FoodPrint®

Patient Guidebook

Informing decisions
Improving health

Omega Diagnostics

Omega Diagnostics defines food sensitivity as an IgG antibody reaction to food. Food IgG antibody testing is not intended to diagnose or treat any medical conditions.

Food sensitivity tests do not identify IgE-mediated food allergies or provide information about coeliac disease, enzyme deficiencies such as lactose, histamine, tyramine or alcohol intolerance, or other chemical sensitivities, such as reactions to certain food additives.

We do not recommend testing during pregnancy or breastfeeding.

Following a test, the assistance of a professional healthcare provider is advised, and any medical concerns should be referred to a medical doctor.

Omega Diagnostics is not responsible for any misinterpretation or misuse of the information that we provide, including any diagnoses or nutritional changes initiated by a healthcare practitioner or patient based upon the content of our test results. Any substantial dietary change should be conducted under the proper guidance of a qualified and registered nutritional therapist or nutritionist. This is particularly important if the individual is a child. This test is not recommended for children under 2 years of age.

This guidebook is intended for educational purposes only and the information contained within it is not intended, in any way, to be used as a diagnostic tool.

CONTENTS	Page

Action plan timeline once you have your results

Interpret results	Read this guidebook
Plan the diet	Foods to remove and rotate and new foods to experiment with
Follow for 3 months	Focus on reparing the gut
Systematic food reintroduction	Reintroduce foods one at a time; one new food every 5 days
Follow new diet and retest in 9-12 months if needed	Enjoy your new varied diet

For more information seek advice from your healthcare professional.

This guidebook is designed to give you advice on how to successfully change your diet based on the results of your FoodPrint® test. The information contained here will help you identify which foods should be temporarily eliminated and which should be reduced or rotated and will provide ideas for replacement foods.

To understand your results and what they mean, it is important to familiarise yourself with the terminology used and what we are referring to when we discuss food sensitivity and the difference between food sensitivity and food allergy.

FoodPrint® is a food sensitivity test, which identifies IgG antibodies and immune-mediated reactions to food. It is also known as a type III allergy as opposed to a type I IgE food allergy. IgG tests and IgE tests cannot be compared. IgE food allergic reactions are instant and may be life threatening, whereas IgG food sensitivity reactions may take up to 72 hours to appear and are more difficult to detect.

Please be aware that if you have a classic IgE allergy to a food this will not be reflected in your FoodPrint® results, and you must always avoid that food as a priority.

Throughout this guidebook we will refer to an IgG immune-mediated reaction as a food sensitivity.

As we know you are keen to get started straight away, we are outlining the most relevant points first. Reading them will help you get the most benefit from the dietary changes you make.

However, if you want to delve in deeper please look out for a box like this which will show you where to head for more info on a particular topic:

Learn more on this
See Appendix.

Before changing your diet

- ✓ Any substantial dietary change should be conducted under the proper guidance of a qualified and registered nutritional therapist or nutritionist. This is particularly important if the individual is a child.
- ✓ If you have a medical condition, or on medication, it is advisable to discuss your proposed dietary change with a health professional e.g. a doctor, nutritionist or dietician.
- ✓ If you have previously been diagnosed with IgE food allergy, then you should continue to avoid those foods even if the food is negative on your FoodPrint® test. This also applies if you are lactose intolerant and need to limit dairy consumption, or if you are sensitive to compounds found in foods such as nitrates, sulphates, or histamine.
- ✓ Plan and organise your meals in advance as much as possible. By collecting recipe ideas based on your non-reactive NORMAL foods and shopping ahead you are less likely to struggle with what you eat.
- ✓ Know the range of foods you can eat. While you may be sensitive to a few foods, there will be many non-reactive NORMAL foods that you should be free to eat, it is just as important to focus on the high number of foods that can be eaten as on those foods to eliminate and rotate.
- ✓ When eliminating a food from your diet, simply replace with other foods from the same food group which are listed under the result of NORMAL foods.
- ✓ Recognise what food products contain your ELEVATED foods. Many ready-made meals and sauces contain a variety of ingredients that you may not have necessarily associated with the product, so it is important to always check the labels.
- ✓ It is very important to maintain a healthy, nutritious diet. By eating a variety of foods, you will obtain a wide variety of nutrients and reduce the risk of further sensitivities.

How can this test help me?

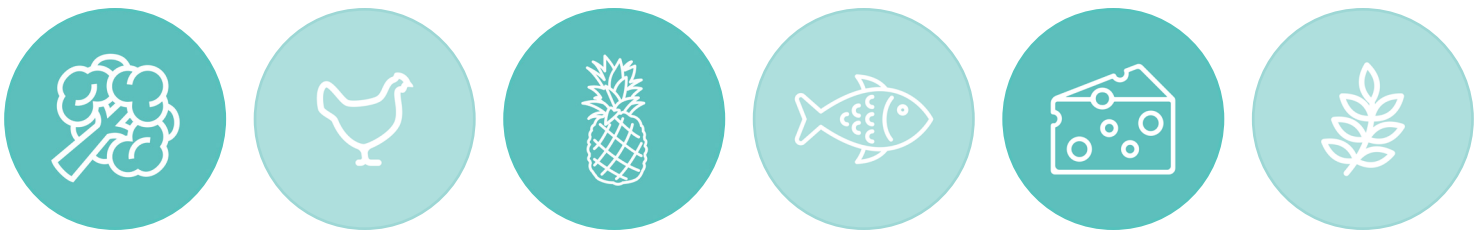
The aim of an IgG dietary elimination programme is to help reduce symptoms that may be triggered by problematic foods and to help support the body to improve tolerance to these foods once symptoms have subsided. This allows foods to then be reintroduced as part of a healthy, balanced diet and to be tolerated at a reduced intake.

Research has linked IgG food antibody reactions to symptoms, including irritable bowel and migraine. It may take up to 72 hours to notice symptoms which is why it can be hard to detect culprit foods.

The production of IgG antibodies to food proteins is just one of the ways in which the body's immune system reacts to substances that adversely affect it. Once culprit foods have been identified using a food sensitivity test, adapting the diet may help to reduce any associated symptoms.

If symptoms do not reduce it is important to understand that not all food-related symptoms are caused by an IgG response; they can be caused several other triggers, including enzyme deficiency or chemical sensitivity, by inadequate digestion, dysbiosis, candidiasis, parasites, intestinal infections, a poorly balanced diet, excess exercise, alcohol consumption, or the effects of drugs and medications. A healthcare professional will help to identify which area to focus on next.

Learn more on this
See Appendix page 13



What symptoms may improve?

Research shows strong evidence for improvement in Irritable Bowel Syndrome (IBS) and migraine which includes the symptoms listed below:

Symptoms associated with Irritable Bowel Syndrome include:

- Bloating
- Constipation
- Diarrhoea
- Flatulence
- Lethargy
- Nausea
- Stomach cramps / abdominal pain

Symptoms associated with migraine include:

- Headaches
- Nausea
- Vomiting
- Lethargy

Anecdotal evidence from clinical practitioners in the field suggests that food sensitivity testing may contribute to a wider variety of symptoms, but more research is needed to confirm this.

Learn more on the mechanism behind food sensitivity
See Appendix page 25

Antibody Levels

A food sensitivity test assesses the level of food antibodies in a blood specimen, detecting which foods are potentially triggering symptoms.

Your IgG antibody response to each food is represented as a numerical value and is colour coded. The former represents the concentration of IgG antibodies detected (U/mL) for each food and the colour code categorises foods as either ELEVATED, BORDERLINE or NORMAL allowing easy comprehension (see box below).

ELEVATED	Indicates a high antibody reaction was detected	These are the primary foods, which should be eliminated from your diet for at least 3 months. Substitute with NORMAL (green) foods from the same food group. Please refer to 'Test Report: Food Groups'.
BORDERLINE	Indicates a moderate antibody reaction was detected	These foods should be reduced and rotated, limiting to twice per week, for at least 3 months. Substitute with NORMAL (green) foods from the same food group. Please refer to 'Test Report: Food Groups'.
NORMAL	Indicates no significant reaction was detected	These foods can be eaten without restriction unless they have previously caused an adverse reaction. Avoid if you have a known allergy (type I IgE)

If you are experiencing adverse symptoms and the FoodPrint® test has identified ELEVATED or BORDERLINE IgG antibody levels, this may indicate a sensitivity to those specific foods. Removing them from the diet can result in an improvement of symptoms. Please refer to 'Planning Your Diet' for more detailed information about removal/substitution of foods.

Test Report

For your convenience the test report is also divided into two categories:

Food Groups

Foods are listed alphabetically within their respective food group allowing you to find simple replacements.

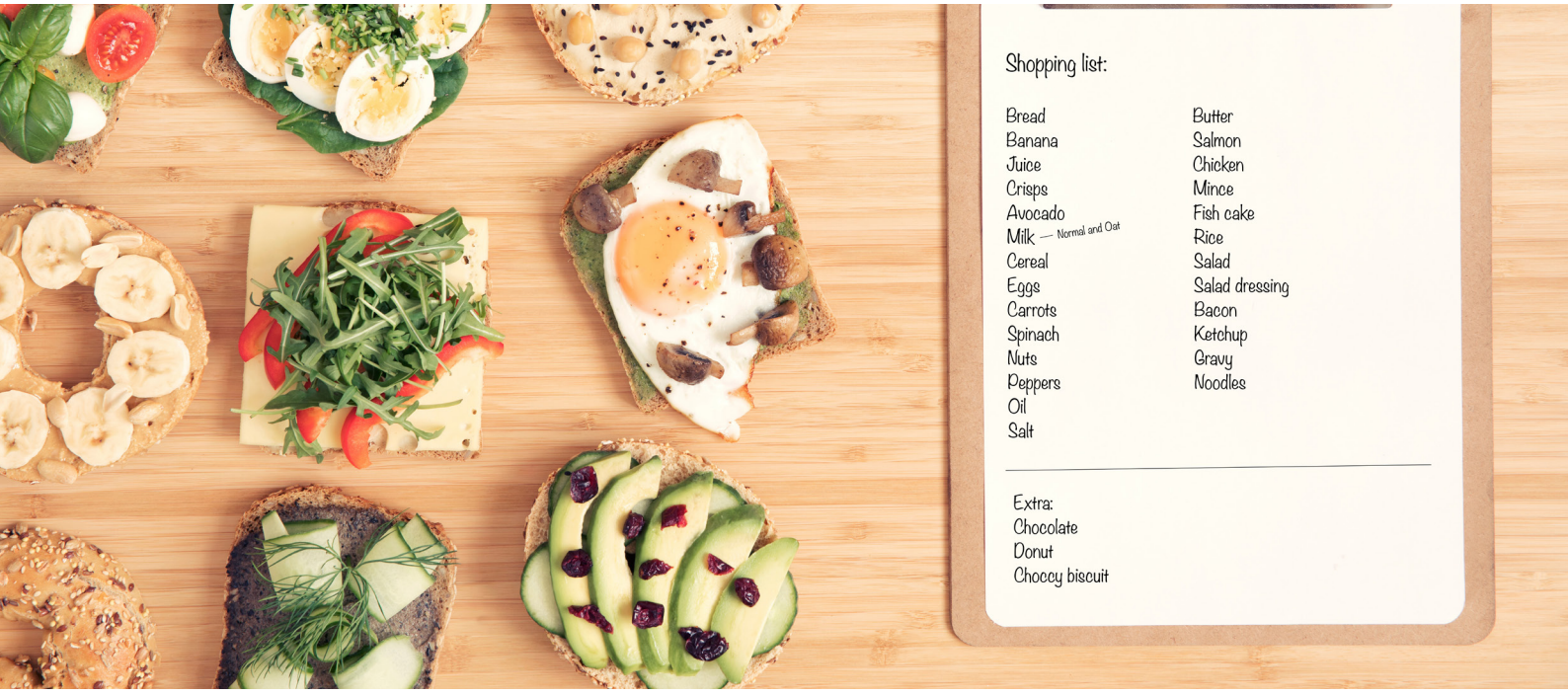
Order of Reactivity

Foods are listed according to the strength of antibody reaction, allowing you to see the key foods that you need to avoid at a glance.

Cross-reactivity

Occasionally foods show up in a food report that have not knowingly been eaten. If the food is not hidden in the diet then this may be due to what is known as a cross-reaction. A cross-reaction occurs when different foods possess almost identical protein structures and an IgG specific antibody reacts to the wrong, but almost identical, protein found in food. This causes a falsely elevated result for this food. If this occurs the result should be ignored, and a healthcare professional will be able to give guidance.

To learn more on the mechanism behind cross reactions
See Appendix page 22



Planning and implementing my programme:

Read the nutritional information in this section carefully before you start. We advise you to seek professional advice to ensure you maintain a balanced diet. The programme consists of 5 stages:

01 REMOVE elevated foods for 3 months

Which category do you fall into?

- ✓ Only a few elevated foods – eliminate all elevated foods
- ✓ Many elevated foods – eliminate the top 5 or 6 foods that have the highest IgG antibody concentrations and are included in your diet. Treat the remaining elevated foods as borderline (see below)

02 ROTATE borderline foods for 3 months

How do you rotate foods?

- ✓ To rotate foods, eat them no more than once every 3-4 days.

03 REPLACE foods with alternative

How can you make it easy to replace foods with alternatives?

- ✓ Take a day or two to find alternative foods
- ✓ Collect recipes, make a menu plan
- ✓ Careful planning helps compliance
- ✓ Keep diet balanced and varied, for example instead of wheat, choose oats and quinoa

04 REPAIR gut health

What does repairing the gut mean?

Particularly important when lots of high positives present. Include gut supportive supplementation and functional foods:

- ✓ Probiotics
- ✓ Bone broth
- ✓ Fermented foods, such as kefir
- ✓ Oily fish, such as salmon
- ✓ Root vegetables, such as sweet potatoes
- ✓ Inulin rich vegetables, such as leeks and bananas

05 REINTRODUCTION of foods eliminated after 3 months

Do the foods need to be avoided forever?

- ✓ No. Reintroduce foods gradually - 1 portion every 5 days x 1 food at a time
- ✓ Start with the least elevated food
- ✓ Monitor symptoms before reintroducing the next food
- ✓ Avoid for longer if necessary
- ✓ Eat foods in moderation and continue to vary the diet
- ✓ Retest if needed after 1 year - don't re-test too soon

If symptoms have not improved after 2-3 months despite strictly following results in your FoodPrint® test, this could indicate that IgG-mediated food sensitivity is not the only cause of your symptoms.

We recommend that you consult with your health practitioner to investigate other potential causes. This could include, amongst others, imbalanced microbiome, lifestyle triggers, e.g., stress and the impact it has on the gut and enzyme deficiencies.

To learn more

See Appendix page 14-21 and page 23-24

Appendix

Removing and Rotating Foods in Your Diet

Temporarily remove the foods from your diet with the highest reaction (the highest U/mL) and replace with alternatives. Do not replace elevated or borderline foods exclusively with a single alternative.

Focus on variety when selecting alternative foods. For example, if wheat is being eliminated from the diet, try a different breakfast every day rather than simply swapping toast for porridge oats, or alternate between a few different options throughout the week, e.g., porridge oats one day, fruit and yoghurt the next day, and poached egg on rye bread the next day.

If you have a high number of elevated foods, exceeding 15, eliminate the top 5 or 6 with the highest reaction from your diet. Any remaining foods, although still within the elevated category, should be treated as borderline foods and can be rotated.

ROTATE FOODS

To rotate foods, eat them no more than once every 3-4 days. For example, to rotate wheat and dairy see image below.

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Wheat bread	Oat cakes	Rye bread	Wheat bread	Oat cakes	Rye bread	Quinoa crispbread
Cow's milk	Coconut milk	Rice milk	Cow's milk	Almond milk	Coconut milk	Hemp milk

In summary:

- Avoid eating any one food too regularly.
- Limit consumption of each food to no more than twice per week.
- Include a wide variety of foods in the diet to ensure that a range of important vitamins and minerals are consumed. Studies show that consumption of more than 30 different plant-based foods per week has been found to deliver health benefits and a more diverse gut microbiome.

FOOD REPLACEMENTS

Aim to focus on eating a wholefood diet and cooking from scratch with simple ingredients where possible. Please explore the "free from" sections in supermarkets and your local health food shops as there is an ever-increasing variety of choices.

DAIRY REPLACEMENT

If the FoodPrint® test has shown an ELEVATED reaction to milk, it is recommended that you eliminate all consumption of milk and milk products for three months. See below for replacement ideas and focus on your green food list.

Dairy replacement

- Plant-based milks, e.g., coconut milk
- Dairy-free butter, e.g., vegan block butter, coconut oil
- Spreads, e.g., hummus, almond butter
- Cheese, e.g., nut cheeses, coconut cheese
- Yoghurt, e.g., coconut and oat yoghurt
- Mayonnaise, e.g., dairy-free mayonnaise
- Cream, e.g., oat cream
- Ice cream, e.g., dairy-free ice cream
- Chocolate, e.g., dark chocolate, vegan bars

Dairy-free alternatives are often highly processed, so be sure to check ingredients carefully and for other elevated or borderline foods on your report and eat wholefoods where possible.

When removing dairy from your diet be aware that it may be hidden in some foods and so it is important to always read the food ingredient labels carefully before purchasing. Check for hidden and other names for dairy, including:

- Butter
- Casein, caseinate
- Beta-lactoglobulin
- Alpha-lactalbumin
- Milk powder, skimmed milk powder
- Milk solids, non-fat milk solids
- Whey

Replacing foods of equivalent nutritional value is vital to health. Seek nutritional advice and ensure nutrients found in dairy are replaced with:

- **Calcium**: seeds including sesame, chia, flax and pumpkin, canned sardines and salmon, beans and lentils, almonds, leafy green vegetables, tofu, edamame and figs.
- **Protein**: fish, nuts, seeds, eggs, meat, lentils and beans.
- **Vitamin D**: natural sunlight (expose skin to UV sunlight for 10–30 minutes daily but do not burn), mushrooms, cod liver oil or nutritional supplements.
- **Vitamin A**: leafy green vegetables and orange and yellow vegetables, e.g., sweet potatoes and carrots, oily fish, liver and tomatoes.

EGG REPLACEMENT

If the FoodPrint® test has shown an ELEVATED reaction to egg white and/or egg yolk, it is recommended that you eliminate consumption of these foods, including egg proteins, for three months. See below for replacement ideas and focus on your green list:

Egg replacement

- Egg-free pasta, e.g., rice or buckwheat
- Egg-free noodles, e.g., rice or buckwheat
- Mayonnaise, e.g., egg-free mayonnaise
- Ice cream, e.g., sorbet or egg-free ice cream
- Replace eggs in cakes and cooking with either 1 tbsp ground flaxseed plus 3 tbsp water and allow to soak for 15 mins, or with mashed banana
- Replace egg as thickener with aquafaba (water in which chickpeas and other pulses have been cooked)
- Puddings, e.g., fresh fruit and fruit crumbles, sorbet, jelly

Egg-free alternatives are often highly processed, so be sure to check ingredients for other elevated or borderline foods on your report and eat wholefoods where possible.

When removing eggs from your diet be aware that they may be hidden in some foods and so it is important to always read the food ingredient labels carefully before purchasing. Check for hidden and other names for eggs, including:

- Albumin
- Egg white
- Egg yolk
- Frozen egg
- Pasteurised egg
- Dried egg
- Egg powder
- Egg protein
- Ovalbumin
- Ovovitellin
- Ovaglobulin
- Ovamucin
- Globulin
- Livetin
- Vitellin

Replacing foods of equivalent nutritional value is vital to health. Seek nutritional advice and ensure nutrients found in eggs are replaced with:

- **Protein**: fish, nuts, seeds, eggs, meat, lentils and beans.
- **Vitamin D**: natural sunlight (expose skin to UV sunlight daily for 10-30 minutes, but do not burn), mushrooms, cod liver oil or supplements.
- **Vitamin A**: leafy green vegetables and orange and yellow vegetables, e.g., sweet potatoes and carrots, oily fish, liver and tomatoes.
- **Selenium**: Brazil nuts, fish, meat, sunflower seeds, mushrooms.
- **B2**: beef, tofu, milk, fish, mushrooms, pork, spinach, almonds, avocados.

WHEAT REPLACEMENT

If the FoodPrint® test has shown an ELEVATED reaction to wheat, it is recommended that you eliminate consumption of wheat and wheat products for three months. See below for replacement ideas and focus on your green list.

Wheat replacement

- Bread, e.g., rice bread, corn bread, 100% rye bread
- Pasta and noodles, e.g., buckwheat or rice
- Cereals, e.g., oat muesli, sugar-free cornflakes
- Sauces and gravies, e.g., arrowroot, cornflour
- Flours, e.g., buckwheat, almond flour
- Biscuits, e.g., maize or oat based
- Processed meat, e.g., wheat-/gluten-free alternatives
- Soy sauce, e.g., coconut aminos, tamari

Wheat-free alternatives are often highly processed, so be sure to check ingredients for other elevated or borderline foods on your report and eat wholefoods where possible.

Replacing foods of equivalent nutritional value is vital to health. Seek nutritional advice and ensure nutrients found in wheat are replaced:

- **Fibre**: non-processed foods, such as brown rice, quinoa, buckwheat, oats, root vegetables with skins washed and not peeled, plenty of fruits and vegetables daily.
- **Starch**: maize, millet, rice and quinoa, lentils, beans, potatoes, sweet potatoes, parsnips, plantains, green bananas and yams.
- **Protein**: nuts, seeds, eggs, meat, fish and eggs.
- **B vitamins** (particularly relevant for a meat-free diet): black-eyed beans, brown rice, Marmite, salmon, tofu, avocado, spinach and peas.

WHEAT REPLACEMENT

When removing wheat from your diet be aware that it may be hidden in some foods and so it is important to always read the food ingredient labels carefully before purchasing. Check for hidden and other names for wheat, including:

- Abyssinian hard
- Atta
- Barley
- Binder or binding
- Bran
- Bulgur
- Cake flour
- Cereal
- Cereal binders/binding
- Cereal protein
- Couscous
- Dinkel
- Durum
- Edible starch
- Einkhorm
- Emmer
- Enriched flour
- Farina
- Farro/Farro
- Filler
- Flour
- Food starch
- Frumento
- Fu
- Graham flour
- Groats
- Gum base/dextrin
- Hydrolysed wheat protein
- Hydrolysed vegetable protein
- Kamut
- Maida
- Malt
- Malt extract (wheat-based)
- Manna
- Matzo/Matzoh/Matzah
- Modified food starch
- Modified starch
- Rusk
- Rye
- Seitan
- Semolina
- Sooji/Suji
- Special edible starch
- Spelt
- Starch
- Thickener or thickening
- Triticale
- Triticum
- Wheat
- Wheat bran hydrolysate
- Wheat protein isolate

Please note that products labelled gluten-free may not be wheat-free as some are made from wheat starch and these are not suitable for wheat-free diets. REMEMBER: always check the label.

GLIADIN/GLUTEN REPLACEMENT

If the FoodPrint® test has shown an ELEVATED reaction to gliadin (gluten) it is recommended that you eliminate consumption of all grains containing gluten; these include wheat, see above for wheat varieties, for three months. We isolate gliadin separately from the other proteins in grains so if gliadin is elevated all gluten containing grains should be avoided even if those individual grains, e.g., rye show as green on your report. See below for replacement ideas.

Please note that oats are gluten-free but are often contaminated with wheat, rye, barley and other gluten containing grains during processing. It is therefore recommended that foods containing oats are also avoided unless they are labelled gluten-free.

Gluten replacement

- Naturally gluten-free flours: amaranth, potato, quinoa, buckwheat, rice, corn, quinoa, ground nuts, e.g., almonds and pecan, lentil flour, chickpea/gram flour, soy flour, millet, tapioca
- Gluten-free bread, e.g., rice bread or corn bread
- Gluten-free pasta and noodles, e.g., buckwheat or rice
- Gluten-free cereals, e.g., quinoa porridge, sugar-free cornflakes
- Sauces and gravies, e.g., arrowroot, cornflour
- Flours, e.g., chickpea, lentil
- Biscuits, e.g., maize or gluten-free oat cakes
- Processed meat, e.g., gluten-free alternatives
- Soy sauce, e.g., coconut aminos, tamari

Gluten-free alternatives are often highly processed, so be sure to check ingredients for other elevated or borderline foods on your report and eat wholefoods where possible.

When removing gluten from your diet be aware that it is contained in all the wheat grains listed on the previous page so these foods should be avoided. It is important to always read the food ingredient labels carefully before purchasing.

BAKER'S AND BREWER'S YEAST REPLACEMENT

If the FoodPrint® test has shown an ELEVATED reaction to baker's yeast or brewer's yeast, it is recommended that you eliminate consumption of these foods for three months. See below for replacements.

Of all the foods to avoid, baker's and brewer's yeast, being two strains of the same organism Saccharomyces cerevisiae, are probably the most difficult as they are used in the manufacture of such a wide variety of foods due to the yeast's excellent food safety record. It is used in most bread-making, brewing and fermentation processes. Baker's yeast is chosen for its flavour and ability to make carbon dioxide, while brewer's yeast has a more bitter taste and lends itself to producing alcohol. As they are both derived from the same organism it is likely that if you react to one you may also react to the other so they both need to be avoided, even if only one has shown positive in your results.

Yeast replacement

- Yeast-free bread, e.g., flatbreads, matzos, soda bread, pumpernickel bread
- Yeast-free biscuits, e.g., rice cakes, tortillas, oat biscuits
- Baking, e.g., baking powder, bicarbonate of soda
- Sauces and gravies, e.g., arrowroot, yeast-free stock cubes, tamari
- Yeast-free alcohol, e.g., spirits and prosecco
- Fermented foods, e.g., sauerkraut, tempeh, kimchi
- Replacements for processed meats, e.g., freshly cooked fish and meat

Yeast-free alternatives are often highly processed, so be sure to check ingredients for other elevated or borderline foods on your report and eat wholefoods where possible.

BAKER'S AND BREWER'S YEAST REPLACEMENT

When removing yeast from your diet be aware that it is contained as an ingredient in many foods and so it is important to always read the food ingredient labels carefully before purchasing. Below is a list of foods and ingredients to look out for:

- Baker's yeast in leavened baked goods, e.g., breads, muffins, croissants, biscuits, and other baked goods
- Yeast extract, e.g., Marmite, Vegemite, Bovril, stock cubes and gravies
- Fermented food and drink, e.g., beer, wine, cider, ginger ale, soy sauce, kombucha, kefir, miso, dressings
- Malt syrup, malt extract

IMPORTANT: We are testing for the protein in baker's and brewer's yeast, we are not testing for Candida albicans. You should therefore only avoid foods containing bakers and brewers yeast. This is not an anti-candida diet and the results of this test cannot tell you if you have a candida overgrowth.

Replacing foods of equivalent nutritional value is vital to health. Seek nutritional advice and ensure nutrients found in yeast are replaced with:

- **B vitamins**: meat, fish, whole grains, nuts, seeds and dark green leafy vegetables.
- **Selenium**: Brazil nuts, tinned fish and shellfish, beef, turkey, chicken, fortified cereals, wholewheat bread, beans and lentils.
- **Chronium**: beef and animal proteins, wholewheat flour, grape juice, tomato juice, apples and green beans.

Repair and restore gut microbiome

Testing positive to a high number of foods could indicate increased intestinal permeability or “leaky gut”. This is a condition used to describe a loss in function of the epithelial (gut) wall, which is highly selective in terms of what it allows to be absorbed into the body.

Several factors can contribute to development of 'leaky gut'. These can include lifestyle, poor diet, medications, and stress, resulting in damage and dysbiosis due to a reduction in microbial diversity, including the loss of beneficial bacteria. These can all increase permeability of the gut wall allowing food particles to cross into the bloodstream before they are adequately digested, provoking an IgG immune response.

The resulting response triggers the production of complement which in turn triggers inflammation and symptoms.

While following an IgG elimination diet, with the resulting reduction of IgG immune responses and complexes, it is also important to take steps to repair the gut wall so that elevated foods can be reintroduced without provoking a reaction.

The dietary recommendations below may help to improve “leaky gut” and any associated inflammation, allowing the gut to heal and setting the stage for the reintroduction phase of the programme. Please seek support from an expert when navigating this stage.

EAT	REDUCE
• A diet rich in nutrients including vitamins A, C, E and zinc, such as the Mediterranean-style diet, which includes fish, fruit, vegetables, nuts, seeds wholegrains and olive oil. • Homemade bone broth which is rich in gut-healing nutrients. • Foods high in anti-inflammatory Omega 3 fats, such as salmon, sardines, walnuts, flaxseed and pecans. • A quality probiotic supplement. • Probiotic foods, such as pickles, sauerkraut, miso soup and kimchi. • Many other supplements have been found to help repair the gut barrier wall. Speak to your healthcare practitioner for more information on the most beneficial healing supplements tailored to your needs.	• Eliminate elevated foods. • Rotate borderline foods. • Reduce foods high in saturated fat, e.g., red meat and butter. • Reduce sugar intake found in biscuits, sweets, and cakes. • Restrict processed foods and fast food high in proinflammatory fats and antinutrients. • Limit caffeine as it is a gut irritant. • Reduce high intake of alcohol and excessive exercise.

Cross-reactions

Cross-reactivity occurs when an antibody recognises not only the food protein, or antigen, for which it was originally formed, but also others that have a significant degree of similarity to that of the original antigen. Cross-reactions are the degree to which various antigens appear alike to the immune system.

This structural similarity enables an antibody, specifically raised against one particular antigen, to recognise another antigen as being identical and to bind with it. An individual who has elevated IgG antibodies to a specific food may therefore show raised antibodies to other foods with similar protein antigens in an IgG-mediated food sensitivity test. It is not uncommon for this to occur, and it is important to understand as it can be confusing if a food is shown as positive but is not included within the diet.

While cross-reactions within the same food family may occur, it must not be assumed that this will be the case. Therefore, only foods shown as positive in the test results should be avoided and any other potentially cross-reactive foods should be kept in the diet. It is also possible that antibodies produced against a specific food may cross-react with non-food items, such as dust mites, pollen, latex or animal dander. This is known as concomitant food sensitivity. What this means is if a food tests positive in a FoodPrint® test, but is not included in the diet, it should continue to be avoided whilst the other foods are temporarily removed from the diet.

Hidden Foods

Sometimes foods are eaten unknowingly, and a food sensitivity test can throw up a positive reaction to a food ingredients which may come as a surprise, e.g., agar agar; a seaweed that is used as a thickener and a product in many vegetarian and vegan processed meals.

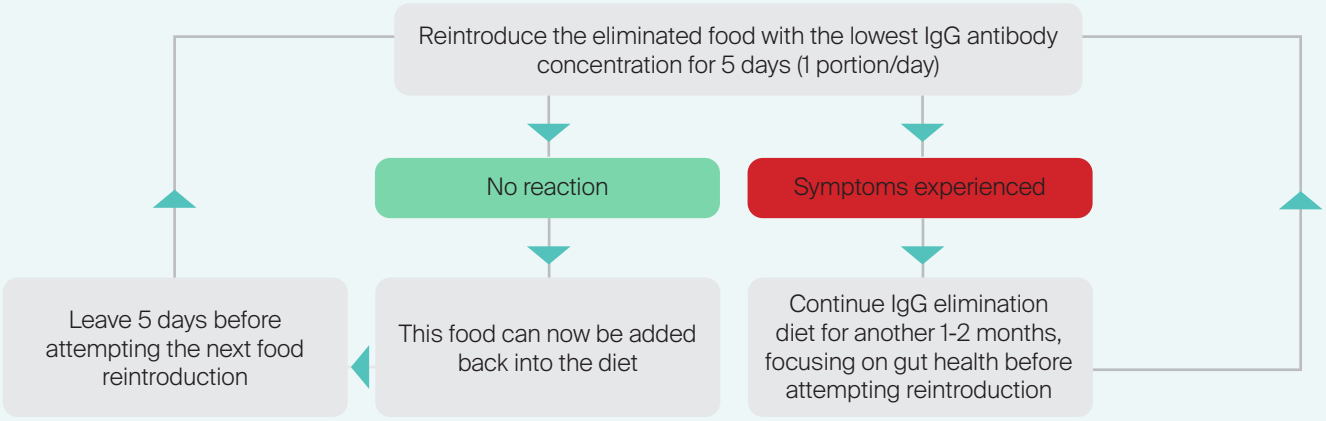
Other examples are within cosmetics, wherein products, particularly lipsticks, often contain animal fats and proteins, and can sometimes be the cause of a positive reaction to a specific animal protein, and aloe contained in topical creams and preparations.

If processed foods are eaten regularly, hidden foods may be consumed unknowingly. Commercially produced breads, cakes, biscuits, desserts, ready meals, sweets, and candies can contain food proteins without them having to be labelled on the packaging if they make up less than 1% of the total ingredients. If extremely sensitive, this small amount may be enough to provoke a reaction.

The simplest way of avoiding hidden food ingredients is to eat homemade meals so that the ingredients are known.

Reintroduction Of Eliminated Foods

After at least 3 months, and only when symptoms have subsided, elevated foods may be reintroduced to the diet. However, this should be a gradual process and planning is essential. Start with the elevated food with the lowest antibody concentration (least elevated) and eat one portion per day for 5 days. Introduce one food at a time and monitor your symptoms over the 5-day period. If symptoms return, this food is still likely to be a problem and you should revert to the elimination diet for a further two months before a second reintroduction challenge.



If symptoms do not return when a food is reintroduced, this food can be included in your diet, but eaten only occasionally in small amounts. A second food can then be reintroduced and symptoms monitored for 5 days, and so on until you have tested all your borderline and elevated foods. See infographic below:

Example Food Reintroduction Diary

Reintroduced food	Date of first reintroduction	Symptom	Date of second reintroduction
Orange	1/07/2020	none	N/A
Oat	6/07/2020	none	N/A
Cow's milk	11/07/2020	diarrhoea, bloating, nausea	11/09/2020

Hints and Tips

- Be patient when introducing foods back into your diet.
- Do not over-indulge! You may have missed your favourite foods, but enjoy them occasionally to help prevent sensitivities from re-occurring.
- Initially reintroduce foods with the lowest antibody levels, i.e., the lowest U/mL. Refer to your 'Test Report: Order of Reactivity'.
- Wait 5 days to observe whether symptoms develop before introducing the next food.
- Continue to introduce increasingly reactive foods, one at a time, leaving 5 days between each new food.
- Use the Food Reintroduction Diary on the following page to help you when you reintroduce foods into your diet.

Food Reintroduction Diary

Reintroduced food	Date of first reintroduction	Symptom	Date of second reintroduction

Understanding Food Sensitivity

Terminology

The terms 'food allergy', 'food intolerance' and 'food sensitivity/hypersensitivity' are often used interchangeably and this can be quite confusing. In simple terms, they all mean that an individual has reacted to a food that has been consumed and this then manifests as symptoms. The reactions they trigger can also vary greatly. This includes the symptoms experienced and how quickly the symptoms manifest after the food has been consumed, as well as the severity of the symptoms and how long they last, and if they are life threatening. Some of these reactions involve the immune system and some don't.

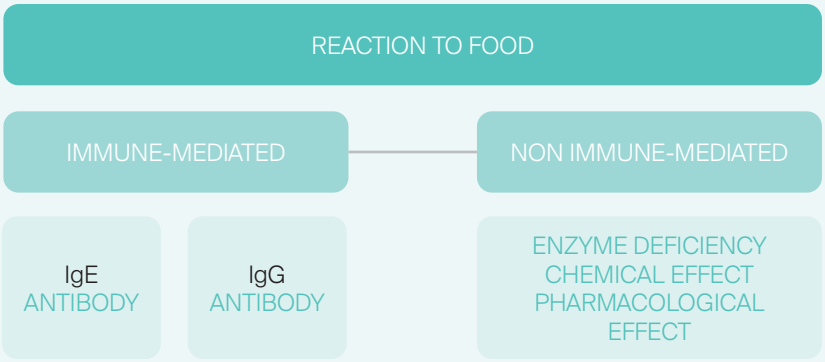
What is the immune system?

To help us understand these varying reactions, it can be helpful to have some basic knowledge of the immune system and how it works. The immune system is made up of various organs, cells and proteins and its role is to protect the body from harmful substances, germs, pathogens, fungi, and cell alterations that can result in illness. Essentially, the main functions of the immune system are:

- To fight pathogens, e.g., viruses, bacteria, or parasites and remove them from the body.
- To identify and neutralise harmful substances from the environment.
- To fight disease-causing alterations in the body, e.g., cancer cells

The immune system can be activated by substances that it doesn't recognise as being a part of the body. Common examples include proteins found on the surfaces of microbes, such as bacteria, fungi, and viruses and these are referred to as antigens. Receptors on the immune cells attach to these antigens and this then triggers an immune reaction, which includes the production of antibodies. Antibodies can then help to neutralise the microbes so they can't multiply and cause illness.

The diagram below gives a summary of the different reactions being highlighted. Take a look at it before we go through each of them in detail. This will help you to understand that, while IgG-mediated food sensitivity is one possible immunological reaction to food, it also highlights that other types of reactions to food exist.



Immune-Mediated Reactions

Reactions that trigger an immune response are most often referred to as 'allergies' and occur when the body over-reacts to foods that do not usually produce a response in the majority of people. This overreaction triggers the immune system to produce antibodies to attack and neutralise the 'foreign' food proteins which the immune system incorrectly recognises as a threat.

Allergies are grouped into four types: I, II, III and IV. These classifications are based on which part of the immune system is activated and how long it takes for a reaction to occur. The two types of allergy that are most often associated with adverse reactions to food are:

Type I Allergy

Also known as IgE-mediated allergy/type I hypersentivities/true allergy

These reactions are characterised by the production of IgE antibodies and the release of histamine and other chemical mediators, upon exposure to an allergen (e.g., peanuts and shellfish). They are responsible for the 'immediate-onset' of symptoms that can occur within seconds or minutes following ingestion of certain foods. Symptoms often associated with a classic 'allergic response' includes rashes, sneezing, difficulty breathing, and anaphylactic shock. It is usually obvious which foods are responsible for a food allergy and these have to be avoided for life.

Type III Allergy

Also known as IgG-mediated allergy/food-hypersentivity

These reactions are characterised by the production of IgG antibodies and the gradual formation of antigen/antibody complexes which are deposited in tissues, leading to an inflammatory response. This type of immune reaction results in 'delayed-onset' of symptoms which can occur several hours or days after foods are ingested. It is possible to eliminate the offending food(s) from the diet for a short perious of time and then gradually reintroduce them when symptoms have improved.

Non Immune-Mediated Reactions

Reactions that do not produce an immune response are often referred to as 'food intolerances'. They can be caused by reactions to certain chemicals/additives found in food or, more commonly, due to enzyme deficiencies:

Enzyme Insufficiency/Deficiency

Lactose Intolerance

- Caused by a deficiency of lactose - an enzyme that breaks down lactose (a complex sugar).
- Foods that contain lactose include: dairy products (milk, cheese, yoghurts, etc).
- Symptoms include bloating, diarrhoea and flatulence.

Histamine Intolerance

- Caused by an elevated histamine level due to a decificiency or inhibition of diamine oxidase (DAO) - an enzyme that breaks down histamine (a chemical that triggers an inflammatory response).
- Aggravated by foods high in histamine, including red wine, cheese, and tuna.
- Some foods are low in histamine but can trigger the release of histamine in the body, including citrus foods, bananas, tomatoes and chocolate.
- Symptoms include migraines, dizziness, bowel/stomach problems, rhinitis, depression, irritation and reddening of the skin.

Understanding the different reactions to food

	IgE Type 1 Allergy	IgG-mediated food sensitivity	Non immune-mediated, e.g., enzyme insufficiency
Involves the immune system	Yes	Yes	No
Common symptoms	Hives, itchy eyes, swelling of lips/tongue, shortness of breath, nausea, vomiting, anaphylaxis	Migraines/headaches, IBS (diarrhoea, constipation, bloating, flatulence, stomach cramps, lethargy)	Gastrointestinal symptoms, hives, itchy eyes, facial swelling (dependent on specific enzyme deficiency)
Speed of reaction	Immediate (within 2 hours)	Usually 24-72 hours	Within 30 minutes to 2 hours
Severity of symptoms	Can be potentially life threatening	Can be potentially debilitating and chronic	Mild to severe
Mechanism of action	IgE antibody stimulation of histamine production	IgG antibody/antigen complex formation and complement activation	Enzyme deficiency / insufficiency
Lifelong condition	Yes	No	Yes

This section has discussed different types of adverse reactions that can be associated with food, including immune-mediated and non immune-mediated reactions. The FoodPrint® IgG antibody test measures immune-mediated, type III allergy reactions or food sensitivities.

Frequently Asked Questions

Is it possible to be affected by foods that are not detected by the FoodPrint® test?

Some foods may cause a classic allergic reaction involving the production of IgE antibodies (type I allergy) to food antigens or proteins in food. These will not be detected by the FoodPrint® test as it detects IgG antibodies.

There are many foods that can cause a reaction in the body without involving the immune system, these are known as food intolerances and can produce symptoms similar to IgG reactions: amines found in chocolate, cheese and red wine may cause migraines; some food additives, such as tartrazine, can trigger hives, rashes, and asthma; monosodium glutamate (MSG) found in restaurant/take-away food can provoke sweating and dizziness; 'Nightshade' alkaloids in potatoes, tomatoes and peppers may affect the joints.

Food intolerance may be due to a deficiency of a particular enzyme, such as lactase in lactose intolerance.

Avoid foods if you suspect they are causing adverse effects.

I have been avoiding a food for several months/years. Will this affect my test results?

The FoodPrint® IgG antibody test is based on the immune system's ability to produce antibodies in response to certain foods. If a food has been avoided for more than 3 months, it is possible that IgG antibody levels will be insufficient to be detected by the test and may give a NORMAL result. To test sensitivity to a certain food, it should be included in the daily diet for five days before testing, or at least every other day, for 4-6 weeks before testing. However, if the food concerned is known to cause extreme symptoms/discomfort or you have a diagnosed allergy to it, do not reintroduce it.

What does U/mL mean?

U/mL stands for 'units per millilitre' and is a measure of concentration. The result for each food listed in the Test Report is expressed in U/mL, which shows the concentration of food IgG antibodies detected in the blood sample provided.

Frequently Asked Questions

Do I need to visit a nutritional practitioner to discuss the test results?

Once you have received your FoodPrint® test results, it is advisable to consult a qualified nutritional practitioner or dietitian who can help advise or support with dietary changes.

If cow's milk is ELEVATED, does this mean that I am lactose intolerant?

No. Lactose intolerance is the inability to digest lactose, the major sugar found in milk, and is caused by a deficiency in the enzyme lactase. The FoodPrint® test detects an IgG-mediated food sensitivity caused by the specific proteins found in milk, but does not detect the lactase enzyme and, therefore, cannot diagnose lactose intolerance.

Why do you not test for sugars?

The FoodPrint® test detects level of food proteins in the blood. Sugars contain no proteins to which the IgG antibodies can combine.

Is the FoodPrint® test suitable for testing children?

Yes, but we recommend a minimum age limit of 2 years to allow for the child's immune system to mature.

If my test shows reactivity towards wheat, does that mean I have coeliac disease?

No, coeliac disease is an immune disease that causes a severe reaction to the protein gluten (gliadin), which is just one of the proteins found in wheat, barley, and rye. We remove gluten from our wheat extract so if it wheat is positive this means you are reacting to the other wheat proteins found in this grain, and not gluten. Coeliac disease cannot be determined in a FoodPrint® test, it requires a different test, should be done under medical supervision and will involve a confirmation biopsy and a positive transglutaminase response.

Frequently Asked Questions

Is gluten-free the same as wheat-free?

No. A product can be wheat-free but not gluten-free, and vice versa. Products are available that are both gluten-free and wheat-free. It is important to read the ingredients label to be certain. The FoodPrint® test uses wheat, barley and rye food extracts that do not contain gluten. Gluten is extracted from the grains and tested separately.

If your Test Report shows an ELEVATED reaction to gluten (gliadin), it is important to eliminate any foods that contain the gluten-based grains wheat, rye and barley and substitute with naturally gluten-free foods, such as quinoa, buckwheat, corn, oats, and wild rice. If your Test Report shows an ELEVATED result for wheat, rye, or barley, but NOT for gliadin, the reaction may be due to one of the other proteins found in the grains.

Do I need to be cautious when removing a food group from my diet?

Yes, you should be careful when introducing a new dietary regime and removing foods. We recommend seeking professional advice from registered qualified nutritionists or a dietician to help support you make these changes to ensure that nutrients are adequately replaced.

Do I need to have a re-test after a few months?

Most people do not need to re-test if symptoms have resolved, but if you would like to take another test we advise a period of 9-12 months between tests.

What if I don't experience any improvement at all?

If, after changing your diet according to the test results, improvements have not been achieved after 3 months, food sensitivity may not be the only cause of your symptoms and other investigations should be undertaken by your healthcare practitioner.

Frequently Asked Questions

Why do we not test for IgA?

IgA is the principal isotype in secretions (especially mucus epithelium of the intestinal and respiratory tracts). It is a neutralising “first line of defence” antibody against bacteria and toxins, binding foreign antigens into complexes which are then removed by macrophages, but with little or no resultant inflammation. IgA antibodies are characterised by less specific antigen binding sites than IgG antibodies, resulting in higher cross reactivity and false positive potentials.

Why do we test for total IgG and not just IgG4?

IgG4 is an anti-inflammatory antibody triggered by IL-10. IgT4 antibodies are involved in the desensitisation of type I allergies (IgE). The guideline of the EAACI (European Academy of Allergy and Immunology) states that testing for IgG4 is not recommended for the detection of delayed food allergies (www.ncbi.nlm. nih.gov/pubmed/18489614) as it is biochemically difficult to measure due to very low IgG4 concentrations and specificity of detection antibodies against IgG4. IgG4 indicates tolerance, not hypersensitivity, as it is not able to induce inflammation.

Why do we not test for anti-C3 antibody/complement?

The complement cascade is an important part of the immune system that enhances the ability of antibodies and phagocytic cells to clear microbes and damaged cells from an organism. This is, in part, driven by an inflammatory response and is beneficial to the body when fighting pathogens. Although the complement system is a component of the innate immune system, which is non-specific, it can also be recruited and brought into action by IgG antibodies generated by the adaptive immune system, which make it specific.

Some companies claim that incorporating an anti-C3d antibody improves the reliability of the food sensitivity test by establishing which foods are triggering complement and, therefore, inflammation. However, the main issue with this hypothesis is this reaction cannot take place in-vitro. Apart from technical validity of the concept issues, when writing, there were no independent published studies using this methodology.

FoodPrint®

Speak to your healthcare professional today

Omega Diagnostics defines food sensitivity as an IgG antibody reaction to food. Food IgG antibody testing is not intended to diagnose or treat any medical conditions. The FoodPrint® test does not identify IgE-mediated food allergies or provide information about coeliac disease, enzyme deficiencies such as lactose, histamine, tyramine or alcohol intolerance or other chemical sensitivities such as reactions to certain food additives.

The assistance of a professional healthcare provider is advised and any medical concerns should be referred to a medical doctor. Specifications, terms and pricing are subject to change at any time. Not all products are available in all countries. FoodPrint is a registered trademark of Omega Diagnostics Ltd in the UK and other countries.

References to published literature available on request | Image credit: Shutterstock

FoodPrint® has been developed and is manufactured by Cambridge Nutritional Sciences, Eden Research Park, Henry Crabb Road, Littleport, Cambridgeshire, CB6 1SE, United Kingdom