

# Toxoplasmosis

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## What is it?

Toxoplasmosis is a disease caused by the organism *Toxoplasma gondii*. Toxoplasmosis usually affects the brain and causes a disease called toxoplasma encephalitis. The organism can infect and cause disease in other organs, including the eyes and lungs.

Common sources of this organism include cats or birds, and undercooked meat, especially pork, lamb, or venison. While cats or birds that test negative for toxoplasmosis and remain housebound are not a risk, those that go outside can carry toxoplasma back into the house or apartment. Handling either bird droppings or kitty litter than contains cat droppings is a major source of infection.

Toxoplasma encephalitis can occur in patients who have antibodies to *Toxoplasma gondii*—which indicates that the infection is present in the body. It is a rare disease among HIV-positive people with CD4 cell counts above 200, and is most common among HIV-positive people with CD4 cell counts below 50. Luckily, some of the treatments used to prevent Pneumocystis pneumonia (PCP), especially TMP-SMX (Bactrim, Septra), have been shown to effectively prevent toxoplasmosis from causing disease.

## What are the symptoms, & how is it diagnosed?

Some of the symptoms of toxoplasma encephalitis include headache, fever, confusion, muscle weakness, seizures, abnormal behavior, and coma.

A blood test can be ordered to check for the presence of antibodies to *Toxoplasma gondii* (including on cats & birds). However, just because someone has antibodies to this organism does not mean that they will experience disease. Approximately 40% of all people living in the United States have been exposed to toxoplasma gondii at some point in their lives. Only people with compromised immune systems, particularly HIV+ patients with CD4 cell counts below 50, are at risk for developing

toxoplasmosis, the active form of disease caused by this organism. In some cases, active disease can be caused by a recent exposure, perhaps from eating undercooked meat. It's also possible that harmless amounts of toxoplasma gondii in the body can take advantage of the immune system being suppressed, begin reproducing, and cause active disease.

To diagnose toxoplasma encephalitis, a CT or MRI scan is usually performed. *Toxoplasma gondii* can cause multiple lesions on the brain. However, it can be difficult to tell the difference between toxoplasmosis of the brain and other central nervous system disease, such as lymphoma. Newer imaging devices, such as PET or SPECT scans, can help distinguish between toxoplasma encephalitis and other central nervous system disease.

If toxoplasmosis of the brain is suspected, based on a patient's symptoms at scan results, treatment will likely be started immediately, even if doctors can't confirm the diagnosis. A brain biopsy is only necessary to establish the diagnosis if the patient does not respond to treatment. A biopsy may be required to diagnose toxoplasmosis of other tissues in the body, such as the lungs.

## How is it treated?

To treat toxoplasmosis, a combination of three drugs—amounting to more than ten pills a day—is usually recommended:

- **Primethamine** (Daraprim): A large dose (between 100 mg and 200 mg) of this antimalarial drug is taken at first, followed by a lower dose. It is taken by mouth in pill form.
- **Leucovorin**: This medication contains folate, the active form of the B complex vitamin. Because pyrimethamine can decrease folic acid levels in the body, which can reduce the formation of red and white blood cells, leucovorin is necessary to protect against anemia and other toxicities.
- **Sulfadiazine**: This drug—an antibiotic—is taken by mouth four times a day.

High doses of these treatments are continued for four to six weeks. Thereafter, lower doses are taken as “maintenance therapy” to prevent the toxoplasmosis from coming back. Maintenance therapy can be discontinued if you have completed the initial six weeks of treatment and no longer have any symptoms of toxoplasmosis—provided that your CD4 cell count is above 200 for at least six months while taking anti-HIV medicines.

Some patients are allergic to sulfadiazine and cannot tolerate it. In turn, an alternative to sulfadiazine may be necessary. The U.S. Department of Health and Human Services recommends clindamycin for this purpose.

Corticosteroids, such as dexamethasone, are sometimes used to help control inflammation of the brain and the symptoms associated with toxoplasmosis. However, these need to be used carefully, given that corticosteroids can have a negative effect on the immune system.

### Can it be prevented?

Yes, it can. For people who do not have antibodies to *Toxoplasma gondii* or do have antibodies but no longer have the infection (determined using PCR), the best way to prevent toxoplasmosis is to prevent coming into contact with *Toxoplasma gondii*. Meats such as pork, lamb, or venison should never be eaten rare and should be cooked long enough that the internal temperature of the meat is 150°F. This is especially true for HIV+ people with CD4 cell counts less than 100.

As for cats and birds, it's always best to use rubber gloves when cleaning kitty litter boxes or removing droppings from bird cages. It's also best to clean up after these pets every day; *Toxoplasma gondii* is not infectious in fresh cat or bird excrement, as it takes several days for the organism's eggs to hatch while inside cat or bird feces. Testing cats and birds for *Toxoplasma gondii* antibodies and then keeping them inside can also reduce the risk of exposure.

Drugs used to prevent toxoplasmosis (prophylaxis) are, for the most part, the same as those used to prevent Pneumocystis pneumonia (PCP). Trimethoprim-Sulfamethoxazole (TMP-SMX; Bactrim, Septra) is the most effective combination of drugs used to prevent PCP and toxoplasmosis. And because PCP prophylaxis

is generally started when a person's CD4 cell count falls below 200, he or she should be well protected against toxoplasmosis in the event his or her CD4 cell count falls below 100.

For those who cannot handle TMP-SMX, due to the allergic reactions caused by SMX, another effective option is dapsone in combination with pyrimethamine and folic acid. This triple-drug combination only needs to be taken once a week.

People who have been taking preventive treatment for toxoplasmosis and who begin a new antiretroviral regimen may be able to discontinue taking the toxoplasmosis preventive treatment once CD4 cell counts reach and remain at or above 200 for at least three months.

### Are there any experimental treatments?

If you would like to find out if you are eligible for any clinical trials involving new treatments for toxoplasmosis, there is an interactive web site run by ACRIA, the AIDS Community Research Initiative of America. Another useful service for finding clinical trials is *AID-Sinfo.nih.gov*, a site run by the U.S. National Institutes of Health. They have “health information specialists” you can talk to at their toll-free number at 1-800-HIV-0440 (1-800-448-0440).

### a note about this publication

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