

## 11. Macrominerals

**Macrominerals:** Minerals with a daily requirement of 100 mg or more; can dissociate in water and become electrolytes, or solutions that are electrically charged.

Macro-mineral	Activity in health	Food sources	Deficiency symptoms	Excess or overdose
Sodium	Maintains acid-base balance, controls fluid balance, regulates nerve, heart and muscle activity	Abundant in most all foods–beef, cheese, canned or prepared foods	Hyponatremia: cold clammy skin, decreased skin turgor, apprehension, confusion, irritability, anxiety, hypotension, orthostatic hypotension, tachycardia, headache, tremors, convulsions, abdominal cramps, nausea, vomiting	Hypernatremia: fever, hot skin, dry sticky mucous membranes, rough dry tongue, edema, weight gain, intense thirst, excitement, restlessness, agitation, decreased urine production
Potassium	Muscles activity, nerve transmission, intracellular acid-base balance, water retention. Diuretics can deplete. No storage; must replace daily	Meat, whole and skim milk, bananas, prunes, raisins, fresh vegetables (potato), fresh fruits,	Hypokalemia: anorexia, nausea, vomiting, mental depression, delayed or impaired thought processes, muscle weakness, fatigue, flaccid paralysis, weak irregular pulse, leg cramps, serious ECG changes, irregular heartbeat	Hyperkalemia: anxiety, irritability, mental confusion, nausea, diarrhea, abdominal distress, weakness & heaviness of the legs, hypotension, flaccid paralysis, serious ECG changes, irregular heartbeat
Calcium	Bone & tooth formation, blood coagulation, neuromuscular irritability, muscle contractility, myocardial conduction.	Milk and milk products, fish, eggs, cereal products, leafy green vegetables, beans, fruits	Hypocalcemia: hyperactive reflexes, muscle twitching, & cramps, tetany, cardiac arrhythmias, nausea, vomiting, anxiety, confusion, osteoporosis in adults	Hypercalcemia: kidney stones, loss of tone in GI tract, psychosis, increased thirst & urination, muscle weakness, cardiac arrest

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Magnesium	Bone & tooth formation, nerve conduction, muscle contraction, enzyme activation	Green leafy vegetables, whole grains, nuts, legumes, seafood	Hypomagnesemia: neuromuscular irritability, leg and foot cramps, disorientation, hallucinations, paresthesias, convulsions	Hypermagnesemia: hypotension, respiratory failure, cardiac disturbances
Phosphorus	Bone & tooth formation, acid-base balance, component of nucleic acids, energy production	Meat, fish, milk and dairy products, poultry, whole grains, nuts, legumes	Hypophosphatemia: irritability, weakness, blood cell disorders, GI tract and renal dysfunction, bone pain, pathological fractures	Hyperphosphatemia: loss of calcium from the bone, renal failure & kidney stones, GI upset