**THERAPEUTIC INTERVENTIONS FOR LACTOSE INTOLERANCE**

The most common carbohydrate in milk is lactose. Lactose consists of galactose bound to glucose. Lactase, a brush border enzyme, is responsible for hydrolyzing lactose to monosaccharides. Problems with lactose absorption can be termed as lactase deficiency, lactose malabsorption, or lactose intolerance. Lactose intolerance is defined as gastrointestinal symptoms (e.g., diarrhea, bloating, flatulence, abdominal discomfort) that result with lactose malabsorption and typically is diagnosed by patient self report. This issue of CLIPs briefly summarizes an article that assessed the maximum tolerated doses of lactose and interventions used for reducing symptoms associated with lactose intolerance and malabsorption. If you need further information, please contact the Samford University Drug Information Service at (205) 726-2659.


**Lactase Deficiency/Lactose Malabsorption/Lactose Intolerance**

- Lactase deficiency is defined as reduced activity of the brush-border lactase enzyme in relation to the activity observed in infants.
- Lactose malabsorption is a lack of lactose being absorbed in the intestine, and can be assessed by hydrogen breath testing. Malabsorption is almost always attributable to a lactase deficiency.
- Lactose intolerance describes the presence of gastrointestinal symptoms indicating lactose malabsorption.
  - The dose of lactose ingested and malabsorbed determines symptom severity.
  - Typically relies on patient self report.

**Study Selection Process**

- Thirty-six studies were included in this systematic review.
- All studies were randomized trials that enrolled participants older than 4 years with presumed lactose intolerance or malabsorption.
- Most of the studies assessing treatment strategies were double-blinded.
- Studies that evaluated symptomatic response to single or multiple doses of lactose were included.
- Studies with participants with irritable bowel syndrome and other probable causes of acute gastrointestinal symptoms were excluded.

**Study Results**

- Studies that evaluated treatment strategies involving lactose-reduced or hydrolyzed milk or lactase supplements taken with milk (n=26), probiotics (n=7), colonic adaptation (n=2), and rifaximin (n=1) all concluded that there was insufficient evidence to support that these therapies reduce gastrointestinal symptoms.
  - Lactose-reduced or hydrolyzed milk (n=26; 741 subjects) did not show consistent reduction of overall symptoms such as abdominal pain, diarrhea, and flatulence associated with lactose intolerance when compared with a control group who were given lactose. Only 2 of 5 trials showed significant reductions in overall symptoms.
    - Five of 9 trials showed significant reductions in abdominal discomfort.
    - Two of 8 trials showed significant reductions in diarrhea.
  - Lactase supplements taken with milk (n=2; 31 subjects) were not consistent at reducing symptoms when compared to placebo.
    - One small trial did show a reduction in symptoms in subjects enrolled without previous self-reported symptoms.

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Probiotics (n=7; 105 subjects) did not show a consistent reduction in symptoms when compared with control subjects given lactose. Also, milk that contained *Lactobacillus acidophilus* was not shown to be more effective at reducing symptoms than regular milk.

Colonic adaptation (n=2; 66 subjects) was compared to control subjects receiving lactose and was not shown to be more effective at reducing symptoms.

- One trial reported improved flatulence, but no improvement in abdominal pain or diarrhea when comparing lactose feeding with dextrose feeding.

Rifaximin (n=1; 32 subjects) did show reduced symptoms when compared with baseline levels, however, there was no direct comparison with placebo, and intention-to-treat analysis was not used.

- Most studies indicated that persons with lactose intolerance or malabsorption could ingest 12 g of lactose as a single dose with minimal or no symptoms.
- When given with food or other nutrients, up to 18 g of lactose seemed to be well tolerated.

### Study Limitations

- Most of the studies enrollment criteria were for a positive result on testing for lactose malabsorption rather than lactose intolerance.
- Most studies were evaluated over a single 8-hour period; giving a test dose in the absence of other nutrients.
- Studies were small, unclear in reporting overall and individual symptoms, and were generally of low quality.
- Data did not include long term safety of these interventions.

### Summary

- This review of studies may be beneficial in helping to diagnose and manage patients who have symptoms of lactose intolerance.
  - A negative hydrogen breath test excludes lactose malabsorption.
  - A positive hydrogen breath test indicates that the symptoms may be attributable to lactose.
- Lactose intolerance can be excluded in persons who ingest less than 15 g of lactose with meals, as this was found to be a tolerable dose and not likely attributable solely to lactose intolerance.
- In patients who see improvement of symptoms by adhering to a lactose-free diet, ingesting 1 serving per day of lactose containing foods and gradually increasing until symptoms develop may be beneficial.
- Double-blind, placebo controlled trials in patients with documented lactose intolerance are needed to evaluate effectiveness of treatment options.