

# Gut Diagnosis Cyrex Array 4 Review

## Testing for cross-reactive protein intolerance and other food sensitivities

Research has shown that between 7 and 30 percent of people with celiac disease continue to have symptoms even after implementing a gluten-free diet. This has led to the theory that antigenic similarity across proteins in dairy, grains, eggs, and other foods and some antibodies to gluten may cross-react with these other food antigens. Thus, patients may also be producing antibodies to these foods.

### Who should get tested with **Array 4?**

**1** Anyone that still **experience symptoms after gluten-free diet** (whether they have CD or NCGS)

**2** Anyone who **wants to be able to consume the foods on Array 4**, and needs clarity on how they are affected by them

## Test Preparation

- 1 Exposure to **particular foods** is what triggers antibody production
- 2 Patient must have consumed each food on Array 4 **within 25-30 days** of test for accurate results
- 3 Advise patient to eat **at least one small serving of each food they wish to test** for minimum of 7 days, starting 25-30 days before test
- 4 If patient has known gluten intolerance, instruct them to **avoid barley, Polish wheat (kamut), rye, spelt, and oats** (if not certified gluten-free)
- 5 **Two options:** have patient consume all foods (difficult), or only those they wish to test/are currently consuming

## Rye, barley, spelt, kamut

Gluten-containing **grains**

**Associated with** allergy, asthma, CD, ME/CFS, fibromyalgia, IBS, NCGS

**Cross-reacts** with Sesame seed,  $\omega$ -gliadin, and wheat, barley and soy flours



## Yeast

### **Saccharomyces cerevisiae:**

yeast used as a leavening agent in baking and as a fermenting agent in brewing

**Associated with** Crohn's disease, IBD, tropomyosin, Behçet's disease

**Cross-reacts** with *Candida albicans*, multiple bacteria, human colon tissue, gliadin

Patients with **antibodies** to yeast should be screened for intestinal permeability



## Buckwheat

A **seed** used in Japanese noodles, porridge, pancakes, and farina

**Gluten-free**, but some studies show antigenicity with patients with CD and NCGS

**Associated with** CD, urticaria, NCGS, allergy, and asthma

**Cross-reacts** with latex; patients with buckwheat reactivity should avoid latex products

# Milk butyrophilin

**Protein** of the milk fat globule membrane

**Associated with** MS, Sjögren's, lupus

**Cross-reacts** with myelin oligodendrocyte glycoprotein and gliadin

**Can provoke** immune responses in GALT and peripheral immune organs

**Exacerbates** central nervous system inflammation



Oats **do not contain gluten** unless cross-contaminated

**Associated with** atopic dermatitis, CD, food hypersensitivity, NCGS

**Cross-reacts** with gliadin



## Coffee

According to Cyrex, the **highest cross-reactivity with gliadin!**

**Important note:** Cyrex tests for instant coffee antigen, which has shown to be contaminated with wheat

Whole coffee beans not contaminated with wheat does not show **cross-reactivity to gliadin**

**Associated with** allergy/hypersensitivity, anaphylactic shock, contact dermatitis, heart arrest, urticaria

**Cross-reacts** with gum arabic



## Teff

Used to make injera, Ethiopian **flat bread**

Sometimes found in **gluten-free** baked goods

Very little published **research**

No known cross-reactivity to gliadin; probably **one of the safest gluten-free alternatives**

If **antibodies** produced to teff, may be because of late introduction into diet



## Potato

**Sensitivity** to potato is rare and more often occurs in children (who usually outgrow it)

**Associated with** allergy/hypersensitivity

**Cross-reacts** with corn/maize

## Casein

**Protein** in milk and other dairy products

**Most common** food intolerance in kids

**Associated with** ASD, autoimmune uveitis, CD

**Cross reacts** with gliadin, cerebellar, and soy

Up to 50% of **CD patients** are intolerant of casein/dairy



Traditionally used as a **sweetener** (“sorghum molasses” in the South)

Common ingredient in gluten-free **baked and processed goods**, and gluten-free beer

Does not commonly cross-react with **gliadin**

Does **cross-react** with corn, millet



Consumed as **whole grain**; also commonly found in gluten-free cereals, baked products, crackers, etc.

**Associated with** allergy, anti-thyroid effect, asthma, atopic dermatitis, respiratory disease

**Cross reacts** with sorghum, rice, gliadin

Millet is **goitrogenic**; patients with thyroid disease should be cautious



**Egg sensitivity** more common in kids than adults; kids will often outgrow it

Cooked egg introduced at 4-6 months may protect against **allergy**

**Associated with** allergy/hypersensitivity

Some patients may **react** only to white, or only to yolk (run Cyrex 10 to find out; Array 4 tests combined white/yolk antigen)



Consumed as **whole grain** and as common ingredient in gluten-free foods

Also fermented to make **sake**

**Associated with** allergy/hypersensitivity, enterocolitis

**Cross reacts** with wheat, gliadin, corn/maize, soy, millet



## Casomorphin

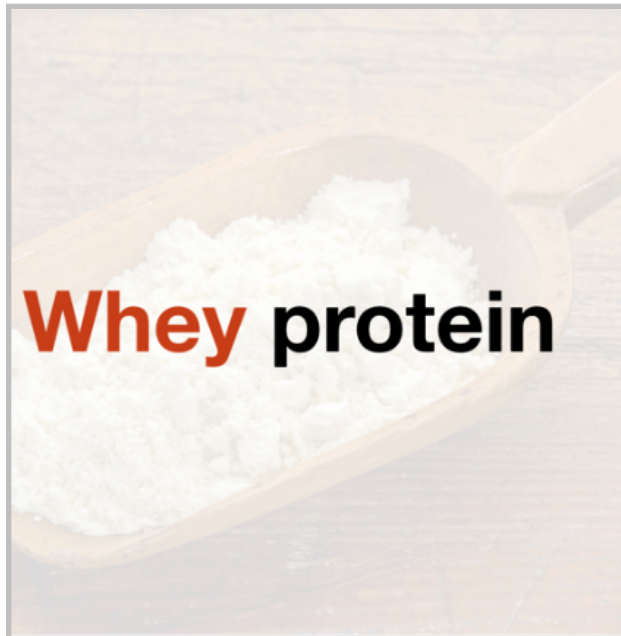
**Opioid peptide** formed from undigested casein. Known to modulate the mucosa of the intestinal lining

If mucosa is damaged, casomorphin and other ingested peptides can more easily **penetrate the intestinal barrier**

Capable of **disrupting the blood-brain barrier** and interfering with the neurotransmitter messaging system

**Associated with** SIDS, ASD, blood-brain barrier permeability, Down syndrome, post-partum psychosis

**Cross reacts** with cerebellar, gliadin



Whey is the liquid remaining after **milk** has been curdled and strained

By-product of the manufacture of **cheese or casein** and is used in cheeses, protein supplements and processed foods

**Associated with** allergy/hypersensitivity

**Cross-reacts** with gliadin

Dried whey contains lactose and should be avoided by patients with **lactose intolerance**



Used in **gluten-free** products and as a source of **protein**

Also used as source of **PUFA** (hemp oil)

**Associated with** allergy

Very little published **research**



**Pseudo-cereal** native to North America

Consumed as **whole grain**; also commonly used in gluten-free cereals and baked goods

**Associated with** allergy

**Cross reacts** with quinoa, rice, sunflower

Does not typically cross react with **gliadin**



## Quinoa

**Pseudo-cereal** native to South America

Consumed as whole grain (actually a **seed**); common ingredient in gluten-free cereals and baked goods

**Associated with** anaphylaxis and secondary hyperoxaluria

**Cross reacts with** amaranth, rice, sunflower

Not known to cross-react with **gliadin**



## Tapioca

Also known as **yuca, cassava, manioc**

**Tuber** that is cooked and eaten peeled

Also eaten as **pudding**, flatbread; used in gluten-free products

**Associated with** anaphylaxis and latex-fruit syndrome

**Cross-reacts** with banana, avocado, chestnut, kiwi

Not known to cross-react with **gliadin**

## Sesame

Sesame **seeds** are processed into oil and flour or eaten whole

Common ingredient in **baked and processed foods**

Found in **tahini**

**Associated with** allergy, anaphylaxis, conjunctivitis, facial erythema, asthma, rhinitis, urticaria

**Cross reacts** with almonds, kiwi, poppy seeds, hazelnuts, rye

Not known to cross react with **gliadin**

## Chocolate milk

**Important:** this antigen is a combination of milk and chocolate, known to cross react with gliadin

Dark chocolate/cacao w/o milk not known to cross react with **gliadin**

**Associated with** allergy and CD

**Cross reacts** with tobacco, ragweed leaves, instant coffee



**Soy**

**Used to make** milk, tofu, soy sauce, fermented bean paste, natto, tempeh and oil

**Extremely common** ingredient in processed foods

**Associated with** allergy

**Cross reacts** with birch pollen, cow's milk, casein

Studies suggest that soy **allergy** is becoming more common

**Corn**

**Eaten whole**, also in vegetable mixes, breads, stews, soups, chili, salsa, supplement/ pharmaceutical fillers, and much more

**Processed** into syrup and used as a sweetener for beverages, treats, and pre-packaged foods

**Associated with** allergy/hypersensitivity, anaphylaxis, CD, crohn's disease, ulcerative colitis

**Cross reacts** with potato, rice, soy, gliadin

**Activates** mucosal neutrophils and eosinophils; can worsen GI inflammatory disorders and CD

## Foods known to **cross-react with gliadin**

Foods known to cross-react with **purified alpha-gliadin-33-mer**

|  |                 |
|--|-----------------|
| Cow's milk   | Gluten grains * |
| $\alpha + \beta$ Casein  | Yeast           |
| Casomorphin  | Oats            |
| Milk butyrophilin  | Millet          |
| Whey protein   | Rice            |
| Chocolate (milk)   | Corn            |
| * Polish wheat is also known as Camel's wheat, Egyptian wheat and Kamut® |                 |

**Adapted from:** Cyrex Array 4 Clinical Applications Guide (<http://cyrexlabs.com>)

**Not all of the antigens listed on Array 4 cross react with gliadin**

**Also cross-reactivity does not happen in all cases.**