Family: Sarcocystidae

Genus: 1-*Sarcocystis*

2-*Toxoplasma*

1-*Sarcocystis*

Species belong this genus are causing disease called sarcocystosis which is a zoonotic disease, and there are two types of *sarcocystis*, microscopic and macroscopic.

Final hosts: Dogs, cats, wild carnivores and man.

Intermediate hosts: Man, ruminant, horses, birds, reptiles.

Site in the final host: Small intestine

Site in the intermediate host:

Schizonts in the endothelial cells of blood vessels; large cysts containing bradyzoites in muscles.

Distribution: Worldwide**.**

Species:

1- Species that recognized with the dog as a final host:

a- Sarcocystis bovicanis

a- S. ovicanis

b- S. capricanis

c- S. porcicanis

d- S. equicanis

e- S. fayri (horse)

2- Species that recognized with the cat as a final host:

a- S. bovifelis

b- S. ovifelis

c- S. porcifelis

3- Species that recognized with the man as a final host:

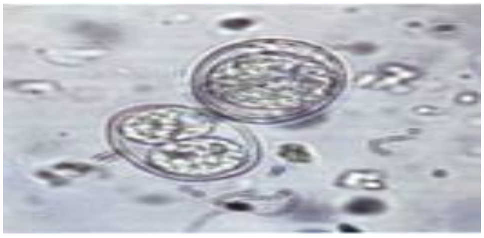
a- S. bovihominis

b- S. porcihominis

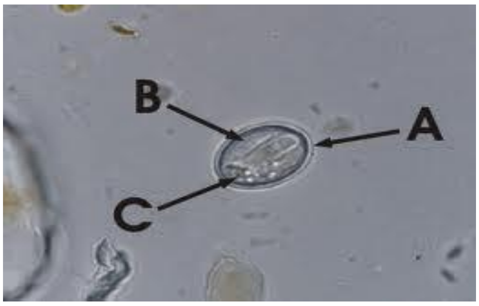
***Note:** Most species that recognized with the dog as a final host give microscopic types except *S. fayri* which give macroscopic type, whereas most species that recognized with the cat as a final host give macroscopic types.

Identification:

1- Oocysts: contain two sporocysts each sporocyst contains four sporozoites, the oocysts are sporulated mainly before excreted and the sporocysts found free in faeces, measured approximately 15x9 µm.



(Mature & immature oocyst)

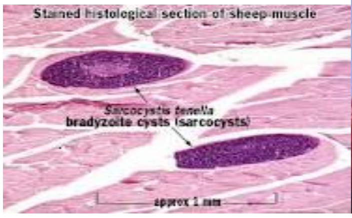


(Sporocyst)

2- Tachyzoite: Is a banana shape like structure, appear in acute stage of infection and it's disappear when host immunity is increased to convert to bradyzoite.

3- Bradyzoite: It is like the tachyzoite in shape but it is contained in a tissue cyst.

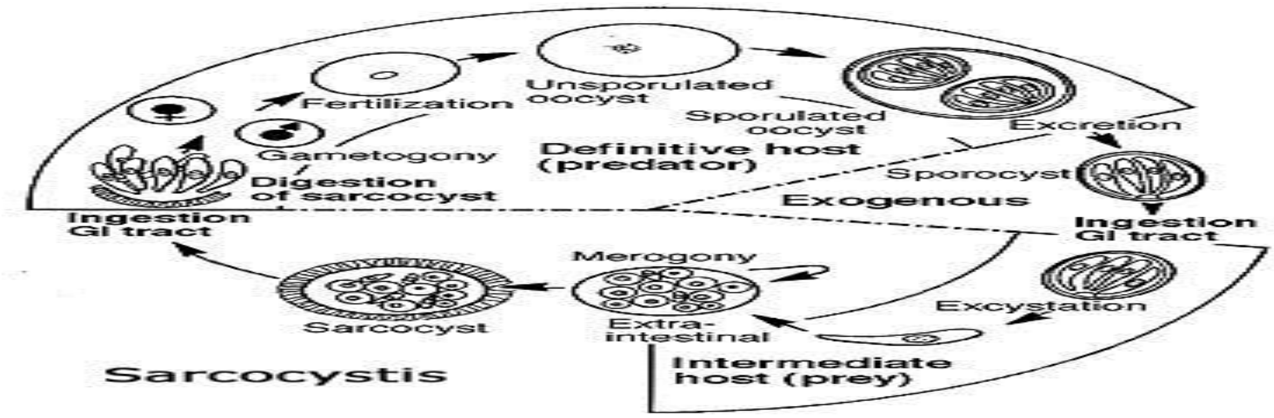
4- Tissue stage: In the intermediate host the schizonts found in the endothelial cells are quite small measuring 2-8µm in diameter. In contrast the tissue cysts can be very large and visible to the naked eye as whitish streaks running in the direction of the muscle fibers which measured from 0.5-5mm.




Life cycle:

The intermediate host become infected by ingested the sporocyst, and in small intestine the sporozoites will be released and peneterate the intestine's wall and find their way to the endothelial lining of arteries of intestine and mesenteric lymph nodes, where they form the first generation of schizonts, and then the first generation of merozoites. After 4-5 weeks of infection merozoites develop in the endothelial cells of capillaries of kidney and brain generation of merozoites, the later are carried by blood to different parts in the body like oesophagus, diaphragm, heart and skeletal muscles to form the tissue cyst containing bradyzoites after 7-8 wks of infection.

Final hosts become infected by ingesting infected meat. In intestine the spores (bradyzoites, cystizoites) convert to trophozoites and penetrate the endothelial cells of intestine wall to differentiated to male (micro) gamete and female(macro) gamete and they unite to form the zygot that develop to immature oocyst and the mature oocyst contain two sporocyst each with four sporozoites.



Clinical signs:

1- Final host: *Sarcocystis* species usually non-pathogenic to their final host except some general clinical signs like anorexia and diarrhea.

2- Intermediate host:

a- Anemia.

b- Anorexia.

c- Diarrhea.

d- Weakness.

e- Hyper salivation.

f- Muscle twitching (2^{nd} generation in brain and kidney).

g- Loss of hair.

h- Death.

Pathogenesis:

1- Anemia due to:

a- Haemolytic **b-** Haemorrhage **c-** Unknown metabolite release from parasite **d-** R.B.Cs. count, Hb and PCV as much as 75% of normal values.

2- Glomerulo-nephritis due to: Immune complex cause distraction of renal glomeruli.

3- Infraction of organs due to: Blockage of blood vessels by parasites.

4- Toxin: The parasite release toxin called sarcocystine which affect heart, C.N.S. and adrenal gland.

Diagnosis:

1- Final host:

a- Faecal examination for sporocyst.

b- Serological test.

2- Intermediate host:

a- Serological tests.

b- C.Ss.

c- P.M. examination including:-

1- Trichnoscopy: By press piece of meat between to slides and examine under microscope.
2- Squeezing method: By squeeze of piece of meat and examined the produced juice.
3- Peptic digestion of meat: This method usually used for microscopic infection.

   ***Note:** Macroscopic types can be seen by necked, whereas the microscopic types are seen by microscopic only.

Control:

1- Eradication of stray dogs and cats.
2- Good cocking of meat.
3- Testing of meat in slaughter house.
4- Good cleaning for vegetables before eating.
5- Treating the animals with amprolium to prevent the C.Ss.

2-Genus: *Toxoplasma*

The genus *Toxoplasma* has a single species,*Toxoplasma gondii*, cause disease called toxoplasmosis which is a zoonotic disease between human and animals.

***Note**: toxon meaning arch and plasma meaning form.

Species:

Toxoplasma gondii

Final host: All felids. The domestic cat is the most important.

Intermediate hosts: Any mammal, including man or birds.

*** Note**: that the final host, the cat, may also be an intermediate host and harbor extra-intestinal stages.

Site in final host:

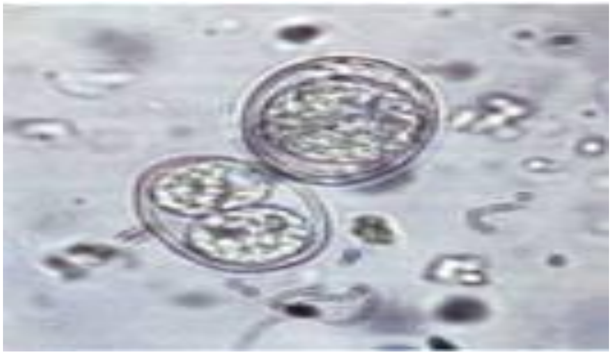
Schizont and gamonts in the small intestine.

Site in intermediate host:

Tachyzoites and bradyzoites in extra-intestine tissues including muscle, liver, lung and brain.

Identification:

Oocysts: These are found in the faeces of cats, are unsporulated and measured 12x10µm , when sporulated it take one to five days (1-5 days) and become contains two sporocysts each one contain four sporozoites.



(Mature & immature oocyst)

Intestinal stages:

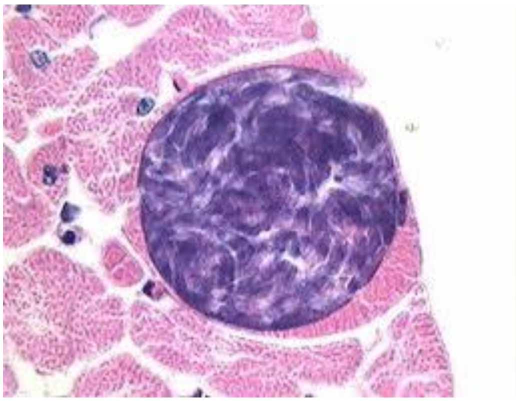
1- Schizonts: These occur mainly in jejunum and ileum, range in size from 4-17 µm in diameter and contain up to 32 merozoites.
2- Gamonts: These are most common in ileum and measure approximately 10 µm in diameter.

Extra-intestinal stages:

1- Tachyzoites: These are found developing in vacuoles in many cell types, for example, hepatocytes and myocardial cells. In any cells there may be 8-16 organisms, each measuring 6-8 µm.

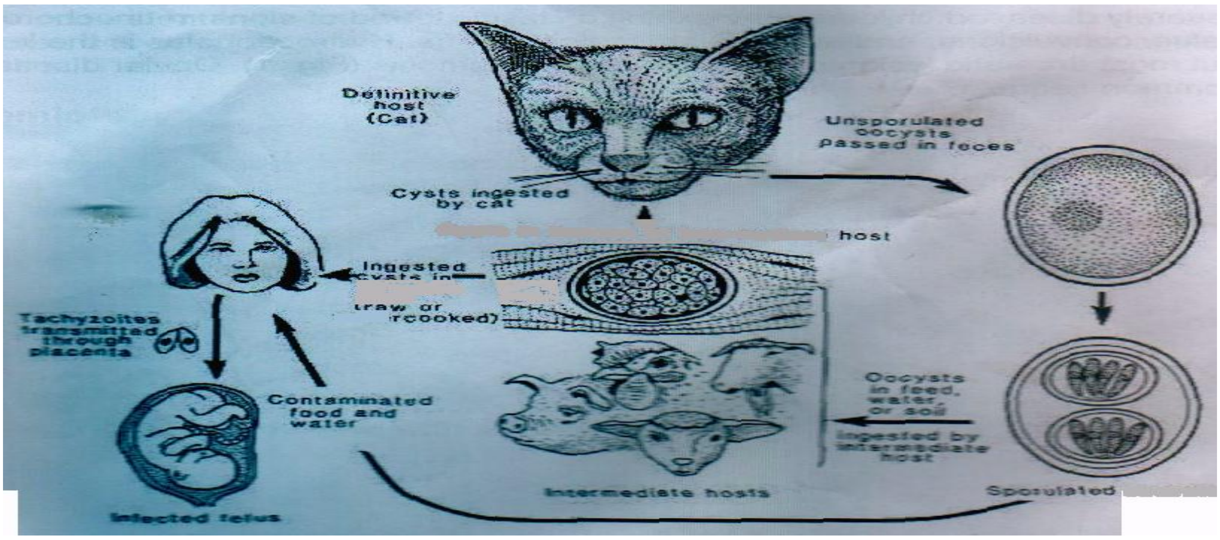
(Tachyzoites)

2- Bradyzoites: These are contained in cysts and occur mainly in the muscle, liver, lung and brain. The bradyzoites are lancet shape and several thousand may be present in one cyst which can measure up to 100μm in diameter.



(Tissue cyst)

Life cycle:



Transmission of infection:

1- Ingestion of oocyst with contaminated food and water.
2- Ingestion of infected meat with bradyzoites.
3- Through placenta from mother to fetus.
4- Unpasteurized goat's milk may act as source of infection to human.

Clinical signs:

1- Abortion of infected females.
2- Anorexia, emaciation and ataxia.

Diagnosis:

1- Final host:

a- Fecal examination to visible the oocyst.

b- Serological tests.

c- Histological examination.

d- Polymerase chain reaction (PCR) technique.

2- Intermediate hosts:

a- Isolation of the parasite from blood, C.S.F., and tissues (placenta, lymph nodes, etc.).

b- Serological tests (Sabn-Feld man test).

c- Histological examination.

d- Polymerase chain reaction (PCR) technique.

Control:

1- Good cleaning of fruits and vegetables.

2- Good cleaning of hands after working in the gardens.

3- Good cocking of meats.

4- Pasteurization of milk.

Treatment:

1- Spiramycin 3g/3wks repeated after two wks for 3 interval wks (use for human but it is toxic for cats).

2- Pyrimethamine 0.5-1mg/kg of B.W. + Sulphadiazine 50-100mg/kg of B.W. + Folinic acid 5mg for 4-6 wks.