MAYO CLINIC LABORATORIES

Test Definition: CATPF

Cat Epithelium, IgE, with Reflex to Cat Epithelium Components, IgE, Serum

Overview

Useful For

Evaluating patients with suspected cat allergy

Reflex Tests

Test Id	Reporting Name	Available Separately	Always Performed
CATPR	Cat Epithelium Components, IgE, S	No	No

Testing Algorithm

Testing begins with analysis of cat epithelium IgE. If cat epithelium IgE is negative (<0.10 kU/L), testing is complete.

If cat epithelium IgE is 0.10 kU/L or more, then 4 cat epithelium components (Fel d 1, Fel d 2, Fel d 4, Fel d 7) will be performed at an additional charge.

Special Instructions

- Allergens - Immunoglobulin E (IgE) Antibodies

Highlights

The determination of the relative amount of IgE antibody to total cat dander, and IgE antibodies to cat dander/epithelium components, may aid in assessment of the potential strength and type of allergenic response to cat epithelium.

IgE antibody to total specific cat dander extract will initially be tested.

If detectable specific total cat dander IgE antibody is present, additional component cat (feline) epithelium allergen antibody testing will be performed. This is comprised of testing for IgE antibodies to the potential allergens Fel d 1, Fel d 2, Fel d 4, and Fel d 7.

Method Name

Fluorescent Enzyme Immunoassay (FEIA)

NY State Available

Yes

Specimen

Specimen Type

Serum

Ordering Guidance

For a listing of allergens available for testing, see Allergens - Immunoglobulin E (IgE) Antibodies

Specimen Required

Supplies: Sarstedt Aliquot Tube, 5 mL (T914)
Collection Container/Tube:
Preferred: Serum gel
Acceptable: Red top
Submission Container/Tube: Plastic vial
Specimen Volume: 1 mL
Collection Instructions: Centrifuge and aliquot serum into a plastic vial.

Forms

If not ordering electronically, complete, print, and send an Allergen Test Request (T236) with the specimen.

Specimen Minimum Volume

0.6 mL

Reject Due To

Gross hemolysis	OK
Gross lipemia	OK
Gross icterus	OK

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	14 days	
	Frozen	90 days	

Clinical & Interpretive

Clinical Information

Overall, allergies to common pets, such as cats and dogs, may afflict up to 20% of the world's population, and the prevalence appears to be increasing over time. A large multicenter study survey in European adults reported an 8.8% sensitization rate to cat (feline, *Felis catus* [*domesticus*]) allergens. The assessment of allergy to cats is dependent upon the presence of compatible clinical symptoms in the context of exposure, with support from identification of potential canine specific IgE allergen antibodies either by skin testing or in vitro serology testing. In vitro testing has generally focused on assessing for the presence of IgE antibodies to total cat dander (which contains epithelial proteins) allergen extract.

There is a correlation between total cat IgE allergen antibodies and an increased likelihood of a clinical allergic response. Allergic symptoms can include rhinitis, asthma, and atopic dermatitis. Once an elevated antibody response to total cat dander IgE extract is established, assessment for the presence of IgE antibodies to the most common cat allergenic components will be performed, which can yield additional, potentially useful, information for clinical assessment of allergy and sensitization. During cat component allergen IgE antibody testing, the presence of IgE antibodies specific for potentially allergenic individual proteins, namely Fel d1, Fel d2, Fel d4, and Fel d7, are individually assessed. The determination of the relative amount of IgE antibody to specific components can aid in assessment of the potential strength and type of allergenic response. Co-sensitization to some components, such as Fel d 1 and Fel d 4 may be associated with asthma symptoms.(1)

Fel d 1 is the most clinically important, prevalent, and specific feline component allergen. Fel d 1 IgE antibodies have been observed in up to 95% of individuals with cat allergy. Measuring IgE antibodies to Fel d 1 may have prognostic value in evaluating cat allergy severity. Sixty to 90% of all IgE reactivity to cat dander is against the Fel d 1. Fel d 1 can be readily found in the fur and epidermis of a cat, may become airborne very easily, and can persist in the surrounding environment for several months. In 140 cat allergic patients, where all subjects were suffering from asthma and/or rhinoconjunctivitis, 95.6% of children and 94.4% of adults had IgE against Fel d 1. The IgE levels found in asthmatic children may be higher than the levels in children suffering from rhinoconjunctivitis. Consider avoidance to cat or other environmental exposure to Fel d 1 as well as allergen immunotherapy (AIT). All domestic cats produce Fel d 1. This allergen is also found in other feline species, such as cougar, tiger, and lion.

Sensitization to the serum albumin Fel d 2 cat allergen is associated with increased risks of asthma and allergic rhinitis. Serum albumins are a minor allergen in animal dander and may be most associated with rhinitis but can play a significant role as cross-reacting allergens. Pork/cat syndrome (allergy to cat dander and pork meat) can be mediated by cross-reactive antibodies against pork serum albumin and cat serum albumin (Fel d 2). Less than 20% of individuals with known cat allergy are reactive to Fel d 2. Individuals sensitized to Fel d 2 may show cross reactivity to canine Can f 3 albumin antigen and potentially to other albumins from human, pig, cattle, sheep, horse, mouse, and rat.

Fel d 4 and Fel d 7 are proteins that are members of the lipocalin protein family and are the cat allergens most associated with symptoms of asthma. In the case of Fel d 4, 62.96% (17 of 27) of individuals with cat allergy symptoms had detectable serum IgE antibody to the Fel d 4 antigen. Lipocalin proteins are found in many animal species, and Fel d 4 may cross react with Can d 6 and Equ c 1, while Fel d 7 may cross react with the major dog allergen Can f 1. Fel d 4 and Fel d 7 are produced in all cats.

Table. Specific Cat Epithelium Allergens

Allergen	Most common reaction type	Selected potential cross-reactivity with other allergens
Fel d 1 (uteroglobin)	The major cat allergen. Sensitivity is associated systemic rhinitis and asthma Fel d 1 is a cat-specific	No major cross reactivity to Fed d 1 has been reported. Fel d 1 is a cat-specific marker of sensitization. However, cat allergic patients with IgE to Fel d 1 have also reacted to different feline species, such as puma (cougar),

	marker of sensitization. For individuals with clinical allergy symptoms to cats, the majority show antibody reactivity to Fel d1. The presence of IgE Fel d 1 antibodies indicates an increased risk of allergic response when exposed to cat skin, dander and/or saliva.	tiger, and lion.
Fel d 2 (albumin)	Fel d 2 is rarely of significant clinical importance, however, sensitization to Fel d 2 may be associated with increased risks of allergic rhinitis and asthma. Serum albumins are a minor allergen in animal dander, but can play a significant role as cross-reacting allergens	Sensitization to Fel d 2 may contribute to pork-cat syndrome. Serum IgE antibodies against this component may indicate cross-reactivity associated with canine Can f 3 albumin antigen as well as albumins from humans, pigs, cattle, sheep, horses, mice, and rats.
Fel d 4 (lipocalin)	Sensitization to lipocalins, such as Fel d 4, may be associated with asthma	Increased sensitization to Fel d 4 is associated with an increased risk of asthma when exposed to cat dander. Potential for lipocalin cross-reactivity including dog Can f 6, dog Can f 4, and horse Equ c 1 allergens.
Fel d 7 (lipocalin)	Sensitization to lipocalins, such as Fel d 7, may be associated with asthma	Increased sensitization to Fel d 7 is associated with an increased risk of asthma when exposed to cat dander. Potential for lipocalin cross-reactivity is present most notably with dog Can f 1 allergen.

Reference Values

Class	IgE kU/L	Interpretation

0	<0.10	Negative
0/1	0.10-0.34	Borderline/equivocal
1	0.35-0.69	Equivocal
2	0.70-3.49	Positive
3	3.50-17.4	Positive
4	17.5-49.9	Strongly positive
5	50.0-99.9	Strongly positive
6	> or =100	Strongly positive

Concentrations of 0.70 kU/L or more (class 2 and above) will flag as abnormally high.
Reference values apply to all ages.

Interpretation

When detectable total cat epithelium IgE antibody is present (> or =0.10 IgE kUa/L), additional specific component IgE antibody testing will be performed. If at least one potential specific allergenic cat component IgE is detected (> or =0.10 IgE kUa/L), an interpretative report will be provided.

When the sample is negative for total cat epithelium IgE antibody (<0.10 IgE kUa/L), additional testing for specific cat component IgE antibodies will not be performed. Negative IgE results for total cat epithelium antibody may indicate a lack of sensitization to potential cat allergenic components.

Cautions

Clinical correlation of results from in vitro IgE testing with patient history of allergic or anaphylactic responses to cats/cat epithelium, saliva, and/or dander are recommended.
-Negative results for IgE to total cat dander and any cat allergenic component does not completely exclude the possibility of clinically relevant allergic responses upon exposure to cats.
-Positive results for IgE to total cat dander or any cat allergenic components are not diagnostic for allergy to cats, and only indicate that the patient may be sensitized to epithelium or a cross-reactive allergen.

Testing for IgE antibodies may not be useful in patients previously treated with immunotherapy to determine if residual clinical sensitivity exists or in patients whose medical management does not depend upon identification of allergen specificity.

False-positive results for IgE antibodies may occur in patients with markedly elevated serum IgE (>2500 kU/L) due to nonspecific binding to allergen solid phases.

Clinical Reference

1. Gronlund H, Adedoyin J, Reininger R, et al. Higher immunoglobulin E antibody levels to recombinant Fel d 1 in cat-allergic children with asthma compared with rhinoconjunctivitis. Clin Exp Allergy. 2008;38(8):1275-1281. doi:10.1111/j.1365-2222.2008.03003.x
2. Nwaru BI, Suzuki S, Ekerljung L, et al. Furry animal allergen component sensitization and clinical outcomes in adult asthma and rhinitis. J Allergy Clin Immunol Pract. 2019;7(4):1230-1238.e4
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5. Konradsen JR, Fujisawa T, van Hage M, et al. Allergy to furry animals: New insights, diagnostic approaches, and challenges. J Allergy Clin Immunol. 2015;135(3):616-625
6. de Groot H, van Swieten P, Aalberse RC. Evidence for a Fel d I-like molecule in the "big cats" (Felidae species). J Allergy Clin Immunol. 1990;86(1):107-116
7. Bonnet B, Messaoudi K, Jacomet F, et al. An update on molecular cat allergens: Fel d 1 and what else? Chapter 1: Fel d 1, the major cat allergen. Allergy Asthma Clin Immunol. 2018;14:14. doi:10.1186/s13223-018-0239-8
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11. Huang Z, Zhu H, Lin R, et al. Serum albumin as a cross-reactive component in furry animals may be related to the allergic symptoms of patients with rhinitis. J Asthma Allergy. 2021;14:1231-1242. doi:10.2147/JAA.S334195
12. Smith W, Butler AJ, Hazell LA, et al. Fel d 4, a cat lipocalin allergen. Clin Exp Allergy. 2004;34(11):1732-1738

Performance

Method Description
Specific IgE from the patient's serum reacts with the allergen of interest, covalently coupled to an ImmunoCAP. After washing away nonspecific IgE, enzyme-labeled anti-IgE antibody is added to form a complex. After incubation, unbound anti-IgE is washed away, and the bound complex incubated with a developing agent. After stopping the reaction, the fluorescence of the eluate is measured. Fluorescence is proportional to the amount of specific IgE present in the patient's sample (ie, the higher the fluorescence value, the more IgE antibody is present).(Package insert: ImmunoCAP System Specific IgE FEIA. Phadia AB; Rev 02/2024)

PDF Report
No

Day(s) Performed
Monday through Friday

Report Available
Same day/1 to 3 days

Specimen Retention Time
14 days

Performing Laboratory Location
Mayo Clinic Laboratories - Rochester Superior Drive

Fees & Codes

Fees

- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.
- Prospective clients should contact their account representative. For assistance, contact Customer Service.

Test Classification

This test has been cleared, approved, or is exempt by the US Food and Drug Administration and is used per manufacturer's instructions. Performance characteristics were verified by Mayo Clinic in a manner consistent with CLIA requirements.

CPT Code Information

86003

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
CATPF	Cat Epithelium Component Reflex, S	6833-8

Result ID	Test Result Name	Result LOINC® Value
CAT1	Cat Epithelium, IgE, S	6833-8