

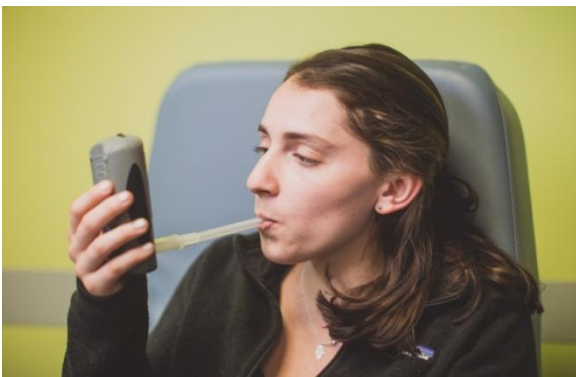
HOW IS LACTOSE INTOLERANCE DIAGNOSED?

A presumptive diagnosis of lactose intolerance can be made in patients with mild symptoms that occur within a few hours after significant lactose ingestion (eg: >2 servings of dairy/day or >1 serving in a single dose that is not associated with a meal) and resolve after five to seven days of avoidance of lactose-containing foods. A lactose hydrogen breath test with simultaneous symptom assessment is often used in clinical practice to definitively confirm or rule out lactose intolerance in patients. The hydrogen breath test is simple to perform, noninvasive, and has specificity and sensitivity ranges from 90-100% and 76-100%, respectively (Fassio; Nutrient, 2018). It has largely replaced expensive and/or invasive tests such as jejunal biopsy for assessment of lactase enzyme activity or genetic testing. The breath test is developed based on the fact that undigested and unabsorbed lactose is fermented by the bacteria in the colon, producing hydrogen gas which can be measured in exhaled air.

During your visit, we will also do a thorough evaluation to rule out secondary causes of lactose intolerance before we proceed with lactose intolerance testing.

HOW DO I PREPARE FOR HYDROGEN BREATH TESTING?

- **4 weeks prior:** no antibiotics
- **1 week prior:** avoid laxatives, stool softeners, stool bulking agents; no bowel cleansing procedures (ex: colonoscopy)
- **24 hours prior:** eat only plain white rice or potatoes, baked/broiled fish or chicken, water and non-flavored coffee/tea. Only salt may be used for flavoring. Consuming anything outside of this could yield false results.
- **12 hours prior:** no further eating/drinking, other than a small amount of water with medication
- **The morning of:** no eating/drinking besides water with medications, and brush teeth at least 2 hours prior to your appointment. No chewing gum, smoking, or eating mints prior as well.
- **During:** only small amounts of water can be consumed



drjohnleung@bfac.org

John Leung, MD is the founding physician and CEO of Boston Food Allergy Center, director of Center for Food Related Diseases at Tufts Medical Center and director of the Pediatric Food Allergy Center at Floating Hospital for Children. He is the first US-trained physician dual board-certified in both Allergy/Immunology and Gastroenterology.

Dr. Leung is the site principal investigator for multiple NIH-funded and pharmaceutical sponsored studies. He is an attending physician in both the Department of Medicine and Department of Pediatrics at Tufts Medical Center, a clinical assistant professor at Friedman School of Nutrition Science and Policy at Tufts University, an adjunct faculty Tufts University Immunology graduate program, and an affiliated faculty of Tufts Institute for Innovation. He is also an investigator for Consortium of Eosinophilic Gastrointestinal Disease Researchers (CEGIR) funded by National Institutes of Health.

HELPFUL RESOURCES:



MONASH UNIVERSITY LOW FODMAP DIET APP

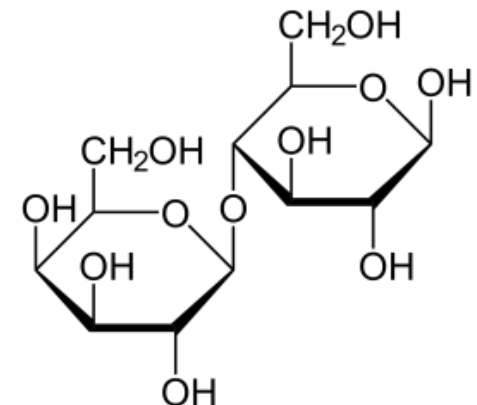


For more information, please see our website at

<http://www.bfac.org/hydrogen>



Lactose Intolerance



Boston Food Allergy Center

65 Harrison Ave, Suite 201, Boston, MA 02111

Email: admin@bfac.org

Phone: (617) 804-6767; Fax: (877) 726-8492

Schedule an appt: www.bfac.org

LACTOSE INTOLERANCE

WHAT IS LACTOSE?

Lactose is a natural sugar found in milk and milk products. The small intestine produces an enzyme called **lactase** that is needed to break down lactose into smaller units, called galactose and glucose, so it can be absorbed.

WHAT HAPPENS IN LACTOSE INTOLERANCE?

Lactose intolerance occurs when one does not make enough lactase enzymes to digest lactose. Undigested lactose passes quickly into the colon, drawing water with it and causing diarrhea. These unabsorbed sugars are then fermented by the bacteria in the colon which produce hydrogen and other gases. This is why lactose intolerant patients experience bloating and abdominal distension shortly after consumption of lactose.

WHAT CAUSES LACTOSE INTOLERANCE?

GENETICS

- **Primary lactase deficiency:** The most common cause of lactose intolerance is an inherited genetic condition. Lactase enzyme production is “pre-programmed” to reduce over time in certain populations. Prevalence is below:

Asians	90%
African/African Americans	70%
Hispanics	50%
Caucasians	20%

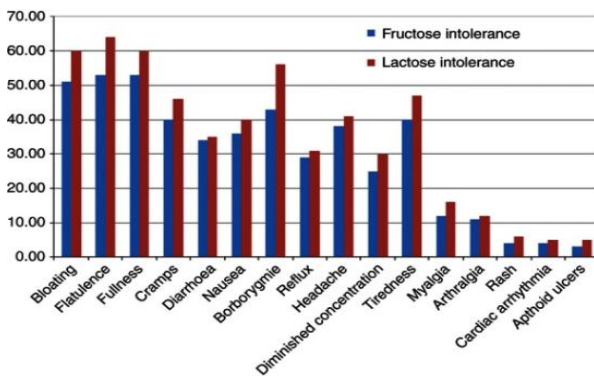
- **Congenital lactase deficiency** is a rare autosomal recessive disorder in which infants are unable to break down lactose.
- **Developmental lactase deficiency** can occur due to prematurity, but can improve as the intestinal mucosa grows.

SECONDARY CAUSES

- **Small intestinal bacterial overgrowth (SIBO)** increases fermentation of lactose in the small bowel and can lead to lactose intolerance symptoms.
- **Small intestinal infections or inflammation** damages the lining of the small bowel, leading to lactose malabsorption.

HOW COMMON IS LACTOSE INTOLERANCE WHAT ARE SOME COMMON SYMPTOMS?

For patient with gastrointestinal disorders, studies show that around 50% of them have lactose intolerance and 30% of them have both lactose and fructose intolerance (Wilder-Smith; Alim Pharmacol Ther, 2013). The most common symptoms for those with an intolerance include flatulence, fullness, bloating, tiredness and borborygmic (Wilder-Smith; Alim Pharmacol Ther, 2013).



WHAT FOODS CONTAIN LACTOSE?

It is helpful to read the ingredient list on a food label to determine if it contains lactose. While most of the time the ingredient list will explicitly say lactose, the follow ingredients are also known to be lactose containing products:

Lactoalbumin	Milk By-products
Non-fat milk powder	Caesin
Milk solids	Curds
Whey	Ghee
Malted milk	Cheese flavors

LACTOSE CONTENT OF COMMON DAIRY FOODS:

LOW LACTOSE	HIGH LACTOSE
Butter	Sweetened, condensed milk
Hard cheeses (Swiss, cheddar, parmesan)	Soft cheeses (brie, mozzarella)
Heavy cream	Buttermilk
Kefir culture milk drink	Evaporated milk
Cream cheese	Ice cream
Reduced lactose milk	Milk (skim, 1%, 2%, whole)
Yogurt with live cultures	Sour cream
Sherbet	Hot chocolate mix

WHAT ABOUT MILK AND CHEESE ALTERNATIVES?

Only cow’s milk contains lactose, thus, any plant-based milk products will be well tolerated in lactose intolerant patients. Soy milk tends to have the most protein, but most fortified plant-based milk has a similar amount of calcium and vitamin D as compared to cow’s milk.

PRO TIP: Products labeled vegan are lactose-free.

MILK ALTERNATIVES	CHEESE ALTERNATIVES
Soy milk (Silk)	Soy Cheese (Violife)
Rice milk (Rice Dream)	Cashew cheese (Dr. Cow)
Coconut milk (Califia Farms)	Vegan cream cheese (Daiya)
Almond milk (Almond Breeze)	Almond cheese (Miyoko’s)
Oat milk (Oatly)	Nutritional yeast (Bob’s Red Mill)
Ultra-filtered milk (Fair Life)	Pea protein powder

WHAT ABOUT PROTEIN POWDER ALTERNATIVES?

Whey protein powder is made from cow’s milk, but usually contains very little of lactose. If you want to, you can also opt for one of the many other plant-based protein powders. Such as: pea, brown rice, soy, or egg protein powder.

HOW IS LACTOSE INTOLERANCE MANAGED?

1. **REDUCE**, but not completely eliminate, dairy products. Research has shown that most people can tolerate about 1 cup of milk a day even if they have severe lactose intolerance (Suarez; N Engl J Med, 1995) . Live culture yogurt may be well tolerated by many lactose intolerant patients. It is recommended to have a serving of dairy a couple times a week, or as tolerated, to reduced severity of symptoms if every accidentally exposed. Studies show that 94-96% of those that adhere to lactose free diet will have symptom improvement (Wilder-Smith; Alim Pharmacol Ther, 2013).
2. **OBTAIN** sufficient **calcium** and **vitamin D** from non-dairy sources such as tofu, broccoli, kale, collard greens, bok choy, kale, almonds, peanuts, salmon with soft bones, and fortified plant-based milk products.
3. **SUBSTITUTE** with lactose-free milk. These products are pre-digested with lactase in the manufacturing process to reduce the lactose content. Lactose-free milk has a similar taste, texture, and nutrient profile as regular milk.
4. **SUPPLEMENT** with lactase enzyme pills (*ex. Lactaid, Digestive Advantage*) if desired. They may help break down lactose when taken with/just before consumption of lactose, however results from human studies looking at symptoms improvement are variable. Therefore, symptoms may vary from person to person, but lactose-free milk and plant based products should be preferred whenever possible.

WHAT ARE NUTRIENT CONSIDERATIONS FOR THOSE WITH AN INTOLERANCE?

1. The recommended daily calcium intake for adolescents and young adults is 1200 mg/day. Recommendations in adults depends on gender, menopausal status in women, and the presence or absence of osteoporosis.
2. The majority of individuals with lactose intolerance are able to achieve their daily calcium requirement from small amounts of dairy, and other plant sources. It is important to try to reach the recommended amount of calcium with food first, then supplement if necessary.

ARE THERE LONG TERM CONSEQUENCES?

Although lactose intolerance can give patients symptoms of abdominal pain, bloating, and diarrhea, it does not cause any inflammation or damage to the gut. As long as you are getting sufficient calcium, protein, riboflavin, and vitamin D from other sources as mentioned above, you can avoid any nutritional deficiencies.

WHY CHOOSE BFAC?

As a gastroenterologist and allergist, Dr. Leung diagnoses patients with food intolerance (or IBS) only after carefully evaluating and ruling out all the other potentially “dangerous” GI and/or allergy causes of the presenting symptoms. Our team has successfully treated many IBS patients with dietary treatment. We are well equipped with state-of-the-art diagnostic tools and have a licensed dietitian on staff to provide in-person or virtual counseling.