Health Insights from Food and Environmental Antibody Testing

Antibody Assessments

CLINICIAN INFORMATION

GAIN INSIGHT INTO SYMPTOMS TRIGGERED BY ANTIGENIC SUBSTANCES

Genova Dignostic's Food Antibody Assessments help identify those with true IgE-mediated allergies, as well as IgG-mediated food sensitivities. **The IgG Food Antibody Assessment** semi-quantitatively measures antibody levels to 87 foods and a total IgE level. **The IgE Food Antibody Profile** measures antibodies to the 19 most allergenic foods and a total IgE level. Additional tests are available for IgG vegetables, IgG spices, IgE regional inhalants, and IgE molds.

The key differences between IgE allergies and IgG sensitivities are summarized below:

IgE-Mediated Allergies (Foods, molds, inhalants)	IgG-Mediated Sensitivities (Foods, spices, vegetarian foods)
Immediate onset (minutes to hours)	Delayed onset (hours to days)
Circulating half-life of 1-2 days	Circulating half-life of 21 days
Permanent allergies	Temporary sensitivities
Stimulates histamine release	Activates complement Does not stimulate histamine release
Hives, stuffy or itchy nose, vomiting, diarrhea, wheezing, anaphylaxis, and other symptoms	Gastrointestinal symptoms, headaches, joint aches, rashes

Why Use Food Antibody Assessment?

Adverse food reactions can lead to distressing symptoms and chronic health conditions. Often times it is unknown exactly which food(s) may be the cause and testing can help identify the problematic foods. Removal of the reactive foods often results in resolution of symptoms.

Increased total antigenic load related to food and environmental reactivity has been associated with a wide range of medical conditions affecting virtually every part of the body. IgG-mediated sensitivities tend to be delayed and may be more vague or difficult to correlate with a specific food trigger.

Conditions associated with IgG food sensitivity:

- IBS[1-3]
- Major Depressive Disorder[3]
- Migraine headaches[4-6]
- Skin rashes such as eczema[7]
- Joint aches[8]
- Autoimmune disease[9]
- Crohn's Disease[10]
- Obesity[11]

GASTROINTESTINAL ISSUES

MIGRANES

ASTHMA

GENOVA DIAGNOSTICS®

IgG Food Antibody Assessment (Serum)

GENOVA DIAGNOSTICS

63 Zillicoa Street
Asheville, NC 28801

Patient: **SAMPLE PATIENT**
DOB:
Sex:
MRN:

IgG Food Antibody Results

Dairy

Casein	VL
Cheddar cheese	0
Cottage cheese	1+
Cow's milk	1+
Goat's milk	VL
Lactalbumin	1+
Yogurt	VL

Fruits

Apple	VL
Apricot	0
Banana	3+
Blueberry	1+
Cranberry	3+
Grape	VL
Grapefruit	1+
Lemon	2+
Orange	1+
Papaya	0
Peach	0
Pear	0
Pineapple	3+
Plum	VL
Raspberry	0
Strawberry	0

Vegetables

Alfalfa	2+
Asparagus	3+
Avocado	0
Beets	0
Broccoli	1+
Cabbage	1+
Carrot	0
Celery	0
Cucumber	1+
Garlic	0
Green Pepper	VL
Lettuce	1+
Mushroom	1+
Olive	1+
Onion	0
Pea	VL
Potato, sweet	0
Potato, white	0
Spinach	VL
String bean	VL
Tomato	VL
Zucchini	VL

Fish/Shellfish

Clam	0
Cod	1+
Crab	3+
Lobster	3+
Oyster	VL
Red snapper	0
Salmon	0
Sardine	0
Shrimp	2+
Sole	0
Trout	0
Tuna	0

Poultry/Meats

Beef	0
Chicken	0
Egg white	1+
Egg yolk	1+
Lamb	0
Pork	0
Turkey	0

Nuts and Grains

Almond	VL
Buckwheat	3+
Corn	1+
Corn gluten	2+
Gluten	VL
Kidney bean	1+
Lentil	2+
Lima bean	2+
Oat	VL
Peanut	VL
Pecan	2+
Pinto bean	VL
Rice	1+
Rye	VL
Sesame	3+
Soy	0
Sunflower seed	VL
Walnut	1+
Wheat	VL

Miscellaneous

Yeast	1+
Cane sugar	VL
Chocolate	1+
Coffee	1+

Total IgE

	Inside	Outside	Reference Range
Total IgE ◆		520.0	<=87.0 IU/mL

0 None Detected VL Very Low 1+ Low 2+ Moderate 3+ High

- The performance characterisitcs of all assays have been verified by Genova Diagnostics, Inc. Unless otherwise noted with ◆, the assay has not been cleared by the U.S. Food and Drug Administration.
- Total IgE level may have clinical significance regardless of specific antibody levels.
- Increasing levels of antibody detected suggest an increasing probability of clinical reactivity to specific foods.
- The Elimination Diet commentary is specific to IgG results only. Allergens inducing an IgE response should be completely avoided.

Laboratory Comments

Summary of IgG Test Results

Reactive / Non-Reactive Foods

3+ High

Asparagus	Banana	Buckwheat	Coconut
Crab	Cranberry	Curry	Garbanzo
Ginger	Lobster	Pineapple	Sesame
Vanilla			

2+ Moderate

Alfalfa	Bean sprout	Cashew	Corn gluten
Fennel	Lemon	Lentil	Lima bean
Oat bran	Pecan	Shrimp	Watermelon
Wild rice			

1+ Low

Blueberry	Broccoli	Cabbage	Chocolate
Cod	Coffee	Corn	Cottage cheese
Cow's milk	Cucumber	Cumin	Egg white
Egg yolk	Grapefruit	Kidney bean	Lactalbumin
Lettuce	Marjoram	Mushroom	Olive
Orange	Pistachio	Rice	Thyme
Walnut	Wheat bran	Yeast	

VL Very Low

Allspice	Almond	Apple	Basil
Black Pepper	Cane sugar	Cantaloupe	Casein
Cayenne	Cinnamon	Cloves	Filbert
Flax seed	Gluten	Goat's milk	Grape
Green pepper	Horseradish	Millet	Oat
Oyster	Paprika	Parmesan cheese	Pea
Peanut	Pinto bean	Plum	Rye
Sage	Spinach	String bean	Sunflower seed
Tomato	Wheat	Yogurt	Zucchini

0 None Detected

Apricot	Artichoke	Avocado	Bay leaf
Beef	Beets	Carrot	Celery
Cheddar cheese	Cherry	Chicken	Clam
Dill	Garlic	Kamut	Lamb
Mung bean	Mustard	Navy bean	Nutmeg
Onion	Oregano	Papaya	Parsley
Peach	Pear	Peppermint	Pork
Potato, sweet	Potato, white	Raspberry	Red Snapper
Rosemary	Safflower	Salmon	Sardine
Sole	Soy	Strawberry	Triticale
Trout	Tuna	Turkey	

Commentary

Overview

Immunoglobulin G (IgG) antibodies that elicit an immune response to food are in a class distinct from Immunoglobulin E (IgE) food allergy reactions. IgG-mediated food responses are described as delayed hypersensitivity reactions and have been associated in the peer-reviewed literature with an array of common clinical conditions including migraine, obesity, asthma, autoimmune diseases, and irritable bowel syndrome.

IgG Testing: Factors to Consider
IgG testing can be very useful in screening foods that a person is eating on a regular basis and which may be causing adverse reactions. However, it is possible to have adverse reactions to foods with low or non-detected levels of IgG. Because the IgG profile measures exposure of the immune system to food antigens, performing this test on a patient who is not consuming a particular food or who is taking a drug with known ability to suppress immune function (i.e. steroids) may result in the test not showing a positive reaction, potentially leading to a false negative result for the particular food. Be advised that if the patient is already on an elimination diet due to known food reactions, a negative result on an IgG food antibody profile does not necessarily mean that they can freely eat the food without experiencing symptoms.

IgG Results Interpretation
The amount of IgG antibodies is measured using a semi-quantitative ELISA assay procedure. The relative degrees of IgG present for each food are reported using a semi-quantitative level; None Detected (0), VL (very low), Low (1+), Moderate (2+) or High (3+). The degree of reactivity may not correlate with the severity of patient's response, therefore clinical correlation is advised as it can help direct treatment.

Clinical Management of Reactive IgG Foods: Elimination Diet
The purpose of an elimination diet is to pinpoint symptom-triggering foods that may be the root cause of and/or perpetuating chronic health issues. This diet is specific to food sensitivities that elicit an Immunoglobulin G (IgG) response and not those defined as classic (IgE-mediated) food allergy reactions. An elimination diet is a strategic process which depends on the oversight of the healthcare provider to ensure that a patient's nutritional requirements - macronutrient, micronutrient, and caloric needs - are adequate.

Four-Phases of an Elimination Diet

PHASE 1 – PREPARATION
A patient's clinical presentation and the IgG Food Antibody Assessment results typically determine which food(s) to temporarily remove from the diet. The average time frame for an elimination diet is 1 to 3 months. It is optimal to work with the patient to determine a start and end date for the elimination diet. Patient guidance around preparation ahead of the start date is important to ensure success. These include: (1) encouraging the patient to remove offending foods from the home and adjust grocery shopping accordingly; (2) providing the patient with resources that advance meal preparation, such as recipe books or reputable websites. Directing the patient to record foods consumed, date of consumption/elimination, and any notable changes in symptoms in a food journal can help track the progress of the diet.

Commentary

PHASE 2 – ELIMINATION

It is important to ensure the patient avoids those foods which resulted in a demonstrable reaction, either in whole food forms or as ingredients in other prepared foods to gain the greatest benefit. For patients unable to eliminate all reactive foods from their diet, focusing on the foods that elicited a stronger reaction (i.e.: 2+ and 3+) may be considered for an elimination diet. Practitioners may also encourage elimination of a complete food group when the patient shows reactivity to all foods tested within that group.

PHASE 3 – REINTRODUCTION

The reintroduction of eliminated foods is done one food at a time while monitoring for any adverse reaction. The patient should consume the test food several times throughout the day for several days. If symptoms occur with reintroduction, the patient should be instructed to remove that food once again and to evaluate whether the symptoms diminish over the next few days following elimination. Signs which may indicate an IgG food reaction include the following: headache, itching, bloating, fatigue, diarrhea or constipation, and indigestion. If the food does not cause symptoms during the reintroduction phase, it can be added back into the diet. The patient should continue this process with each food eliminated.

CAUTION: *All patients warrant counseling related to signs and management of immediate hypersensitivity reactions prior to food reintroduction following an elimination diet. If reintroduction of a food causes an immediate allergic reaction (i.e. swelling of face, mouth, tongue, etc.; wheezing, rash/hives, or other allergic symptoms), it is imperative that the patient be treated as soon as possible. Following resolution of the immediate hypersensitivity reaction, the patient should be instructed to completely avoid consumption of that food.*

PHASE 4 – LONG TERM MANAGEMENT

An elimination diet based on food sensitivity testing is part of a comprehensive approach to overall gastrointestinal health. Based on the test results and the complete clinical presentation of the patient, a long-term plan is usually developed utilizing the results of the reintroduction phase. Clinicians may also consider assessing and treating intestinal permeability, as gut barrier integrity is important for proper immune responses to foods. Nutrients that have been found to support intestinal barrier and decrease potential inflammation are glutamine, vitamin A, vitamin D, essential fatty acids (Omega-3), probiotics, and butyrate. Botanicals that can also be considered to assist with intestinal health are slippery elm, deglycyrrhizinated licorice (DGL), Aloe vera extract, and marshmallow root.

IgE Food Antibody Assessment

GENOVA DIAGNOSTICS

63 Zillicoa Street
Asheville, NC 28801

Patient: **SAMPLE PATIENT**
DOB:
Sex:
MRN:

IgE Food Antibody Results

	RESULT kU/L	CLASS	INDICATOR
Grains			
Buckwheat	<0.24	0/1	
Corn	<0.24	0/1	
Oat	<0.24	0/1	
Rice	<0.24	0/1	
Sesame	<0.24	0/1	
Soybean	<0.24	0/1	
Wheat	<0.24	0/1	
Dairy			
Egg white	<0.24	0/1	
Cow's milk	<0.24	0/1	
Nuts			
Almond	<0.24	0/1	
Brazil nut	<0.24	0/1	
Coconut	<0.24	0/1	
Hazelnut	<0.24	0/1	
Peanut	<0.24	0/1	
Seafood			
Blue mussel	<0.24	0/1	
Codfish	<0.24	0/1	
Salmon	<0.24	0/1	
Shrimp	<0.24	0/1	
Tuna	<0.24	0/1	

Total IgE

	Inside	Outside	Reference Range
Total IgE		520.0	<=87.0 IU/mL

- IgE levels must be used in conjunction with the clinical picture and are not intended to be independently diagnostic.
- The performance characteristics of all assays have been verified by Genova Diagnostics, Inc. All assays are cleared by the U.S. Food and Drug Administration.
- Total IgE level may have clinical significance regardless of specific antibody levels.
- Increasing levels of antibody detected suggest an increasing clinical reactivity to specific foods.

Key

Class	kU/L	Levels of Specific IgE	Indicator
0/1	<=0.24	Undetectable or Equivocal	
I	0.25 - 0.39	Low	
II	0.4 - 1.29	Moderate	
III	1.3 - 3.89	High	
IV	3.9 - 14.99	Very High	
V	15 - 24.99	Very High	
VI	>=25	Very High	

Laboratory Comments

IgG Vegetarian Food Profile

GENOVA DIAGNOSTICS

63 Zillicoa Street
Asheville, NC 28801

Patient: **SAMPLE PATIENT**

DOB:

Sex:

MRN:

IgG Vegetable Food Results

Artichoke	0	Garbanzo	3+	Parmesan cheese	VL
Bean sprout	2+	Filbert	VL	Pistachio	1+
Cantaloupe	VL	Kamut	0	Safflower	0
Cashew	2+	Millet	VL	Triticale	0
Cherry	0	Mung bean	0	Watermelon	2+
Coconut	3+	Navy bean	0	Wheat bran	1+
Flax seed	VL	Oat bran	2+	Wild rice	2+

Total IgE

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0 None Detected | VL Very Low | 1+ Low | 2+ Moderate | 3+ High

Laboratory Comments

IgG Spice Profile (Serum)

63 Zillicoa Street
Asheville, NC 28801

Patient: **SAMPLE PATIENT**
DOB:
Sex:
MRN:

IgG Spice Antibody Results

Allspice	VL	Curry	3+	Oregano	0
Basil	VL	Dill	0	Paprika	VL
Bayleaf	0	Fennel	2+	Parsley	0
Black Pepper	VL	Ginger	3+	Peppermint	0
Cayenne	VL	Horseradish	VL	Rosemary	0
Cinnamon	VL	Marjoram	1+	Sage	VL
Cloves	VL	Mustard	0	Thyme	1+
Cumin	1+	Nutmeg	0	Vanilla	3+

Total IgE

	Inside	Outside	Reference Range
Total IgE ◆		520.0	<=87.0 IU/mL

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0 None Detected VL Very Low 1+ Low 2+ Moderate 3+ High

Lab Comments

IgE Inhalants Profile

Texas +

63 Zillicoa Street
Asheville, NC 28801

GENOVA DIAGNOSTICS

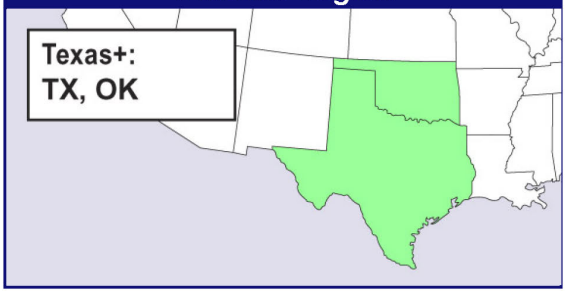
Patient: **SAMPLE PATIENT**
DOB:
Sex:
MRN:

IgE Antibody Levels

INHALANT	RESULT kU/L	CLASS	INDICATOR
Trees			
Maple	<0.24	0/1	
Mountain Cedar	3.27	III	
Grasses			
Bermuda Grass	0.67	II	
June Grass (Kentucky Blue)	2.87	III	
Perennial Rye Grass	3.57	III	
Weeds			
Lamb's quarters	<0.24	0/1	
English Plantain	<0.24	0/1	
Rough Marsh Elder	<0.24	0/1	
Giant Ragweed	<0.24	0/1	
Molds			
Mold Generic	0.89	II	
Misc.			
Cat dander	<0.24	0/1	
Cockroach	<0.24	0/1	
Dog dander	<0.24	0/1	
Mite - D. farinae	0.57	II	
Mite - D. microceras	0.77	II	
Mite - D. pteronyssinus	0.41	II	

Lab Comments

Inhalant Region



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Total IgE

	Inside	Outside	Reference Range
Total IgE		520.0	<=87.0 IU/mL

Key

Class	kU/L	Levels of Specific IgE	Indicator
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VI	>=25	Very High	

IgE Molds Profile

63 Zillicoa Street
Asheville, NC 28801

Patient: **SAMPLE PATIENT**
DOB:
Sex:
MRN:

IgE Mold Antibody Results

INHALANT	RESULT kU/L	CLASS	INDICATOR
Aspergillus fumigatus	<0.24	0/1	
Alternaria tenuis (Alternaria alternata)	3.12	III	
Candida albicans	<0.24	0/1	
Cladosporium herbarum	<0.24	0/1	
Curvularia lunata	0.36	I	
Epicoccum purpurascens	<0.24	0/1	
Fusarium moniliforme	<0.24	0/1	
Helminthosporium halodes	<0.24	0/1	
Mucor racemosus	<0.24	0/1	
Penicillium notatum	<0.24	0/1	
Phoma betae	0.4	II	
Pityrosporum orbiculare	0.42	II	
Rhizopus nigricans	0.53	II	
Stemphylium botryosum	0.81	II	
Trichoderma viride	0.25	I	

Key

Class	kU/L	Levels of Specific IgE	Indicator
0/1	<=0.24	Undetectable or Equivocal	
I	0.25 - 0.39	Low	
II	0.4 - 1.29	Moderate	
III	1.3 - 3.89	High	
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Total IgE

	Inside	Outside	Reference Range
Total IgE		520.0	<=87.0 IU/mL

Lab Comments

Celiac Profile

GENOVA DIAGNOSTICS
63 Zillicoa Street
Asheville, NC 28801

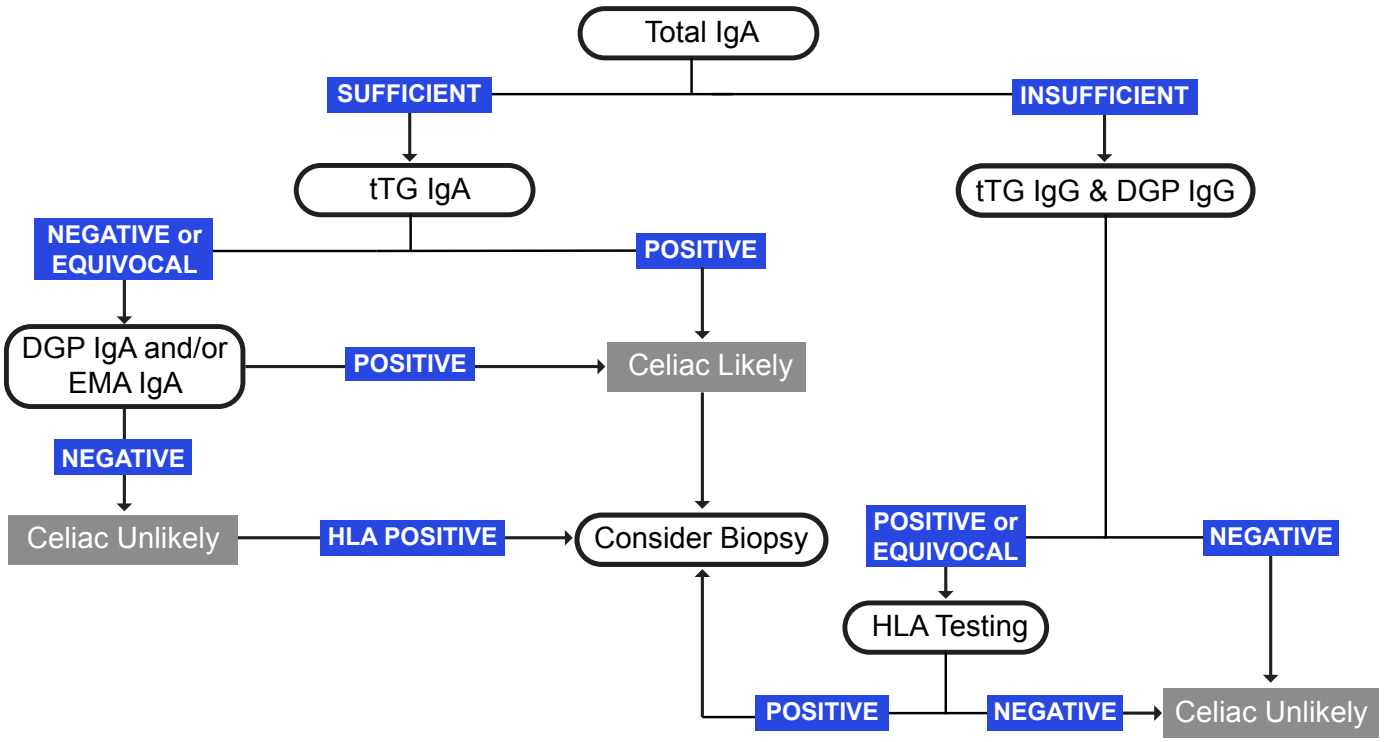
Patient: **SAMPLE PATIENT**
DOB:
Sex:
MRN:

1006 Celiac Profile - Serum
Methodology: FEIA, Immunoturbidometric and IFA (when EMA IgA testing is performed)

Immunologic Markers

Biomarker	Result		Reference Range
Total IgA	83	Insufficient	85-532 mg/dL
Anti-Tissue Transglutaminase IgG (tTG IgG)	2.7	Negative	<=6.9 U/ml
Anti-Deamidated Gliadin IgG (DGP IgG)	6.4	Negative	<=6.9 U/ml
Anti-Tissue Transglutaminase IgA (tTG IgA)	51.0	Positive	<=6.9 U/ml
Anti-Deamidated Gliadin IgA (DGP IgA)	6.4	Negative	<=6.9 U/ml
Anti-Endomysial IgA (EMA IgA)	Not Detected		Not Detected

Interpretation



Related Profiles

Clinicians now have the ability, with a single requisition, to build any combination profiles using up to 7 antibodies profiles including:

See inside sample report for the full list of foods tested

- IgG Food Antibodies (87 IgG foods + total IgE) #1001
- IgG Spices (24 IgG spices + Total IgE) #1005
- IgG Vegetarian #1002
- IgE Food Antibodies (19 IgE Foods) #1000
- IgE Molds (15 IgE molds + Total IgE) #1004
- IgE Inhalants (14 IgE inhalants + Total IgE) #1003
- Celiac Profile #1018
- **A Full Combination of all seven (7) antibody profiles**

References

1. Atkinson W, et. al. Food Elimination Based on IgG Antibodies in Irritable Bowel Syndrome: A Randomized Controlled Trial. *Gut*. 2004;53:1459-1464.
2. Drisko J, et. al. Treating Irritable Bowel Syndrome with a Food Elimination Diet Followed by Food Challenge and Probiotics. *J Amer Col Nutr*. 2006;25(6):514-522.
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