

Researchers Trace Toxoplasma Parasite's Family Tree

Cats can ingest infected birds; infection can spread to humans.

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Agricultural Research Service scientist Ben Rosenthal and his team made a recent discovery in the diversity in parasites related to *Toxoplasma gondii*, one of the most widespread parasites of warm-blooded vertebrates.

Understanding how *T. gondii* has evolved and spread will help parasitologists and public-health officials improve methods for controlling the parasite in humans and animals. The infection can be contracted by inadvertently ingesting parasites while gardening or handling cat feces. Washing hands after both activities eliminates this risk.

If contracted during pregnancy, *T. gondii* can severely threaten the health of the fetus and the mother, Rosenthal said. In addition, this infection can pose big problems for people with HIV/AIDS, or others with suppressed immune systems.

Rosenthal, a zoologist at the ARS Animal Parasitic Diseases Laboratory in Beltsville, Md., partnered with ARS microbiologist Jitender Dubey and biologist David Sibley at the Washington University School of Medicine in St. Louis to analyze DNA snippets from 46 existing *T. gondii* strains found around the planet.

The team's research pinpoints evolutionary changes in one parasite chromosome that have been especially widespread, he said, and which may be contributing to the parasite's transmission success. Although he said that pet owners cannot yet "do anything" with the discovery, these findings have narrowed the search for a gene, or suite of genes, which may be especially important for the parasite.

"Further study may find an Achilles heel, leading to new strategies for better control," he said, adding, "Even those without cats should be interested, because many of us (estimates range from 25 percent to 33 percent of Americans) have antibodies to the parasite."

This fact, he said, suggests that we have been exposed in the past. And while that doesn't mean we are sick – indeed, most infections are completely without symptoms – but infection is widespread throughout the world.

When it comes to cats, however, they can become infected by eating birds and mice, after which point the dormant parasite "wakes up," divides and matures. For a period of a few weeks out of a cat's lifetime, they will excrete microscopic "oocysts," but they rarely express symptoms that people would recognize. Because cats only shed the eggs once out of their lifetime, contracting toxoplasmosis from cats is rare. "Our worry, therefore, relates more to what their infection might mean for us," Rosenthal said.

By knowing how *T. gondii* has evolved and disseminated, scientists can more effectively limit human exposure in the United States and abroad, he said.