***Isospora belli* ………………..3**

It is an intestinal protozoan that causes **coccidiosis** **/isosporiasis** in humans (diarrhea, especially in immunocompromized patients**,** e.g., those with AIDS).

**Morphology of oocysts.**

The mature oocyst contains 2 sporocysts, each containing 4 sporozoites measure on average 35 x 9µm. The sporulated oocyst is the infective stage of the parasite

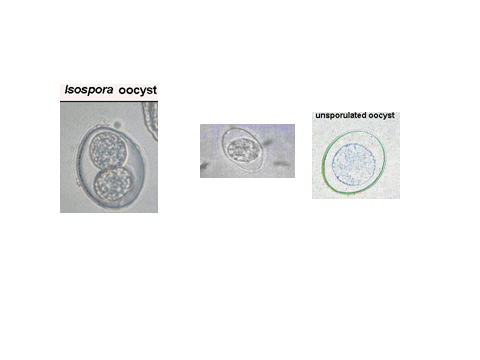




Figure 24; immature Oocyst of isospora species

The life cycle :

At time of excretion, the immature oocyst contains usually one sporoblast (more rarely two) . In further maturation after excretion, the sporoblast divides in two (the oocyst now contains two sporoblasts); the sporoblasts secrete a cyst wall, thus becoming sporocysts; and the sporocysts divide twice to produce four sporozoites each. Infection occurs by ingestion of sporocysts-containing oocysts: the sporocysts excyst in the small intestine and release their sporozoites, which invade the epithelial cells and initiate schizogony .  Upon rupture of the schizonts, the merozoites are released, invade new epithelial cells, and continue the cycle of asexual multiplication. Trophozoites develop into schizonts which contain multiple merozoites.  After a minimum of one week, the sexual stage begins with the development of male and female gametocytes. Fertilization results in the development of oocysts that are excreted in the stool.  *Isospora belli* infects both humans and animals.

Briefly , the life cycle is parallels that of other members of the Coccidia. The organism is acquired by fecal-oral transmission of oocysts from either human or animal sources. The oocysts excyst in the upper small intestine and invade the mucosa, causing destruction of the brush border.



Figure : Life cycle of *Isospora belli.*

**Clinical disease and pathogenesis:**

Infection with *Isospora belli* occurs in both immunocompetent and immunocompromised patients and begins when the mature oocyst is ingested in water or food.

The disease in immunocompromized patients presents as a chronic, profuse, watery diarrhea. The pathogenesis of the diarrhea is unknown.

In the immunocompetent, infection is generally asymptomatic or a self-limiting gastro-enteritis. However, in chronic infections, severe non-bloody diarrhea with cramp-like abdominal pain can last for weeks and result in fat malabsorption and weight loss. Eosinophilia may be present (atypical of other protozoal infections).

In immunocompromised individuals, infants and children, infection ranges from self-limiting enteritis to severe diarrheal illness resembling that of cryptosporidiosis.

**Laboratory Diagnosis**

Oocysts are thin walled, transparent and ovoid in shape. They can be demonstrated in feces after a formal ether concentration where they appear as translucent, oval structures.

Alternatively, oocysts can be seen in a fecal smear stained by a modified Ziehl-Neelsen method, where they stain a granular red color against a green background, or by phenol-auramine.

Its diagnosis is made by finding the typical oocysts in fecal specimens. Serologic tests are not available.

**Treatment**

The treatment of choice is trimethoprim-sulfamethoxazole.

**Sarcocystis species ………………….4**

Number of species of parasites that fall within the group known as sarcocystis ,e.g.,:

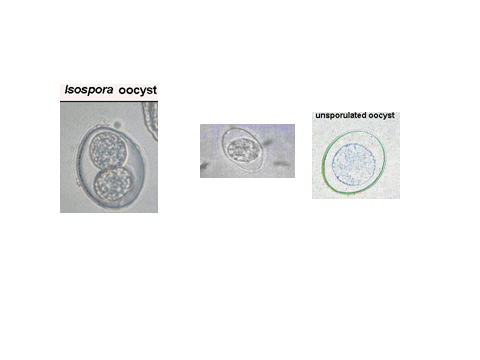
1.*Sarcocystis bovihominis (S. hominis)*------in cattle(farm animals).

2.*Sarcocystis suihominis* ------------in pigs(farm animals).

3. *Sarcocystis lindemani* ---------in human and wild animals.

**Description of parasites:**

Its mature oocyst morphology is resembling that of Isospora genus , since, the oval, transparent organism consist of two mature sporocysts that each is equipped with four sausage -shaped sporozoites. A double layered clear and colorless cell wall surrounds the sporocysts.

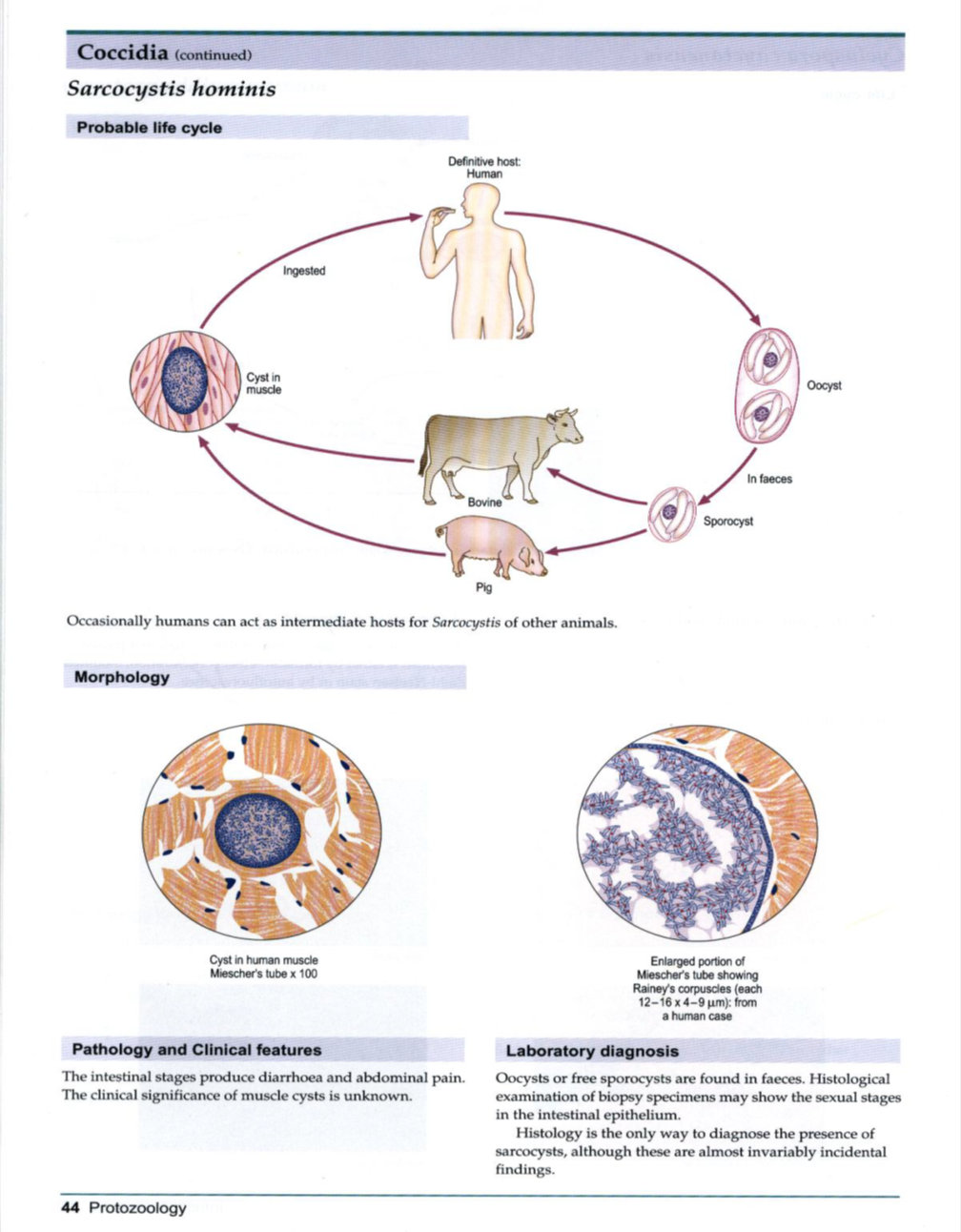


**Life cycle and transmission route:**

Asexual reproduction of sarcocystis occurs in the intermediate host. Human infection of sarcocystis species may be initiated in one of the two ways:

**A-**Occurs when uncooked pig or cattle meat, infected with Sarcocystis parasite, is ingested. Humans are the definitive host. The gametogony usually occurs in the human intestinal cells .The development of oocyst and subsequent release of sporocysts thus following .This sets the stage for continuation of the life cycle in a new intermediate host.

**B-** Occurs when humans accidently swallow oocysts from stool sources of animals other than cattle or pigs. The ingested oocysts take up residence in human striated muscles ,under these conditions, the human serves as the intermediate host. Note; sarcocysts do not infect the host of their origin.



**Clinical symptoms**

There have only a few documented symptomatic cases of sarcocystis infections among compromised patients. These persons experienced : fever ,severe diarrhea ,weight loss , and abdominal pain. It is presumed that patients suffering from muscle tenderness and other local symptoms are exhibiting symptoms caused by sarcocystis invasion of the striated muscle.

**Lab. Diagnosis**

**1-**By examination of stool specimen (when human serve as a final host…as in *S. bovihominis*, *S. suihominis*) , the mature oocyst are typically seen in wet preparations(the oocyst are usually passed into the feces fully developed.

**2-**By histological methods (when human serves as the intermediate host …as in *Sarcocystis lindemani* ); it may be used to identify the sarcocystis cyst stage(sarcocyst),from human muscle samples.

**Treatment**

* By combined medications of trimethoprim plus sulfamethoxazole **,** orpyrimethamine and sulfadiazine.
* **Note :** There is no known specific chemotherapy to treat sarcocystis infection of the striated muscle when humans are the intermediate host.

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