



## Improved Heska ALLERCEPT Feline Hydrogel test

The cat is ubiquitous in our societies. Cats have been sharing home with humans for more than 10.000 years. With new trends in lifestyle, cats are gaining in popularity as companion animals.

However, in regard of allergy, cats have received less attention than other animal species. Research in feline dermatology has been following research in canine dermatology. It has now been realized how important new research initiatives in feline dermatology is and knowledge is expanding rapidly.

Feline hypersensitivity reactions can show respiratory, digestive, ocular and cutaneous symptoms. Respiratory clinical symptoms in the cat has been reported as rhinitis, coughing (allergic bronchitis) and asthma parallel to what is seen in humans.

Pruritus in cats is manifested differently than in dogs. Dogs scratch, lick, bite and rub when itchy and in full public and/or at night keeping the owner awake. And they develop secondary skin lesions. Cats lick, scratch and bite some of which are also elements of their grooming behaviour and when pruritic cats most often hide this behaviour pattern and become secret groomers. They groom when in another room than the owner or they have secret "grooming/itch places" in the home. Some cats use the owner as backscratcher. Owners do not distinguish pruritus from normal grooming and often they are not aware of their cat being pruritic. Even with extensive pruritus and licking cats only rarely develop secondary skin lesions.

Feline hypersensitivity dermatitis (FAD ~ Feline Atopic Dermatitis) is a clinical diagnosis made by exclusion just as the case is with Canine Atopic Dermatitis (CAD). The clinical presentation is characterized by reaction patterns which also may have different causes (ectoparasites, adverse food reaction, allergic).

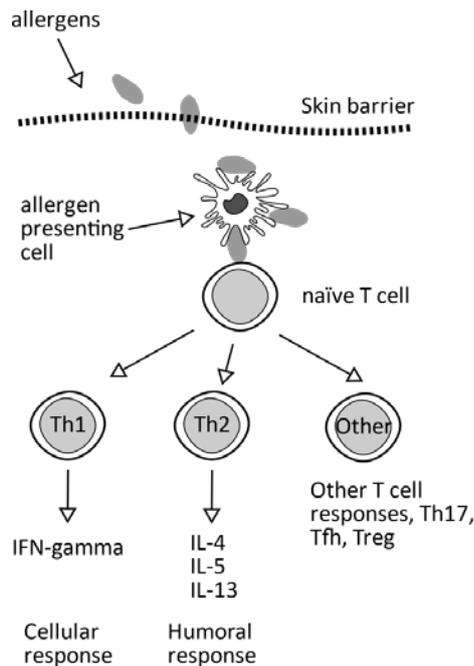
- Head and neck pruritus
- Self-induced Symmetric alopecia
- Millitary dermatitis
- Eosinophilic granuloma Complex
  - Eosinophilic granuloma
    - Linear eosinophilic granuloma,
    - Lip/chin eosinophilic granuloma,
    - oromucosal eosinophilic granulomas
  - Eosinophilic ulcer (Indolent ulcer)
  - Eosinophilic plaque
- Otitis externa

The secondary microbial infections often accompanying CAD are rarely seen in cats and a clear breed predilection for FAD has not been clearly observed.

Intradermal testing in the cat is not used as frequently as in the dog due to a very thin skin and since reading of the skin reactions is difficult and the interpretation therefore challenging.

These facts point out that cats should tested, evaluated and treated differently than dogs.

**"Cats are not small dogs"**



### Is the feline immune system different?

No major or evident differences are observed between the cat and other animal species. Cats have the same range of lymphoid subsets, same range of immune receptors and same spectrum of allergen presenting cells.

Immunologically the primary lymphocyte responses to allergens are of Th2 (T helper) type, with production of IL-4, IL-5 and IL-13 which trigger humoral responses (production of antibodies).

In cats newer investigations point out that the dominating response seems to be Th1 which trigger a cellular response (production of cells). Genetically the cat have a lower amount of surface receptors in allergen presenting cells. This may reduce the possibilities of allergen presentation which may be one of the reasons why cats generally show lower antibody responses.

It is believed that immune related components interact differently in the cat leading to different type of responses. For example, autoimmune diseases are uncommon in cats and allergic diseases characterize differently. Respiratory allergic disease which is uncommon in the dog is frequently seen in allergic cats.

There are antibody differences reported in feline antibodies. In cats, 3 of the 4 IgG subclasses have only been recognized. IgD has not been identified in the cat.

The illustration shows a naïve, undifferentiated T lymphocyte stimulated by an allergen through an antigen presenting cell after sensitization. Major paths of differentiation of naïve T cells are shown (T Helper cells; Th1 or Th2 pathways).

The Th1 route triggers the production of interferon gamma (IFN- $\gamma$ ) and direct cell mediated immunity. The Th2 path produces interleukins (IL-4, IL-5 and IL-13) and initiates antibody responses. Cats seem to respond mainly with a Th1 response while in other animal species hypersensitive responses are dominated mostly by Th2 reactions.

The immune mechanisms in cats are therefore identical but they may have a different balance between the activation pathways.

### IgE responses in atopic cats

It is observed that the magnitude of the IgE response does not always correspond to the IgE levels observed in other animal species. The amount of specific IgE in cats are generally lower.

In an examination of 200 cats with clinical atopic symptoms the following frequencies were observed:

- Negative samples: 4-8%
- Close to or below the detection limit of the test: 15-18%

Low IgE responses in cats may be very important clinically. The amount of IgE seems to be independent of the clinical severity of the symptoms.



### **The improved ALLERCEPT Feline test**

ALLERCEPT now takes advantage of the use of the hydrogel technology.

Hydrogels are three-dimensional, hydrophilic, polymeric networks capable of retaining large amounts of water. Hydrogels were first reported by Wichterle and Lím (1960). Hydrogels undergo a significant volume phase transition in response to biochemical stimuli which include pH, presence of ions, and specific protein compositions.

The feline ALLERCEPT test now incorporates this technology utilising a mix of polymers which have been designed to simulate physiological conditions in the ELISA testing well.

The environment created by the hydrogel regulates the hydration capacity of the solution and build a molecular porosity which increases protein solubility and mobility.

The use of the hydrogel technology stabilizes the conformation of proteins making the allergen epitopes more available which enhances the kinetic of the feline IgE binding. This phenomenon is particularly effective and visible on samples where low titres of specific IgE are present.

The commercial name of this technology : **ALLERCEPT Feline Hydrogel system.**

#### **Major observed problems of *in vitro* feline IgE tests**

- **False negative results:** the test fails to detect low amounts of specific IgE

The Feline Hydrogel system retains water in a way that simulates a liquid phase reaction. Because allergen specific IgE levels are frequently very small in the cat reactivity to immobilized allergens is thus facilitated increasing the test sensibility.

**The consequence of a false negative test is missing potentially important allergens for immunotherapy.**

- **False positive results:** Some IgE detecting reagents cross-reacts with IgG or IgE anti-CCD reactions are not controlled

The ALLERCEPT test uses the high affinity Fc-epsilon receptor as IgE detecting reagent which has absolute specificity for IgE. In 2016 Heska introduced an IgE anti-CCD system which for the first time addressed the false multi-positive results in *in vitro* tests caused by Cross Reacting Carbohydrate Determinants.

**The consequence of a false positive test is including inappropriate allergens to an immunotherapy.**

**The ALLERCEPT Feline Hydrogel system allows to determine consistently and accurately low specific IgE concentrations in cat serum samples.**