

# DERMATOLOGY PEARLS

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## **The role of allergy testing and desensitization in feline asthma**

Dermatology Clinic for Animals is available and interested in helping your feline asthma patients! The diagnosis of feline asthma is made by considering history, clinical signs and thoracic radiographs, exclusion of respiratory parasites (lungworm, roundworm, and heartworms via fecal examination and Baermann, trial deworming, and heartworm serologic testing), consistent bronchoalveolar lavage cytology demonstrating eosinophilic lung inflammation, and positive response to therapy with bronchodilators and steroids. Once the clinical diagnosis of feline asthma is made, treatments typically include oral, parenteral and/or inhaled steroids to reduce airway inflammation, and bronchodilators to reduce airway constriction. However just as in humans with asthma, allergy testing and desensitization in asthmatic cats can be helpful to reduce symptoms and medication needs by treating the underlying allergic disease. The new advent of sublingual allergy immunotherapy in companion animals is also an exciting development; due to the markedly increased safety profile of sublingual immunotherapy, it is gaining favor in human medicine for treatment of asthma, especially in children.

The following abstracts demonstrate that asthmatic cats do react to aeroallergens both on intradermal and serologic allergy testing (preferably Fc epsilon R1 alpha-based ELISA), that allergy immunotherapy administered by injection or by mucosal delivery reduces clinical signs and eosinophilic airway inflammation in both experimentally induced and naturally occurring feline asthma, but that, when possible, concurrent treatment with inhalant rather than oral steroids while the allergen has time for effect may be preferred to avoid reducing the efficacy of immunotherapy.

Vet Dermatol 2004 Aug 15 supp s1: 55

### **Treatment of allergic feline asthma with allergen avoidance and specific immunotherapy: 20 cats**

C. Prost

#### **Abstract**

Twenty cats presented with respiratory signs identified as asthma lasting for several months or years. The episodes of acute coughing and dyspnea were severe, requiring frequent glucocorticoid therapy. An allergic diagnosis was proposed in order to identify the putative allergens involved and to try specific therapy. Three cats developed diabetes mellitus secondary to glucocorticoid treatments. Two of them could not be tested and were given inhalant therapy with bronchodilators and glucocorticoids several times during the day and night. Intradermal tests were performed in 18 cats using 42 aeroallergens. Three tests were negative, even after a second test. Inhalant therapy was prescribed for three cats. Fifteen cats showed positive intradermal test reactions to house dust mites, storage mites and less frequently, pollens. When intradermal test results were positive for storage mites or cockroach, elimination of dried food was first recommended. This was sufficient for remission of the respiratory signs in three cats. Specific immunotherapy was prescribed for the other 12 cats. At the initiation of immunotherapy, all cats were treated with inhaled medications. After 6–9 months, immunotherapy was effective in controlling clinical signs of asthma without any other symptomatic treatment in eight cats. Four cats still required inhaled salbutamol and beclometasone two to three times weekly, instead of two to three times daily. This study demonstrates the role of allergenic stimuli in feline asthma and the advantage of specific immunotherapy as a long-term treatment.

Vet Dermatol. 2007 Apr;18(2):94-100.

## **Pilot study: prevalence of positive aeroallergen reactions in 10 cats with small-airway disease without concurrent skin disease.**

Moriello KA et al

### **Abstract**

The purpose of this study was to determine the prevalence of positive allergen reactions in cats with small-airway disease (i.e. 'feline asthma', 'feline allergic bronchitis', 'feline bronchial disease'). Intradermal skin tests (IDT) and serum immunoglobulin E (IgE) tests were performed in 10 cats with idiopathic small-airway disease and in 10 normal cats without a history of respiratory disease. None of the cats had a history of skin disease or clinical signs of skin disease at the time of testing. Significantly more individual positive allergen reactions were found on serum IgE tests than on IDT in both groups of cats. Affected cats had significantly more individual positive allergen reactions on both tests than unaffected cats. Both IDT and serum IgE tests resulted in more individual positive allergen reactions to weeds, trees, grasses, and/or moulds in affected cats than in normal cats. Significantly more positive allergen reactions to house dust mites were found in affected compared to non-affected cats by IDT but not by serum IgE testing.

Vet Immunol Immunopathol. 2009 Nov 15;132(1):46-52.

## **Comparison of intradermal skin testing (IDST) and serum allergen-specific IgE determination in an experimental model of feline asthma.**

Lee-Fowler TM et al

### **Abstract**

Intradermal skin testing (IDST) and allergen-specific IgE determination are used to determine allergen sensitization. In cats, studies have found poor correlation between the two tests. However, these studies were mainly conducted in pet cats sensitized to unknown allergens with unknown dose and duration of exposure. We hypothesized that in an experimental model of allergic sensitization where these variables are controlled, IDST would demonstrate greater sensitivity and specificity than would serum allergen-specific IgE determination. A model of feline asthma employing Bermuda grass allergen (BGA) or house dust mite allergen (HDMA) was used to test the hypothesis. Thirteen cats were assigned to undergo sensitization to BGA, HDMA or saline (placebo). Bronchoalveolar lavage fluid confirmed development of an asthmatic phenotype. Serum collection and IDST were performed on D0, D28 and D50. Individual, pooled, and pooled HI samples were used for allergen-specific IgE determination using an Fc epsilon R1 alpha-based ELISA; pooled samples were also analyzed using an enzymeimmunoassay. Sensitivity (SE), specificity (SP), and positive and negative predictive values (PPV and NPV) were calculated for IDST and for BGA- and HDMA-specific IgE. Combined results for IDST found SE=90.9%, SP=86.7%, PPV=83.3%, and NPV=92.9%. For ELISA-based serum IgE testing, the SE=22.7%, SP=100%, PPV=100% and NPV=63.8%. The enzymeimmunoassay did not detect sensitizing IgE, but did detect IgE reactivity to a variety of irrelevant allergens (even in HI samples). Sensitivity of IDST was greater than sensitivity of serum IgE measurement supporting use as a screening test for aeroallergens. Both IDST and allergen-specific IgE determination via ELISA were specific; either test can be used to guide selection of allergens for immunotherapy. The enzymeimmunoassay was unreliable and cannot be recommended.

Vet Immunol Immunopathol. 2006 Mar 15;110(1-2):141-53.

## **Rush immunotherapy in an experimental model of feline allergic asthma.**

Reinero CR [et al](#)

### **Abstract**

Specific allergen immunotherapy represents the only curative treatment of allergy. No studies have evaluated its efficacy in feline allergic asthma. We hypothesized that an abbreviated course of immunotherapy (rush immunotherapy, RIT) would blunt eosinophilic airways inflammation in experimental feline asthma induced with Bermuda grass allergen (BGA). The 6-month study included asthmatic-RIT treated cats; asthmatic-no RIT treated cats; and non-asthmatic cats. RIT involved increasing parenteral doses (20-200 microg) of BGA over 2 days. Numbers of eosinophils in bronchoalveolar lavage fluid (BALF), serum and BALF immunoglobulins, lymphocyte blastogenesis assays, and cytokines in blood and BALF were evaluated. BALF eosinophils decreased only in asthmatic-RIT treated cats. No differences in BGA-specific IgE levels over time were noted among asthmatic-RIT cats, but this group had lower IgE levels than asthmatic no-RIT cats at Months 3 and 6. RIT dampens eosinophilic airways inflammation in cats with experimental asthma. The mechanism of RIT may involve changes in allergen-specific immunoglobulins, induction of hyporesponsive lymphocytes, or alteration of cytokine profiles.

Vet Immunol Immunopathol. 2009 May 15;129(1-2):49-56..

## **Evaluation of subcutaneous versus mucosal (intranasal) allergen-specific rush immunotherapy in experimental feline asthma.**

Lee-Fowler TM [et al](#)

### **Abstract**

Rush immunotherapy (RIT) is effective for the treatment of experimental feline allergic asthma. In humans, the safety profile of immunotherapy is improved by delivering allergen by a mucosal route. We hypothesized that mucosal (intranasal) RIT would have similar efficacy to subcutaneous RIT with improved safety. Twelve cats sensitized and challenged with Bermuda grass allergen (BGA) were randomized to receive subcutaneous (SC) or intranasal (IN) RIT. Increasing doses of BGA (20-200 microg) were administered over 24h followed by 200 microg BGA weekly as maintenance. Adverse reactions were recorded. Clinical respiratory scores after BGA aerosol challenge, bronchoalveolar lavage fluid (BALF) % eosinophils, and cytokine concentrations were measured before RIT (day 1) and at months 1, 3 and 6 (M1, M3, M6). More adverse events were recorded with SC RIT (n=12) compared with IN RIT (n=6). Respiratory scores were lower by M6 compared with D1 in both the groups. The % BALF eosinophils declined significantly after RIT for both groups. While both protocols decreased eosinophilic airway inflammation, the SC RIT protocol did not cause life-threatening adverse events and demonstrated more consistent resolution of clinical signs after allergen challenge. Either protocol could be considered for the treatment of feline allergic asthma.

Vet J. 2013 Aug;197(2):268-72.

## **Oral glucocorticoids diminish the efficacy of allergen-specific immunotherapy in experimental feline asthma.**

Chang CH [et al](#).

### **Abstract**

Allergen-specific rush immunotherapy (RIT) shows promise in treating asthma; however, pet cats will likely require at least initial concurrent glucocorticoids (GCs) to control serious clinical signs. How the immunosuppressive effects of GCs would impact RIT in cats is unknown. The hypothesis of this study was that oral, but not inhaled GCs will diminish the efficacy of RIT in experimental feline asthma. Cats (n=6/group) were sensitized using Bermuda grass allergen (BGA) and randomized to receive BGA-specific RIT for 9 months with an oral GC (prednisolone 10mg daily), inhaled GC (fluticasone 220 µg twice daily), or placebo administered for the first 6 months. Bronchoalveolar lavage fluid (BALF) percent eosinophils and other immunological assays were performed. Eosinophilic airway inflammation was suppressed in all groups at month 6 of RIT. BALF percent eosinophils significantly increased over time only in oral GC/RIT cats between months 6 and 9. Placebo/RIT cats had significant decreases over time in BGA-specific serum IgE. Given the significant increase of airway eosinophilia over time in RIT cats initially treated with an oral GC, inhaled GCs might be better for dampening eosinophilic inflammation until RIT normalizes the dysregulated immune system.