

Toxoplasma gondii



Toxoplasma gondii is an obligate intracellular, parasitic apicomplexan (taxonomic group and especially a phylum of diverse parasitic protozoans that have a complex life cycle usually involving both asexual and sexual generations often in different hosts) that causes the disease toxoplasmosis. Found worldwide, *T. gondii* is capable of infecting virtually all warm-blooded animals, but felids such as domestic cats are the only known definitive hosts in which the parasite may undergo sexual reproduction.

Epidemiology

In humans, *T. gondii* is one of the most common parasites in developed countries; It is found throughout the world and in some countries has infected up to 95% of the population.

Is toxoplasmosis contagious?

It is not directly passed from person to person, except from mother-to-child. Almost all cases of infections come from eating, drinking, or handling something that is contaminated.

Routes of Transmission

Although you can't "catch" toxoplasmosis from an infected child or adult, you can become infected if you:

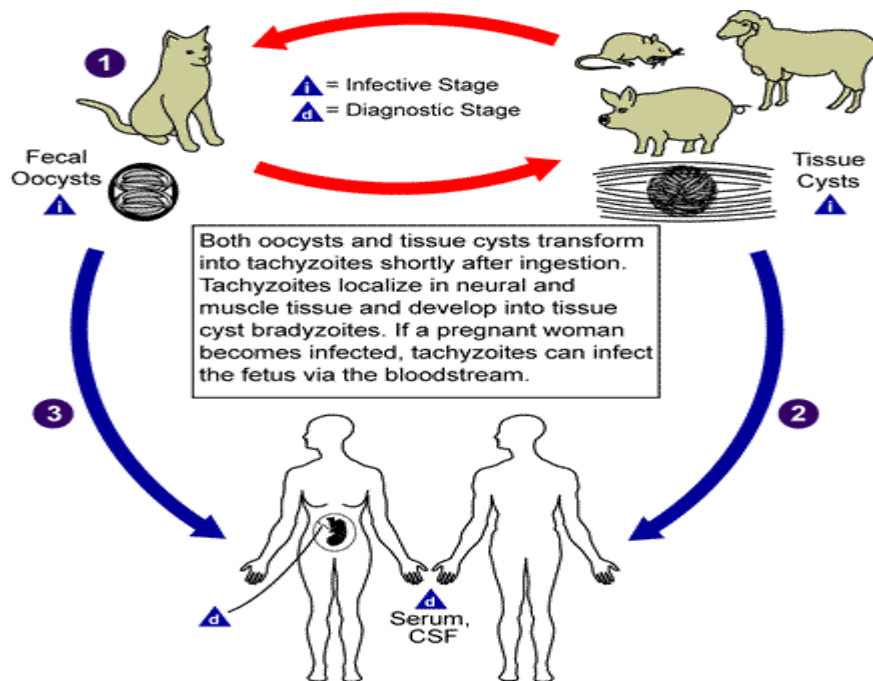
- **Come into contact with cat feces that contain the parasite.** You may accidentally ingest the parasites if you touch your mouth after gardening, cleaning a litter box or touching anything that has come in contact with infected cat feces. Cats who hunt or who are fed raw meat are most likely to harbor *T. gondii*.
- **Eat or drink contaminated food or water.** Lamb, pork and venison are especially likely to be infected with *T. gondii*. Occasionally, unpasteurized dairy products also may contain the parasite.
- **Use contaminated knives, cutting boards or other utensils.**

- **Eat unwashed fruits and vegetables.** The surface of fruits and vegetables may contain the parasite. To be safe, thoroughly wash and peel all produce, especially any you eat raw.
- **Receive an infected organ transplant or transfused blood.** In rare cases, toxoplasmosis can be transmitted through an organ transplant or blood transfusion.

***T. gondii* life cycle:**

T. gondii is a parasite that cannot be seen with the naked eye (microscopic). In most healthy humans, the infection either causes no symptoms or results in a mild flu-like illness. When a pregnant woman becomes infected, however, and passes it to her unborn child, or a person with a weakened immune system (immunocompromised) becomes infected, the parasite can cause severe complications.

The definitive host for *T. gondii* is wild and domestic cats. When cats become infected by eating infected birds, rodents, or contaminated raw meat, *T. gondii* replicates and forms eggs encased in protective coverings (oocysts). During an active infection, millions of microscopic oocysts may be released for several weeks into the cat's stool. The oocysts become infective within a couple of days and can remain viable for several months. In all other hosts, including humans, *T. gondii* only goes through a limited portion of its lifecycle and then forms inactive [*cysts*](#) in the muscles, brain, and eyes. The host's immune system keeps these cysts dormant and protects the body against further infection. The dormant stage can persist throughout the host's life, unless the immune system becomes compromised.



Why Get Tested?

To detect a *Toxoplasma gondii* infection in a pregnant woman, unborn baby, or in a person with a weakened immune system (immunocompromised) who has flu-like symptoms; sometimes to determine if a person has been previously infected or to help determine if complications are due to an active *Toxoplasma* infection

What is being tested for diagnosis?

Testing is performed in order to detect and diagnose a past or current infection by detection of:

- Antibodies in the blood that are produced in response to an infection;
- Genetic material (DNA) of the parasite in the sample of choice by Real-time **PCR** method.
- While acute toxoplasmosis can be differentiated to some degree by the absence of certain symptoms (such as a cough, sore throat, or rash), it can only be confirmed with a blood test or an analysis of cerebrospinal fluid or a tissue sample via **Real-time PCR**.

Sample Required?

- A blood sample drawn from a vein in your arm;
- Cerebrospinal fluid (CSF);

•Amniotic fluid sample;

Complications

If you have a normal immune system, you're not likely to experience complications of toxoplasmosis, although otherwise healthy people sometimes develop eye infections. Untreated, these infections can lead to blindness.

When a woman becomes infected during pregnancy, there is a 30-40% chance that the infection will be passed to her unborn child. If this congenital infection occurs early in the pregnancy, it can cause miscarriages or stillbirths or can lead to severe complications in the newborn (see below).

Frequent Symptoms

In people with normal immune systems, up to 90 percent of cases of toxoplasmosis will be entirely asymptomatic (without symptoms).

If acute symptoms do appear, they will most often be mild and may include:

- Low-grade fever (lower than 38 degrees)
- Headache
- Fatigue
- Swollen lymph nodes (lymphadenopathy)
- Muscle aches (myalgia)
- A general feeling of unwellness (malaise)

While symptoms rarely get worse, they can sometimes persist for weeks on end.

Congenital Symptoms

T.gondii can also be passed from mother to child during pregnancy.

The condition is known as congenital toxoplasmosis and while the most cases are caused when a mother is newly infected during pregnancy, others may be the result of a reactivation of a past infection (most often in mothers with HIV).

Risk of Birth Defects

The potential harm of *T. gondii* infection may be greatest during the early part of the first trimester. This is when the fetal stem cells are just starting to specialize and develop into cells of the brain, heart, and other organs.

Damage during this early stage of development can be catastrophic. In rare instances, it can lead to an irreversible birth defect known as microcephaly and macrocephaly.

Common Symptoms

Congenital toxoplasmosis can also increase the risk of miscarriage and stillbirth. Nearly 50 percent of cases will result in premature birth accompanied by low birth weight, most often when the baby has been infected before the 24th week of gestation.

Infants with severe toxoplasmosis will usually have symptoms at birth or develop them within the first six months of life. Most of the symptoms will be related to a triad of complications commonly seen in severe cases, including hydrocephalus ("water on the brain"), chorioretinitis (inflammation of the choroid and retina of the eye), and intracranial calcification (abnormal deposits of calcium in the brain due to the infection).

Symptoms can include:

- Jaundice (yellowing of the skin and eyes);
- Vomiting;
- Diarrhea;
- Feeding problems, including difficulty swallowing (dysphagia);
- Blurring and vision problems;
- Hearing loss;
- Speech problems (dysarthria);
- Problem with walking, coordination, and motor skills;
- Developmental delays;
- Intellectual disability (mild to severe);
- Seizures;

Prevention

If you have a cat and you want to get pregnant, you are pregnant, or your immune system is suppressed, there's no need to give up your cat because of fear of toxoplasmosis. Just be sure to take precautions such as making sure you cook all your meat thoroughly; washing all your food preparation dishes, surfaces, and utensils in hot soapy water; thoroughly washing all vegetables and fruit; having someone else change your cat's litter box, or wearing disposable gloves and a face mask and washing your hands afterward if no one else can do it; changing the litter every day; refraining from adopting or touching any new cats while you're pregnant; not feeding your cat raw or undercooked meat; and wearing gloves when you touch soil or sand.