

## Overview

### Useful For

Establishing a diagnosis of an allergy to whole egg

Defining the allergen responsible for eliciting signs and symptoms

Identifying allergens:

- Responsible for allergic response and/or anaphylactic episode
- To confirm sensitization prior to beginning immunotherapy
- To investigate the specificity of allergic reactions to insect venom allergens, drugs, or chemical allergens

### Special Instructions

- [Allergens - Immunoglobulin E \(IgE\) Antibodies](#)

### Highlights

This test is used to help establish a diagnosis of an allergy to whole egg.

This test is useful for identifying allergens that may be responsible for allergic disease and/or anaphylactic episode or to confirm sensitization prior to beginning immunotherapy.

### 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:** 0.5 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

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 |

## 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 an allergen.

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

The allergens chosen for testing often depend upon the age of the patient, history of allergen exposure, season of the year, and clinical manifestations. In individuals predisposed to develop allergic disease, the sequence of sensitization and clinical manifestations proceed as follows: eczema and respiratory disease (rhinitis and bronchospasm) in infants and children less than 5 years due to food sensitivity (milk, egg, soy, and wheat proteins) followed by respiratory disease (rhinitis and asthma) in older children and adults due to sensitivity to inhalant allergens (dust mite, mold, and pollen inhalants).

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 other 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**

| 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    |

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 of Major Egg Allergens**

| <b>Egg white allergen</b> | <b>Common name</b>           | <b>Heat-and Digestion Stability</b> | <b>Allergenic activity</b> |
|---------------------------|------------------------------|-------------------------------------|----------------------------|
| Gal d 1                   | Ovomucoid                    | Stable                              | +++ (major allergen)       |
| Gal d 2                   | Ovalbumin                    | Unstable                            | ++                         |
| Gal d 3                   | Ovotransferrin/conalbumin    | Unstable                            | +                          |
| Gal d 4                   | Lysosyme                     | Unstable                            | ++                         |
| <b>Egg yolk allergen</b>  |                              |                                     |                            |
| Gal d 5                   | Alpha-livetin, serum albumin | Partially stable                    |                            |
| Gal d 6                   | YGP42, a lipoprotein         | Stabile                             |                            |

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

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

Some individuals with clinically insignificant sensitivity to allergens may have measurable levels of IgE antibodies in serum, and test 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

- 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
- 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
- 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.

### 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

**LOINC® Information**

| Test ID | Test Order Name | Order LOINC® Value |
|---------|-----------------|--------------------|
| WEGG    | Whole Egg, IgE  | 7291-8             |

| Result ID | Test Result Name | Result LOINC® Value |
|-----------|------------------|---------------------|
| WEGG      | Whole Egg, IgE   | 7291-8              |