Phylum Apicomplexa

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Characteristics

- Obligate, intracellular protozoa
- Distinct from other protozoa because they lack motor organelles (cilia and flagella), except for the male gametes during the sexual phase
- Complicated life cycle, including sexual and asexual stages
- Sexual- Sporogony/ Sporogonic Cycle
- Asexual- Schizogony/ Schizogonic Cycle

- They undergo schizogony/merogony (multiple fission/budding-production of merozoites),
- Gametogony (production of male and female gametes), and sporogony (sexual stage- production of sporozoites)
- The sporozoites have apical complex which is specific to sporozoans, this structure is used for attachment to the host.

Phylum Sporozoa/ Apicomplexa

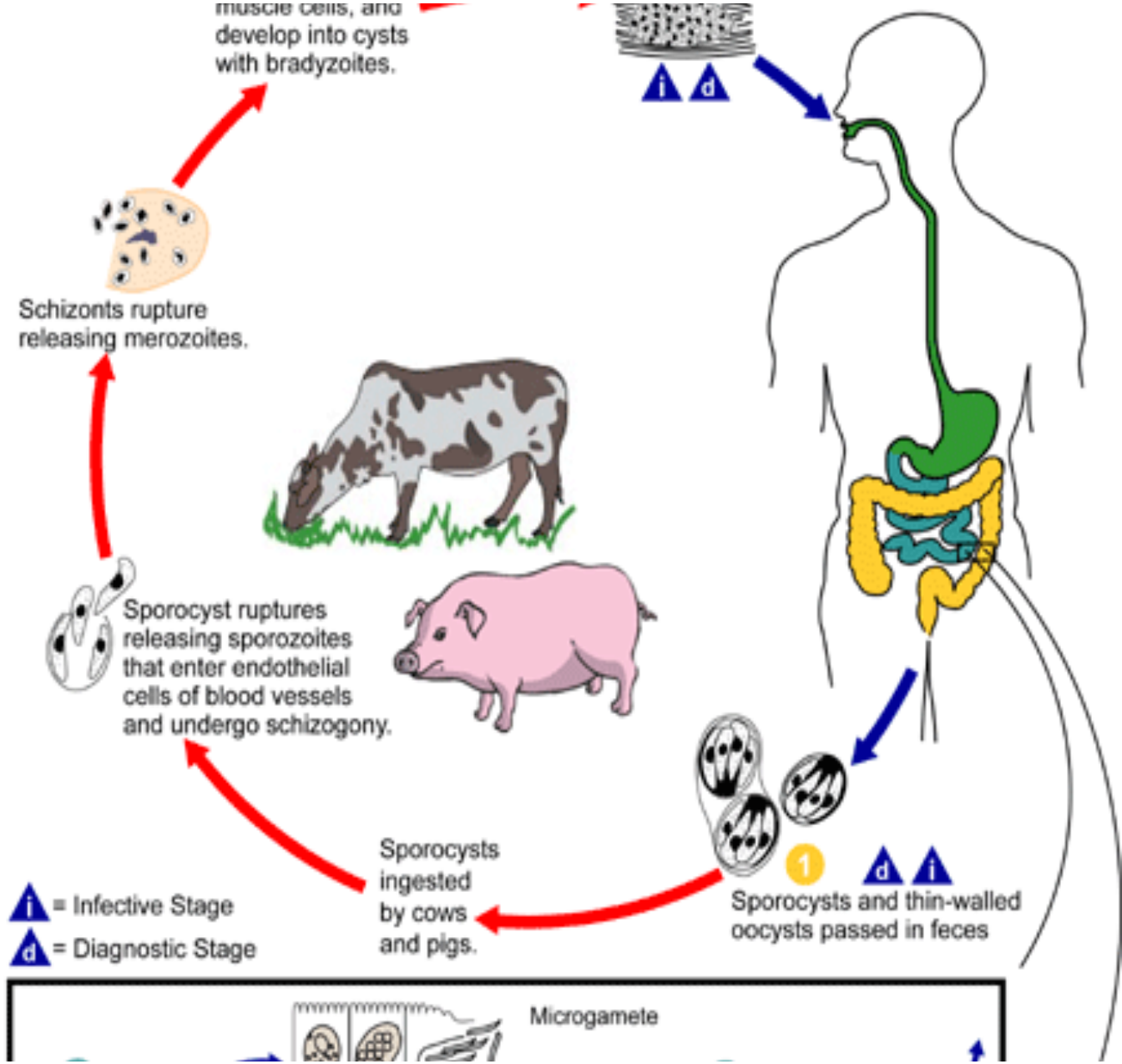
- Class Coccidia
- Subclass Piroplasmea
- Order Piroplasmida
- Genus *Babesia*
- Order Eucoccidiida
- Suborder Eimeriina
- Genus *Sarcocystis*
- Genus *Toxoplasma*
- *Genus Cryptosporidium*
- Suborder Haemosporina
- Genus *Plasmodium*

Sarcocystis hominis and *Sarcocystis suihominis*

1.a.

- Causes sarcocystosis (muscular and intestinal) in humans
- *S. hominis*
  - Intermediate host: cattle
  - Definitive host: humans
  - *S. suihominis*
  - Intermediate host: pigs
  - Definitive host: humans

The cysts with bradyzoites (infectice stage) ingested by humans will rupture in their intestines releasing the bradyzoites, these bradyzoites will differentiate into microgamete and macrogametes. The microgametes will fertilize the macrogametes resulting to oocysts. These oocysts will then be shed from the host in the feces. If these oocysts will be ingested by the intermediate hosts (pigs and cattle) it will rupture in their blood vessels releasing sporozoites. These sporozoites will invade the muscle tissues of the intermediate hosts and develops into cysts containing bradyzoites which will then be passed into humans once ingested.



Epidemiology

- Acquired through ingestion of infected uncooked / undercooked meat
- Occurs worldwide but is common in areas where live stocks are raised.
- Most cases are reported in Asian tropics and subtropics.
- The prevalence of intestinal sarcocystosis is apparently low and is rarely associated with illness.

Symptoms:

1. Muscular sarcocystosis
2. Myositis

Dyspnea

2. Wheezing associated with eosinophilia

3. Intestinal sarcosystosis

Nausea

Stomach pain

Diarrhea

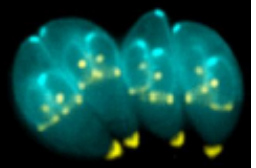
Diagnosis:

1. Fecal flotation method
2. IFA and ELISA

Treatment:

1. Corticosteroid
2. Albendazole
3. Metronidazole
4. Cotrimoxazole

Toxoplasma gondii



- *Toxoplasma gondii* was first described in 1908 by Charles Nicolle and Louis Manceux within the tissues of the common Gundi

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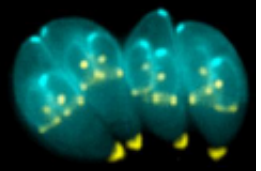
Toxoplasma gondii



- Parasitic protozoa
- Toxoplasmosis
- 30% to 50% seropositive
- Transmission
  - Congenitally
  - Consumption of uncooked contaminated meat
  - Via fecal matter

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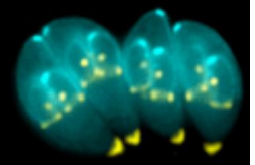
HEALTHY



- No symptoms
- May cause
  - Flu-like symptoms
- Immune system – effective
  - Able to acquire memory
- Parasite remains in the body (inactive state)
  - Cysts localize in brain and muscle tissue

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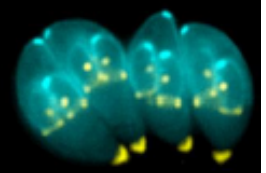
MOTHER TO CHILD



- Infection before becoming pregnant
  - Unborn child immunity against toxoplasma
- Infection during or just before pregnancy
  - Pass infection to unborn baby
- Damage to unborn child:
  - Intracranial calcifications
  - Mental retardation
  - Deafness, seizures, retinal damage

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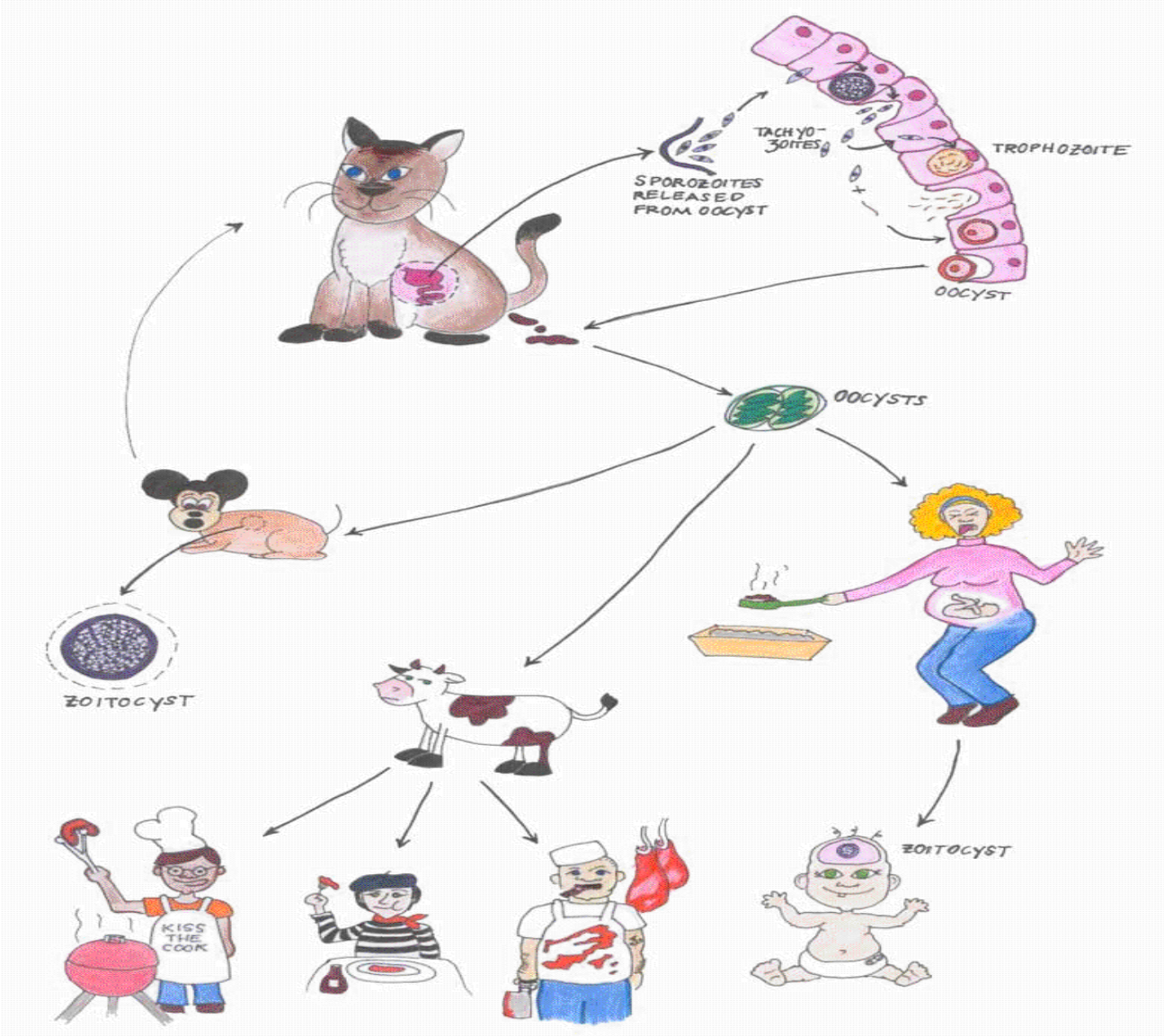
Toxoplasma gondii

Geographagic Distribution: worldwide

Epidemiology and Hosts

- 1. 500 million people worldwide have antibody to T. gondii
- 2. Prevalenc is the same in men and women
- 3. Prevalence of T. gondii in other animals.
    - a. Sheep -**20%**
    - b. Cattle - **25%**
    - c. Pigs - **30%**
    - d. Dogs - **30%**
    - e. Cats - **45%**
    - f. Birds - **12%**
    - g. Toxoplasma gondii infects many species of warm-blooded vertebrates **(euryxenous)**
- 4. Modes of transmission:
    - a. Feline feces containing infective oocyst
    - b. Eating raw of undercooked meat
    - c. Congenital and acquired toxoplasmosis

Toxoplasma gondii



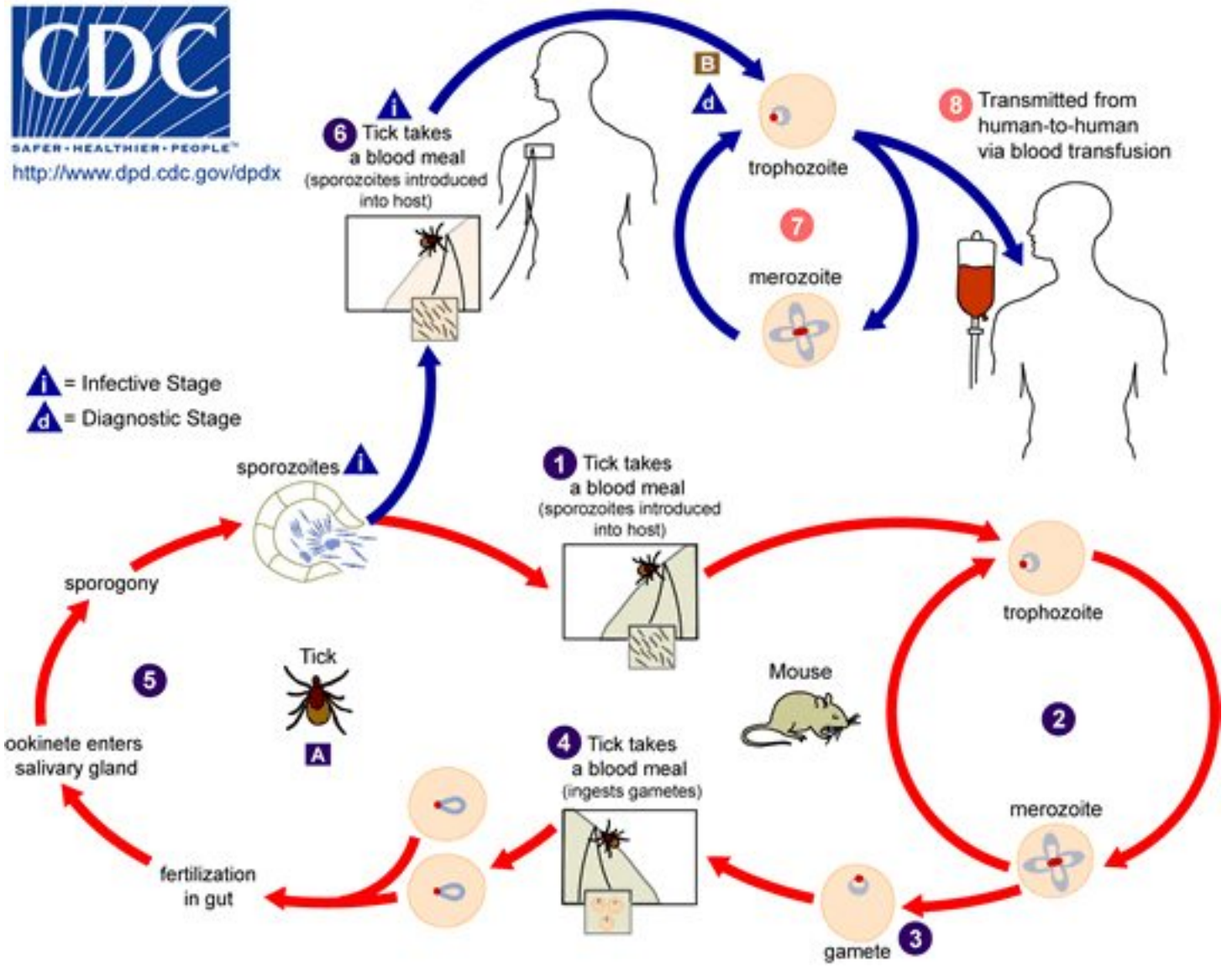
Diagnosis, Prevention and Control

1. Diagnosis performed postmortem by ID of organisms in infected tissues.
2. Serologic tests, biopsy or xenodiagnosis in mice
3. Preventive measures apply to all persons but particularly in pregnant women and young children.
4. Avoid contamination of food with cat feces.
5. Avoid ingestion of tissue cysts by cooking meat over 66 C and washing hands after handling raw meat.
6. Avoid contamination of feed or water with oocysts in cat feces.

Babesia bigemina /Babesia microfti

- Causes babesiosis
- Occurs in the US
- Infects and destroys red blood cells
- Transmitted by ticks (under nymph stage)
- Transmission: bite of infected tick, blood transfusion, and congenital transmission
- Hosts:
- Definitive host –tick
  Intermediate host- humans

1.During a blood meal, a *Babesia*-infected tick introduces sporozoites into the mouse host. Sporozoites enter erythrocytes and undergo asexual reproduction (budding). In the blood, some parasites differentiate into male and female gametes. The definitive host is the tick. Once ingested by an appropriate tick, gametes unite and undergo a sporogonic cycle resulting in sporozoites.
Humans enter the cycle when bitten by infected ticks. During a blood meal, a *Babesia*-infected tick introduces sporozoites into the human host. Sporozoites enter erythrocytes and undergo asexual replication (budding).Humans usually are dead-end hosts. However, human-to-human transmission is well recognized to occur via contaminated blood transfusions.



Symptoms:

- presence of hemolytic anemia and nonspecific flu-like symptoms (e.g., fever, chills, body aches, weakness, fatigue).
- Splenomegaly
- Hepatomegaly
- Jaundice

Severe cases

Thrombocytopenia

Myocardial infarction

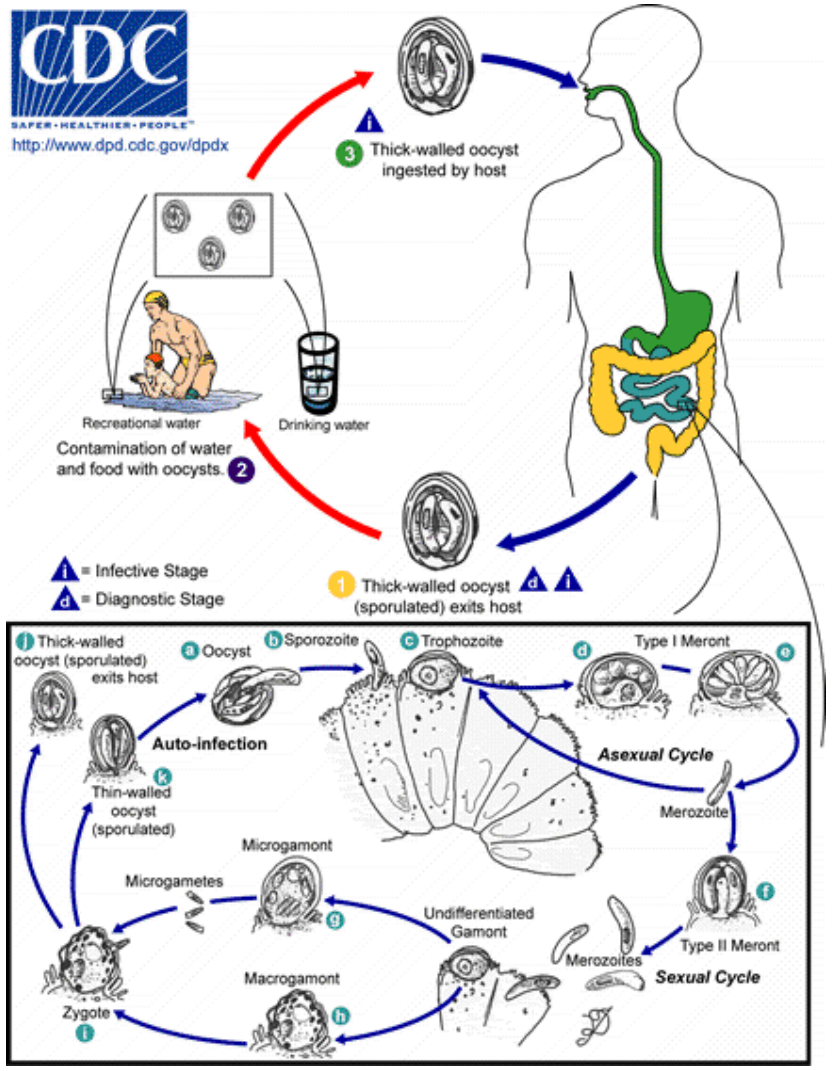
Renal failure

Altered mental status

Death

Diagnosis:
Microscopy
Serological test
Treatment:
atovaquone PLUS
azithromycin
clindamycin
PLUS quinine

***Cryptosporidium* species, are coccidian protozoa, which are cosmopolitan in distribution, occurring in both developed and underdeveloped countries and causing infection in both humans and their live stock. *Cryptosporidium parvum* and *C. hominis* are the species responsible for human infection.**



Cryptosporidium sp. as Potential Carcinogenesis Agent in immunocompromised individuals

MARIA LLAINE JIMENEZ CALLANTA

GEOGRAPHIC DISTRIBUTION

- *Cryptosporidium* has been found worldwide
- Outbreaks of cryptosporidiosis have been reported in several countries
- most remarkable being a waterborne outbreak in Milwaukee (Wisconsin) in 1993
  - affected more than 400,000 people

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PHILIPPINES PREVALENCE RATE

- **May 2004- May 2005**
  - n=3, 456 diarrheic patients
  - 1.9% prevalence among patients
  - Most prevalent in Luzon with 3.1 % prevalence rate
  - Pediatric patients: 2.9% (highest among 0-4 yo)
  - Adult patients: 0.2% prevalence rate
- **2005**
  - PGH cancer patients n=53
  - 28.3% + for antibody using IFAT

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HUMAN TO HUMAN

- outbreaks in day-care centers
  - Children to their households
- Patient-to-patient in hospitals
- patient-to health care staff transmission may occur in hospital
- Sexual practices that imply oro-anal contact
- foreign travel to countries with a higher prevalence of cryptosporidiosis

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ANIMAL TO HUMAN

- exposure to calves or lambs
- cattle and sheep
  - important sources of environmental contamination with *Cryptosporidium* oocysts
- avian cryptosporidiosis
- Cats and dogs as risk only to immunocompromised individuals

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WATER

- The largest outbreaks were attributed to contaminated drinking water
  - surface water and groundwater sources
  - Reported concentrations generally range from 0.01-100 per liter
- Large rivers and lakes
- Most frequent genotypes are *C. parvum* and *C. hominis*
- Contaminated recreation or drinking, swimming pools or food

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FOOD

- Food contaminated by infected food handlers
- raw milk and meat
- farm-made apple cider
- fermented milk, salads, raw vegetables
- found in shellfish, such as oysters

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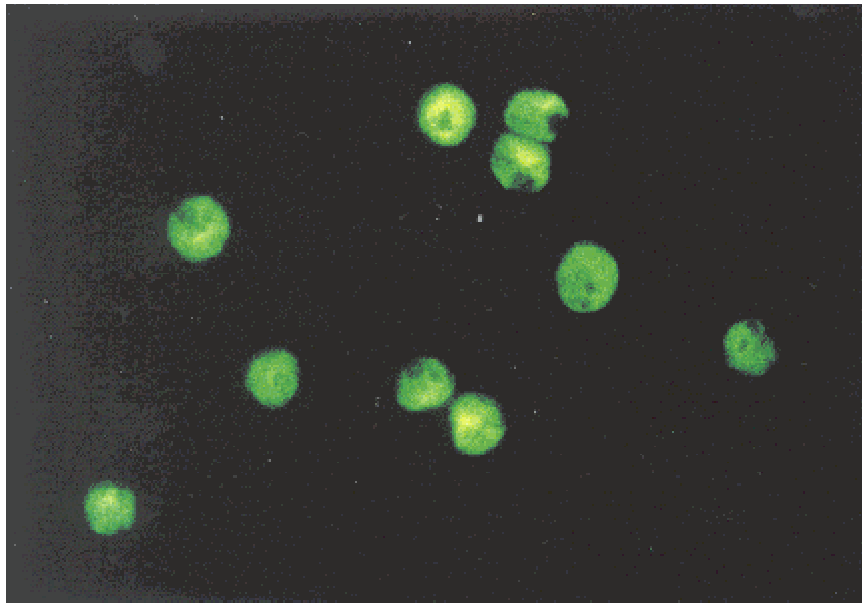
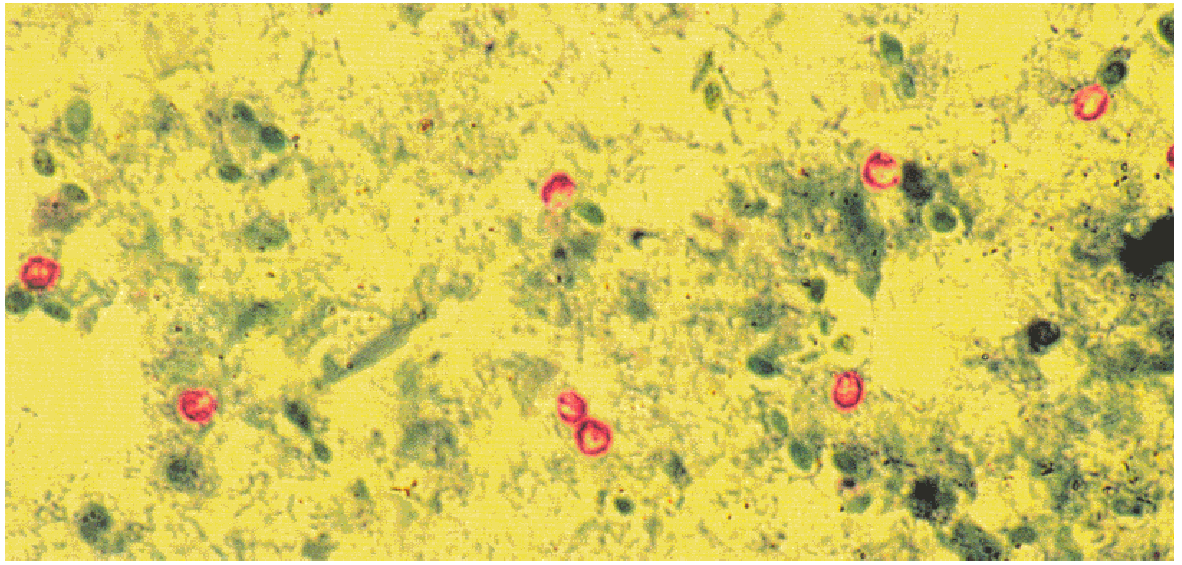


Cryptosporidium parvum and *C. hominis*



Cryptosporidium spp.

- Cryptosporidiosis may be self limiting diarrhea in immunocompetent hosts but in immunocompromised individuals, diarrhea becomes more severe, progressively worse and life threatening.
- Water-borne transmission is most common so use of multiple disinfectants and water treatment may reduce *C. hominis* in water.
- Unpasteurized milk and apple cider have also been reported as sources of infection.

Thank you.