



HERDING CATS

By Greg Kozol

UNO FELINE RESEARCH TAKES AIM AT LEARNING MORE ABOUT A COMMON PARASITIC INFECTION

Herding cats is an unenviable task.

UNO researchers, however, are hoping the trouble they go through wrangling finicky felines might produce insights into a parasitic infection that runs rampant through the U.S. population.

The herding is done in the cat behavior laboratory in UNO's Allwine Hall. There, cats are studied for their role in a parasite — *Toxoplasma gondii* — that infects somewhere between 20% to 80% of all cats in the United States — and between 17% and 29% of humans. The researchers are striving to learn how infection affects the behavior of cats, and to address misconceptions about the single-celled parasite.

To do so, UNO biology Professor Bruce Chase and psychology graduate student Mohammad Alyetama enlist the support of area cat owners.

"It really is different than the typical lab approach," Chase says. "It really is a humane approach. We ask the cat owners to be citizen-scientists and fully participate."

Research on *Toxoplasma gondii* is nothing new at UNO. In the university's Molecular Parasitology Lab, studies have focused on the molecular pathogenesis of the parasite. Those researchers hope to learn more about the development of brain



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cysts associated with toxoplasmosis at the molecular and genetic level. They also see the parasite as useful in studying anti-malarial compounds.

But focusing on cats is a unique tact.

"It's a hard question," Chase says. "No one has looked at how it affects the behavior of cats."

HEALTH CONSEQUENCES

Finding answers is critically important. The U.S. Centers for Disease Control and Prevention named toxoplasmosis one of five parasitic infections targeted for more public health action. The parasite is found in cat feces, but it is most commonly spread from contact with uncooked meats.

Infection with the parasite causes a disease called toxoplasmosis. In pregnant women or people with compromised immune systems, it can lead to mild flu symptoms, or brain and eye damage in more serious cases.

The CDC estimates that up to 40 million Americans may be infected. Most people carry the parasite for years and remain healthy with no ill effects.

"Adults with strong immune systems don't even know they have it," Alyetama says.

One fascinating aspect of toxoplasmosis is its link to risk-taking behavior. Infected mice are known to become more impulsive and display a fatal attraction to cat urine, which makes them an easier mark for predators. This risk-aversion aspect also could impact humans infected with toxoplasmosis.

"Different people have different risk aversion," Chase says. "The main harm is to people who are immuno-compromised."

He and Alyetama, though, are only focused on whether the parasite alters the behavior of cats. It's already known that felines are

central to toxoplasmosis and its spread because the parasite only reproduces in the intestines of cats.

The two researchers stress that they do not infect cats as part of the research project. A small amount of blood is drawn to see if a cat is infected, but the study otherwise involves behavior observation. The cat owner completes a survey and participates in some of the tests in an animal room at the cat behavior lab. Other research is conducted with the owner watching a live video feed as the cat responds to different stimuli and smells.

In addition, UNO researchers continue to track the behavior of indoor-outdoor cats. Some cat owners record follow-up assessments at home to test a cat's memory and to monitor its litter box behavior and level of vigilance.

"It lets us get a spectrum of behaviors for animals that are living in the real world," Chase says. "They're not living in a lab environment."

Nearly 200 cats have participated in laboratory behavioral observation at UNO, in-home assessments, personality testing or outdoor tracking. The latter is done with lightweight GPS tracking devices.

About 12 percent of cats in the study tested positive for the parasite, though that number includes indoor-only cats that are less likely to carry *Toxoplasma gondii*.

"We get people from all around Omaha," Alyetama says. "We even had people driving from Lincoln with their cats. They find the process to be exciting."

CAT PERSONALITY

UNO student Kristen Cunningham brought her two cats for study at the behavior lab. She found it especially interesting because she is pursuing a psychology doctorate in neuroscience and behavior, which means she's already familiar with conducting academic research.

"It was kind of a role reversal," she says. "I'm usually on the other side. It was really neat, the way they had it set up. I learned different things. I had a fun time. I hope my cats did, also."

What the university calls the Toxo Project doesn't just seek to answer scientific questions about *Toxoplasma gondii*, its spread and its effects. It also gives cat owners like Cunningham insight into the personality and behavior of their pets.

For those who participate, it's one of the rewarding aspects of the research. "These animals are wonderful," Chase says. "They're pets. They have their own personalities."

Cunningham learned that her cats, Forrest and Savannah, didn't act the way she expected inside the behavior lab.

"I have one who was a little more standoffish at home. He might be considered a shy cat," Cunningham says. "He was very independent and outgoing. He seemed very comfortable with me not being there. It was interesting to see that their behavior almost flipped."

Such observations could yield fruit.

"We are trying to glean differences between infected and non-infected cats," Chase says. "Our goal is really to improve understanding of the parasite and improve our understanding of what it is doing."

Findings might influence the development of early-prevention programs that veterinarians can use to help infected pets. It also could help reduce any behavioral consequences associated with toxoplasmosis in cats.

In addition, Chase and Alyetama hope to increase general understanding of a parasite that scares some people away from having cats. Their work could dispel myths about the parasite's spread and ultimately make cats more adoptable.

"If someone gets pregnant, should we get rid of the cats?" asks Alyetama. "We talked to vets. They get that question all the time."

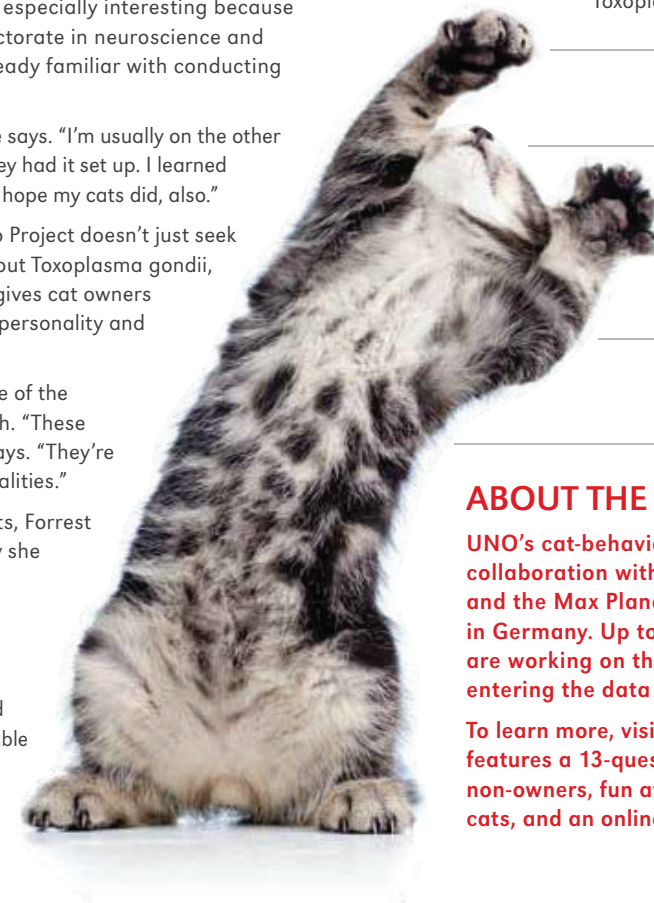
But, he adds: "People don't necessarily get infected from cats."

To reduce the parasite's spread, the CDC recommends freezing and cooking meats as well as washing fruits, vegetables and cutting boards. Gloves should be worn while gardening.

Chase and Alyetama feel a sense of accomplishment given how many non-scientists have become active participants in this research. So far, nearly 900 data contributors have contributed to the work.

"People get a better understanding of the process," Chase says. "They get insights into their own cat's behavior. They participate in the study itself. The main thing the owner gets out of it is they understand their cat better."

And, hopefully, a better understanding of *Toxoplasma gondii*.



ABOUT THE CAT BEHAVIOR LAB

UNO's cat-behavior research is conducted in collaboration with North Carolina State University and the Max Planck Institute of Animal Behavior in Germany. Up to 12 UNO undergraduates are working on the study. Research currently is entering the data analysis phase.

To learn more, visit toxoproject.com. The site features a 13-question survey for cat owners and non-owners, fun at-home experiments to conduct on cats, and an online cat personality test.

