# Food Allergy and Intolerance

## CPC Seminar June 2015

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# Outline

- What is food allergy and food intolerance ?
- How prevalent is it?
- How do we diagnose it?
- How do we manage it?

# Adverse reactions to food: definition

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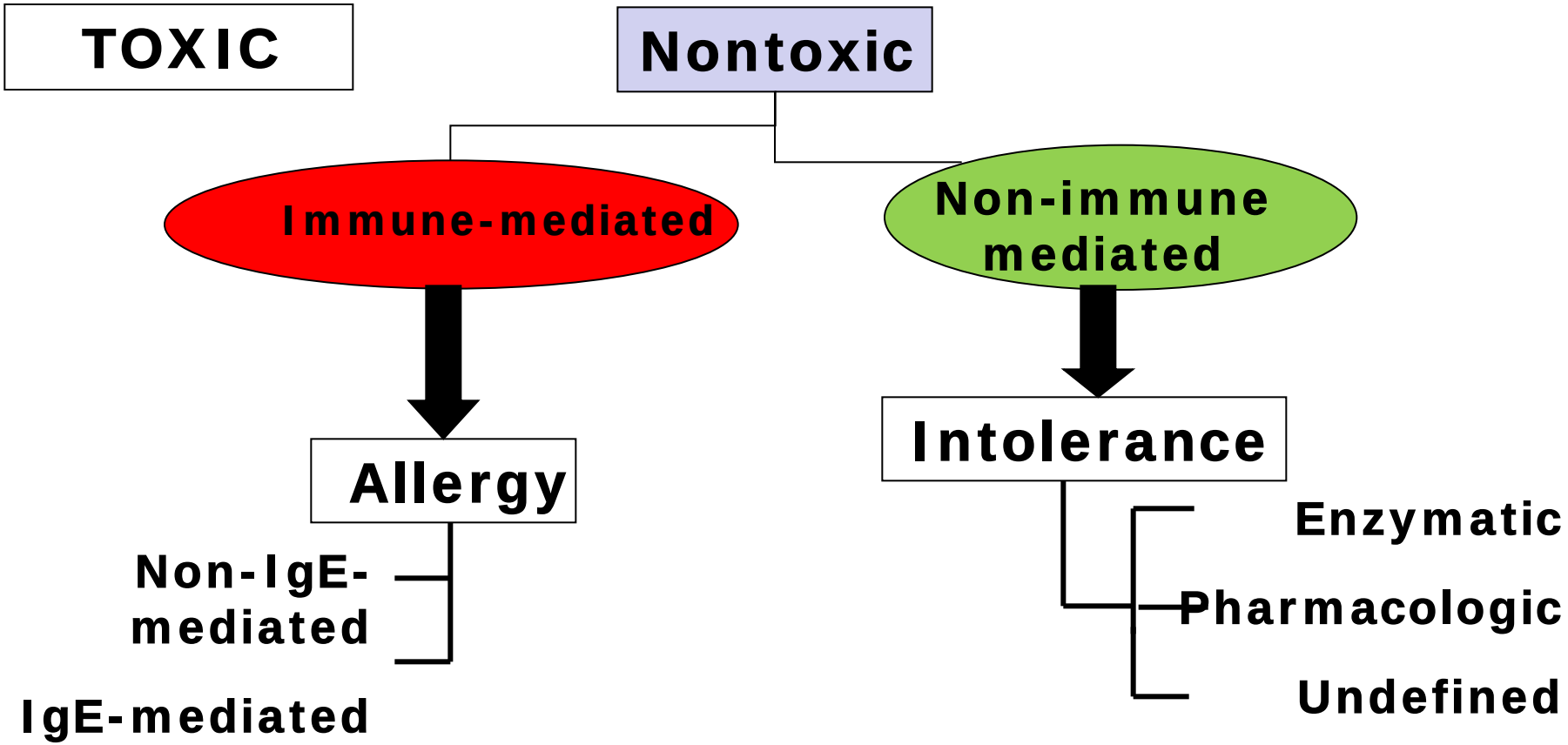
*Any abnormal clinical response attributed to ingestion, contact or inhalation of any food, a food derivative or a food additive*

- Toxic
- Non toxic or hypersensitivity

# Adverse reactions to food




*Adverse Reactions to Food: Position Paper. Allergy 1995; 50:623-635*

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**Exposure**

Genetic Predisposition

**Sensitization**

Re-exposure

**Symptoms**

# Allergy

# Prevalence of food allergy

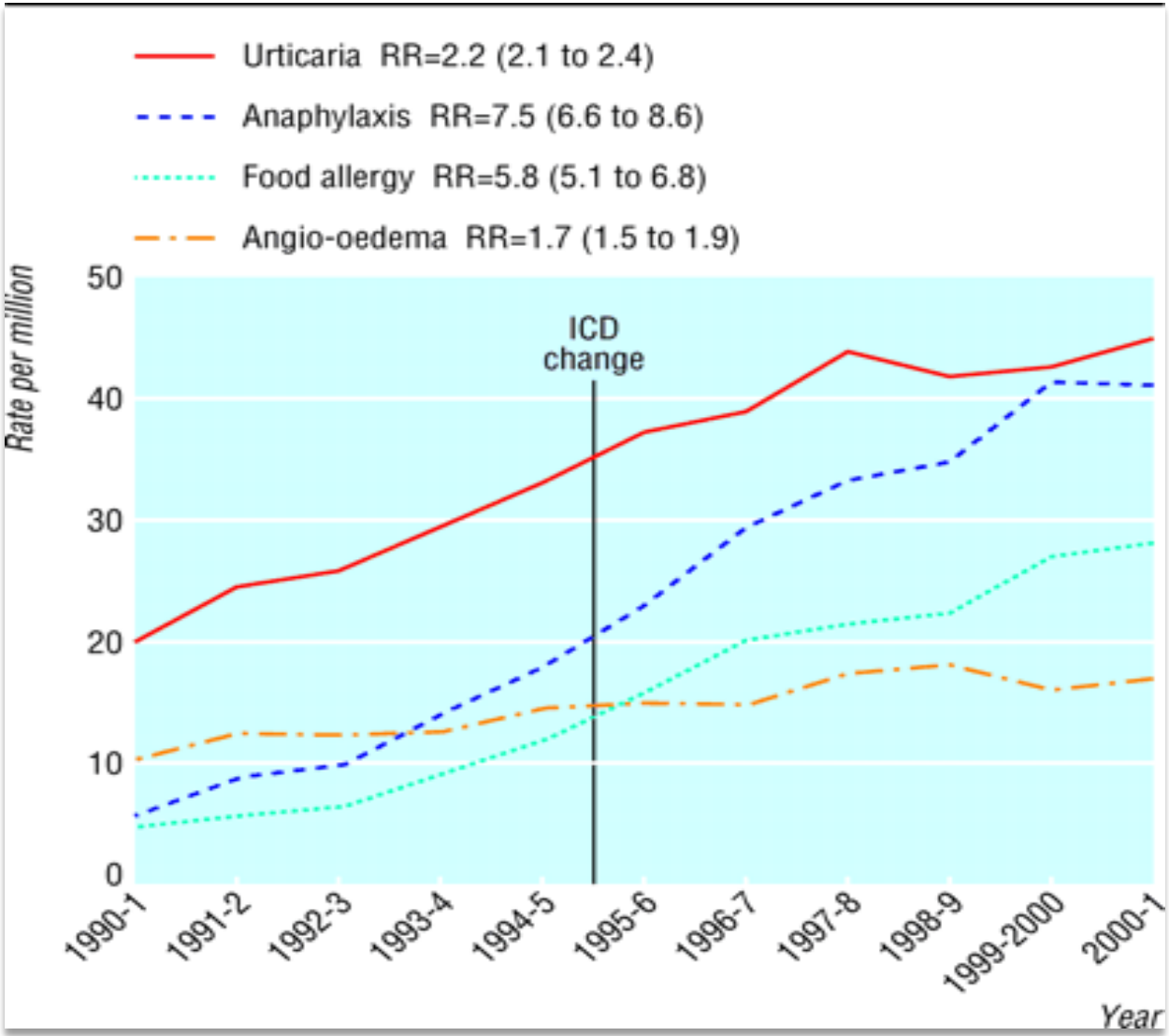
Precise prevalence is unknown: Self report vs diagnosis

- Adults: 1.4% - 2.4%
- Children < 3 years: ~ 6%
- Atopic dermatitis (mild/severe): ~35%
- Asthmatic children: 6 - 8%
- Prevalence depends on: Genetic factors, age, dietary habits, geography and diagnostic procedures

# Increasing prevalence of allergy



Hospital admissions data from 1990/91 to 2000/01 in England.




Over 11 years total admissions for these disorders increased from 0.02% - 0.06%. (1960 to 6752 out of 49,300 admissions in total).

Gupta et al, BMJ 2003

# Food Allergy Vs Food Intolerance

Food allergies, particularly to peanuts, are on the rise, although they are still relatively uncommon, as is allergy to bee and wasp stings.

## Symptoms

- Mouth and lips tingling
- Your face swelling
- Feeling sick
- Urticaria (nettle rash or hives)
- Colicky pains in your abdomen
- A feeling of tightness around your throat

In the UK about

**1 = 100**

people have an allergy to peanuts

& about

**1 = 200**

people have an allergy to tree nuts.

## Common food allergens

- Egg
- Nut
- Sesame
- Soya
- Seafood

## What is intolerance?

A food intolerance is not the same as a food allergy. A food allergy is when the body's immune system reacts abnormally to specific foods. No allergic reaction takes place with a food intolerance.

People with a food intolerance may get digestive symptoms such as

Diarrhoea · Stomach Cramps · Bloating

In the UK

**ONE in FIVE**

thought they suffered with a food allergy

but on formal testing

THE PLACEBO-CONTROLLED **FOOD CHALLENGE**

showed that only

**7 IN EVERY 500**

of adults showed signs of allergy.

## In a nutshell (well not if you're allergic!)

Food intolerances are never life-threatening, whereas some allergies are – they can cause anaphylaxis.

## Anaphylaxis

Anaphylaxis is an extreme form of allergic reaction. It can cause swelling of the lips and tongue, breathing problems, collapse and loss of consciousness. Anaphylaxis can cause death and is therefore a medical emergency.

About **20** people a year die in the UK due to anaphylactic reactions...in about half of these cases, there is no known cause (idiopathic anaphylaxis).

Facts and figures about allergy from Patient.co.uk http://www.patient.co.uk/Allergy-General-Overview.htm
Allergy UK http://allergyuk.org, pollen count information from http://www.worcester.ac.uk/discoverresearching-the-pollen-count.html
For more information on allergy visit Patient.co.uk

Patient.co.uk
Trusted medical information and support

# Why increase in Food Allergy ?

- Hygiene hypothesis
- Age of introduction of allergenic foods to infants
- Methods of food processing
- Development of allergy to food by skin exposure

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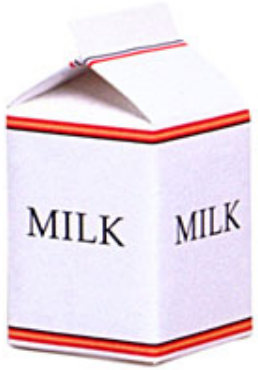
# Food Allergy Facts

- Eight foods account for 90% of all reactions




# Food Allergy Facts

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- Food allergy usually proves to be restricted to 1 or 2 foods
- Young children: milk, egg, peanut, tree nuts, soy, and wheat account for about 90% of cases
- Adolescents and adults: peanut, fish, shellfish, and tree nuts account for about 85%

# Food allergy in children: international

# Food allergens

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## Class 1 food allergens:

- Primary sensitizers
- Sensitization may occur through the gastrointestinal tract
- Large Proteins
- Stable to heat, acid and proteases

## Class 2 food allergens (cross-reactive):

- Generally plant-derived proteins
- Highly heat-labile
- Difficult to isolate
- No good, standardized, extracts are available for diagnostic purposes

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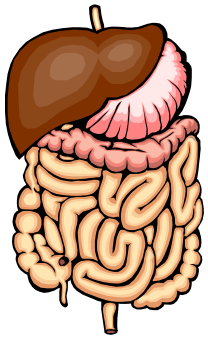
# Cross reactivity

| If Allergic to: | Risk of Reaction to at Least One: | Risk: |
|---|---|---|
| A legume* (peanut) | Other legumes (peas, lentils, beans) | 5% |
| A tree nut (walnut) | Other tree nuts (brazil, cashew, hazelnut) | 37% |
| A fish* (salmon) | Other fish (swordfish, sole) | 50% |
| A shellfish (shrimp) | Other shellfish (crab, lobster) | 75% |
| A grain* (wheat) | Other grains (barley, rye) | 20% |
| Cow's milk* | Beef (hamburger) | 10% |
| Cow's milk* | Goat's milk (goat) | 92% |
| Cow's milk* | Mare's milk (horse) | 4% |
| Pollen (birch, ragweed) | Fruits/vegetables (apple, peach, honeydew) | 55% |
| Peach* | Other Rosaceae (apple, plum, pear, cherry) | 55% |
| Melon* (cantaloupe) | Other fruits (watermelon, banana, avocado) | 92% |
| Latex* (latex glove) | Fruits (kiwi, banana, avocado) | 35% |
| Fruits (kiwi, avocado, banana) | Latex (latex glove) | 11% |

*Sicherer JACI 2001*

# Immune mechanisms

- Protein digestion
- Antigen processing
- Some Ag enters blood

**IgE-Mediated**

IgE-receptor

Mast cell

Histamine

APC

**Non-IgE-Mediated**

B cell

T cell

- TNF-α
- IL-5

# Food allergy: clinical signs

| IgE | IgE/Non-IgE | Non-IgE |
|---|---|---|
| Urticaria/angioedema<br>Rhinitis /Asthma<br>Anaphylaxis | Atopic dermatitis | Protein-induced proctocolitis/enterocolitis |
| Oral allergic syndrome<br>Gastrointestinal symptoms (GIT) | Eosinophilic gastro-intestinal disorders | Coeliac disease<br>Contact dermatitis<br>Herpetiform dermatitis |

*Adapted from J Allergy Clin Immunol. 1999;103:717-728*

# Cutaneous food hypersensitivities: atopic eczema

- Generally begins in early infancy
- Food allergy plays in about 35 % of moderate-to-severe atopic dermatitis in children

# Cutaneous food hypersensitivities

**Acute Urticaria and Angioedema:**

- The most common symptoms of food allergic reactions
- Acute urticaria due to contact with food is also common

# Diagnosis of Food Allergy

- Detailed history
  - Food(s) suspected
  - Specific symptoms
  - Timing of symptoms
  - Reproducibility of reaction
- History may be diagnostic with some acute reactions - verified only 30 – 40% of the time

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# Skin prick tests –(presence of IgE)

Used for inhalants, foods, venoms and some drugs

Detect specific IgE bound to cells in the skin

# The Diagnosis of Food Allergy

- Is difficult!
- High rate of false positive skin tests and RASTs (poor positive predictive value)
- Must be carefully interpreted
- Oral challenges are the only tests that are more (but still not completely) definitive

# Food Allergy - Diagnosis

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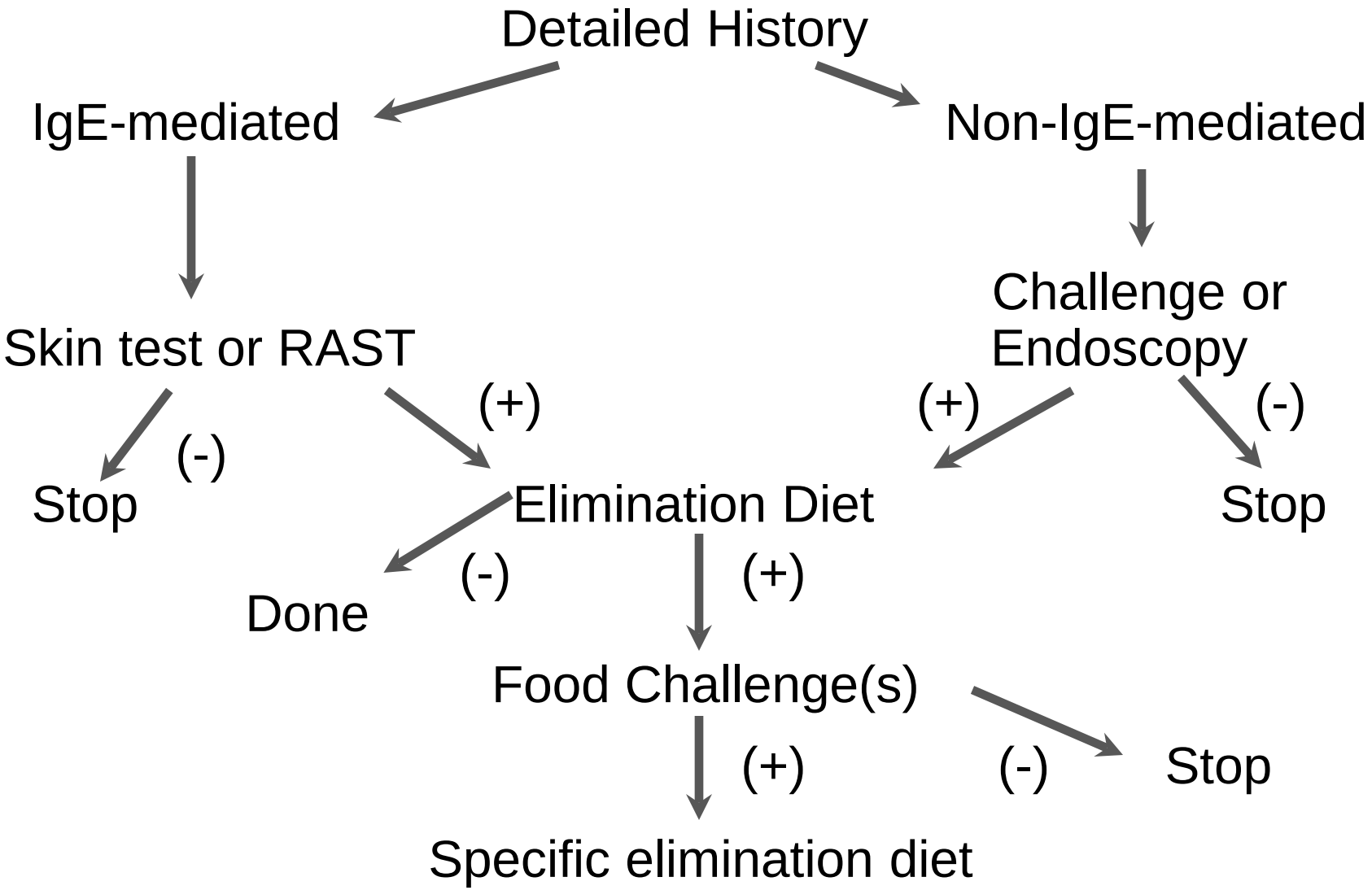


# Food allergy: Management

FSANZ Food Standards Code

- Food Standards Code 1.2.3 includes mandatory labelling of common allergens included as an ingredient, part of compound ingredient, food additive or processing aid.
- Mandatory allergens include:
  - Peanut
  - Tree nuts
  - Cow's milk
  - Egg
  - Soy
  - Fish
  - Shellfish
  - Sesame
  - Gluten (must state grain sourc

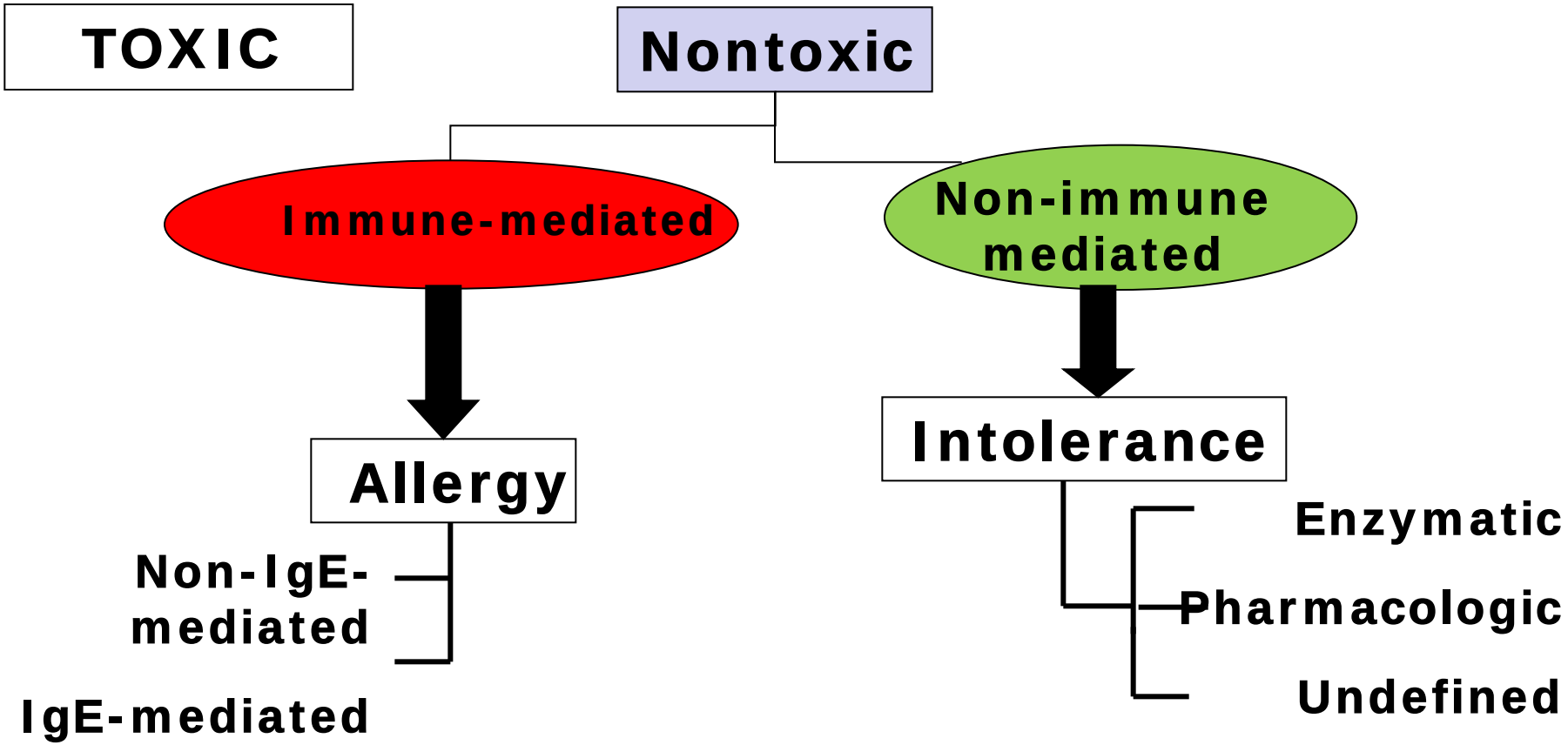

- Despite this regulation, some labels may not comply and therefore it is still important to educate about the various names for the allergens

Nutrients at risk with exclusion diets:

| Food | Nutrients at risk with exclusion | Substitute food |
|---|---|---|
| Cow's milk | Calcium<br>Protein, fat<br>Vit A, Vit D, Vit B12, riboflavin, pantothenic acid, phosphorus | Calcium: soy or specialised formula; fortified soy, rice, nut or oat beverage<br>Protein, fat, Vit D: meat, poultry, legumes, nuts, wholegrains, soy beverage, specialised formula |
| Soy | Thiamine, phosphorus, riboflavin, magnesium, Vit B6, iron, folate, calcium | Meat, wholegrains, legumes |
| Egg | Vit B12, pantothenic acid, riboflavin, selenium, folate, biotin<br>Protein, fat | Meat, poultry, legumes, wholegrains |
| Wheat | Thiamine, riboflavin, niacin, iron, selenium, folate, biotin<br>Protein, fat | Oats, rice, quinoa, aramanth, rye, buckwheat, barley, corn, millet |
| Nuts | Niacin, Vit E, magnesium, manganese, chromium | Meat, wholegrains, legumes, vegetable oils |
| Fish, shellfish | Niacin, Vit B6, Vit B12, Vit E, phosphorus, selenium, iodine | Meat, poultry, grains, legumes, vegetable oils |
| Meat (beef, chicken) | Iron, zinc, Vit B12, protein | Fish, shellfish, wholegrains, legumes, seeds, nuts |

*Ref: Pediatric Annals 37:8 August 2008.*

# Adverse reactions to food




*Adverse Reactions to Food: Position Paper. Allergy 1995; 50:623-635*

# # Food Intolerance - IBS

# Dietary exclusions – Irritable Bowel Syndrome

- IBS - multiple food sensitivities
  - Intolerance rather than allergy
- Exclusion diets - patients diaries etc and foods with recognized association with IBS
- 50% response rate
  - Depends on enthusiasm of patient and dietitian
- Recent interest in FODMAPs diet
  - fructose intolerance – better response in motivated patients

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**F**ermentable

**O**ligosaccharides

Fructans

Galactans

**D**isaccharides

Lactose

**M**onosaccharides

Fructose

**A**nd

**P**olyols

Sugar Alcohols

# Low FODMAP diet for Irritable Bowel Syndrome



The Low FODMAP diet was developed by researchers at Monash University. The Monash team, led by Peter Gibson, provided the first evidence that a Low FODMAP diet improves IBS symptoms. Irritable bowel syndrome (IBS) is a common functional gastrointestinal disorder affecting one in seven Australian adults and is also common in the USA, Europe and many Asian countries. IBS is characterised by chronic and relapsing symptoms; lower abdominal pain and discomfort, bloating, wind, distension and altered bowel habit (ranging from diarrhoea to constipation) but with no abnormal pathology. The diagnosis of IBS should be made by a medical practitioner.

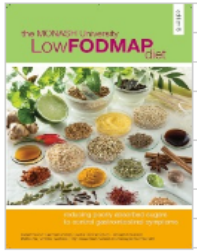
**Join the Conversation**

**The Monash University Low FODMAP diet**

The research team at Monash University have developed a diet to control gastrointestinal symptoms associated with IBS/FGID focusing on a group of carbohydrates called FODMAPs. Current research strongly suggests that this group of carbohydrates contributes to IBS/FGID symptoms.

## Low FODMAP resources

Read more FODMAP news




- More about the Low FODMAP App
- iPhone (launch December 2012)
- Android (launch November 2013)
- Online purchase of the Monash University Low FODMAP Diet booklet (hard copy only)
- Order form for the Monash University Low FODMAP Diet booklet (hard copy only) when paying by cheque
- Participants sought for research studies
- Monash University FODMAP blog
- Monash University Seminars & Workshops

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# COMMON FOODS CONTAINING FODMAPs

| EXCESS FRUCTOSE | LACTOSE | FRUCTANS | GALACTANS | POLYOLS |
|---|---|---|---|---|
| **> Fruits**<br>apples, pears, nashi, mangoes, tinned fruit in natural juice, watermelon<br>**> Sweeteners**<br>fructose, high fructose corn syrup<br>**> Large total fructose dose**<br>concentrated fruit sources, large serves of fruit, dried fruit, fruit juice<br>**> Honey** | **> Milk**<br>cows', goats' and sheeps' milk, yoghurt, ice cream<br>**> Cheeses**<br>soft and fresh (eg. ricotta, cottage) | **> Vegetables**<br>artichokes, beetroot asparagus, Brussels sprouts, cabbage, fennel, garlic, leeks, okra, onions, spring onions (white part), shallots<br>**> Cereals**<br>wheat and rye when eaten in large amounts (eg. bread, pasta, couscous, crackers, biscuits)<br>**> Fruits**<br>watermelon, custard apples, persimmons | **> Legumes**<br>chickpeas, lentils, red kidney beans, baked beans | **> Fruits**<br>apples, apricots, cherries, lychees, nashi, nectarines, pears, peaches, plums, prunes, watermelon<br>**> Vegetables**<br>avocados, mushrooms<br>**> Sweeteners**<br>sorbitol (420), mannitol (421), xylitol (967), maltitol (965), isomalt (953) |

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# ✓ SUITABLE ON A LOW-FODMAP DIET

| FRUIT | VEGETABLES | MILK PRODUCTS | GRAIN FOODS | OTHERS |
|---|---|---|---|---|
| **> Fruit**<br>bananas, grapefruit, blueberries, grapes, honeydew melons, kiwifruit, lemons, limes, mandarin, oranges, pawpaw, passionfruit, tangelos, raspberries, rock-melons, strawberries, tangelos | **> Vegetables**<br>bamboo shoots, bok choy, carrots, celery, capsicums, chokos, choy sum, corn, eggplant, green beans, lettuce, chives, parsnips, pumpkins, silver beet, spring onions (green part only), tomatoes<br>**> Onion/garlic substitutes**<br>garlic-infused oil | **> Milk**<br>lactose-free, rice milk<br>**> Cheeses**<br>'hard' cheeses, and brie and camembert<br>**> Yoghurt**<br>lactose-free<br>**> Ice-cream substitutes**<br>gelati, sorbet<br>**> Butter substitutes**<br>milk-free spread | **> Cereals**<br>gluten-free bread/ cereal products<br>**> Bread**<br>100% spelt bread<br>**> Rice**<br>**> Corn**<br>**> Oats**<br>**> Polenta** | **> Sweeteners**<br>sugar (sucrose), glucose, artificial sweeteners not ending in '-ol'<br>**> Honey substitutes**<br>maple syrup, golden syrup |


KEEP
CALM
ITS
GLUTEN
FREE
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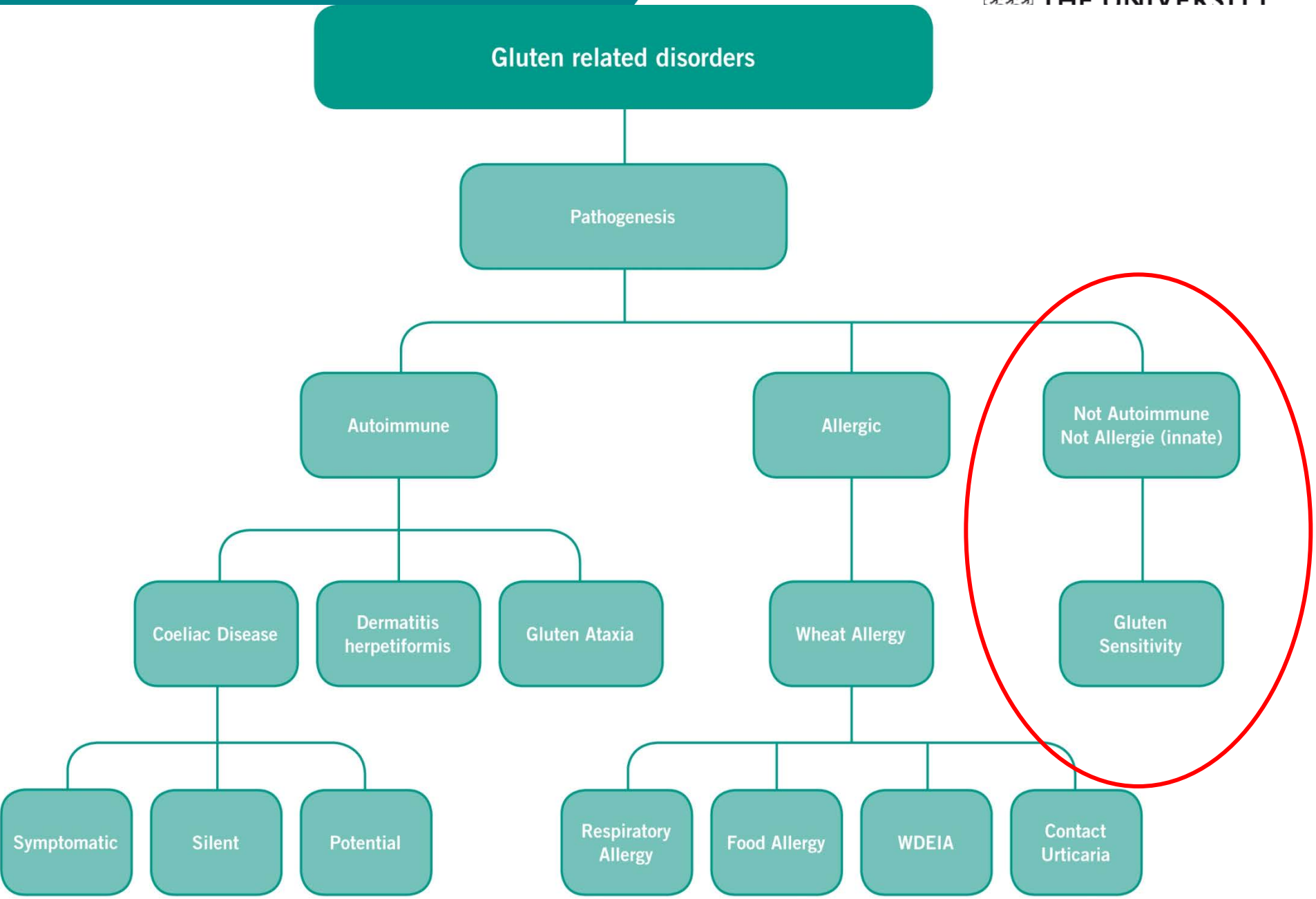
Gluten related disorders
Pathogenesis
Autoimmune
Allergic
Not Autoimmune
Not Allergie (innate)
Coeliac Disease
Dermatitis herpetiformis
Gluten Ataxia
Wheat Allergy
Gluten Sensitivity
Symptomatic
Silent
Potential
Respiratory Allergy
Food Allergy
WDEIA
Contact Urticaria

# Gluten

| Grain | Prolamines |
|---|---|
| **WHEAT** | **GLIADINS** |
| **BARLEY** | **HORDEINS** |
| **RYE** | **SECALINS** |
| **OATS** | **AVENIN** |

# US Data

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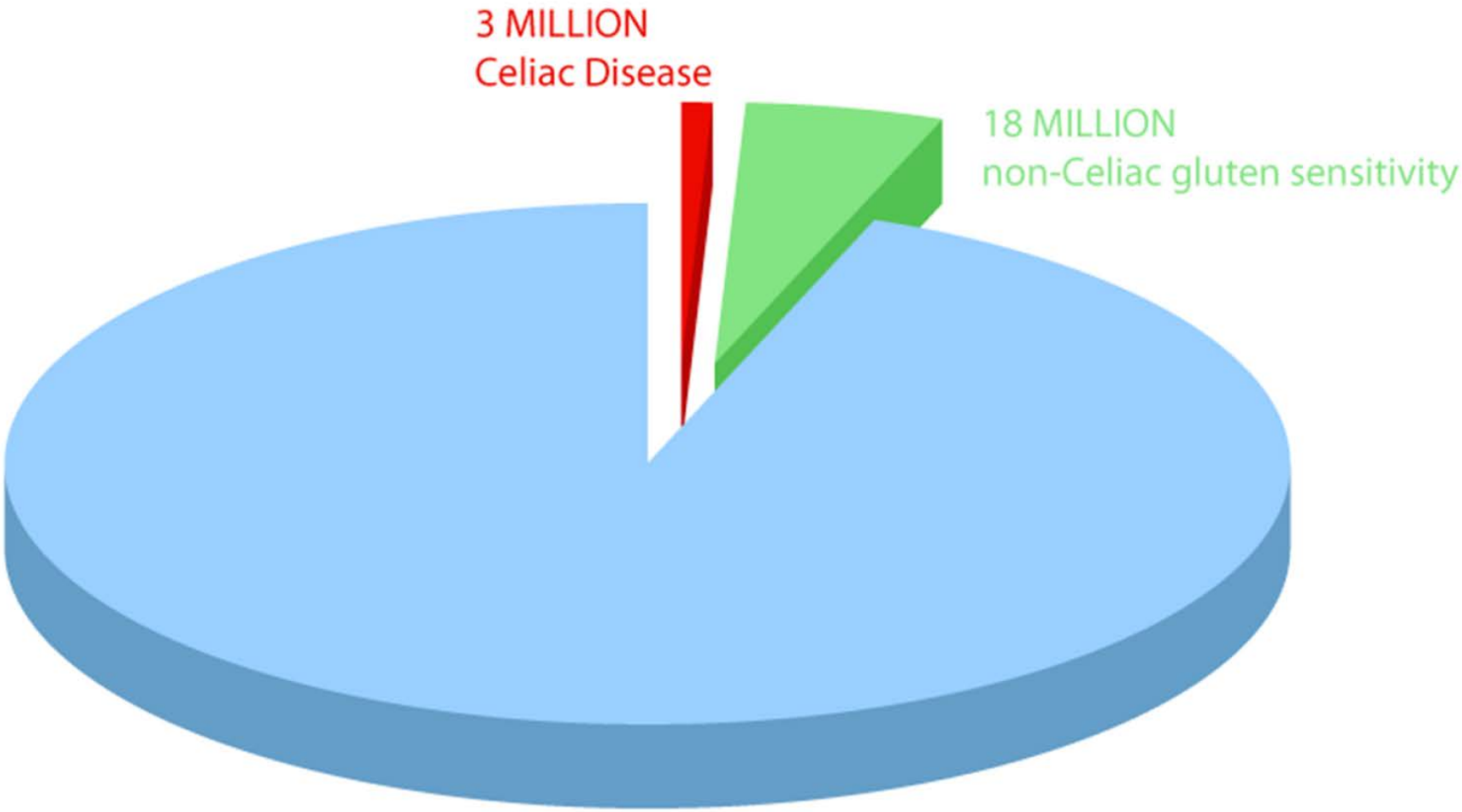

# Sources of Gluten

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- **OBVIOUS**
  - Bread
  - Bagels
  - Cakes
  - Cereal
  - Biscuits
  - Pasta / noodles
  - Pastries / pies
  - Rolls

- **Not so OBVIOUS**
  - Sauces
  - Gravy
  - Cornflakes
  - Deli Meats
  - Meat products
  - Seasonings
  - Lipsticks
  - Medication
  - Stamp glue
  - Play dough


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- Amaranth
- Arrowroot
- Buckwheat
- Corn
- Flax
- Millet
- Montina
- Oats ?
- Potato
- Quinoa
- Rice
- Sorghum
- Tapioca
- Flours made from nuts, beans and seeds


GLUTEN FREE
Gluten Free
Graham Style
CRUMBS
Brownies
Poundcake
GLUTEN FREE

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# Gluten Free

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# Food Standards

## FSANZ

Gluten Free

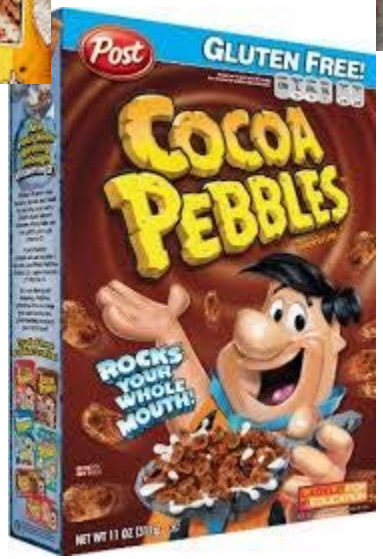
**No Detectable Gluten**

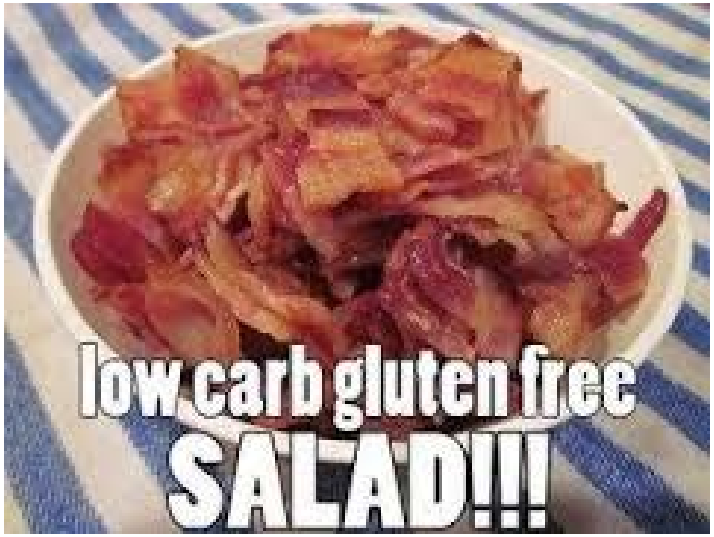
## CODEX

**< 20 ppm Gluten**

# Gluten Free Healthy- Yeah Right !




"I REALLY HOPE
COCONUTS ARE GLUTEN FREE"

# Summary

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- ✓ Main foods causing food allergy are milk, eggs, peanuts, wheat, soy, tree-nuts, fish and shell-fish
- ✓ Rates of food allergy have risen significantly
- ✓ Up to 5% of the population overall are likely to have food allergy
- ✓ Important to have correct diagnosis
- ✓ Dietitian should be involved with management
- ✓ Important to ensure nutrient intake is adequate
- ✓ Food intolerances are difficult to diagnose
- ✓ Dietary management of food intolerance is complex
- ✓ Going gluten free isn't always the answer!

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Allergy New Zealand website:
http://www.allergy.org.nz/

Coeliac New Zealand website:
http://www.coeliac.org.nz/

Food Standards Australia New Zealand website:

http://www.foodstandards.govt.nz/