AMEBIASIS (amebic dysentery, amebic hepatitis)

Etiology
Entamoeba histolytica is the major cause of amebic dysentery.

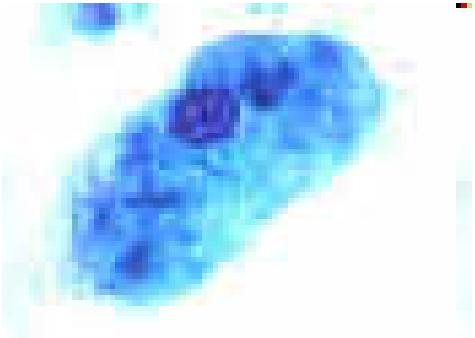
Epidemiology
-0.5 to 50% of the population world wide harbors *E. histolytica* parasites with the higher rates of infection being in underdeveloped countries.
-Infection is associated with poor hygiene.
-Humans are the principal host, although dogs, cats and rodents may be infected.

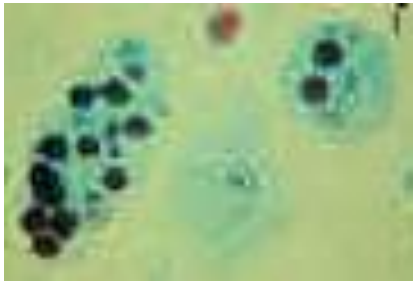
Morphology

Trophozoite: This form has an ameboid appearance and is usually 15-30 micrometers in diameter

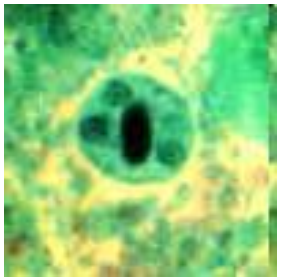
The organism has a single nucleus with a distinctive small **central** karyosome

The fine granular endoplasm may contain ingested erythrocytes





Cyst: Entameba histolytica cysts are spherical ,1 to 4 nuclei with a central karyosome



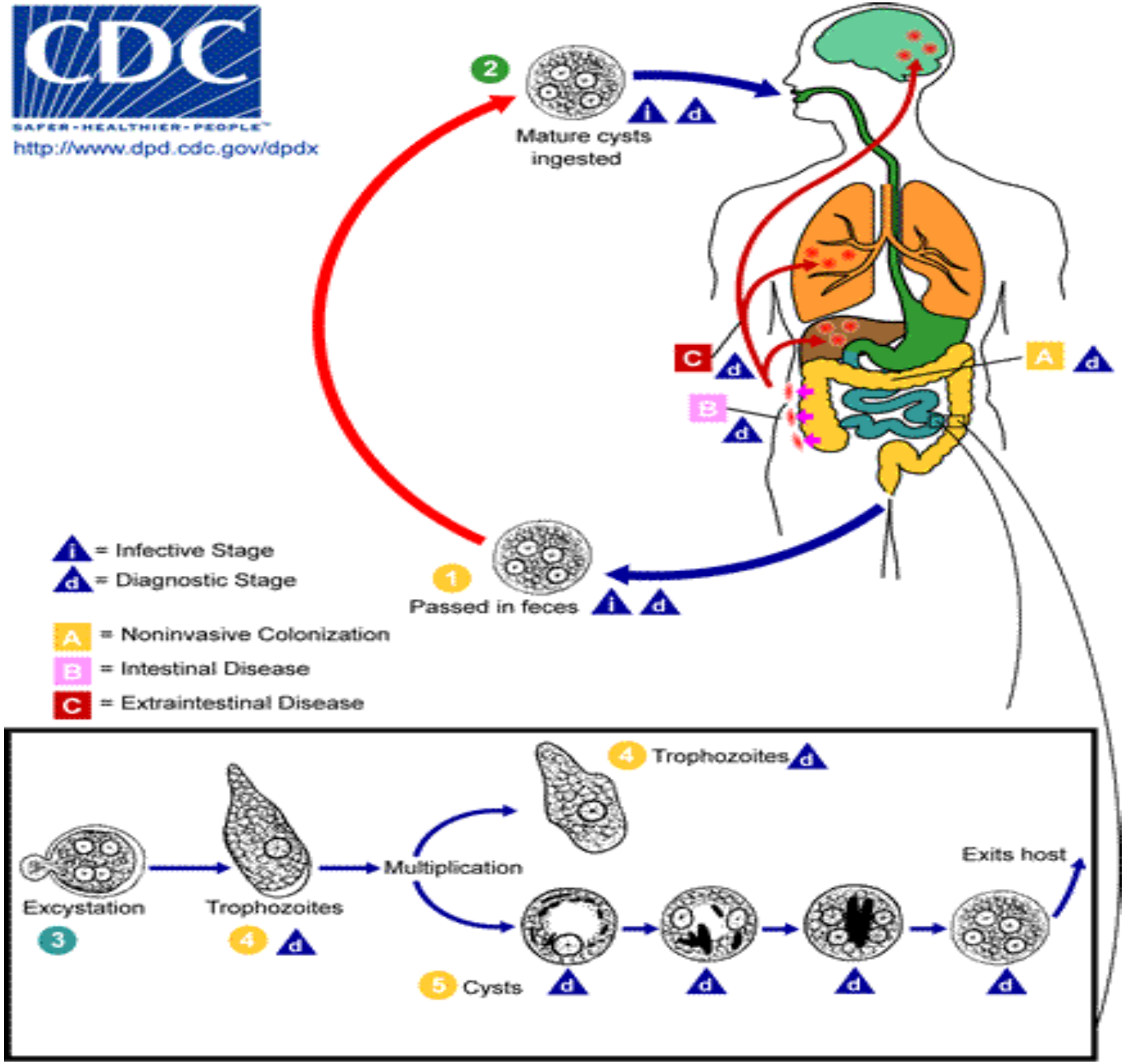
Life cycle
Infection occurs by ingestion of cysts on fecally contaminated food or hands.

The cyst is resistant to the gastric environment and passes into small intestine where it decysts.

The metacyst divides into four and then eight amoebae which move to the large intestine.

Some amebae attach to and invade the mucosal tissue forming "flask-shaped" lesions.

The organisms encyst for mitosis and are passed through with feces. There are no intermediate or reservoir hosts.


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

Symptoms

Acute: Frequent dysentery (stool: blood and mucus) with necrotic mucosa and abdominal pain.

Chronic: Recurrent episodes of dysentery with blood and mucus in the feces. There are intervening gastrointestinal disturbances and constipation. Cysts are found in the stool.

The organism may invade the liver, lung and brain where it produces abscesses that result in liver dysfunction, pneumonitis, and encephalitis.

Pathology
Intestinal ulcers are due to enzymatic degradation of tissue. The infection may result in appendicitis, perforation, liver abscess; sometimes brain, lung and spleen abscesses can also occur.

Diagnosis

In the laboratory, the infection is confirmed by finding cysts in the stool

E. histolytica infection is distinguished from bacillary dysentery by the lack of high fever and absence PMN leukocytosis.

Treatment

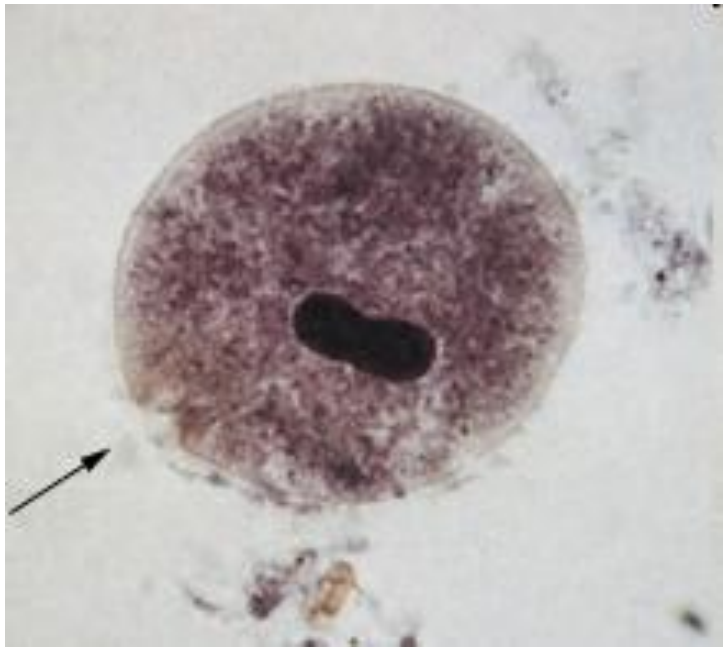
Iodoquinol is used to treat asymptomatic infections and metronidazole (flagyl) is used for symptomatic and chronic amebiasis, including extra-intestinal disease.

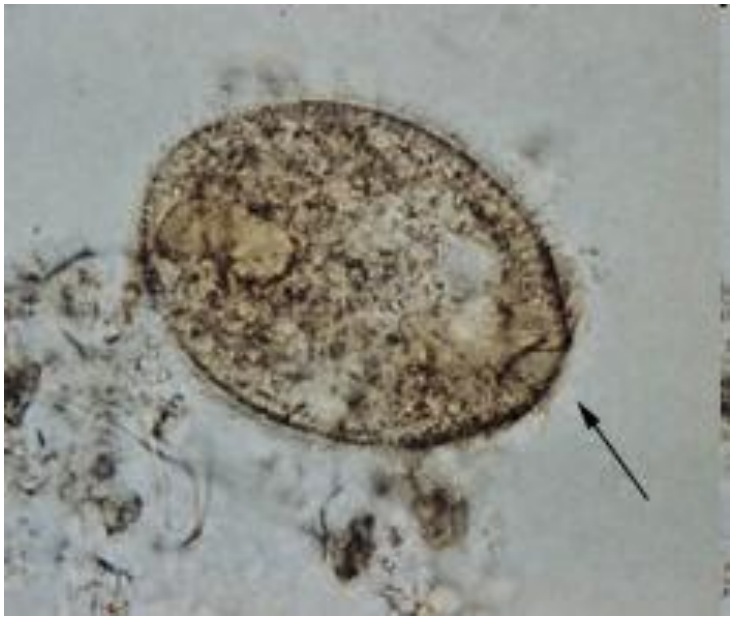
OTHER INTESTINAL PROTOZOA

Balantidium coli and Cryptosporidium (parvum) are both zoonotic protozoan intestinal infections with some health significance. Isospora belli is an opportunistic human parasite.

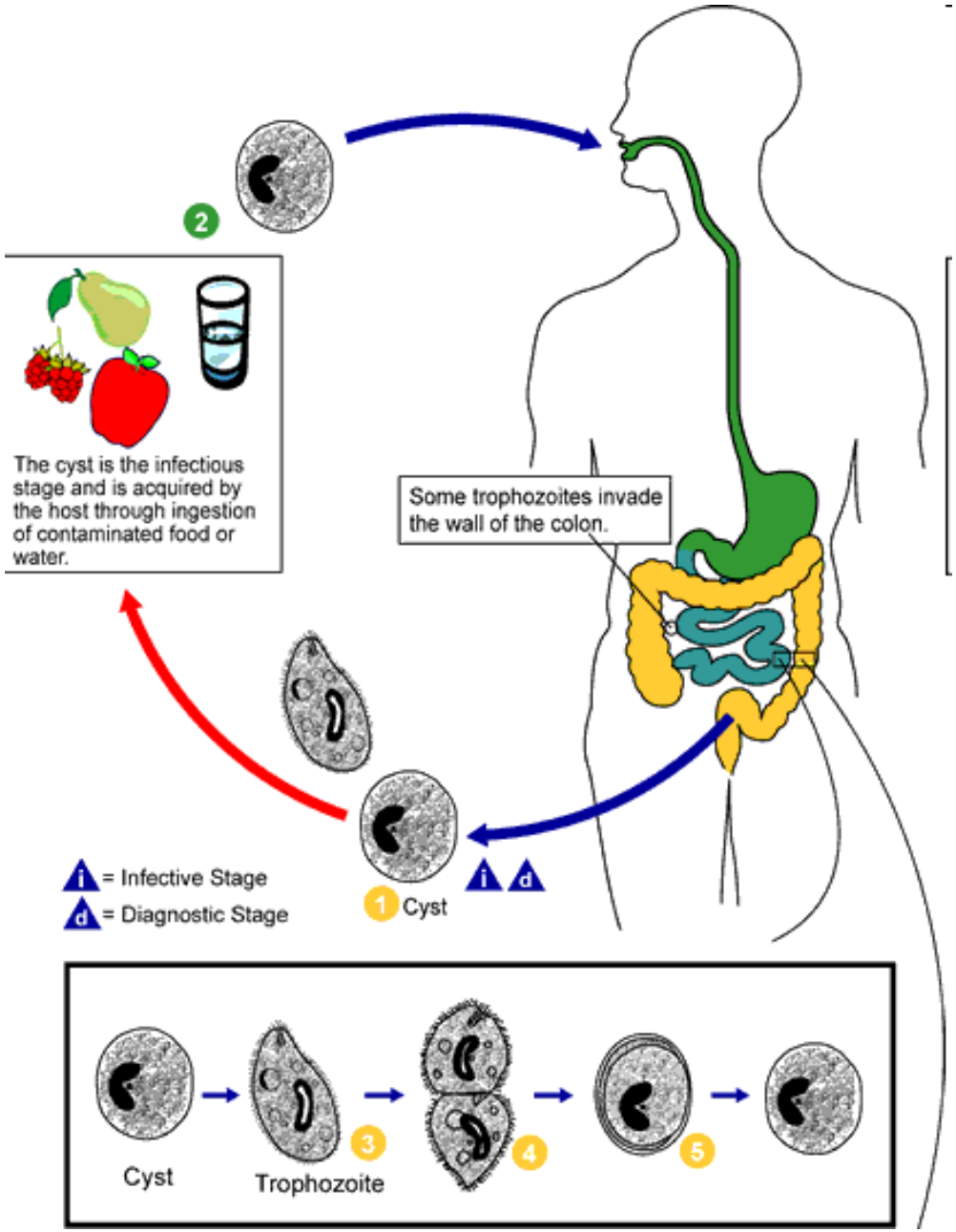
Balantidium coli

This is a parasite primarily of cows, pigs and horses. The organism is a large (100 x 60 micrometer) ciliate with a macro- and a micro-nucleus. The infection occurs mostly in farm workers and other rural dwellers by ingestion of cysts in fecal material of farm animals. Man-to-man transmission is rare but possible. Symptoms and pathogenesis of balantidiasis are similar to those seen in entamebiasis, including intestinal epithelial erosion
Metronidazole and iodoquinol are effective.



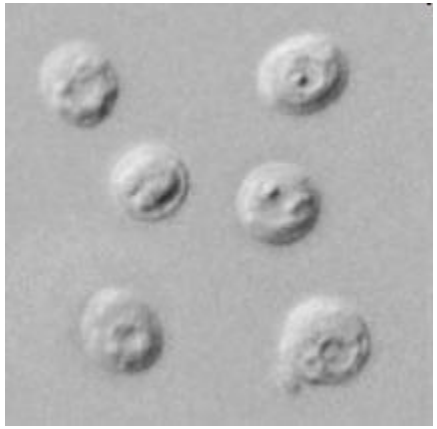


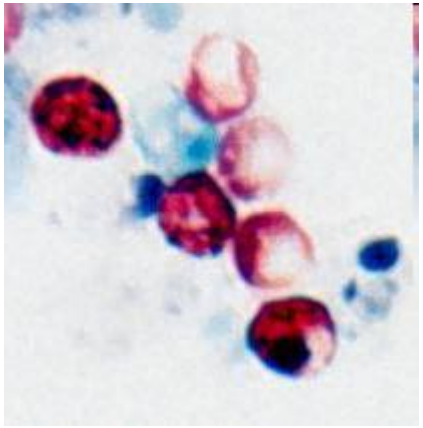
Balantidium coli trophozoites. These are characterized by: their large size (40 µm to more than 70 µm) the presence of cilia on the cell surface - particularly visible in (B) a cytostome (arrows) a bean shaped macronucleus which is often visible - see (A), and a smaller, less conspicuous micronucleus

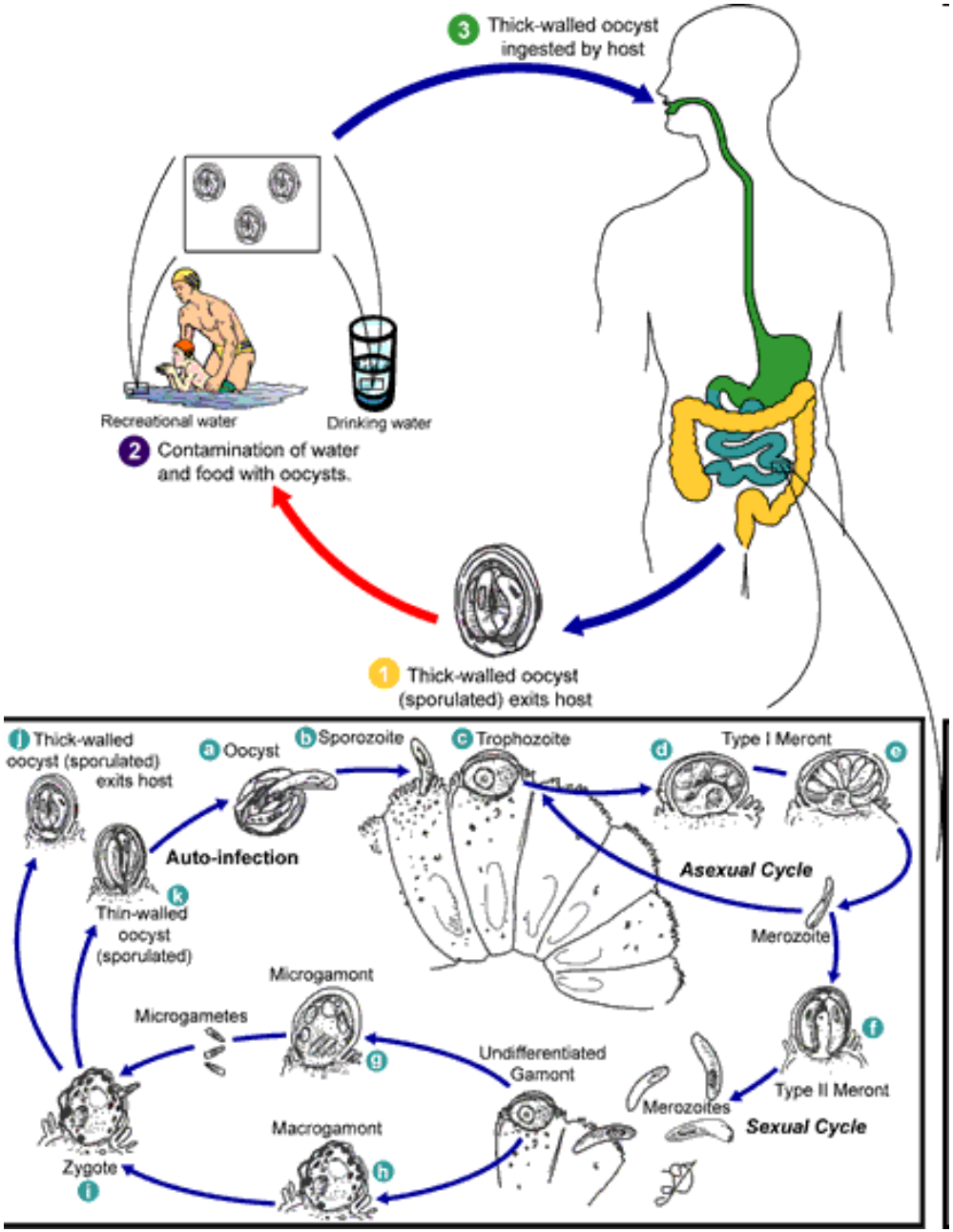

2
The cyst is the infectious stage and is acquired by the host through ingestion of contaminated food or water.
Some trophozoites invade the wall of the colon.
i = Infective Stage
d = Diagnostic Stage
1 Cyst
Cyst
Trophozoite
3
4
5

Cryptosporidium parvum

C. parvum is a small round parasite measuring 3 to 5 micrometers which is found in the gastrointestinal tract of many animals and causes epidemics of diarrhea in humans via contaminated food and water. Humans are infected by ingestion of *C. parvum* oocysts containing sporozoites. After schizogony, gametogony, and sporogony, the mature oocyst is excreted with fecal material and infects other individuals.






3 Thick-walled oocyst ingested by host
Recreational water
Drinking water
2 Contamination of water and food with oocysts.
1 Thick-walled oocyst (sporulated) exits host
j Thick-walled oocyst (sporulated) exits host
a Oocyst
b Sporozoite
c Trophozoite
d Type I Meront
e
Auto-infection
k Thin-walled oocyst (sporulated)
Asexual Cycle
Merozoite
Microgamont
Microgametes
g
f
Type II Meront
Undifferentiated Gamont
Merozoites
Sexual Cycle
Macrogamont
h
Zygote
i

Non parasitic pathogenic amoebae

Naegleria fowleri
Acanthamoeba culberstoni

They are free living amoebae: water, moist soil
They infect human during swimming, or through dust
Naegleria enter nose to olfactory nerve then to brain causing encephalitis
Acanth enters through eye causing eye infection

Dx: Non nutrient 1.5% agar plus *E.coli* specimen is spread on the agar