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## Serological Prevalence of FeLV and FIV in Cats in Peninsular Malaysia

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### Abstract

Feline Leukemia (FeLV) and Feline Immunodeficiency Virus (FIV) are the two feline retroviruses that were studied in 65 client-owned cats from eight veterinary centres in selected areas throughout Peninsular Malaysia during a 4-week period. Blood samples were collected for serological tests using SensPERT® FeLV Ag/FIV Ab test kits. Five of 65 cats (7.69%) tested positive for the FeLV antigen and 10 cats (21.54%) tested positive for FIV antibodies. Only one cat had a dual infection. Chi square analysis revealed a significant association ( $P < 0.05$ ) between the health status and lifestyle of the cat and FeLV-positive status. FeLV infections were more likely to occur in a pedigree, adult male cat while FIV was more likely to infect the adult, intact cat that is aggressive towards other cats.

**Keywords:** Cats, FeLV, FIV, prevalence, risk factors, SensPERT® test kit

### Introduction

Feline Leukaemia Virus (FeLV) and Feline Immunodeficiency Virus (FIV) originate from the family of *Retroviridae*. These viruses affect domestic cats worldwide and infections contribute to considerable immunosuppression in cats. FeLV was first discovered in 1964, whereas FIV was isolated later in 1986, from a sick cat that was chronically infected with FeLV (Pedersen *et al.*, 1987). A general lack of disease control, their effects on the immune system and the fact that these diseases are easily transmissible, have allowed FeLV and FIV to persist and become one of the more important diseases affecting domestic cats. It is crucial that the prevalence rates and epidemiology of FeLV and FIV infections in domestic cats are understood so that control measures for these viral infections can be implemented.

In Malaysia, the prevalence for FIV was first reported 20 years ago (Cheng, 1990) and since then, very few studies have been conducted on the disease. More

recently, a 2009 study on FIV in cats admitted to University Veterinary Hospital, Universiti Putra Malaysia reported a prevalence of 24.7% (Bande *et al.*, 2009). This was followed by another report in the following year that showed a 33.2% FIV prevalence. Both these studies were conducted in the state of Selangor, Malaysia. While information is available for FIV, at least for the Selangor, no such information is available for FeLV. Numerous test kits for FeLV and FIV are available in Malaysia, but there is no information on the use of FeLV or FIV vaccines for the control of these diseases. Furthermore, the risk factors, clinical signs and vaccination programmes for the diseases are not known. Thus this study was designed to determine the prevalence of FeLV and FIV, to report on the clinical signs and risk factors associated with these diseases, to determine the use of vaccines in the prevention of these diseases in small animal practices in Peninsula Malaysia

## **Materials and Methods**

### ***Study area and design***

This study was conducted in three different regions of Peninsular Malaysia, the northern, southern and eastern regions. The Northern region consists of Perlis, Kedah, Penang and Perak. The Southern region comprised Negeri Sembilan, Malacca and Johore while the Eastern region comprised of the states of Kelantan, Pahang and Terengganu. A cross-sectional study was used in the serological testing performed on plasma samples from feline patients presented to clinics or hospitals for treatment. Samples were collected during a period of 4 weeks from 20 November until 16 December 2010.

### ***Animals***

Sixty-five cats presented to eight veterinary centres for routine vaccination and treatments were the target population in this study. All cats in the study were sampled with the consent from their owners. The owners were given a questionnaire upon participating in the study to obtain relevant information on the environment, health and behavior of the cats participating in the study.

### ***Investigation of vaccination practices for FeLV and FIV***

Information was also gathered from all participating veterinary centres involved in this study, regarding the use of vaccines against FeLV and FIV.

### ***Risk factors***

Information for study of risk factors for FIV and FeLV was obtained by questionnaire. These factors include gender, age, sexual intact, breed, behavior, multi- or single-cat household, vaccination status, the health status, and other concurrent diseases.

### ***Clinical signs***

A thorough physical examination was conducted and findings documented for each cat. Cats were classified into healthy and sick groups. The history of treatment was also obtained in order to relate to the likely risk factors.

### ***Samples***

Blood samples were collected from the jugular veins or cephalic veins using 23G needles (B. Braun®, Melsungen AG, Germany) and EDTA tubes (BD®, Franklin, USA). Plasma was obtained by centrifugation of blood samples at 1000 x g at 4°C (HettichZentrifugen, Germany) for 10 min and stored in plain tubes at -20°C (Sanyo Biomedical Freezer, Sanyo Electric Co. Ltd., Japan) until analysis.

### ***Serological test***

This serological test (SensPERT®, FeLV Ag/FIV Ab kit, Vetall Laboratories, Korea) based on the principle of immunochromatography, was performed according to the manufacturer's instructions. The test detects the antigen of FeLV (p27) and antibodies against FIV (p24) in the plasma of infected cats. Each test kit has two specimen wells to allow for simultaneous testing for the antigen and antibodies of FeLV and FIV respectively, using the same plasma sample. The sensitivity and specificity of test kit for FeLV antigen detection are 97 and 99% respectively, whereas sensitivity and specificity for FIV antibody detection are 98.5 and 99.7% respectively.

### ***Statistical analysis***

The number of cats sampled were calculated according to each risk factor and recorded as a ratio and percentage. Results of cats that were serologically positive for FIV and FeLV were recorded in ratio and percentage. The associated risk factors for FIV or FeLV were recorded and compared using Pearson Chi-square ( $\chi^2$ ) analysis for each sample with 95% confidence interval (95% C.I) using SPSS software 16.0 (SPSS software Inc. Chicago Illinois). Each risk factor calculated using odd ratios instead of relative risk as the study was obtained by the cross-sectional method. Association was considered statistically significant when  $P < 0.05$  (Zar, 1999).

## **Results and Discussion**

From this study, FIV infection in cats was more prevalent (21.5%) compared with FeLV infection (7.69%) or dual infections of FeLV and FIV (0.01%). The prevalence of FIV was higher than that of FeLV, and this observation is similar that reported earlier (Cheng, 1990). Although the overall FIV prevalence rate

(21.4%) in this study is higher than FeLV or dual infection prevalence rates, it is still lower compared to the previous report. Previous prevalence rates of FIV, based on samples from cats in Selangor, were 33.1 (personal communication), 24.7 and 27% respectively (Bande *et al.*, 2009; Cheng, 1990). The lower prevalence rate may be explained by the differences in geographical areas where these studies were conducted. However, the results from this study may be a true reflection of the prevalence of these diseases in cats in Malaysia.

In this study, sick cats were shown to be significantly associated with FeLV infection ( $P = 0.016$ ). The clinical signs observed in these FeLV-positive cats were dullness and depression, anorexia, weight loss, gingivitis and stomatitis. This is consistent with the findings of Dunham and Graham (2008) who reported that cats infected with FeLV will develop immunosuppression before dying of other diseases. They suggested that the immunosuppression in the affected cats is believed to be caused by protein p15e.

The lifestyle of cats is significantly associated with FIV infection. Semi-roamers seem to have the highest prevalence. However, in this study, only one of 20 outdoor cats was positive for FIV. This cat was an intact male, which was sick at the point of testing. This finding suggests that intact and sick cats are more likely to be FIV-positive (Pedersen *et al.*, 1987). Thus the current recommendation by the American Association of Feline Practitioners (Levy *et al.*, 2008) and European Advisory Board on cat Diseases (ABCD) is that neutering should be adopted to serve as a control measure for FIV infection (Hosie *et al.*, 2009). This should also serve to reduce roaming and aggressive behaviours more often seen in intact cats.

None of the cats sampled in this study were ever vaccinated against FeLV or FIV. In Malaysia the core vaccines currently recommended for cats for feline panleukopenia (FPL), feline herpesvirus, and feline calicivirus. The FeLV vaccine is a non-core vaccine recommended based on risk assessment while the FIV vaccine is not recommended due to firstly, the lack of information on the FIV clade type present in Malaysia and secondly, the questionable cross-protection for the different clades rendered by the FIV vaccine. This is surprising because although FeLV vaccination is recommended for high risk cats, only one of eight clinics that participated in this study had FeLV vaccine in stock. None of the participating clinics practiced vaccination against FIV.

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