



## Too much of a 'healthy' diet can lead to severe problems

A growing number of people feel that eating a diet only containing food considered "healthy" is the ideal. But this belief is not ideal and can contribute to health problems that are irreversible.

Research indicates that this overly "healthy" diet can easily contain excessive and potentially toxic levels of the essential trace mineral manganese. A deficiency of this essential nutrient is rare, but the potential for excess intake is easier than one might expect.

Teresa LeMoon, a graduate student in human nutrition, food and animals sciences at the University of Hawaii at Manoa, presented her research at the 28th CTAHR and COE Student Research Symposium earlier this month. LeMoon analyzed the three standard 2,000-calorie diet patterns — omnivore, Mediterranean and vegetarian — recommended by the Dietary Guidelines for Americans. Her research found that regardless of diet pattern, it was possible to select combinations of food deemed "healthy" that contained manganese at levels that exceeded the established adult tolerable upper intake level, or UL, set by the Institute of Medicine. The Mediterranean and vegetarian diet patterns could exceed the level that toxicologists call the "lowest observed adverse effect level," about 15 milligrams a day.

**Question:** How does excess manganese affect the body?

**Answer:** Although manganese is needed for functions like normal carbohydrate metabolism, too much manganese is known to be toxic to the nervous system, including parts of the brain. The potential damage by excess manganese depends on the age of the individual. Excessive manganese from pregnancy through childhood can adversely affect brain development and seriously affect mental functions and psychological health for life. In adults, excess manganese is known to cause Parkinson's disease-like symptoms but without the ability to reverse symptoms with typical Parkinson's medications. It is not clear whether excess manganese is a factor in the causes of Parkinson's disease.

**Q:** What minimum and maximum manganese level should a person try to consume daily?

**A:** Recommended intake is around 2 milligrams per day. The Expert Group on Vitamins and Minerals in the United Kingdom recommends not exceeding 4 milligrams a day from supplements. The UL for adults is 11 milligrams a day but is only 2 milligrams a day for 1- to 3-year-olds and 3 milligrams for 4- to 8-year-olds. For those with iron deficiency, these values could be even lower because iron deficiency increases

manganese absorption from food.

**Q:** What are the main sources of manganese?

**A:** Although the body obtains manganese from water and air, in most cases food is the major source. Foods naturally high in manganese include whole grains (such as oats, whole wheat and brown rice), nuts (such as peanuts, cashews and hazelnuts), beans (such as garbanzo, soy and lima), pineapple and some types of berries (such as blueberries and raspberries), dark greens and some shellfish (mussels).

For perspective, here is the typical manganese content of some of these foods:

- >> Granola (1 cup) 2 to 5 milligrams
- >> Brown rice, cooked (1 cup) 2 milligrams
- >> Whole-wheat pasta, cooked (1 cup) 1.5 milligrams
- >> Peanut butter (2 level tablespoons) 0.6 milligrams
- >> Hemp seeds, hulled (1 ounce) 2.3 milligrams
- >> Garbanzo beans, canned (1 cup) 2 milligrams
- >> Tofu, firm (1 cup) 3 milligrams
- >> Frozen blueberries (1 cup) 4 milligrams
- >> Pineapple, canned (1 cup) 2.8 milligrams
- >> Spinach, cooked (1 cup) 1.7 milligrams

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