ALLERGY Advisor

Wheat- Free-from Diet Instructions

Please use this diet sheet under the supervision of a registered dietitian

Wheat Allergy

Wheat is the grain most commonly reported to cause allergic reactions; it is also the most common grain in the Western diet. Allergy to other grains (e.g., oats, rice, maize and barley) is less common.

Proteins in Wheat

Although the carbohydrate content of grains is much higher than the protein content, it is the proteins that cause the immune system response in an allergic reaction. Protein makes up about 12% of the dry kernel. Wheat proteins are divided roughly into the following classes:

- Gliadins
- Glutenins
- Albumins
- Globulins

Gliadins and glutenins form the gluten complex. Gliadins contain as many as 60 distinct components; glutenins contain at least 15. The molecular size of the protein components in wheat is 10 to 40 kilo-Daltons, the size considered optimal for triggering a Type I hypersensitivity reaction. Other cereal grains contain similar mixtures of proteins, which theoretically could trigger a reaction.

Allergy to Wheat Proteins

No single protein or class of protein seems to be responsible for wheat allergy. One authority showed that persons allergic to wheat tended to react to the albumins and globulins, rather than to the gliadins and glutenins. Other studies demonstrated immune responses to gliadins and globulins; however, in spite of this immune reactivity (demonstrated by RAST tests in most cases), some subjects showed no clinical evidence of wheat allergy.

Allergy to wheat may occur in any individual. This is unlike coeliac disease, which is hereditary.

How Common Is Wheat Allergy?

Clinical experience suggests that wheat allergy is relatively uncommon, but there are no accurate figures for prevalence. The allergy is more prevalent in certain groups: e.g., wheat allergy is responsible for occupational asthma in up to 30% of individuals in the baking industry.

Symptoms Associated with Wheat Allergy

Abdominal pain and loose stools commencing within 12 to 72 hours after eating wheat are the most frequently reported manifestations of wheat allergy. In children, this pattern often accompanies an allergy to cow's milk proteins. (Wheat has been reported to be the provoking allergen for a number of different allergic conditions.)

Ingested and inhaled wheat flour has been demonstrated to cause asthma in both adults and children, and is one of the numerous food and environmental allergens implicated in eczema. Wheat allergy also may provoke urticaria (hives) and angioedema (swelling due to allergy). An anaphylactic reaction to wheat has been reported in a young infant, and exercise-induced anaphylaxis after eating wheat has been reported several times.

Other symptoms reported are nausea, vomiting, oral allergy syndrome and allergic rhinitis.

In association with exercise, reactions to gliadin or glutenin can cause urticaria, angioedema or life-threatening anaphylaxis. As these proteins are present in other cereals, these symptoms may occur in wheat-allergic individuals due to cross-reactivity

How Is Wheat Allergy Treated?

Medication is ineffective in treating this condition. Avoidance of wheat and wheat-containing foods is the only treatment. (See Table below.) This may be difficult to maintain, particularly as wheat protein may be "hidden" in other foods. Rice or maize may be substituted as alternative cereals. A dietician must supervise treatment. Wheat-allergic patients who have sensitivity to gluten (or gliadin) should avoid other gluten-containing cereals

Wheat-Free Diet in the Management of Wheat Allergy

In Western countries, avoidance of wheat is one of the more difficult diets to manage because wheat is a principal ingredient in many commonly eaten foods. Breads, cereals, crackers, cookies, muffins, pasta, snack foods, luncheon meats, sausages, candies, desserts, cakes, pies, pancakes, waffles, and many other wheat-containing products are basic "convenience foods" in the fast-paced Western lifestyle. These products supply the nutrients occurring naturally in wheat, as well as those added in the fortification of wheat flour, namely thiamine, riboflavin, niacin, and iron.

Hydrolysed plant protein (HPP), hydrolysed vegetable protein (HVP), and monosodium glutamate (MSG) may be made from wheat. However, because the hydrolysis process breaks down the protein to a form that is unlikely to be allergenic, avoiding these products is not necessary.

If rye, oats, barley, corn, and rice are tolerated, baked products, cereals, and pastas using these grains can be eaten in place of those using wheat. In addition, unusual grains and flours such as millet, quinoa, amaranth, buckwheat, tapioca, sago, arrowroot, soy, lentil, pea, and bean, as well as nuts and seeds, may be used in interesting combinations to make baked products and cereals.

Grains and Coeliac Disease

Individuals with gluten-sensitive enteropathy (coeliac disease or sprue) react to the alpha-gliadin fraction of gluten. Although a variety of mechanisms involving immune reactions have been proposed as the primary trigger of coeliac disease, there is no definitive evidence that it is due to an allergy.

Symptoms of coeliac disease are diarrhea, weight loss, malabsorption (especially of fats), iron or folate deficiency, and sometime rickets or indications of other vitamin and mineral deficiencies. Occasionally the condition is accompanied by an itchy rash (dermatitis herpetiformis).

Coeliac disease is diagnosed by a biopsy that reveals abnormal morphology of the lining of the jejunum. The diagnosis should always be confirmed by laboratory data, so that treatment is not undertaken inappropriately. Treatment is life-long and consists of the strict avoidance of all grains that contain gluten, namely wheat, rye, oats, and barley.

It is important to realize that not all wheat intolerance, grain intolerance, or even gluten intolerance is due to coeliac disease.

Allergy to Other Cereal Grains

The incidence of allergy to other cereal grains and the degree of cross-reactivity among cereal grains is unknown. Allergy to oats, rye, or barley is uncommon, and therefore restricting these grains is rarely necessary except for the treatment of coeliac disease. Maize allergy is rare, but it has been documented in a number of reports, mainly in childhood. Allergy to rice appears to be equally uncommon. If allergy to any grain is suspected, elimination and challenge should be carried out.

Feeding the Wheat-Allergic Infant

Proteins from wheat in the mother's diet can pass into the breast milk and cause allergy symptoms in the wheat-allergic infant.

If the breast-fed infant is allergic to wheat protein, the elimination of all wheat and wheat-containing products from the mother's diet should be beneficial. If wheat elimination only partially eases the infant's distress, food symptom diaries carefully kept by the mother may isolate other possible dietary or medication irritants.

Prognosis

The majority of young children with wheat allergy will outgrow it. Individuals who develop the allergy later in life will probably retain it. There is some evidence that individuals who remove wheat from their diet for a year or longer may be able to tolerate wheat upon re-introduction.

The diet that follows is not suitable for persons with coeliac disease.

Extracted and modified, with permission from the authors, from *Dietary Management of Food Allergies & Intolerances: A Comprehensive Guide*, by Prof. Janice Vickerstaff Joneja, Ph.D., R.D.N.J.A., 2nd Edition, Canada: Hall Publications, 1998. ISBN: 0-9682098-2-3; and from an article by Dr Harris Steinman in "Science in Africa," scienceinafrica.co.za/2001/december/gluten.htm

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Wheat - Free Diet Sheet

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	Foods Allowed	General Foods Restricted
Milk and Dairy:	All milk and milk products are allowed in a wheat free diet except those listed under specific foods restricted (milk and dairy). Milk Buttermilk Cream Yoghurt Aged cheese Cottage cheese	Instant cocoa, chocolate mixes, malted milk. Cheese sauces, spreads and foods containing wheat. Cheese Spread Cheese Spread - Reduced fat Ice cream Ice cream cone / Cornet Milkshake
Bread and Cereal:	Flour, grains and starches: Amaranth Arrowroot Buckwheat Corn Lentil Flour Pea Flour Kasha Nut meal and flour Quinoa Non-enhanced rice Sago Seed meal and flour Soy flour Tapioca Popcorn Sorghum Flax Wild rice Breads made from substitute flours and starches: Rice bread Soy bread Waffles and cakes made with allowed grains Crackers and snacks: Corn Chips Corn nachos Corn taco chips Potato chips Rice cakes (plain or with allowed seeds and grains) Rice crackers	Any bread or baked goods made from restricted flours and starches Any crackers or snacks which contain wheat as an ingredient Cracker meal Pasta made with wheat flour Most cereals Biscuits / Cookies Bran Bread Bread (rolls) Breakfast cereal Cereal Mixes Cereals (enriched) / Porridge Couscous Flour Graham flour Noodles Pasta Pasta products Rye bread Wheatburger

	Cereals: Corn Corn flakes Puffed rice Puffed millet Puffed Amaranth Pasta: Soy pasta Buckwheat pasta Mung bean pasta Rice noodles and pasta Brown rice pasta Wild rice pasta Corn pasta	
Vegetables:	All fresh, frozen or canned vegetables and their juice extracts are allowed, unless they are prepared or combined with wheat or wheat products. (See specific food restricted vegetables). Starches allowed: Tapioca Potato Arrowroot Sweet potato	Vegetables prepared with a dressing or garnish containing wheat or wheat products. Creamed vegetables Potato (croquette, frozen) Scalloped Vegetables
Legumes:	All legumes are allowed, unless they are prepared or combined with wheat or wheat products. (See specific food restricted legumes). Plain tofu Peanut butter Beans Fava Beans Soy Beans Garbanzo Beans Lentils Peas Peanuts	Legume dishes prepared or combined with wheat or wheat products. Sprouted wheat Soya bean paste / Miso (fermented) Soya condiments
Fruit:	All fruit and their fruit juice extracts are allowed, unless they are prepared or combined with wheat or wheat products. (See specific food restricted fruit).	All fruit dishes containing wheat Fruit (spreads)
Meat, Poultry & Fish:	All plain, fresh, frozen or canned meat, poultry and fish are allowed, unless they are prepared or combined with wheat or wheat products like bread crumbs and batters. (See specific food restricted -meat, poultry and fish).	Meats, poultry or fish that are prepared or combined with restricted grains Egg dishes thickened with flour Battered meat, poultry and fish Breaded meat, poultry and fish Meat (canned) Meat (hamburger patties) Meat (lunch meat) Meat (manufactured) Meat (pate) Meat (processed)

		Meat (sausage) Meat loaf Wieners
Nuts & Seeds:	All plain nuts and seeds are allowed Almond Chestnut Acorn Hazelnut Walnuts Brazil nuts Cashews Water chestnuts Sunflower seeds Mustard seeds Sesame seeds Safflower Coconut Poppy Alfalfa	Snack nuts and seeds (containing HVP* HPP* or MSG* or malt* or restricted grain products)
Fats & Oils:	Butter Cream Margarine Shortening Pure vegetable oil Pure nut oil Pure seed oil Pure fish oil Lard and meat dripping Peanut butter Pure nut butter Pure seed butter Homemade gravy with thickener (other than wheat)	
Spices & Herbs:	All spices and herbs are allowed	Seasoning mixes containing HVP* HPP* or MSG* or malt* e.g. Aromat Black pepper powder
Miscel-laneous:	Sugar Honey Molasses Maple syrup Jams (prepared without wheat) Jellies (prepared without wheat) Preserves (prepared without wheat) Baking chocolate Pure cocoa powder	Sweets containing wheat of unknown origin Batter / Battered food Cakes (pre-packed mix) Drinks (alcoholic) Ketchup / Tomato sauce Pancakes Sandwich spread Soup (packet mix) Sweets / Candy
	Unreferenced Sources / Other:	Oils made from wheat should be free of wheat allergens unless a poor process is used. Baked beans (the sauce may be made with wheat) Bread crumbs Cheese spreads Chocolate mixes

Commercial pie fillings and jams
Commercially made fish cakes
Cracker meal
Instant cocoa
Malted milk
Matzoh
Some ice cream
Sprouted wheat
Stewed fruits thickened with flour
Stuffing

*Prepared drinks that contain malt

STARCHES
(used to thicken sauces may be made from wheat, and is allergen free)
Candy *
Icing sugar *
Marshmallows *
Yogurt

The following may contain wheat: HVP, natural flavouring, soya sauce, gelatinized starch.

Ingredient terms to avoid on labels

All-purpose flour
Bleached flour
Bran
Bulgur (cracked wheat)
Corned Starch
Couscous
Durum wheat
Enriched flour
Farina
Gluten
Graham flour
Hard durum flour
High gluten flour
High protein flour #
Hydrolysed vegetable protein ‡
Kamut
Miller's bran
Modified food starch ¥
Modified starch ¥
MSG (monosodium glutamate) *
Protein
Semolina
Spelt
Starch ¥
Unbleached flour
Vegetable gum ¥
Vegetable starch ¥
Vital gluten
Wheat bran

Wheat flour
Wheat germ
Wheat gluten
Wheat starch
White flour
Whole wheat
Whole wheat flour

Label Alerts

CHECK LABELS ON ALL PROCESSED FOODS - if a food label is absent, unclear or vague it is best to avoid it. Read all labels, even familiar brands, as manufacturers may change suppliers or ingredients.

Also look out for the following items on ingredient lists:
cake flour, cereal extract, food starch, malt, malt extract, malt flavouring, pastry flour, seitan, wheat, wheat malt, wholewheat berries.

See http://AllAllergy.net - Food Alerts, and, http://www.safetyalerts.com

Substitutes

WHEAT (NOT GLUTEN FREE)
Items listed under: Wheat (Gluten free)

Barley - whole hulled, flakes, flour
Kamut - Whole, flakes, flour, pasta
Oat - Scotch style, flour, oat bran, rolled flakes
Rye - flakes, flour, bread, crackers (if 100 % rye)
Spelt - whole, flakes flour, pasta

BAKING
In baking, the following quantities equal 1 cup (120 g) of wheat flour:
Oats: 333 ml ~1 1/3 cup ~ 133g ~ 4½oz
Rye flour: 250ml ~ 1 cup ~ 130g ~ 4oz
125ml ~ ½ cup ~ 65g ~ 2oz (rye flour) + 125ml ~ ½ cup (potato flour)
167ml ~ 2/3 cup ~ 87g ~ 3oz (rye flour) + 83ml ~ 1/3 cup (potato flour)
83ml ~ 1/3 cup ~ 43g ~ 1½oz (rye flour) + 150ml ~ 3/5 cup ~ 86g ~ 3oz (rice flour)
Barley: 125ml ~ ½ cup
For further substitutes for wheat flour in baking see gluten free.

1 part rice flour + 1 part soya flour + 1 part potato flour (always include 1 high protein flour e.g. soya or lentil)

Coarser meals and flours need more leavening.
It is advisable to use 7,5 ml (1½ tsp) baking powder for each cup of course flour.

THICKENERS
- Sago flour can be used to thicken soups, sauces and stews. Pearl sago and pearl tapioca can be made into puddings with milk.
- Arrowroot is an excellent thickener.
- Rice flour, potato flour, barley flour and rye flour can all be used as thickeners with care, as they tend to be lumpy.
- Substitute 12,5 ml cake flour as a thickening agent in a recipe with:
12,5 ml (2½ tsp) rye flour
For more substitutes see gluten free.

Reminders

Medic Alert ?
Cross reactivity ?

Free-from Recipes and Related Information