Manganese

Function:
Manganese is a mineral element that is both nutritionally essential and has the potential to be very toxic. This fact is further complicated by the small range of dosage for clinical benefit and toxicity with serious consequences. Manganese is an important factor in many critical biochemical processes including antioxidant function. The principle antioxidant enzyme within our mitochondria (energy) is superoxide dismutase and the enzymes requires manganese for optimal performance. Manganese is also required for normal skeletal development and cartilage synthesis. Wound healing is also impacted by manganese, as the synthesis of collagen in skin cells is dependent on the presence of adequate manganese. Manganese is also important functioning as a co-factor in the metabolism of carbohydrates, amino acids and cholesterol. Manganese is considered anti-osteoporotic and anti-arthritic.

Immunologic Effects of Symptoms:
Reduced T-lymphocyte response to challenge and impaired ability to fight infection.

Deficiency Symptoms:
Deficiency in manganese is rare, but it is now estimated that up to 20% of the population may be deficient in manganese caused by improper diet and eating habits. Deficiency in manganese may lead to various health problems which could include bone malformation, eye and hearing problems, increased cholesterol, hypertension, infertility, cardiovascular issues, memory loss, hearing loss, muscle cramping and tremors. Other deficiency symptoms may include ataxia, fainting and carbohydrate intolerance (diabetes). Manganese deficiency has also been linked to myasthenia gravis.

Manganese Toxicity: Symptoms of manganese toxicity mimic those of Parkinson’s disease with permanent neurological damage. It may also precipitate hypertension in patients over 40, and significant rises in manganese are found in patients with hepatitis, cirrhosis and in dialysis patients and victims of heart attack. Early signs of toxicity include loss of appetite, impaired memory, and mask-like facial expressions. Excess manganese will reduce iron absorption.

Repletion Information:
Estimated average dietary manganese intakes range from 2.0 to 3.0 mg/day for men and 1.6-1.8 mg/day for women. People eating vegetarian diets may have higher intakes. Rich sources of manganese include whole grains, nuts, leafy vegetables, pineapple and teas. Foods high in phytic acid or oxalic acid may reduce manganese absorption.

The RDA for adults is 2.5-5.0 mg/day. Patients with chronic liver disease and iron-deficiency are at increased risk for toxicity and manganese deposition in the brain.