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A Winn Feline Foundation Report On ....

THE REAL STORY ON TOXOPLASMOSIS - WHAT IS THE RISK TO YOU OR YOUR CAT?

Characterization of the Toxoplasma gondii-specific humoral immune responses of the cats concurrently infected by T. gondii and the feline immunodeficiency virus.

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A report on a completed study funded by the Winn Feline Foundation
Summary by Cathy Rokaw

The authors originally hypothesized that through the study of the immune responses of cats infected both with T. gondii (the organism responsible for TOXOPLASMOSIS) and the feline immunodeficiency virus (FIV) that they would identify patterns that would:

1. **lead to a better understanding of toxoplasmosis in immunosupressed individuals (such as AIDS patients);**
2. **identify the best procedures for the detection of recent or active toxoplasmosis (in cats or human patients);**
3. **determine whether different T. gondii antigens, or the responses to those antigens in the blood, are important in the**

development of clinical illness; and
4. identify the T. gondii antigens most suited for the development of a vaccine against toxoplasmosis.

Dr. Lappin and his colleagues have succeeded in identifying Toxoplasma gondii-antigen containing immune complexes in the serum of cats. These complexes can be used as far more accurate indications of active toxoplasmosis infection in cats than the tests currently available. To understand the importance of Dr. Lappin's work, a brief background on toxoplasmosis in the cat is useful. Much of this material was drawn from an on-line computer discussion generated within the Veterinary Information Network (VIN) and led by Dr. Alice Wolf, DVM (Texas A&M University).

Dr. Wolf refers to toxoplasmosis as the "nemesis of our interactions with M.D. - OB-GYNS." Most cat breeders are well aware of the bad press relating to the dangers of pet cats to pregnant women. The disease, toxoplasmosis, is responsible for many pregnant women deciding to give up their feline companions. Is such a decision warranted? Probably not, providing that proper precautions are taken. Definitely not if more accurate and reliable tests to determine whether or not an animal is actively infected with Toxo can be developed. The current tests run by most labs for Toxo are actually titers for antibody. These tests indicate only that the animal in question has at some point been exposed to toxoplasmosis. According to Dr. Wolf, about 60% of all adult cats will have this type of antibody titer (IgG).

Most cats are never ill with the disease and the period during which they are infectious to humans (through eggs shed in the feces) is very

brief, usually in the first 2-3 weeks of infection. What all of this means is that pregnant women should be more concerned with a cat that has a very low or negative antibody titer, since that animal has not developed natural resistance to the disease and could become actively infected at any time. It is only during the initial infection that the eggs are shed, posing a risk to humans. Dr. Wolf indicates that she usually tries to get her clients to get themselves tested (before they become pregnant, if possible). There is a 40% positivity rate in people and if they already have the antibodies, they cannot get the active infection unless they are immune suppressed. More importantly, people are more likely to acquire an infection by handling or eating raw meat, or handling raw vegetables and not washing their hands well.

A study in the New England Journal of Medicine showed no correlation between cat ownership and infection with toxoplasmosis.(1,2) Dr. Wolf also reported on a recent study of toxoplasmosis in AIDS patients which indicated that even in immune compromised individuals, such as AIDS patients, toxoplasma antibody seroconversion is unusual and appears unrelated to cat ownership.(3) If cat-owning immunosupressed individuals do not show a higher incidence of infection, it "stands to reason that normal cat-owning persons are not at greater risk of infection either."(4)

Of course, some precautions are advisable for anyone who is either pregnant or immunosupressed (such as HIV positive individuals). Dr. Wolf suggests washing hands well after handling meats and vegetables, or after gardening (the organism is found in the soil), not eating extremely rare or raw meat (the incidence of toxoplasmosis cysts in meat in the US. is 1%),

and changing the litter box daily or having someone else do it for you. For breeders who feed their cats raw meat this can mean an added concern. Since the cysts are not killed by normal freezing - meat must be deep frozen to -80 degrees to successfully kill them.

Dr. Michael Lappin and his associates at Colorado State University felt that a more accurate test for toxoplasmosis needed to be developed. Much of the work funded by the Winn Foundation was concerned with increasing understanding of the disease in cats and in developing such a test. Dr. Lappin's work has shown that cats rarely become clinically ill with toxoplasmosis, usually only if they are themselves immunosupressed by disease or stress. Clinical cases do occur, however. Respiratory involvement is common in cats with both primary and secondary forms of the disease. Cats with respiratory toxoplasmosis often have a fever and show signs of malaise, weight loss and lack of appetite. Labored breathing becomes more pronounced as the disease progresses. Gastrointestinal signs are also common among cats with secondary toxoplasmosis. The most frequent signs are fever, weight loss, vomiting, diarrhea, mesenteric lymph node enlargement, and palpable thickening of the abdominal wall. Clinical signs resulting from central nervous system involvement include personality changes, incoordination, convulsions, unequal pupil size, blindness, plaintive crying, circling, ear twitching, and impaired swallowing. Ocular involvement can be the only sign of illness. Chronic and healed lesions can coexist in the same eye.

Clinical toxoplasmosis in cats is most commonly associated with immunosupressive diseases such as FeLV and FIV, but concurrent infections with upper respiratory disease and FIP have been

reported. Any problem that stresses or compromises the immune system may potentiate the development of clinical toxoplasmosis, but the incidence of clinical disease is still rare.

Fecal exams are essentially useless, since the eggs are only shed in the feces in the first 2-3 weeks of infection, during a time when even a cat that later becomes ill exhibits no symptoms. As mentioned above, the current lab test only indicates exposure to toxoplasmosis, not the presence of active infection. This is where Dr. Lappin's work becomes important. He has demonstrated that one particular type of antibody (IgM) correlates well with active disease. This type of antibody is usually the first formed after infection with toxoplasmosis. When naturally infected cats were compared, T gondii-specific IgM immune complexes were found only in clinically ill cats.

T gondii-specific IgG immune complexes was more common in clinically ill cats than healthy cats, but was found in some cats without active disease. As the animal overcomes the disease and becomes immune the IgM antibodies shift to IgG antibodies.(5) If an animal that becomes clinically ill is diagnosed promptly and correctly, toxoplasmosis is responsive to clindamycin (25 mg/kg orally in divided doses two to three times a day for 3 weeks) or trimethoprin sulfate(120 mg/kg orally twice daily for 3 weeks).(6)

Through work funded by the Winn Foundation, Dr. Lappin and his associates have examined in depth the cat's immune responses to toxoplasmosis infection. They have identified Toxoplasma gondii-antigen immune complexes in feline serum (both T gondii-specific IgG-IC and T gondii-specific IgM-IC). The latter group (T gondii-specific IgM-IC) can be used as a far more

accurate indicator of active toxoplasmosis infection than the tests currently available. These researchers developed an ELISA assay for this group of antibody-antigen complexes. To date this test is not available through commercial laboratories. Dr. Lappin's laboratory can run the test (T. gondii-specific IgM) for a reasonable cost. Your veterinarian should contact Colorado State University at (303)491-1274 for instructions on what samples to send, how to ship, and exact costs.

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5. **Lappin M.R., et.al.: Detection of Toxoplasma gondii antigen-containing immune complexes in the serum of cats. Am.J.Vet.Res. 54:415-419, 1993.**
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ADDITIONAL REFERENCES:

(NOTE: Much of the research described in the following papers was the result of Winn Feline Foundation grants to Dr. Lappin and his associates.)

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