



GLUTEN INTOLERANCE GROUP™



Nutrient Deficiencies and the Gluten-Free Diet

Updated July 2021

In people with celiac disease (CD), nutritional deficiencies can occur because of both low intake and poor absorption. When there is damage in the small intestine, the absorption of certain nutrients can be reduced. The vitamins and minerals most commonly affected include iron, calcium, folate, vitamin B12 and all of the fat soluble vitamins (vitamins A*, D*, E* and K*).

Once the intestine has healed and recovered from the damage that is characteristic of CD, nutrient absorption improves, but reduced intake may still be a problem. In the case of non-celiac gluten sensitivity, absorption of nutrients is not compromised, but foods consumed may be low in nutrients.

Very few gluten-free grain products are enriched or fortified with the vitamins and minerals that gluten-containing grain products are. Deficiencies in these vitamins and minerals can occur as a result. Some people with celiac disease also have lactose intolerance during the early stages of their treatment on a gluten-free diet, so there may be low intake of many of the nutrients provided by dairy foods (such as calcium, magnesium, and Vitamin D).

Deficiencies which are common in gluten-related disorders and some of their gluten-free and dairy-free sources

| Vitamins & Minerals | Food Sources |
|---------------------|--|
| Thiamin | Sunflower seeds, black beans, tuna, green peas, lentils |
| Riboflavin | Mushrooms, cooked spinach, venison, soybeans |
| Niacin | Mushrooms, avocados, broccoli, tuna, salmon, chicken breast |
| Folate | Green leafy vegetables (spinach, romaine lettuce, turnip greens), asparagus, lentils, beets, broccoli |
| Iron | All types of meat, lentils, soybeans, tofu |
| Calcium | Green leafy vegetables (spinach, turnip greens, collard greens), sardines, almonds, sesame seeds, seaweed (nori, kelp) |
| Vitamin D** | Salmon, sardines, shrimp, cod |
| Magnesium | Green leafy vegetables (spinach, Swiss chard), pumpkin seeds, sunflower seeds, black beans |
| Vitamins B12 | All types of meat, poultry & fish, eggs, dairy products |
| Vitamin A* | Green leafy vegetables (spinach, turnip greens), sweet potato, carrots, red bell peppers |
| Vitamin E* | Green leafy vegetables (spinach, mustard greens, turnip greens), sunflower seeds, almonds, hazelnuts |
| Vitamin K* | Green leafy vegetables (kale, spinach, Swiss chard, collard greens), broccoli, Brussels sprouts |

*An increased risk of these deficiencies only occurs when there is fat malabsorption.

**There are only a few food sources of Vitamin D. Especially if you live in a northern climate, a supplement may be needed.

Tips for Maintaining Adequate Nutrition

1. Choose a wide variety of different foods
2. Eat plenty of colorful vegetables and fruits
3. Eat whole grains
4. Make calories count by choosing nutrient-dense foods
5. Use a vitamin/mineral supplement if needed; consult with your personal healthcare team.
6. See a dietitian at least once a year to review the adequacy of your diet

Other Nutrition Tips

1. Choose high fiber foods
2. Choose low fat foods
3. Limit salt
4. Limit sugars
5. Drink plenty of water

Increasing Fiber on a Gluten-Free Diet

Eating enough fiber when following a gluten-free diet can sometimes be a challenge. However, there are many ways to increase your fiber intake because fiber is found in virtually all plant foods.

Examples of gluten-free sources of fiber include:

- **Fruits:** apples, pears, oranges, figs, plums, prunes, berries
- **Gluten-Free Whole Grains:** amaranth, quinoa, buckwheat, brown rice, teff, millet, corn
- **Legumes:** lentils, split peas, black beans, pinto beans, kidney beans, lima beans, garbanzo beans
- **Nuts & Seeds:** almonds, pistachios, pecans, flax seeds, sunflower seeds, chia seeds
- **Vegetables:** squash, broccoli, artichokes, peas, green leafy vegetables, carrots

Getting the Most Nutrients Out of Your Food

- **Eat Foods as “Whole” as Possible:** Whole, unprocessed foods generally have nutrients that processed foods no longer contain.
- **Cook Vegetables Lightly:** Nutrients are lost when a food is fried or boiled in water for an extended time. Lightly sauté, steam, or roast vegetables rather than frying them or boiling them in water.
- **Be Colorful:** Choose foods that are naturally bright in color. In general different colors represent different nutrients. For example, while red tomatoes and pink watermelon have a nutrient called lycopene, orange sweet potatoes and pumpkin have a nutrient called beta-carotene. For a nutrient-rich and appetizing meal, try to include several different colors of fruits and vegetables.

This educational bulletin has been produced by the Gluten Intolerance Group of North America, a registered 501(c)3 organization. Learn more about GIG at www.gluten.org.

GIG is on a mission to make life easier for everyone living gluten-free.

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