MAYO CLINIC LABORATORIES

Test Definition: EGWTP

Egg White Component Profile, Serum

Overview

Useful For

Identifying egg white allergens:
-Responsible for allergic disease and/or anaphylactic episode
-To confirm sensitization prior to beginning immunotherapy

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

Profile Information

Test Id	Reporting Name	Available Separately	Always Performed
EGG	Egg White, IgE	Yes	Yes
OVAL	Ovalbumin, IgE	Yes	Yes
OVMU	Ovomucoid, IgE	Yes	Yes

Special Instructions

- Allergens - Immunoglobulin E (IgE) Antibodies

Method Name

Fluorescence 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

Collection Container/Tube:
Preferred: Serum gel
Acceptable: Red top
Submission Container/Tube: Plastic vial
Specimen Volume: 0.75 mL; if needed, 0.5 mL for every 5 allergens requested

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

0.4 mL

For 1 allergen: 0.3 mL

For more than 1 allergen: (0.05 mL x number of allergens) + 0.25 mL deadspace

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

Clinical manifestations of immediate hypersensitivity (allergic) diseases are caused by the release of proinflammatory mediators (histamine, leukotrienes, and prostaglandins) from IgE-sensitized effector cells (mast cells and basophils) when cell-bound IgE antibodies interact with allergen.

Allergy to egg represents one of the most common causes of food allergy, especially in children. The evaluation for egg-related IgE antibodies can identify up to 95% of individuals at risk for clinical allergic reactions.

The most clinically prevalent allergens in egg are found in the egg white, but egg yolk also contains clinically significant specific IgE-binding allergens. The allergenic egg proteins found in egg white include ovomucoid (Gal d 1), ovalbumin (Gal d 2), ovotransferrin (Gal d 3), and lysozyme (Gal d 4). Ovomucoid has been demonstrated to be the most clinically significant egg allergen, in part due to its heat and digestion resistance. In the yolk, the protein alpha-livetin (Gal d 5) is the major allergen and is involved in bird-egg syndrome.

Foods that may contain egg include salad dressings, breads, breaded foods, muffins, cakes, marshmallows, prepared soups and beverages, frostings, ice cream and sherbets, pie fillings, sausages, prepared meats, mayonnaise, coatings and breading for fried foods, and some sauces.

Sensitization to allergic reaction to inhaled egg-white allergens has been reported in egg-processing workers and bakers.

Certain vaccines grown on chick embryos may cause severe allergic reactions in patients when injected. Further development of vaccines, most of which are no longer grown on egg protein, seems to have decreased or even eliminated the risk.

There is cross-reactivity between chicken egg white and turkey, duck, goose, and gull egg whites.

In vitro serum testing for IgE antibodies provides an indication of the immune response to allergens that may be associated with allergic disease.

Reference Values

Reference values apply to all ages.

Interpretation

Whole egg includes proteins and potential allergens from both egg white and egg yolk. Egg white is generally more allergenic than egg yolk. Clinical reactions to egg are predominantly IgE-mediated immediate reactions characterized by atopic dermatitis, urticarial (hives), angioedema, vomiting, diarrhea, rhinoconjunctivitis, and asthma. Children with atopic dermatitis may have an immediate exacerbation of symptoms or a delayed reaction causing a worsening of their dermatitis 1 to 2 days after exposure to egg. Eosinophilic esophagitis as a result of allergy to egg has been described. Egg white is often responsible for the early development of urticaria and eczema during infancy.

In egg yolk, alpha-livetin (Gal d 5) is the major allergen and allergenicity to Gal d 5 is involved in bird-egg syndrome characterized egg intolerance in adults is due to sensitization by inhalation of bird dander. In these cases, there is secondary sensitization or cross-reactivity with serum albumin in egg yolk (Gal d 5) resulting in potential respiratory symptoms including asthma or rhinitis with bird exposure and additional allergic symptoms to egg.

Table. Major Egg Allergens

Egg white allergen	Common name	Heat-and digestion stability	Allergenic activity
Gal d 1	Ovomucoid	Stable	+++ (major allergen)
Gal d 2	Ovalbumin	Unstable	++
Gal d 3	Ovotransferrin/conalbumin	Unstable	+
Gal d 4	Lysozyme	Unstable	++
Egg yolk allergen			

Gal d 5	Alpha-livetin, serum albumin	Partially stable	++
Gal d 6	YGP42, a lipoprotein	Stable	+

Detection of IgE antibodies in serum (class 1 or greater) indicates an increased likelihood of allergic disease as opposed to other etiologies and defines the allergens that may be responsible for eliciting signs and symptoms.

The level of IgE antibodies in serum varies directly with the concentration of IgE antibodies expressed as a class score or kU/L.

Cautions

Some individuals with clinically insignificant sensitivity to allergens may have measurable levels of IgE antibodies in serum, and 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. Homburger HA, Hamilton RG: Allergic diseases. In: McPherson RA, Pincus MR, eds. Henry's Clinical Diagnosis and Management by Laboratory Methods. 23rd ed. Elsevier; 2017:1057-1070
2. Caubet JC, Wang J: Current understanding of egg allergy. Pediatr Clin North Am. 2011;58(2):427-xi. doi:10.1016/j.pcl.2011.02.014
3. Shin M, Han Y, Ahn K: The influence of the time and temperature of heat treatment on the allergenicity of egg white proteins. Allergy Asthma Immunol Res. 2013 Mar;5(2):96-101. doi: 10.4168/aair.2013.5.2.96
4.Allergen Encyclopedia. ThermoFisher Scientific; 2023. Accessed February 22, 2023.Available at www.thermofisher.com/diagnostic-education/hcp/us/en/resource-center/allergen-encyclopedia.html

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

Rochester

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 x 1
86008 x 2

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
EGWTP	Egg White Component Profile, S	In Process

Result ID	Test Result Name	Result LOINC® Value
EGG	Egg White, IgE	6106-9
OVAL	Ovalbumin, IgE	7556-4
OVMU	Ovomucoid, IgE	7557-2