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## NEWSLETTER

# Healthy Cats: To Test or Not to Test? That is the Question<sup>©</sup>

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### In This Issue:

In the spring 2011 issue of the NVL Newsletter we will discuss the reasons for routine screening for *Bartonella* in healthy cats and the need for confirmation of ELISA positive in-hospital tests for FeLV and FIV. Since we developed the first FeLV test, and the first practical *Bartonella* test, we feel we can discuss these topics with credibility. **We recommend: Test all healthy cats for *Bartonella* and confirm all FeLV and FIV in-hospital ELISA positive tests.**

### Personal Note:

The Spring issue of our Newsletter was intended to review the 1<sup>st</sup> International One Health Congress, held in February in Melbourne, Australia, where we presented our research into the transmission of *Bartonella* from cats to people. We began a tour of New Zealand after the meeting in Australia and, as fate would have it, we were victims of the 6.3 earthquake, that struck at 1 PM on February 22, 2011, the epicenter of which was only 6 miles from the center of Christchurch, New Zealand. Although we missed being caught in the center of the city by only 2 hours, where there was tremendous damage and more than 190 deaths, all of our belonging, 2 laptops computers, and our One Health meeting program and notes were trapped in our hotel. The hotel was literally at ground zero, only 40 yards from the Christchurch Cathedral in Cathedral Square that lost its steeple (see photo below).



Christchurch Cathedral which lost the steeple (arrow) in the foreground and our hotel (H), undamaged in Cathedral Square.



Christchurch TV station- before and after- only one block from our hotel.

The center of the city was cordoned off, our hotel was undamaged but locked down, and we and many other tourists were evacuated with only the clothes on our backs by the New Zealand Royal Air Force. Two months later we still have not recovered our possessions but, when we do, we will summarize the One Health Congress and our contribution.

### *Bartonella*:

#### Early Observations:

Ever since the etiology of "cat scratch disease" was discovered in 1990, controversy has pervaded the medical and veterinary communities.<sup>1</sup> The early publications reported no diseases observed in *Bartonella* infected cats and that antibiotic therapy was unable to eliminate the infection in cats.<sup>2</sup> Many articles still refer to these original studies that have since been shown to have been preliminary and where inappropriate antibiotics were used for an inappropriate duration.

#### Healthy Cats and *Bartonella*:

As with any pathogen, healthy animals can become infected and some may develop a disease induced solely by the pathogen or a disease induced by the pathogen and other co-infecting pathogens- polymicrobial disease. Not all animals infected with various pathogens progress to disease, some become chronic healthy carriers and may develop disease long after their initial infection.<sup>3</sup> This is often the case for *Bartonella* infected healthy cats. Some develop immunity and reject their infections whereas others become chronic carriers and never show detectable clinical disease. However, some cats become chronically infected and develop mild to moderate inflammatory disease processes that are often overlooked by their owners and their veterinarians. Such diseases are gingivitis, URI, conjunctivitis, uveitis, dermatitis, and major organ inflammatory disorders.

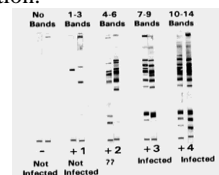
There are now numerous publications that show *Bartonella* induce inflammatory diseases when inoculated into cats experimentally, and in natural settings in pet cats (please see our web site- [natvetlab.com](http://natvetlab.com) for a complete documentation with references).<sup>4,5</sup> The wide tissue tropism of *Bartonella* is due to the

adhesion to endothelial cells which are the constituents of capillaries.<sup>6</sup> *Bartonella* proteins stimulate endothelial cells and the inflammatory process begins. Thus, *Bartonella* induce chronic lymphocytic plasmacytic granulomatous inflammatory reactions in tissues throughout the infected animal's body. In fact, since capillaries are found in all tissues, all tissues are susceptible to the inflammatory effects of *Bartonella*.

Even the most ardent skeptics now concede that *Bartonella* do cause disease in pet cats. Since this is so, the logical extension of this knowledge is to devise programs to identify infected healthy cats and treat them before they develop clinical disease, or to prevent them from serving as a reservoir for the flea vector, or from transmitting their infections to people. In this regard, our presentation at the One Health Congress reported that the cats that transmitted *Bartonella* to people were most often healthy (68%) and 47% were kittens under 1 year of age, and very few had current evidence of flea infestation when they transmitted *Bartonella*.<sup>7</sup>

### To Test or Not to Test, That is The Question?

Although not Shakespeare, this is still an important question for veterinarians today. As a testing laboratory we obviously recommend *Bartonella* testing of all cats for their sake and for the safety of their owners. Most veterinarians routinely test cats for FeLV and FIV, retroviruses with a very low prevalence in pet cats, and for which there is no therapy. However, most veterinarians do not routinely recommend *Bartonella* tests of healthy cats, a feline pathogenic agent of numerous preventable diseases and a zoonotic risk for their owners. In fact, feline derived *Bartonella* infections in humans can cause severe neurological, ocular and cardiac diseases and even can rarely be fatal. We do the western blot (WB) for *Bartonella* antibodies, the FeBart<sup>®</sup> test. As with FIV infection, antibodies to the *Bartonella* persist during infection.



FeBart<sup>®</sup> *Bartonella* western blot results

## Feline Leukemia Virus:

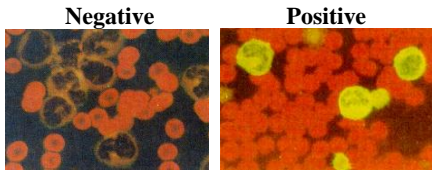
### FeLV Tests:

The study of the occurrence and control of FeLV in pet cats was accomplished by detection of FeLV antigens in the cytoplasm of peripheral blood leukocytes by the indirect immunofluorescent antibody (IFA) test.<sup>8,9</sup> All of the FeLV biology and control methods were elucidated using the IFA test for FeLV during the 1970s. A positive IFA test correlates 98% of the time with the ability to isolate FeLV from the blood and indicates persistent infection, usually life long viremia (in 91% of IFA positive cats), and shedding of the virus in the saliva.<sup>9,10</sup>

### Recent DISCORDANT FeLV ELISA Positive In-hospital Tests:

We have observed a disconcerting trend in the lack of confirmation of FeLV positive in-hospital ELISA test results during the past year and 3 months (Table 1). In 2010, 48% (242 of 505) of in-hospital FeLV+ ELISA tests were negative by the Gold Standard confirmatory FeLeuk<sup>®</sup> IFA FeLV test. As of the end of the first 3 months of 2011, 50.5% (49 of 97) of in-hospital FeLV+ ELISA tests were negative by the confirmatory FeLeuk<sup>®</sup> IFA FeLV test. We have been told that some shelters recommend euthanasia of cats that are FeLV+ by only the ELISA test, without confirmation of their FeLV status. We urge all practitioners to confirm ALL in-hospital FeLV+ ELISA tests with our confirmatory FeLeuk<sup>®</sup> IFA FeLV test.

### FeLeuk<sup>®</sup> IFA FeLV Test:



**Table 1. Comparison of FeLV ELISA Positive Tests With the FeLeuk<sup>®</sup> IFA FeLV Test**

Years	Number ELISA Positive	FeLeuk <sup>®</sup> IFA Negative	% Disagreement
1979-89	18,908	10,147	54%
1996-00	3,792	1,068	28%
2001-09	4,733	1,608	34%
2010	505	242	48%
2011*	97	49	50.5%

\* To 4-7-2011

### In-Hospital ELISA Positive Tests: Confirmatory Recommendations:

#### AVMA FeLV Test Expert Panel's Recommendations:

In 1991 the AVMA Expert FeLV Panel recommended that all FeLV positive ELISA tests be immediately confirmed by an IFA test.<sup>11</sup> The members of this panel were international virologists who were experts in the FeLV test development and the biology of FeLV. They recommended that all FeLV positive ELISA tests be immediately confirmed by an IFA test. There is no recommendation to repeat the ELISA

test again. ELISA positive but IFA negative results indicate the cat is not infected with FeLV. We now know that most of these cats may be antigenemic but have no infectious FeLV in their blood or saliva and should not be managed as infected cats.<sup>12</sup>

### AAFP's FeLV+ Test Recommendations:

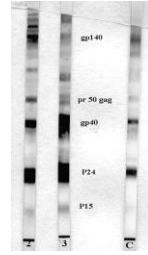
The American Association of Feline Practitioners (AAFP) revised their recommendations on Feline Retrovirus Testing and Management several times.<sup>13</sup> They too now recommend that all FeLV positive ELISA tests ("antigen tests") be immediately confirmed by an IFA test.<sup>14</sup>

### National Veterinary Laboratory's FeLV Recommendations:

Many cat owners elect to remove FeLV infected cats from their households and most presently do so without being aware that the veterinary profession recommends that all in-hospital FeLV positive ELISA tests should be immediately confirmed by an IFA test. We recommend that all FeLV ELISA + in hospital tests be confirmed by the FeLeuk<sup>®</sup> IFA FeLV test.

### Feline Immunodeficiency Virus: Confirmation of In Hospital FIV ELISA Positive Tests:

The WB is the "gold standard" test for FIV serology and various retrovirus experts recommend that all FIV ELISA positive tests be confirmed by the WB. The WB is the confirmatory test for positive HIV-1 ELISA tests in humans and for most serological tests that detect antibodies. Unlike the ELISA or IFA tests that result in a color change, the WB results in a profile of the antibody bands against the infecting agent. Many studies have shown that the WB test is more sensitive and specific than ELISA tests. However, the American Association of Feline Practitioners (AAFP) 2008 FIV recommendations state: "All positives should be confirmed by another test method." They do not specify what test method to use.<sup>13</sup> In fact, they refer to a publication by the co-chair of the AAFP panel, which concludes that the IDEXX FIV WB is not as sensitive or specific as the IDEXX FIV ELISA tests.<sup>15</sup> This is NOT our observation, as we have found our FIV WB is more sensitive and more than 100 times more sensitive than the IDEXX FIV PetChek<sup>®</sup> ELISA test (unpublished). In contrast to the AAFP recommendations, excellent FIV guidelines have been published by the European Advisory Board on Cat Diseases, a panel of 17 veterinary virus researchers. They recommend that all ELISA FIV positive tests should be confirmed by a WB.<sup>16</sup> Our confirmatory tests show that 24% of FIV positive in-hospital ELISA tests are negative by our WB (Table 2).



**Table 2. FIV WB Confirmation of FIV In-Hospital ELISA Positive Tests- to 5-1-2011**

IH ELISA +	NVL WB --	% Disagreement
523	125	24%

### Prevalence of FeLV, FIV and Bartonella in HEALTHY Pet Cats:

As of May 1, 2011 we have tested 7,250 healthy pet cats from around the United States for FeLV, FIV and *Bartonella* and found that only 1.8% were infected with FIV, 1.1% with FeLV whereas 35% were infected with *Bartonella* (Table 3). Since *Bartonella* is a feline and zoonotic pathogen, we feel that all healthy cats should routinely be tested.

**Table 3. Prevalence of Bartonella, FeLV, and FIV: 7,250 Healthy Pet Cats- 5-1-2011**

Pathogen	# Tested	# Infected	% Infected
FIV (WB/E)	7,250	136	1.8%
FeLV (IFA)	7,250	83	1.1%
<i>Bartonella</i> WB	7,250	2,534	35%

**Our recommendations: Test all healthy cats for *Bartonella* and confirm all FeLV and FIV in-hospital ELISA positive tests.**

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***Bartonella* references can be obtained at:**  
[www.nlm.nih.gov/or/natvetlab.com](http://www.nlm.nih.gov/or/natvetlab.com)  
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