



Lactose Intolerance

What is lactose intolerance?

Human infants produce an enzyme called lactase to help digest lactose, the sugar found in human and other animal milk. Interestingly, lactose is also found in forsythia flowers and a few tropical shrubs. Past infancy, some individuals do not continue to produce lactase (the enzyme that aids lactose digestion) in sufficient quantity to continue to completely digest all of the lactose in milk. If these individuals consume milk products, some lactose could pass through their digestive tracts undigested, arriving in the colon where bacteria ferment it, causing unpleasant digestive symptoms.

There are three main types of lactose intolerance:

- 1. Primary lactase deficiency** results from a decrease in lactase production that begins in early childhood during the transition from human milk to consuming a variety of foods. This reduction in lactase induces varying degrees of symptom severity and is the most common type of lactose intolerance.
- 2. Secondary lactase deficiency** results from another factor, such as a primary disease (e.g., celiac disease, Crohn's disease, and gastroenteritis), a long course of antibiotics, radiation or chemotherapy, or severe malnutrition. However, this condition typically clears up with improved health and nutrition, and is usually temporary in nature.
- 3. Congenital lactase deficiency**, or congenital alactasia, is a very rare and irreversible genetic disorder (most commonly found in individuals of Finnish descent) in which an infant is born without the ability to produce lactase. Babies with this variant are unable to breastfeed or consume regular formula, instead requiring specialized lactose-free formula. They cannot develop the ability to digest lactose.

In addition, individuals who can typically tolerate lactose might become temporarily lactose intolerant if they avoid lactose-containing products for a long time. The body can stop producing adequate quantities of lactase if it doesn't need to.

However, slowly increasing lactose intake can build back a suitable level of lactase production.

What about milk allergy?

It is important to note that lactose intolerance is not the same thing as a milk allergy. The very few individuals who are allergic to milk experience negative reactions to one or more types of milk proteins, such as casein. Exposure to these proteins causes symptoms such as hives, rash, nausea, vomiting, diarrhea, stomach cramps, watery eyes/runny nose, upper respiratory tract problems, and even anaphylaxis. It only takes a small quantity of dairy products to cause a reaction in those who have milk allergies, whereas lactose intolerant individuals can often tolerate some amount of dairy products, and they are at no risk for anaphylaxis.

Differences between Lactose Intolerance and Milk Allergy

	Lactose Intolerance	Milk Allergy
Cause	insufficient lactase, an enzyme necessary to break down milk sugar (lactose)	allergic reaction to milk proteins
Symptoms	diarrhea, gas, bloating, abdominal pain, weight loss in children	gastrointestinal symptoms (nausea, vomiting, diarrhea, stomach cramps), hives, rashes, watery eyes, runny nose, wheezing, coughing, anaphylaxis
Comments	typically can consume small amounts of dairy without problems, and might be able to increase milk products by adding lactase to the diet	must avoid all dairy products and dairy-containing ingredients

Prevalence

It is difficult to get exact numbers on lactose intolerance prevalence, since most data uses self-reported statistics which tend to be more subjective than objective. However, as a general rule, lactose intolerance is less common in those of European descent, and more common in those of African, Hispanic, or Asian descent.

Symptoms/Complications

Individuals with lactose intolerance are unable to break down all the lactose they ingest into its absorbable simple sugars (galactose and glucose). Instead, the lactose molecules pass through the gastrointestinal tract intact and cause uncomfortable symptoms. These can include abdominal pain, bloating, cramping, gurgling sounds in the digestive system (borborygmi), gas (flatulence) and diarrhea, and can lead to weight loss in children. Symptoms typically begin within thirty minutes to two hours after eating foods that contain lactose.

Symptom severity varies greatly between individuals. Some might find symptoms occur after consuming a very small serving of food containing lactose, whereas others might tolerate moderate portions before symptoms begin.

Diagnosis

The simplest way for your physician to test for lactose intolerance is through a series of questions about your symptoms, followed by an elimination diet in which you avoid eating any lactose-containing foods for a short period of time (a few days to a week) to see if symptoms subside. However, it is important that you do this under the guidance of your physician, rather than on your own. Self-diagnosing can be dangerous, because if your symptoms are the result of a different disease or disorder, continuing to treat your symptoms by eliminating dairy products could delay a true diagnosis.

If your physician decides to use a more specific testing method, the following are also available:

Hydrogen breath test: We mentioned earlier that the symptoms of lactose intolerance are caused by bacteria breaking down the lactose in the large intestine. One by-product of this process is hydrogen. Hydrogen breath tests measure the amount of hydrogen expelled in the breath after consuming lactose. Large amounts of hydrogen in the breath indicate a large amount of undigested sugars. This is the most reliable diagnostic test for lactose intolerance.

Lactose tolerance test: For this test, you consume a liquid that contains a high amount of lactose, then the technician monitors your blood sugar levels. In someone who digests lactose properly, there would be a rise in blood glucose a couple hours after ingestion as you digest the sugars. If your blood sugar does not increase, that could mean that your body isn't breaking down the lactose efficiently, which could indicate lactose intolerance.

Stool acidity test: This is an option for children and babies who are unable to take the other tests. Laboratory technicians

analyze stool samples for lactic acid and other acids that are created from the fermenting lactose. When these acids are present at certain levels, it could indicate lactose intolerance.

You can also have genetic testing to see if you have certain genes present that are common in individuals who are lactose intolerant, but this is not adequate for a lactose intolerance diagnosis, since gene science is still in the early stages.

Management

If you are lactose intolerant, you might be able to manage your symptoms by reducing the quantity of lactose-containing foods you consume. This includes products made with cow and goat milk, including cheese, ice cream, and yogurt. Many processed products, such as soups, baked goods, cereals, crackers, candies, dressings, etc., can also contain added lactose in small amounts, so if you are particularly sensitive, be sure to read the labels. However, most individuals can tolerate some degree of lactose consumption.

There are many ways to decrease lactose intolerance symptoms, yet still be able to consume dairy products, as follows:

1. **Low-lactose dairy products.** Not all dairy products contain the same amount of lactose (see chart on page 9). For example, mozzarella and ripened cheeses, such as cheddar, Swiss, blue and brie contain almost no lactose, so they are usually easily tolerated.
2. **Eat lactose-containing foods with other foods.** If you are digesting other food at the same time, gastric emptying becomes slower, and lactose makes up a smaller proportion of the total food you consume. This means that you need fewer enzymes in the small intestine at any given time to break down the lactose.
3. **Fermented dairy products.** The bacteria used in the production of yogurt and kefir produce a lactase-like enzyme, which makes these foods easier to digest, even though they do contain lactose.
4. **Lactase supplements.** There are supplements available that contain the enzyme lactase (e.g., Lactaid®). Taking lactase shortly before consuming dairy products will allow it to break down the lactose into glucose and galactose so that your body can absorb the sugars, avoiding symptoms. There are also dairy products labelled 'lactose-free', in which manufacturers previously applied lactase to the product, to break down the lactose.
5. **Slowly increase tolerance.** You might be able to increase the amount of lactose you tolerate by slowly adding more dairy to your diet. Your body will respond by increasing its lactase production.

If you do choose to replace dairy with plant-based alternatives, be sure to check the nutritional facts for the foods you enjoy. Only fortified soy beverages can adequately replace cow milk, since soy beverage is naturally rich in protein and various vitamins and minerals, and is fortified to provide a nutri-

tional profile similar to cow milk. Other plant beverages, such as almond, cashew, and rice beverages are often fortified with calcium, vitamin D, and other nutrients, but their protein content is much lower than milk and soy beverages, often containing almost no protein.

Not everyone requires the same degree of vigilance. While most individuals who have lactose intolerance are able to tolerate cheese, yogurt, and a small amount of milk, a minority may need to limit lactose-containing products.

Those with congenital lactase deficiency must be very careful to avoid all lactose, whereas those with primary or secondary lactase deficiency can typically tolerate higher amounts. You can work with a registered dietitian to determine the amount of lactose that you can comfortably tolerate, so you can enjoy the health benefits of milk and milk products. A registered dietitian can also make sure you are consuming adequate calcium and vitamin D through other foods and/or supplements if you choose to eliminate dairy products.

Calcium and lactose content in common milk products*

Milk Product	Calcium Content (mg)	Lactose Content (g)
Cow milk, 2% M.F., 250 mL	309	12.92
Goat milk, whole, 250 mL	345	11.47
Cottage cheese, 2% M.F., 125 mL	133	4.62
Yogurt, plain, 2-3.9% M.F., 125 mL	194	3.25
Cream cheese, 50 g	49	1.60
Cheddar cheese, 50 g	360	0.12
Parmesan cheese, 50 g	554	0.08
Mozzarella cheese, 50 g	252	0.04
Swiss cheese, 50 g	396	0.03

*Health Canada

Outlook

Lactose intolerance is a condition that, for most, is easily manageable through dietary modifications and/or enzyme supplementation. Most individuals who are lactose intolerant may still enjoy milk-based products.



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