

## Toxoplasmosis

Toxoplasmosis is an infectious disease caused by a one-celled parasite called *Toxoplasma gondii*. It is a prevalent parasite of cats throughout the world, although other species can become infected. The cat is unique in that it is the definitive host of the parasite, meaning that the organism must pass through the cat to complete all stages of its life cycle.

### Contributing Factors

Cats usually become infected by feeding on rodents, some types of insects, and by ingestion of undercooked meat. Although cats who go outdoors are at somewhat increased risk of becoming infected, indoor cats may also contract the disease.

### Prevalence

Once the immune system has been exposed to the toxo organism, antibodies will be produced. Antibodies (also called globulins) play a protective role in the immune system. However, detection of antibodies against toxo only means that the person or cat has been exposed; it does not mean that active toxoplasmosis is present.

The scientific literature reports that in the United States, between 30% and 50% of cats have antibodies to toxoplasmosis. About 1/3 of humans are thought to have been exposed. However, those statistics do not mean that antibody-positive cats and humans have toxoplasmosis. *The presence of antibodies only means that exposure to the Toxo organism has occurred in the past.*

### Clinical Signs

In humans, clinical signs are rarely apparent when the immune system is normal. If signs of illness are present, they are usually self-limiting and nonspecific. The majority of clinical signs result from replication of the organism within tissues.

The respiratory system may be involved, giving the impression of a flu-like illness. In other cases, it may appear similar to mononucleosis, with fever and swollen lymph nodes. In humans with weakened immune systems (such as with AIDS or patients receiving chemotherapy), the consequences of toxoplasmosis can be devastating, eventually leading to death of the individual.

In cats, the most common signs are related to inflammatory changes in the eyes. The respiratory system, liver and central nervous system may also be involved, with signs of pneumonia, jaundice, or seizures.

### Diagnosis

Owners worried that they have been infected with toxoplasmosis should seek consultation with their physician about testing.

Veterinarians are frequently asked to test a cat that belongs to a pregnant woman for toxoplasmosis. Pregnant women should know the following concerning toxoplasmosis testing:

1. A screening test for toxo antibodies can be performed on both the pregnant woman and the pet cat. A negative result means that the woman (and/or the cat) has not been exposed to the toxo organism.
2. A single antibody titer that is positive, performed on the woman and/or the pet cat, means that there has been exposure to the toxo organism at some time. In order to determine whether there is active infection, a second test must be run 2-4 weeks later. Be aware that no test is available to determine that infection has been acquired by contact with cats.
  - a. If the two tests give similar results, there has been an infection in the past and a certain degree of immunity exists.
  - b. If the second test is significantly higher than the first, there is a strong possibility that an active case of toxoplasmosis is in progress.

c. It is very important that both tests be performed by the same testing laboratory in order to properly compare results.

3. Fecal exams are low yield procedures for determining the presence of active toxoplasmosis in the cat. Most cats shed the organism once in their lives and for a period of only a few days.

### **Treatment**

Clindamycin hydrochloride is the drug of choice for treating cats with toxoplasmosis. There is no evidence to indicate that the drug is able to completely remove the organism from the cat's body, although most cats are improving within 2-3 days of starting the drug. Infections that involve the eyes or central nervous system are more difficult to treat. In general, better results are achieved if the cat is treated for four weeks or longer.

### **Prognosis**

Cats who respond to clindamycin therapy and are negative for feline leukemia virus and feline immunodeficiency virus have a good prognosis. Those with weakened immune systems, advanced stages of the disease, or infections of the nervous system have a guarded prognosis for full recovery.

### **Transmission to Humans**

As stated above, several species may develop the disease toxoplasmosis, including humans and dogs, but the organism can only complete its life cycle in the domestic cat. This means that the cat may be infected with the toxo organism and transmit it to other cats or to other species, including humans. Owners should be aware that human infection resulting from direct contact with infected cats is extremely unlikely. In order for this to occur, the following must happen:

1. The cat must be infected with the toxo organism. This usually occurs as a consequence of carnivorous feeding on mice or ingestion of undercooked meats, such as pork or mutton. Other sources of infection for cats include cockroaches and earthworms.
2. The cat must be shedding the organism in its feces. This occurs for only about a 10-day period. It usually only occurs once in the cat's lifetime.
3. Organisms in the cat's feces must have 1-5 days to sporulate ("incubate"). This "incubation" must occur after the feces leaves the cat's body. Therefore, fresh cat feces cannot cause transmission of the infection to humans.
4. The toxo organism must be swallowed by the person being infected. It is not spread to humans through the air.

The toxo organism may also be transmitted to humans by eating raw or undercooked meats, especially pork or mutton. Since many hamburgers from fast-food restaurants are made of beef diluted with pork, most authorities feel that human infection occurs much more frequently by this method than by association with cats.

Although this is indeed a real disease with dire consequences, it should be noted that toxoplasmosis occurs infrequently, especially in consideration of the numbers of people with *Toxoplasma* antibodies. In AIDS patients with toxoplasmosis, the disease is generally considered to arise from reactivation of a prior infection rather than establishment of a new infection. For this reason, it is often not necessary to remove cats from the household of HIV-infected people.

The incidence of toxo antibodies in U.S. veterinarians is not different than that of the rest of the population.

### **Prevention**

At this time, researchers are investigating the utility of a mutant strain of toxo as a potential vaccine source. Until such time as a vaccine would be widely used, prevention of infection is indicated. Practical means of preventing infection include:

1. Do not allow your cat to eat mice or poorly cooked meat. Feeding a commercial cat food and not allowing your cat outdoors reduces the possibility of the cat becoming infected.
2. Clean all feces from your cat's litter box daily. *Even if the cat's feces are infected with toxo oocysts, they must incubate for 1-5 days before becoming infectious.* To be extra safe, pregnant women should not clean the litter box.
3. When working in soil (flowerbeds) where cats might defecate, wear gloves to keep from getting oocysts on your hands.
4. Avoid eating raw or poorly cooked meats. Be especially careful of fast-food hamburgers. Wash hands thoroughly after handling raw meat. Clean cutting boards, knives and all utensils involved in preparation of raw meat.
5. Wash all fruits and vegetables prior to eating.
6. Keep children's sandboxes covered. Outdoor cats will frequently use the sandbox for defecation. Even if the feces are scooped out, the sandbox may remain contaminated with parasites.