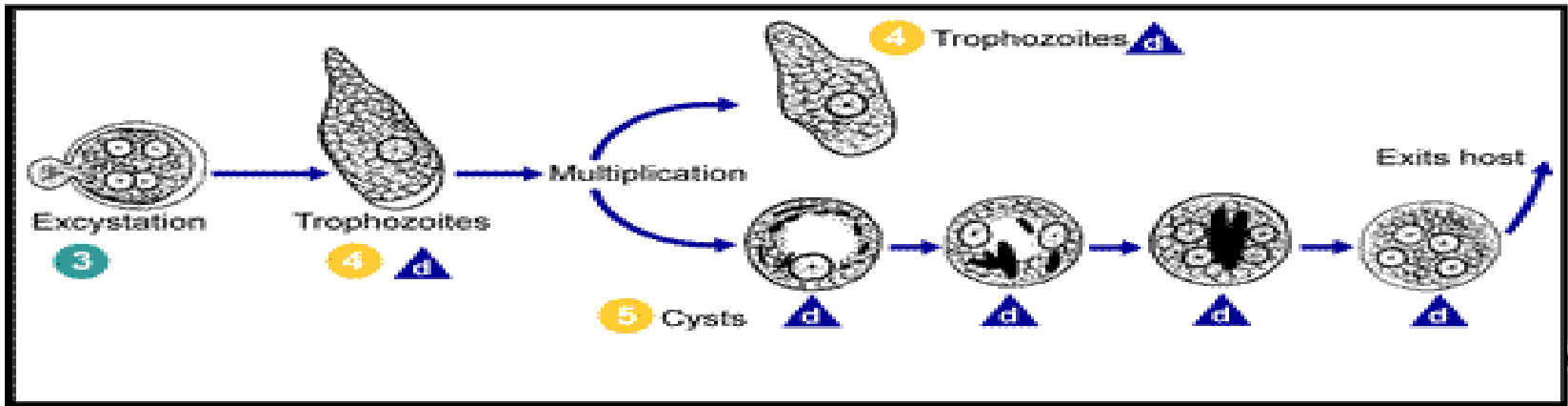
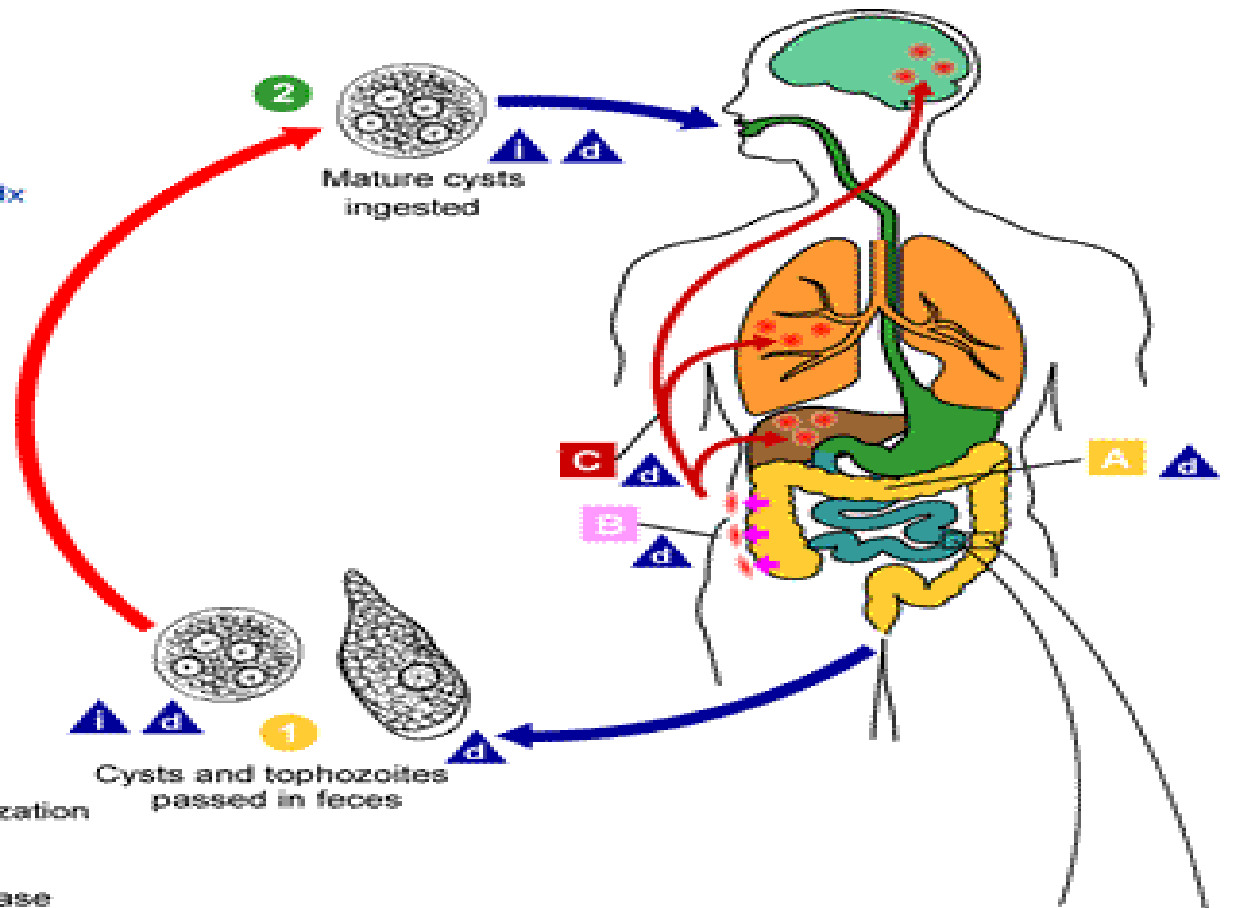
Cyst (Infective form)





SAFER - HEALTHIER - PEOPLE™

<http://www.dpd.cdc.gov/dpdx>



Life cycle

It is simple and is completed in a single host (human). Human acquires infection by ingestion of water and food contaminated with mature quadrinucleate cysts.

On ingestion, **cysts excyst** in the small intestine, liberating a single **trophozoite** with four nuclei (*excystation*).

Which they grow and multiply by **simple binary fission** in the large intestine. Then they colonise on mucosal surfaces and in crypts of the large intestine.

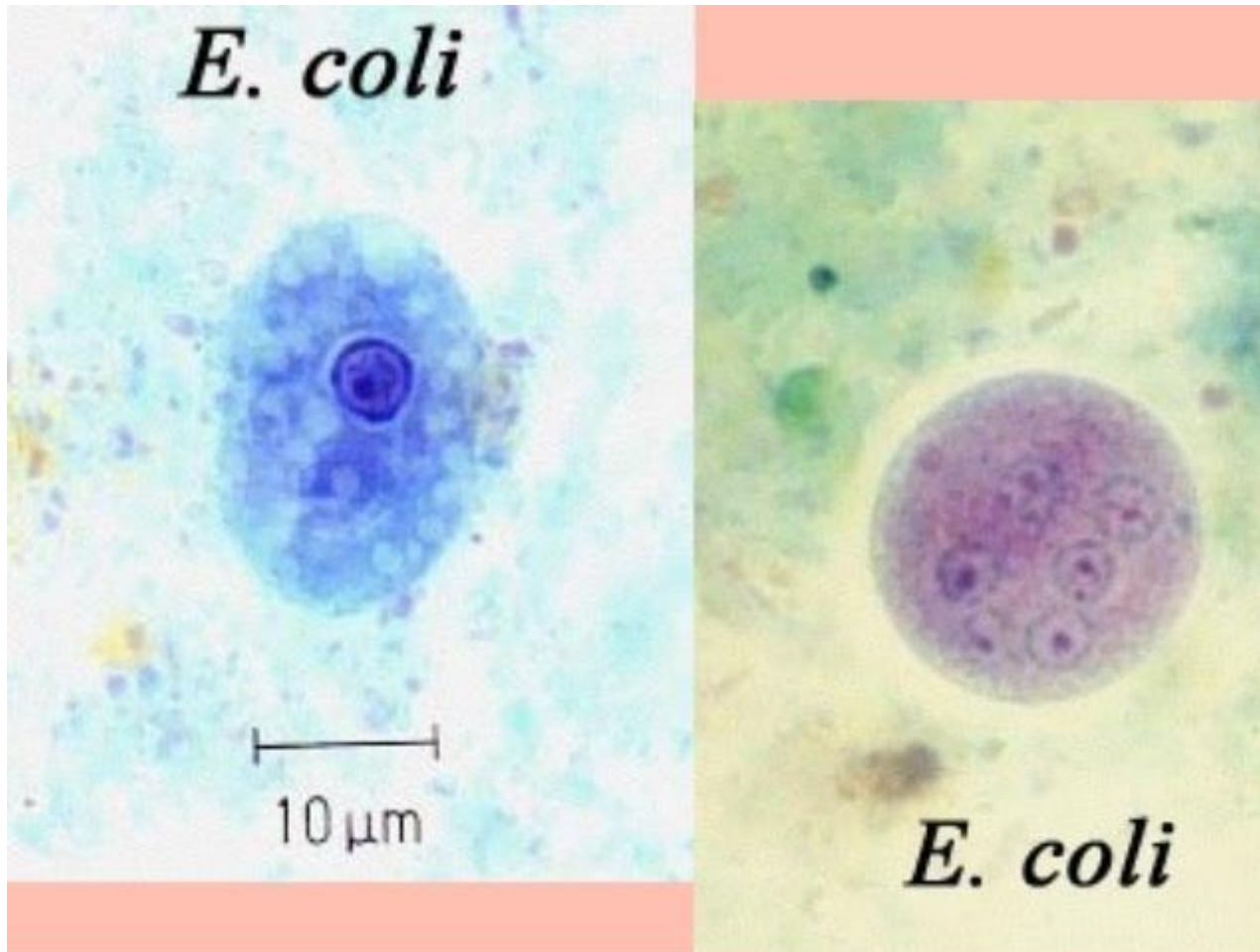
Reservoir, source and transmission of infection

Food and water contaminated by human faeces that contain cyst are the main sources of infection.

Infection is transmitted from one person to another by following methods:

1. **Faecal-oral route**: Amoebiasis is transmitted orally by ingestion of water, vegetables and food contaminated by faeces containing quadrinucleate cysts.
2. **Vectors**: Flies and cockroaches mechanically may transmit cyst from the faeces to the unprotected food and water.
3. **Sexual contact**

Entamoeba coli



Trophozoite

cyst

Entamoeba coli

Trophozoite of *E. coli* is the largest amoeba present in the large intestine of human.

Cytoplasm is granular and contains bacteria and cellular debris. It never contains any red blood cells (RBCs), unlike *E. histolytica*, it never lyses hosts tissue. It shows sluggish movement by pseudopodium.

Pseudopodium is blunt and granular, not finger and hyaline like pseudopodia of *E. histolytica*.

2-*Entamoeba coli*

It is similar to *E. histolytica* with exception of the following differences:

Trophozoite	<i>E. histolytica</i>	<i>E. coli</i>
Disease	Amoebiasis(Amoebic dysentery or Amoebic liver abscess)	Non pathogenic
Motility	Active	Sluggish
Size	10-40 μ m	20-50 μ m
Cytoplasm	Ectoplasm clearly differentiation from endoplasm	Not clearly differentiation from endoplasm
Food vacuole	Contain R.B.C in acute case	Contain bacteria,yeast & other particles without RBC
Karyosome	Small & central in the nucleus	Large & not central eccentric
Cyst	Have cyst stage	Have cyst stage
Diameter	10-15 μ m	10-30 μ m
Nuclei in mature cyst	4 Nuclei	8 Nuclei
Chromatin	Chromatin bodies from 1-4 & cigar-shape	Chromatin bodies from 10-15 & splinter shape

Methods of examination:

1. Stool examination: this includes

- A. Stool microscopy
- B. Stool antigen detection
- C. Stool culture

The diagnosis is based on demonstration of the amoebae (both trophozoites and cysts) in stool specimens.

Diagnosis of *E.histolytica*

Diagnosis of Intestinal Amoebiasis

Microscopic examination

Culture

Endoscopy

Antigen detection

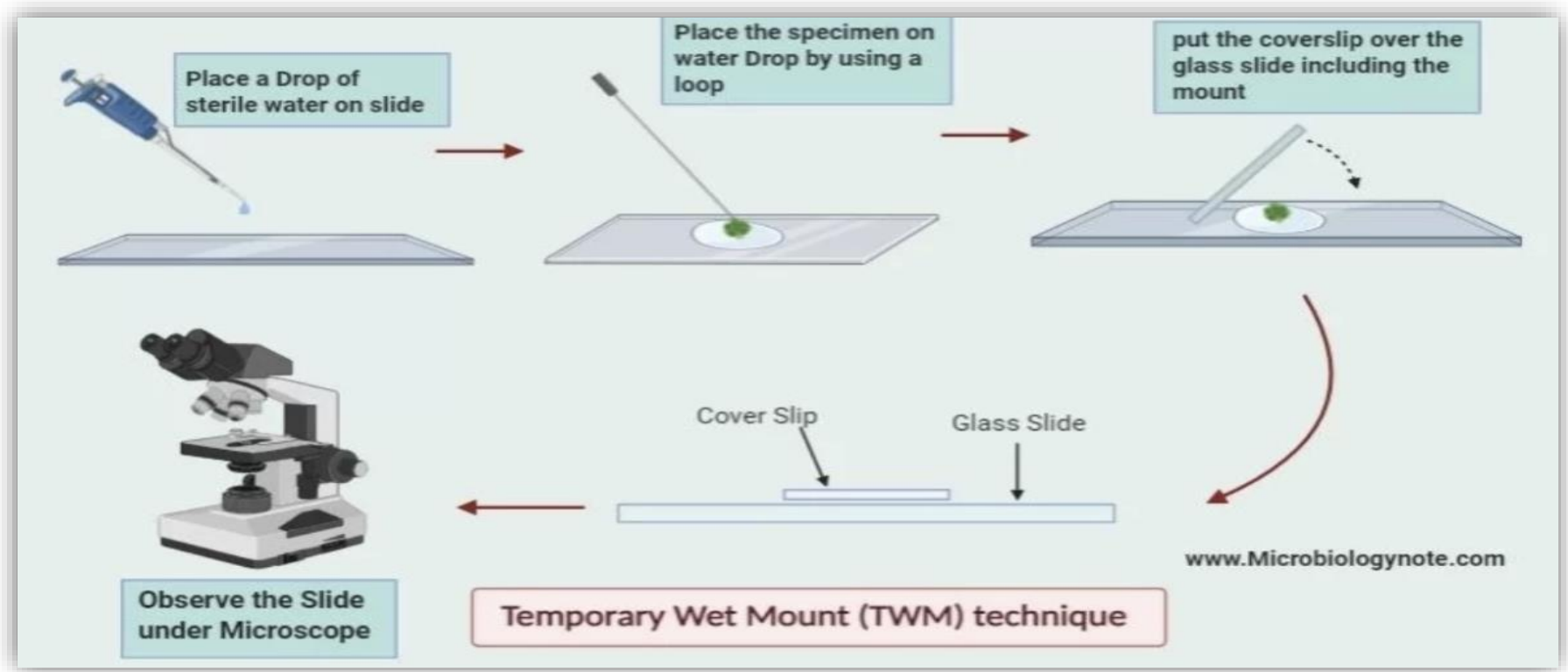
Serological methods

Chemical tests

Entamoeba histolytica

A. Wet mount preparation:

(saline wet mount preparation – Logul's iodine wet mount preparation - Buffered methylene blue)





THANK YOU