

Component testing for furry pet allergy

INTRODUCTION

The worldwide prevalence of dog and/or cat allergy is about 10% to 20%, and up to 5% of people with respiratory allergies are allergic to horses.^{1,2} In the United States, exposure to dander from these animals can be significant because almost 40% of households report owning dogs, over 20% own cats, and approximately 1% own horses.³ Allergy symptoms can include asthma, allergic rhinitis, rhinoconjunctivitis, anaphylaxis, and conditions such as bronchial inflammation.

DIAGNOSTIC TESTING

Suspicion of dog, cat, or horse allergy is usually prompted by the presence of symptoms, and support for the diagnosis commonly involves a skin-prick test (SPT) or specific IgE testing based on whole allergen extracts.⁴ But the use of extracts to assess suspected animal allergy has drawbacks.⁵ Commercially available extracts may have variable potency, may contain other allergens, or may contain proteins which cross-react with other allergens. This can lead to false-positive results.⁶

Also, although sensitization (ie, production of IgE antibodies) to antigenic proteins from dander can cause an allergic reaction, some patients with a suspected allergy may be only sensitized to an antigen without having a true allergy. Patients who are sensitized but not truly allergic have developed IgE antibodies to the antigen on initial exposure but do not mount an IgE-mediated immune response (ie, allergic reaction) on re-exposure.

Components are the specific proteins found in whole allergen extracts. The identification of IgE antibodies to component proteins can help confirm that patients are sensitized to the animal in question and that the positive extract result is not due to cross reactivity. The presence of reactivity to multiple components increases the likelihood that the patient is truly allergic.

TEST AVAILABILITY

Quest Diagnostics offers fluorescent enzyme immunoassay-based (ImmunoCAP Specific IgE) whole-allergen (dander) tests with reflex to component panels (**Table 1**). The component panels test for specific IgE antibodies to dog (Can f 1-6), cat (Fel d 1, 2, 4, and 7), and horse (Equ c 1) allergens.

Quest also offers respiratory profile panels that include dog and cat allergen testing. These panels are appropriate for 14 different regions of the United States, including Alaska and Puerto Rico. Details for these panels, for regions designated I through XI, XVI, XVIII, and XIX can be found in the Test Directory at <https://testdirectory.questdiagnostics.com/test/home>.

TEST SELECTION AND INTERPRETATION

Component testing is offered with or without reflex testing (**Table 1**) with the latter being appropriate if an IgE response to the animals' dander has already been established. Compared with extract testing alone (Cat Dander [e1] IgE [test code 2601]; Dog Dander [e5] IgE [test code 2605]; Horse Dander [e3] IgE [test code 2603]), component testing provides more

Table 1. ImmunoCAP Component IgE Tests for Respiratory Allergens

Test name	Test code
Tests with reflex testing^a	
Cat Dander (e1) IgE With Reflex to Component Panel	10564
Dog Dander (e5) IgE With Reflex to Component Panel	10571
Horse Dander (e3) IgE With Reflex to Component	10629
Tests without reflex testing	
Cat Dander Component Panel	10558
Dog Dander Component Panel	10569
Horse Dander Component Panel	10583

^a Reflex tests are performed at an additional charge and are associated with an additional CPT[®] code(s).

information about the patient’s reactivity and can help assess risk of severe symptoms.

Positive results (ie, >0.10 kU/L) for certain components can help assess the risk of asthma development and severity (Table 2^{2,7-25}). For example, levels of Can f 1–specific IgE antibodies are correlated with the severity of asthma symptoms in patients who are allergic to dogs.^{8,9} Component testing can also have a positive impact on the management of the patient’s course. For instance, sensitization to one of the components associated only with male dogs can help allow the patient to have a female dog.²³

The risk and severity of allergy is also greater in patients who are cosensitized or polysensitized to dog, cat,

and/or horse allergens compared to patients who are monosensitized.^{17,19,26,27} For example, in a study of 259 animal-sensitized children, cosensitization to Can f 5 and Can f 1 or f 2 conferred the greatest risk for asthma.⁷ Other studies have shown that sensitization to ≥3 dog and/or cat components is more common in patients with severe asthma.^{17,19,26}

Negative results for IgE to dog, cat, or horse component protein(s) indicate absent or undetectable levels of IgE to the protein(s). Negative results may not rule out dog, cat, or horse allergy. For example, studies with dog extract IgE-positive sera have found that as many as 40% are negative to Can f 1, Can f 2, and Can f 5.⁸

Table 2. Specific Cat, Dog, and Horse Component Proteins

Allergen (protein family)	Clinical significance of IgE sensitization
Cat	
Fel d 1 (uteroglobin)	<ul style="list-style-type: none"> Major cat allergen; detected in up to 90% of people with cat allergy¹⁰ Associated with asthma in patients with IgE monosensitivity¹¹ to Fel d 1 Associated with cat allergy, bronchial hyperresponsiveness (ie, increased sensitivity to airway-narrowing stimuli), and increased fractional exhaled nitric oxide (FeNO, a type 2 inflammation biomarker) in patients polysensitized¹² to Fel d 1, 2, and 4
Fel d 2 (albumin)	<ul style="list-style-type: none"> Minor cat allergen¹² Associated with moderate/severe rhinitis and asthma¹² Associated with atopic dermatitis in children¹³
Fel d 4 (lipocalin)	<ul style="list-style-type: none"> Associated with cat allergy, bronchial hyperresponsiveness (ie, increased sensitivity to airway-narrowing stimuli), and increased FeNO in patients polysensitized¹² to Fel d 1, 2, and 4 Associated with atopic dermatitis in children¹³
Fel d 7 (lipocalin)	<ul style="list-style-type: none"> Cross-reactive with Can f 1, which is associated with asthma
Dog	
Can f 1 (lipocalin)	<ul style="list-style-type: none"> Major dog allergen; >50% of individuals¹⁴ with dog allergy are sensitized to Can f 1 IgE levels correlated with asthma severity^{8,9}
Can f 2 (lipocalin)	<ul style="list-style-type: none"> Minor dog allergen and most patients^{15,16} sensitized to Can f 2 will have cosensitivity to Can f 1 Associated with bronchial inflammation and severe asthma¹⁷
Can f 3 (serum albumin)	<ul style="list-style-type: none"> Reported sensitization to Can f 3 ranges from 25% to 90% in patients with dog allergy^{7,14,16,18,19} Associated with increased risk of asthma and allergic rhinitis²⁰
Can f 4 (lipocalin)	<ul style="list-style-type: none"> Major dog allergen; most abundant detected allergen found in dog dander²¹ Associated with asthma²²

(Continued)

Table 2. Specific Cat, Dog, and Horse Component Proteins (Continued)

Allergen (protein family)	Clinical significance of IgE sensitization
Can f 5 (kallikrein)	<ul style="list-style-type: none"> Associated with severe asthma and strongly associated with rhinoconjunctivitis in children who are monosensitized²⁰ to Can f 5 People sensitized only to this component can tolerate female dogs²³
Can f 6 (lipocalin)	<ul style="list-style-type: none"> Major dog allergen Associated with asthma and rhinitis²⁰
Horse	
Equ c 1 (lipocalin)	<ul style="list-style-type: none"> Major horse allergen² Associated with severe asthma in adults and children^{24,25}

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These tests were developed and their analytical performance characteristics have been determined by Quest Diagnostics. They have not been cleared or approved by the FDA. These assays have been validated pursuant to the CLIA regulations and are used for clinical purposes.