

Information about

Lactase Deficiency

(Lactose Intolerance)

What is lactose?

Lactose is a sugar that naturally occurs in the milk from cows, goats and sheep. It is a disaccharide, that is 2 single sugar molecules joined together. Lactose is made up of two single sugar molecules called glucose and galactose.

What is lactase deficiency (lactose intolerance)?

The food we eat is broken down into particles by the muscular action of the stomach. These particles then pass into the small intestine where they are further broken down into single molecules which are then absorbed into our bloodstream. As lactose is a disaccharide, it must be broken down into its two smaller sugar molecules before it can be properly absorbed.

Disaccharides are broken down into smaller single sugar molecules called **monosaccharides by enzymes**. Enzymes are located on the small hairs on the surface of the small bowel. **It is the enzyme “lactase” that breaks down lactose into its component monosaccharides of glucose and galactose.** The glucose and galactose can then be absorbed into our bloodstream and converted into energy in the form of glucose.

Some people stop producing enough lactase enzyme, and they are unable to break down lactose. This is called lactase deficiency, and many people who have this may be said to have ‘lactose intolerance’. Lactase deficiency is the most common enzyme deficiency, and can be temporary or permanent.



What are the symptoms of lactase deficiency?

If lactose is not able to be broken down and absorbed in the small bowel, the sugar passes down into the large bowel where there are bacteria present. These bacteria ferment the sugar using their own enzymes and gas is produced giving symptoms of abdominal cramps, bloating and distension. The sugar molecules in the large bowel cause water to be secreted and the patient may also have diarrhoea.

Often these symptoms can be related to having eaten lactose-containing foods but sometimes the effects are delayed several hours after eating and the relationship is not obvious. Drinking as little as one cup of milk may produce symptoms.

What is the cause of the lactase deficiency?

The most common cause of lactase deficiency is a genetic deficiency. Almost all babies have lactase, it is a basic survival adaptation to enable them to survive on mother's milk. However, as we grow older the enzyme is less necessary and some people lose the ability to synthesise the enzyme. In Caucasian populations, 15% of adults cannot tolerate milk but in African American and Asians populations, the incidence rises to 90%.

Any disease which affects the small bowel may damage the body's ability to produce the enzyme lactase. Patients who are diagnosed with Coeliac disease may have a temporary lactose intolerance, likely due to the damaged lining of the small bowel. However, most often resume lactose in their diet after 3 months' compliance with a Coeliac diet. People with Crohn's disease may also have periods of temporary lactose intolerance if the small bowel is affected during a flare-up of the condition. Also, it is not unusual to have minor damage to lactase levels after a bout of infective gastroenteritis. In this case, the damage to the enzyme is usually temporary as the body's ability to produce lactase often returns after a few weeks.

How is lactase deficiency diagnosed?

There are a number of ways lactase deficiency can be diagnosed. One method is where a small piece of the small bowel lining (biopsy) is taken at endoscopy. The cells in the biopsy are examined for the presence of lactase. However this is an invasive procedure and not commonly used. Less invasive investigations include:

- **Breath tests** - detecting a rise in hydrogen or methane production after consuming a lactose load can indicate malabsorption.
- **Blood glucose** - a series of blood tests are taken. The first at baseline then at 1 hour and 2 hours after consuming a lactose-containing drink. A rise in blood glucose indicates that there is lactase enzyme activity as the monosaccharide glucose within lactose is absorbed.

What should I do if I am lactase deficient?

A reduced lactose diet will assist in managing symptoms. Not every trace of lactose needs to be avoided. Lactose is present in large amounts in milk, yoghurt, icecream, soft cheeses. It is recommended you choose alternative lactose free varieties (made from cow's milk but the lactose has been removed) that are available in the supermarket if you usually have large quantities of these. Also, soy and rice milk contain no lactose, choose varieties that are fortified with calcium. Hard, ripened cheeses do not contain lactose, even though they are made from milk, and can therefore be enjoyed by people who have lactase deficiency. Lactose intolerance is often dose-related. Having smaller quantities more often over the day may be better tolerated. A guide to a low lactose diet is displayed over the page. It is recommended you visit a dietitian to discuss how to plan your reduced lactose diet and to ensure a calcium balanced diet.

Helpful hint:

Lacteeze tablets and drops are available which contain the enzyme lactase. These can be expensive but may be useful by adding greater flexibility to your diet, e.g. when going out to dinner and can't be sure what is on the menu. These are available from pharmacies.

What will happen if I take lactose into my diet again?

There will be no damage to the bowel if lactose is consumed, but you are likely to experience symptoms if you take it in excess. The amount of lactose that causes symptoms varies greatly within individuals so that you may wish to experiment with the diet and see how much lactose you can tolerate. There are no long term complications associated with lactase deficiency.

A guide to a low lactose diet

Foods to avoid	Suggested alternatives
Cow's milk, goat's milk, sheep's milk Milk powder, skim milk, evaporated and condensed milk.	Lactose free cow's milk calcium-fortified soy milk and rice milk products.
Ice-cream.	Soy or rice based ice-cream.
Cow, sheep, goat yoghurts in large amounts.	Lactose free yoghurts, Calcium-fortified Soy yoghurts.
Soft, non-matured cheeses (eg. Cottage, ricotta, quark, Marscapone), cheese spreads.	Block cheeses: matured, semi-matured and mild cheeses.
Cream, sour cream.	Avoid if consuming large amounts.
Margarine.	Avoid regular varieties if consuming in large amounts or choose milk-free margarine alternatives. Butter. All fruit and vegetables are suitable. All plain meats, fish or chicken are suitable. All breads, pasta, rice, flour, etc. are suitable.

Lactose intolerance symptoms may be seen with as little as 10 gm of lactose per day. Below is a guide to the amount of lactose contained in many food and beverages.

Product	Lactose content (grams)
Low-fat fortified milk, 200ml.	13.0
Breast milk, 200ml.	14.4
Buttermilk, 200ml.	10.8
Sheep's milk, 200ml.	10.2
Regular milk, 200ml.	9.4
Buttermilk, low-fat, 200ml.	9.4
Goat's milk, 200ml.	8.8
Yoghurt, 200ml.	7.8
Cottage cheese, low-fat, 100g.	4.3
Cream cheese, 100g.	3.2
Ice-cream, 50g.	2.8
Ricotta, reduced-fat, 100g.	2.4
Cottage cheese, 100g.	1.4
Ricotta, 100g.	1.2
Cream, 30g.	0.8
Butter, 20g.	0.1
Processed cheddar, 35g.	0.1
Cheese, 35g slice.	0.1

Digestive Health Foundation

This information leaflet has been designed by the Digestive Health Foundation as an aid to people with lactase deficiency or for those who wish to know more about this topic. This is not meant to replace personal advice from your medical practitioner.

The Digestive Health Foundation (DHF) is an educational body committed to promoting better health for all Australians by promoting education and community health programs related to the digestive system.

The DHF is the educational arm of the Gastroenterological Society of Australia (GESA). GESA is the professional body representing the specialty of gastrointestinal and liver disease. Members of the Society are drawn from physicians, surgeons, scientists and other medical specialties with an interest in gastrointestinal disorders. GI disorders are the most common health related problems affecting the community.

Research and education into gastrointestinal disease are essential to contain the effects of these disorders on all Australians.

For further information on a wide variety of gastrointestinal conditions is available on our website.



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