MAYO CLINIC LABORATORIES

Test Definition: PEANT

Peanut, IgE with Reflex to Peanut Components, IgE, Serum

Overview

Useful For

Evaluating patients with suspected peanut allergy

Evaluating patients with possible peanut cross-reactivity

This test is **not useful for** patients previously treated with immunotherapy to determine if residual clinical sensitivity exists or in whom the medical management does not depend upon identification of allergen specificity.

Reflex Tests

Test Id	Reporting Name	Available Separately	Always Performed
PNTCP	Peanut Components, IgE, S	No	No

Testing Algorithm

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

If peanut IgE is 0.10 kU/L or greater, then 7 peanut components (Ara h 2, Ara h 1, Ara h 3, Ara h 6, Ara h 8, Ara h 9, and profilin Bet v2) are performed at an additional charge.

Special Instructions

- Allergens - Immunoglobulin E (IgE) Antibodies

Highlights

The determination of the relative amount of IgE antibody to total peanut, and IgE antibodies to specific peanut components, can aid in assessment of the potential strength and type of allergenic response to peanuts.

IgE antibody to total peanut extract will be tested.

If detectable total peanut IgE antibody is present, additional specific peanut allergen antibody testing will be performed. This is comprised of testing for IgE antibodies to the potential allergens Ara h 2, Ara h 1, Ara h 3, Ara h 6, Ara h 8, Ara h 9, and profilin Bet v2.

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: 2 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
1 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	
	Ambient	7 days	
	Frozen	90 days	

Clinical & Interpretive

Clinical Information
Peanut allergy is one of the most common food allergies in the United States, with an estimated prevalence of

approximately 1% to 2%.(1) The clinical symptoms of peanut allergy may range from relatively mild, such as rhinorrhea, pruritus, or nausea, to a systemic and potentially life-threatening anaphylactic reaction. The diagnosis of peanut allergy is dependent upon the presence of compatible clinical symptoms in the context of peanut exposure, with support from identification of potential peanut-specific IgE allergen antibodies, either by skin testing or in vitro serology testing. In vitro testing has generally focused on assessing the presence of total peanut IgE antibodies. These antibodies are identified by immunoassay in which the capture allergen is an extract prepared from natural peanut raw material. Most studies have demonstrated a correlation between total peanut IgE allergen antibodies and an increased likelihood of a clinical allergic response.

Once an elevated antibody response to total peanut IgE extract is established, assessment for the presence of specific IgE antibodies to the most common peanut allergenic components will be performed.

During peanut component allergen testing the presence of IgE antibodies specific to potentially allergenic individual proteins, namely Ara h 1, Ara h 2, Ara h 3, Ara h 6, Ara h 8, Ara h 9, and profilin protein Bet v2, are assessed. The determination of the relative amount of IgE antibody to specific peanut components can aid in assessment of the potential strength and type of allergenic response (see Table).

Ara h 1, 2, 3, and 6 are seed storage proteins and are the most relevant for evaluation of suspected peanut allergy.(2,3) The presence of antibodies to Ara h 2 exhibits strong association with potential systemic reactions. Ara h 1, 2, and 3-specific IgE antibodies tend to be associated with more severe allergic reactions. Ara h6 shares substantial, but not complete, cross-reactivity with Ara h2, and often exhibits similarity in terms of the degree and type of allergenicity.

Immunoglobulin E antibodies against Ara h 8 are generally associated with milder peanut allergies and may be seen in the context of birch pollen sensitization. Ara h 8 is a homologue of the birch pollen allergen Bet v1.(4) Ara h 9 is a member of the lipid transfer protein (LTP) family. LTP is ubiquitous throughout the plant kingdom and is also extremely homologous. IgE antibodies specific for Ara h 9 may be associated with allergic reactions upon peanut ingestion, although published data on this is not conclusive.(5) In addition, because of the significant sequence homology, cross-reactivity of IgE antibodies may be observed between Ara h 9 and LTP in commonly consumed plants, such as peaches, apples, and plums.

Finally, IgE antibodies to the profilin Bet v2, while associated with birch pollen sensitivity, also represent a minor peanut allergen marker as it is cross-reactive with the peanut profilin, Ara h5. As profilin proteins are present in many other foods, sensitivity to profilin Bet v2 may be associated in broad allergen cross-reactivity among foods, including mango, peach, apple, hazelnut, celery, carrot, paprika, anise, fennel, coriander, cumin, tomato, and potato. The presence of antibodies to profilin Bet v2 is typically associated with milder allergic reactions and oral allergy syndrome.

Table. Specific Peanut Allergens

Allergen	Most common reaction type	Heat and digestion stability	Selected potential cross-reactivity with other allergens
Ara h1 (storage peanut protein)	Systemic	Stable	Some potential allergenic cross reactivity with plant vicilin, including those found in soy and pea

Ara h2 (storage peanut protein)	Systemic	Strongly stable	Some potential allergenic cross reactivity with almond and brazil nut allergens Ara h6
Ara h3 (storage peanut protein)	Systemic	Stable	Some potential allergenic cross reactivity with hazelnut and soybean allergens
Ara h6 (storage peanut protein)	Systemic	Strongly stable	Ara h2
Ara h8 (PR-10 protein, Bet v 1-homologous allergen)	Associated with local reactions such as oral allergy syndrome (OAS)	Labile to heat and digestion	Associated with allergy to birch and birch related tree pollen
Ara h9 (lipid transfer protein)	Associated with both systemic reactions and local reactions such as OAS	Stable	Associated with allergy to peach and peach related fruits
Profilin Bet v2	Associated with more minor local reactions such as OAS	Labile to heat and digestion	Associated with allergy to a broad variety of pollen and plant products from trees, nuts, grasses, and weeds

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

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

Cautions

Results from peanut specific IgE antibody testing must be interpreted in the context of patient's clinical evaluation and history of allergen exposures.

Negative results for IgE to total peanut and any peanut components do not completely exclude the possibility of clinically relevant allergic responses upon exposure to peanuts. Clinical correlation of results from in vitro IgE testing with patient history of allergic or anaphylactic responses to peanuts is recommended.

Positive results for IgE to total peanut or any potential peanut allergenic components are not diagnostic for peanut allergy and only indicate that the patient may be sensitized to peanuts or a cross-reactive allergen. Clinical correlation of results from in vitro IgE testing with patient history of allergic or anaphylactic responses to peanuts is recommended.

Some patients with significantly elevated concentrations of total peanut IgE antibodies do not have any reaction when administered a peanut oral food challenge. This may be due to the presence of an IgE antibody specific to a nonallergenic protein present within the peanut extract. Furthermore, some individuals with clinically insignificant or no sensitivity to allergens may have detectable levels of IgE antibodies in serum; therefore, results must be interpreted in the clinical context.

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. Sicherer SH, Wood RA. Advances in diagnosing peanut allergy. J Allergy Clin Immunol Pract. 2013;1(1):1-14. doi:10.1016/j.jaip.2012.10.004
2. Eller E, Bindslev-Jensen C. Clinical value of component-resolved diagnostics in peanut-allergic patients. Allergy. 2013;68(2):190-194. doi:10.1111/all.12075
3. Hong X, Caruso D, Kumar R, et al. IgE, but not IgG4, antibodies to Ara h 2 distinguish peanut allergy from asymptomatic peanut sensitization. Allergy. 2012;67(12):1538-1546. doi:10.1111/all.12047
4. Asarnoj A, Nilsson C, Lidholm J, et al. Peanut component Ara h 8 sensitization and tolerance to peanut. J Allergy Clin Immunol. 2012;130(2):468-472. doi:10.1016/j.jaci.2012.05.019
5. Klemans RJ, van Os-Medendorp H, Blankestijn M, Bruijnzeel-Koomen CA, Knol EF, Knulst AC. Diagnostic accuracy of specific IgE to components in diagnosing peanut allergy: a systematic review. Clin Exp Allergy. 2015;45(4):720-730. doi:10.1111/cea.12412
6. Koid AE, Chapman MD, Hamilton RG, et al. Ara h 6 complements Ara h 2 as an important marker for IgE reactivity to peanut. J Agric Food Chem. 2014;62(1):206-213. doi:10.1021/jf4022509

7. Bublin M, Breiteneder H. Cross-reactivity of peanut allergens. Curr Allergy Asthma Rep. 2014;14(4):426. doi:10.1007/s11882-014-0426-8
8. Chan ES, Greenhawt MJ, Fleischer DM, Caubet JC. Managing cross-reactivity in those with peanut allergy. J Allergy Clin Immunol Pract. 2019;7(2):381-386. doi:10.1016/j.jaip.2018.11.012
9. Simberloff T, Parambi R, Bartnikas LM, et al. Implementation of a standardized clinical assessment and management plan (SCAMP) for food challenges. J Allergy Clin Immunol Pract. 2017;5(2):335-344.e3. doi:10.1016/j.jaip.2016.05.021

Performance

Method Description
Specific IgE from the patient's serum reacts with the allergen of interest, which is 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; Rev 06/2020)

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
PEANT	Peanut Component Reflex, S	6206-7

Result ID	Test Result Name	Result LOINC® Value
PNUT	Peanut, IgE, S	6206-7