

IgG Food Sensitivity

Clinical Information

for Professionals

IgG TYPE III DELAYED HYPERSENSITIVITY REACTIONS

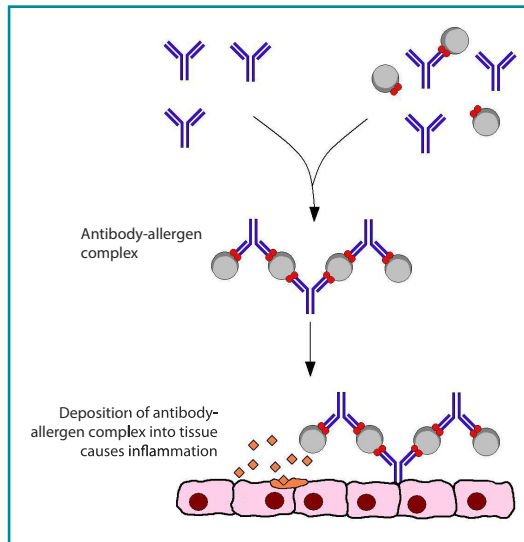
Circulating IgG antibodies form immune complexes with allergen/antigen (Ag). This is considered a Type III delayed hypersensitivity reaction, and typically occurs over several hours to several days.

Formation of the complexes activates the complement pathway and releases inflammatory mediators.

The IgG-Ag immune complexes are usually cleared by macrophages but, in the presence of excess antigen, macrophages may saturate their capacity to remove

immune complexes, causing the excess to be deposited in tissue. Deposition of IgG-Ag complexes causes inflammation and tissue damage, which may contribute to specific health issues.

There are four subclasses of IgG: IgG1, IgG2, IgG3 and IgG4. All subclasses activate the classical complement pathway except for IgG4. Our IgG test measures all four subclasses, and reports the result as total IgG.



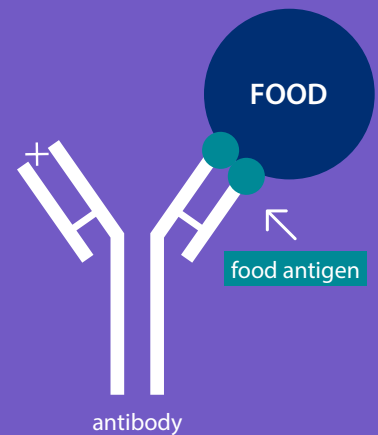
CLINICAL RELEVANCE

Although still controversial in mainstream medicine, IgG food sensitivity testing is starting to accumulate research in support of its clinical utility. For example, 125 patients, identified by an allergist as likely having food allergies, were given blood tests for IgG food reactions. All positive foods were removed for a 6 month period. The allergist considered the treatment a success when a minimum 75% improvement in symptoms occurred. Of the 80 patients who completed the full course, 71% were successfully treated. In particular, there were 11 patients who had positive allergy symptoms, but had negative IgE test results. These patients were all successfully treated by eliminating the IgG food allergens. The allergist concluded that blood tests for IgG reactions to food were clinically useful and much more palatable to patients than the traditional skin prick and oral challenge tests.

Although he acknowledged that the lack of blinding and randomization meant the results could be considered anecdotal, the allergist concluded that eliminating reactive foods was useful clinically.¹

IgG testing for food is not considered diagnostic for food reactions because a direct cause-effect relationship has not been established. Elevated levels of IgG have not yet been proven to cause patient symptoms, however, more studies are emerging to show a correlation between elevated IgG reactions and a variety of conditions.

IgG FOOD SENSITIVITY



IgG delayed onset reactions can contribute to a variety of health problems.

IgG Food Sensitivity

IRRITABLE BOWEL SYNDROME

A double-blind 2004 British study randomized 150 patients to receive either a sham diet or true diet. The true diet group eliminated all IgG reactive foods, and the sham diet group excluded the same number of foods as showed up reactive, but not the actual reactive foods. The severity of IBS symptoms, non-IBS related symptoms, anxiety/depression and quality of life scores were obtained at the start and again after three months on either diet. At the end of the study, the true diet group had significantly reduced severity of IBS symptoms and overall symptoms compared to the sham diet group.²

MIGRAINE

A 2004 study looked at the relationship between IgG food reactions and migraine attacks. In the study, 61 people were tested via IgG ELISA for 113 foods. About 90% of participants eliminated some or all of the reactive foods from their diet. At 1 month, 30% reported marked improvement, and at 2 months 40% reported benefit. Reintroduction of the reactive foods into the diet resulted in return of migraine for 60% of these patients. This study suggests that IgG reactions to food may play a role in the etiology and/or treatment of migraine attacks.³

A 2010 randomized, double-blind, crossover trial also showed a statistically significant drop in the number of headache days, and the number of headaches during the six week period when IgG reactive foods were eliminated from the diet.⁴

WEIGHT GAIN / ATHEROSCLEROSIS

A paper published in 2008 reported that obese children have significantly higher IgG antibodies to food antigens than normal weight children. They also found that anti-food IgG antibody concentrations are strongly associated with low grade systemic inflammation and with increased intima media thickness of the common carotid arteries. The study concluded that: "These findings raise the possibility that anti-food IgG is pathogenically involved in the development of obesity and atherosclerosis."⁵

ATOPY

Allergic individuals and those with atopy achieved 70% reduction of symptoms with elimination of IgG reactive foods.⁶ In addition, atopic children (with or without eczema) were shown to have higher IgG levels to specific foods than non-atopic children. In children without eczema, higher levels of IgG were still significantly associated with atopy, with elevated IgG most prominently to egg white, orange and cow's milk.⁷

RHEUMATOID ARTHRITIS

Some rheumatoid arthritis patients have shown improvement in symptoms when reactive foods were eliminated from the diet. It has been hypothesized that patients with occasional rheumatitis may experience delayed hypersensitivity food reactions.⁸

ADHD

Although no studies directly correlate elevated IgG levels to specific foods with hyperactivity in children, a few studies have shown improvement in attentiveness and temperament when common food allergens (e.g. wheat, dairy, oranges) were eliminated.

ABOUT IgG TESTING FOR FOOD SENSITIVITY

Procedure: The *RMA FST™* measures levels of IgG antibodies to up to 222 different foods. Antibodies are highly specialized proteins that bind to specific antigens. All foods have antigen molecules on them, and sometimes these food antigens can trigger the production of antibodies. The exact reason why food antigens trigger the release of IgG antibodies is not known.

Antibody levels are measured via an ELISA (Enzyme-Linked Immunosorbent Assay) microarray method. For an ELISA test, food antigens must first be chemically bonded to a site within a gel pad. Each of these sites has the antigens of one specific food. More than 220 foods can be tested on a single gel pad for any given patient. A measured amount of the patient's blood serum is placed on the pad and then treated with a series of chemical solutions. Eventually a colour develops at each site and the intensity of the color is measured by a high resolution scanner. The intensity of the colour is proportionate to the amount of antibody in the blood specific to that food antigen.

Source of Food Antigens: Foods and extract material are sourced from pre-approved vendors in Europe and North America and are assayed for total protein content. Quality control procedures ensure the protein source is correct and that no other contaminants are detectable. Proteins are de-fatted (where applicable), freeze-dried (lyophilized) as necessary and stored at less than 0oC (the lyophilization process involves rapidly freezing the food source then subjecting it to a high vacuum which removes ice by sublimation). A particular antigen is only considered suitable for use if there is significant stock. Lot-to-lot analysis is done using the extract.

Accuracy: The patient 'unknown' response is compared to the response of a known standard. Positive and negative controls are also run on each gel pad. All foods standards and controls are run in duplicate.

Regardless of the laboratory or testing method used, results perceived to be 'false' negatives or positives may occur.

IgG Food Sensitivity

NON-IMMUNE MEDIATED REACTIONS			
Implicated Substance		Associated Foods	Nausea, Diarrhea, Gas, Bloating, And Abdominal Cramps
Enzymes	Lactase Deficiency	Lactose In Dairy Products	Nausea, diarrhea, gas, bloating, and abdominal cramps
	Alpha-Galactosidase Insufficiency	Cruciferous Vegetables, Legumes	Gas, bloating
Chemicals	Histamine	Fish, Sauerkraut, Cheese	Headaches, rashes, itching, diarrhea, vomiting and/ or abdominal pain
	Methylxanthine	Cola, Coffee, Chocolate, Tea	Anxiety, panic disorders
	Tyramine	Cheese, Pickled Herring	Headache, palpitations, nausea, vomiting
	Tryptamine	Fermented Foods (Soy Sauce), Acacia Species (Incl. Beans)	Restlessness, agitation, gastrointestinal distress, muscle tension, may be hallucinogenic
Toxins	Aflatoxin	Peanuts, Cereal Grains	Chronic exposure: liver disease, increased risk of liver cancer
	Saxitoxin	Shellfish	Inhalation: numbness & tingling of lips, tongue, and fingertips, followed by numbness of the neck and extremities and motor incoordination. Other symptoms may include light-headedness, dizziness, weakness, confusion, memory loss, and headache
	Ergot	Cereal Grains	Numbness, tingling & burning in limbs, feeble pulse, restlessness, stupor, delirium
	Cyanogenic Glycosides	Cassava, Stone Fruits (E.g. Peach, Apricot)	Chronic exposure may lead to thyroid and neurological disorders

FALSE POSITIVES

Cross-reactivity: False positives may occur as a result of cross-reactivity with other foods or proteins. This can occur when the proteins are not identical, but similar enough that the immune system reacts to them. For example, a reaction to bananas may also produce a reaction to latex or vice versa.

There is an antibody pattern (either IgE or IgG) seen in a small subpopulation that has elevated antibodies to vegetables, fruits and grains. In these individuals, the high antibody levels to plant glycoproteins do not appear to be clinically relevant. Nevertheless, the practitioner must use his/her professional judgement to ascertain the significance of the results relative to the patient's clinical picture.⁹

Leaky Gut: When the gut lining is inflamed, food particles can leak through and be considered foreign bodies. This can lead to elevated IgG levels for all the foods the patient normally eats. Leaky gut may originate with one or more food allergies, or may be a result of stress or prescription drug or alcohol consumption.¹⁰

FALSE NEGATIVES

No Exposure: If the food antigen was consumed very infrequently or not at all for several weeks or months prior to testing for IgG, the antibody levels may have decreased to the point that no significant food reaction is apparent. However, there are no studies that demonstrate the precise impact of food avoidance on antibody levels. Individual variability in antibody level decline is also likely a factor. Ideally the patient should consume a regular-sized serving of the food at least twice a week for two or three weeks prior to testing.¹¹ Foods that are not consumed regularly may not give accurate results.

• **Alteration:** The form of allergen being tested is not the same as what the patient reacts to. For example, whey protein is altered by high heat, so someone with a whey allergy may have no reaction to heat-altered milk products. Similarly, raw eggs may show no reaction, but cooked eggs may be a problem.

Non-Immune: Enzyme deficiencies, toxins and chemicals found in foods may mimic the symptoms of a food allergy. See chart below.

IgG Food Sensitivity

The chart below highlights the clinical picture for the various phases of IgG food sensitivity reactions [Adapted from Dixon and Trevino. Food Allergy. 1997. Thieme Medical Publishing].

CLINICAL PHASES OF IGG REACTIONS		
I	Hidden Phase	Small amounts of the reactive food are eaten. Antibody-allergen complexes form, but are removed by macrophages. Patient is asymptomatic.
II	Symptomatic Phase	Reactive food is eaten in large quantities and regularly. Large numbers of antibody-allergen complexes form and cannot be completely cleared by macrophages. Patient suffers chronic symptoms.
III	Trial Avoidance Phase	Patient removes reactive foods from diet. Levels of IgG antibodies to reactive foods remain high.
IV	Challenge Phase	Four or five days after reactive food antigens have been removed from diet, the food antigens have cleared but IgG antibody levels remain high. Patient consumes a large amount of the reactive food and experiences exacerbation of symptoms.
V	Elimination Phase	Reactive food is eliminated for 4 to 6 months. IgG levels to the reactive food(s) drop to non-reactive levels.
VI	Reintroduction Phase	After avoiding for 6 months, the reactive food is reintroduced. Patient to consume only modest amounts every fifth day. IgG levels rise when reactive food is consumed but because levels are already low, the elevation in IgG is usually insufficient to induce symptoms. Patient may consume modest amounts of the reactive food once every 5 days. Note that it is not always possible to reintroduce reactive foods into the diet without symptoms reappearing. In some cases, it may be necessary for the patient to permanently avoid the reactive food(s).

References

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This information is provided for educational purposes only. Rocky Mountain Analytical does not diagnose, treat or prescribe for any health condition. IgG testing is considered to be an investigational and research tool. Clinical data is not considered conclusive for the diagnosis of food allergies. Testing is conducted for investigational and research purposes only. © 2019



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Rocky Mountain Analytical®

Antigens List

By Category

Category	RMA FST™ Basic		RMA FST™ Enhanced (Everything in the Basic panel, plus)		RMA FST™ Vegetarian Panel		
Dairy/Eggs	Alpha-lactalbumin Beta-lactoglobulin Casein Egg White	Egg Yolk Milk (Cow) Milk (Goat) Milk (Sheep)	Milk (Buffalo)		Alpha-Lactalbumin Beta-Lactoglobulin Casein	Egg White Egg Yolk Milk (Buffalo)	Milk (Cow) Milk (Goat) Milk (Sheep)
Grains	Barley Durum Wheat Gliadin Oat	Rye Wheat Wheat Bran	Couscous Malt	Spelt	Barley Couscous Durum Wheat Gliadin	Malt Oat Rye	Spelt Wheat Wheat Bran
Grains (gluten-free)	Buckwheat Corn	Millet Rice	Amaranth Polenta	Tapioca	Amaranth Buckwheat Corn	Millet Polenta	Rice Tapioca
Fruit	Apple Apricot Avocado Banana Blackberry Blackcurrant Cherry Cranberry Grape Grapefruit Kiwi Lemon	Lime Melon (Honeydew) Nectarine Olive Orange Peach Pear Pineapple Plum Raspberry Strawberry	Blueberry Date Fig Guava Lychee Mango Mulberry	Papaya Pomegranate Raisin Redcurrant Rhubarb Tangerine Watermelon	Apple Apricot Avocado Banana Blackberry Blackcurrant Blueberry Cherry Cranberry Date Fig Grape Grapefruit	Guava Kiwi Lemon Lime Lychee Mango Melon (Honeydew) Mulberry Nectarine Olive Orange Papaya	Peach Pear Pineapple Plum Pomegranate Raisin Raspberry Redcurrant Rhubarb Strawberry Tangerine Watermelon
Vegetables	Asparagus Beet Bell Peppers Broccoli Brussel Sprout Cabbage (Savoy/White) Carrot Cauliflower Celery	Chicory Cucumber Eggplant Leek Lettuce Onion Potato Soy Bean Spinach Tomato	Artichoke Arugula Cabbage (Red) Chard Fennel (Leaf) Quinoa Radish Shallot	Squash (Butternut) Squash (Summer) Sweet Potato Turnip Watercress Yucca	Artichoke Arugula Asparagus Beet Broccoli Brussel Sprout Cabbage (Red) Cabbage (Savoy/White) Caper Carrot	Cauliflower Celery Chard Chicory Cucumber Eggplant Fennel (Leaf) Leek Lettuce Onion Potato	Bell Peppers Quinoa Radish Shallot Soy Bean Spinach Squash (Butternut) Squash (Summer) Sweet Potato Tomato Turnip Watercress

Antigens List

By Category

Category	RMA FST™ Basic		RMA FST™ Enhanced (Everything in the Basic panel, plus)			RMA FST™ Vegetarian Panel		
Fish/ Seafood	Cod	Salmon	Anchovy	Eel	Sardine			
	Crab	Scallop	Barnacle	Espaguettes	Sea Bream (Gilthead)			
	Haddock	Shrimp/Prawn	Bass	Hake	Sea Bream (Red)			
	Herring	Sole	Carp	Monkfish	Snail (Winkle)			
	Lobster	Swordfish	Caviar	Octopus	Spirulina			
	Mackerel	Trout	Clam	Perch	Squid			
	Mussel	Tuna	Cockle	Pike	Wakame			
	Oyster	Turbot	Cuttlefish	Clam (Razor)				
	Plaice							
Meat	Beef	Pork	Goat	Partridge				
	Chicken	Turkey	Horse	Quail				
	Duck	Veal	Ostrich	Rabbit				
	Lamb	Venison	Ox	Wild Boar				
Herbs/ Spices	Basil	Mint	Aniseed	Liquorice	Aniseed	Garlic	Nutmeg	
	Chilli (Red)	Mustard Seed	Bayleaf	Marjoram	Basil	Ginger	Parsley	
	Cinnamon	Nutmeg	Camomile	Nettle	Bayleaf	Ginkgo	Peppercorn (Black/White)	
	Clove	Parsley	Cayenne	Peppermint	Camomile	Ginseng	Peppermint	
	Coriander (Leaf)	Peppercorn (Black/White)	Curry	Rosemary	Cayenne	Hops	Peppermint	
	Cumin	Sage	Ginkgo	Saffron	Chilli (Red)	Liquorice	Rosemary	
	Dill	Thyme	Ginseng	Tarragon	Cinnamon	Marjoram	Saffron	
	Garlic	Vanilla			Clove	Mint	Sage	
	Ginger				Coriander (Leaf)	Mustard Seed	Tarragon	
	Hops				Cumin	Nettle	Thyme	
				Curry		Vanilla		
				Dill				
Nuts/Seeds	Almond	Hazelnut	Bean (Broad)	Pine Nut	Almond	Canola	Pine Nut	
	Bean (Green)	Lentil	Chickpea	Tiger Nut	Bean (Broad)	Chickpea	Pistachio	
	Bean (Red Kidney)	Pea	Flax Seed		Bean (Green)	Coconut	Macadamia Nut	
	Bean (White Haricot)	Peanut	Macadamia Nut		Bean (Red Kidney)	Flax Seed	Sesame Seed	
	Brazil Nut	Pistachio			Bean (White Haricot)	Hazelnut	Sunflower Seed	
	Cashew Nut	Sesame Seed			Lentil	Tiger Nut		
	Canola	Sunflower Seed			Brazil Nut	Pea	Walnut	
	Coconut	Walnut			Cashew Nut	Peanut		
Misc	Cane Sugar	Tea (Black)	Agar Agar	Cola Nut	Agar Agar	Cocoa Bean	Tea (Black)	
	Carob	Tea (Green)	Aloe Vera	Honey	Aloe Vera	Coffee	Tea (Green)	
	Cocoa Bean	Yeast (Baker's)	Caper	Chestnut	Cane Sugar	Cola Nut	Yeast (Baker's)	
	Coffee	Yeast (Brewer's)	Transglutaminase		Carob	Honey	Yeast (Brewer's)	
	Mushroom				Chestnut	Mushroom	Transglutaminase	