Understanding Lactose Intolerance

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Lactose intolerance is the inability to digest the milk sugar lactose, causing gastrointestinal symptoms of flatulence, bloating, cramps, and diarrhea in some individuals. This results from a shortage of the lactase enzymes which break down lactose into its simpler forms, glucose and galactose.

Virtually all infants and young children have the lactase enzymes that split lactose into glucose and galactose, which can then be absorbed into the bloodstream. Prior to the mid-1960s, most U.S. health professionals believed that these enzymes were present in nearly all adults as well. When researchers tested various ethnic groups for their ability to digest lactose, however, their findings proved otherwise: Approximately 70 percent of African Americans, 90 percent of Asian Americans, 53 percent of Hispanic Americans, and 74 percent of Native Americans were lactose intolerant.[1-4] Studies showed that a substantial reduction in lactase activity is also common among those whose ancestry is Arab, Jewish, Italian, or Greek.[5]

In 1988, the *American Journal of Clinical Nutrition* reported, "It rapidly became apparent that this pattern was the genetic norm, and that lactase activity was sustained only in a majority of adults whose origins were in Northern European or some Mediterranean populations."[6] In other words, Caucasians tolerate milk sugar only because of an inherited genetic mutation.

Overall, about 75 percent of the world's population, including 25 percent of those in the United States, lose their lactase enzymes after weaning.[7] The recognition of this fact has resulted in an important change in terminology: Those who could not digest milk were once called "lactose intolerant" or "lactase deficient." They are now regarded as normal, while those adults who retain the enzymes allowing them to digest milk are called "lactase persistent."

There is no reason for people with lactose intolerance to push themselves to drink milk. Indeed, milk and other dairy products do not offer any nutrients that cannot be found in a healthier form in other foods. Surprisingly, drinking milk does not even appear to prevent osteoporosis, its major selling point.

Milk Does Not Reliably Prevent Osteoporosis

Milk is primarily advocated as a convenient fluid source of calcium in order to slow osteoporosis. However, like the ability to digest lactose, susceptibility to osteoporosis differs dramatically among ethnic groups, and neither milk consumption nor calcium intake in general are decisive factors with regard to bone health.

The National Health and Nutrition Examination Survey (NHANES III, 1988 to 1991) reported that the age-adjusted prevalence of osteoporosis was 21 percent in U.S. Caucasian women aged 50 years and older, compared with 16 percent in Hispanic Americans and 10 percent in African Americans.[8]

A 1992 review revealed that fracture rates differ widely among various countries and that calcium intake demonstrated no protective role at all.[9] In fact, those populations with the highest calcium intakes had higher, not lower, fracture rates than those with more modest calcium intakes.

What appears to be important in bone metabolism is not calcium intake alone, but the balance between calcium loss and intake. The loss of bone integrity among many postmenopausal white women probably results from genetics and from diet and lifestyle factors. Research shows that calcium losses are increased by the use of animal protein, salt, caffeine, and tobacco, and by physical inactivity.

Animal protein leaches calcium from the bones, leading to its excretion in the urine. Sodium also tends to encourage calcium to pass through the kidneys and is even acknowledged as a contributor to urinary calcium losses in the current *Dietary Guidelines for Americans.*[10] Smoking is yet another contributor to calcium loss. A twin study showed that long-term smokers had a 44-percent higher risk of bone fracture, compared to a non-smoking identical twin.[11] Physical activity and vitamin D metabolism are also important factors in bone integrity.

The balance of these environmental factors, along with genetics, is clearly as important as calcium intake with regard to the risk of osteoporosis and fracture. For most adults, regular milk consumption can be expected to cause gastrointestinal symptoms, while providing no benefit for the bones.

Commercial Lactase Enzymes: Not the Best Choice

Lactose-reduced commercial milk products are often depicted as the "solution" to lactose intolerance. These products are enzymatically modified to cleave lactose into glucose and galactose, preventing stomach upset and other symptoms of lactose maldigestion. But even the lactase pills and lactose-reduced products don't solve the problem, as individuals can still experience digestive symptoms.

Iron deficiency is more likely on a dairy-rich diet since cow's milk products are so low in iron.[12] A recent study linked cow's

milk consumption to chronic constipation in children.[13] Epidemiological studies show a strong correlation between the use of dairy products and the incidence of insulin-dependent diabetes (Type 1 or childhood-onset).[14,15] Women consuming dairy products may have higher rates of infertility and ovarian cancer than those who avoid such products.[16] Susceptibility to cataracts[17] and food allergies are also affected by dairy products.

Humans typically get the vitamin D needed from small amounts of daily exposure to the sun. Some foods, such as cow's milk, soymilk, and some cereals are fortified with this nutrient. Unfortunately, samplings of cow's milk have found significant variation in the vitamin D content, with some samplings having had as much as 500 times the indicated level, while others had little or none at all.[18,19] Too much vitamin D can be toxic and may result in excess calcium levels in the blood and urine, increased aluminum absorption in the body and calcium deposits in soft tissue.

Healthier Sources of Calcium

While the focus on calcium intake appears to have resulted from the prevalence of osteoporosis among Caucasian women (not to mention the influence of the dairy industry), this is not to say that a certain amount of dietary calcium is not needed by those in other demographic groups. However, calcium is readily available in sources other than dairy products. Green leafy vegetables, such as broccoli, kale, and collards, are rich in readily absorbable calcium (Table 1).

Table 1. CALCIUM IN FOODS

	Serving	Amount
Dried figs	10 figs	269 mg
Total cereal, General Mills	3/4 cup	250 mg
Calcium-fortified orange juice*	8 ounce	250 mg
Collards, frozen, boiled	1/2 cup	179 mg
Tofu, raw, firm	1/2 cup	130 mg
Vegetarian baked beans	1 cup	128 mg
Great northern beans, boiled	1 cup	120 mg
Kale, boiled	1 cup	90 mg
Navel orange	1 medium	52 mg
Raisins, golden, seedless	2/3 cup	53 mg
Broccoli, boiled	1 cup	72 mg
Brussels sprouts, boiled	1 cup	46 mg
Kale, boiled	1 cup	90 mg
Chick peas, canned	1 cup	77 mg
Kidney beans, canned	1 cup	69 mg

* Package information

Source: Pennington JAT. Bowes & Church's Food Values of Portions Commonly Used. Lippincott, New York, 1998.

Many green vegetables have absorption rates of more than 50 percent, compared with about 32 percent for milk. In 1994, the *American Journal of Clinical Nutrition* reported calcium absorption to be 52.6 percent for broccoli, 63.8 percent for Brussels sprouts, 57.8 percent for mustard greens, and 51.6 percent for turnip greens.[20] The calcium absorption rate from kale is approximately 40 to 59 percent.[21] Likewise, beans (e.g., pinto beans, black-eyed peas, and navy beans) and bean products, such as tofu, are rich in calcium. Also, about 36 to 38 percent of the calcium in calcium-fortified orange juice is absorbed (as reported by manufacturer's data).

Green leafy vegetables, beans, calcium-fortified soymilk, and calcium-fortified 100-percent juices are good calcium sources with advantages that dairy products lack. They are excellent sources of phytochemicals and antioxidants, while containing little fat, no cholesterol, and no animal proteins.

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