

TOXOPLASMOSIS

FECAVA WORKING GROUP
ON ZONOSIS

1. DISEASE

Toxoplasmosis

2. NAME, DEFINITION, ETIOLOGICAL SPECIES

Toxoplasma gondii, an obligate intracellular parasitic protozoan (*Sarcocystidae* family)

- *T. gondii* has a worldwide distribution and can infect all warm-blooded animal species and humans.
- Three forms of the parasite are distinguished in its life cycle: sporozoite (the form developed within oocysts), tachyzoite (rapidly dividing form that spreads within the host's body), and bradyzoite (slowly developing form within tissue cysts).
- Oocysts are shed in the feces of the definitive host. Fecal oocysts are not readily infectious, as they first need to sporulate. This process requires a minimum of 24 hours and up to 5 days, depending on the environmental conditions.
- Oocysts are highly resistant to physicochemical factors and methods used to treat wastewater and sewage and can survive in the environment for over 18 months.

4. CLINICAL SIGNS, IF THERE ARE ANY

- Most infected cats do not exhibit clinical signs.
- In cats with impaired immune function (e.g. in cases of FeLV or FIV infections) clinical disease is likely to occur.
- Common signs include loss of appetite, lethargy, and fever. Systemic disease is rare, but additional symptoms may occur depending on parasite localization and the chronicity of the infection (e.g., pneumonia).
- Despite the fact that *T. gondii* does not comprise a major diarrhea cause in cats, self-limiting diarrhea lasting 1-2 weeks after infection can be developed in a small percentage of cats.
- The central nervous system and eyes can also be affected, with symptoms ranging from uveitis and retinitis to blindness, lack of coordination, seizures, ataxia, and loss of control over defecation and urination.
- Kittens infected transplacentally develop severe signs and frequently die of pulmonary or hepatic disease.



3. DESCRIPTION OF THE ANIMAL RESERVOIRS

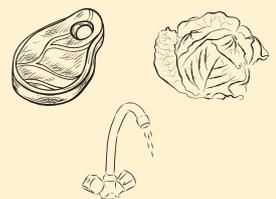
- *Felidae* species are the only known definitive hosts of *T. gondii*, in the intestine of which the parasite undergoes sexual reproduction.
- Non-feline animal species (birds, rodents, other mammals) including humans act only as intermediate hosts.
- Depending on their lifestyle, up to 60% of the cats will be infected in their life.
- Cats are exposed to the parasite by ingestion of tissue cysts formed in the bodies of intermediate hosts. The infection is more common in outdoor cats that are active hunters, and in cats that eat raw or undercooked meat.
- Only during their first-time exposure, cats shed oocysts in feces. Shedding begins approx. 3-10 days after infection and lasts typically for no more than 2 weeks.



5. WAY OF TRANSMISSION TO HUMANS

Transmission of *T. gondii* to humans takes place via the following routes:

- Consumption of undercooked meat containing tissue cyst bradyzoites.
- Consumption of food and water contaminated with cat fecal oocysts.
- Ingestion of cat fecal oocysts by the contaminated environment, e.g., soil or litter boxes.
- Congenital (transplacental) infection by tachyzoites circulating in the bloodstream.



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6. CLINICAL SIGNS IN HUMANS

- Tissue cysts can develop in skeletal muscles, myocardium, brain, and eyes, and can persist throughout the infected person's life.
- Most of the infected healthy humans do not show clinical symptoms. Occasionally, flu-like signs, as well as lymphadenopathy, may develop.
- Relapses can be observed in previously infected people after the subsequent development of immunodeficiency (e.g. HIV-related), with symptoms including headache, poor coordination, fever, nausea, and seizures.
- Immunocompromised people are at risk for life-threatening disease which can involve the central nervous system and other organs.
- Infection of pregnant women can result in abortion, stillbirth, perinatal death, or congenital infection with severe malformations affecting the eyes and the brain.
- Ocular toxoplasmosis of varying severity, which may be accompanied by vision-threatening complications (e.g. retinal detachment) can also develop.



7. DIAGNOSIS IN HUMANS

- Clinical diagnosis of ocular toxoplasmosis can be made by observing focal necrotizing retino-chorioiditis. MRI and brain biopsy are performed in cases of severe encephalitis.
- In infected pregnant women additional diagnostic approaches (e.g., ultrasonography and amniotic fluid analysis) are undertaken to evaluate the status of the embryo.
- The primary method for laboratory diagnosis is the detection of *T. gondii*-specific antibodies via different serological techniques. Combined use of serological tests can help establish whether a person was infected recently or in the past.
- Identification of *T. gondii* cysts in stained tissue sections and fluid smears can also substantiate the diagnosis.
- Methods to isolate *T. gondii* and identify its antigens in the blood or other fluids, can indicate acute infection, however they are applied rarely.
- *T. gondii* DNA can be detected via PCR in body tissues and fluids, especially in cases with cerebral, congenital, ocular, and disseminated toxoplasmosis.

8. PREVENTION OF THE DISEASE

- Cats should not be fed with raw meat, or allowed to hunt, to avoid infection.
- Regular hand washing is necessary after contact with cats and cats' litter boxes.
- Daily emptying of litter boxes is imperative, to prevent oocysts to sporulate, and feces should be disposed of safely.
- Direct contact with cats' feces should be avoided, especially if they have remained in the environment for more than 24 hours.
- It is advisable that pregnant women and immunocompromised people avoid cleaning cats' litter boxes.
- Handwashing prior to and after handling of foods is crucial. Fruit and vegetables should also be washed thoroughly before consumption to remove oocysts that may be present on their surface.
- Non-drinkable water needs to be filter-sterilized or boiled before use.
- Meat must be properly processed prior to consumption to render tissue cysts non-viable.



DIAGNOSIS IN ANIMALS

- The diagnostic approach in animals has similarities to that of humans. The disease is diagnosed based on history, symptoms, and laboratory testing results.
- Definitive diagnosis in animals includes the microscopic examination of tissue sections.
- Antibody detection is not particularly useful to prove clinical toxoplasmosis in animals. However, determination of *T. gondii*-specific IgM and IgG levels can assist towards diagnosis.
- A negative serology result can rule out the disease. In cats, it also suggests that the animals are susceptible to infection.
- Routine parasitological examination of cat faeces is not reliable, as *T. gondii* oocysts look similar to those of other protozoa. In addition, cats shed oocysts for a short period of time only during the first-time exposure to the parasite.
- PCR can be used for the identification of cats shedding oocysts, or for *T. gondii* detection in samples obtained from animals with clinical occurrences.