Sodium and Chloride

AT A GLANCE

Introduction

Sodium (Na) is a metallic element soluble in water, where it is mostly counterbalanced by chloride (Cl) to form sodium chloride (NaCl), or common table salt.

Sodium chloride is essential for life. Although a minimal amount of salt is required for survival, the health implications of excess salt intake represent an area of intensive research.

Health Functions

Sodium (Na) and chloride (Cl) are important as they help the body to

- conduct electricity, which is crucial to heart function and muscle contraction, making it important for normal digestive and muscular function, too
- transmit nerve impulses
- absorb glucose and water
- regulate blood volume and blood pressure.

The **European Food Safety Authority (EFSA)**, which provides scientific advice to assist policy makers, has confirmed that clear health benefits have been established for the dietary intake of chloride in contributing to:

- normal digestion by production of hydrochloric acid in the stomach.

Dietary Sodium Chloride and Disease

Stomach cancer
Population studies indicate that high intakes of salted, smoked, and pickled foods increase the risk of stomach (gastric) cancer. However, these foods may contain several cancer-causing agents, such as nitrosamines. Additionally, populations with high intakes of salted foods tend to have low intakes of fruits and vegetables, which are thought to protect against gastric cancer.

Although there is little evidence that salt (NaCl) itself is a cancer-causing agent, high intakes of certain salted foods, such as salted fish, may increase the risk of stomach cancer in susceptible individuals.

Osteoporosis
Nutrition is one of many factors contributing to the development and progression of osteoporosis. Increased salt (NaCl) intake has been found to increase urinary excretion of calcium, necessary for bone health.

Salt intake has been associated with bone loss in some studies but not in others.

Long-term studies are needed to determine whether decreasing salt intake has beneficial effects on bone health and fracture risk in individuals at risk for osteoporosis.

Kidney stones
Increased dietary salt (NaCl) has been found to increase urinary calcium excretion, which has been found to increase the risk of developing calcium stones in the kidneys.

However, study results have been mixed: while one study found a lower risk of kidney stones in people restricting their salt intake, a similar study did not find an association between sodium chloride intake and the development of kidney stones.

High blood pressure and cardiovascular disease
A large population study concluded that increased salt (NaCl) consumption is associated with higher levels of blood pressure.

Two additional large studies showed that a modest reduction in salt intake by about 1.0 g/day resulted in better control of elevated blood pressure (hypertension) in older adults who initially were on blood pressure medication. In overweight participants who did not have hypertension, a decreased salt intake reduced the onset of hypertension.

Persistent ('chronic') hypertension damages the heart, blood vessels, and kidneys, thereby increasing the risk of heart disease and stroke, as well as hypertensive kidney disease.

In some studies, salt (NaCl) intake has been linked with increased risk of death due to diseases involving heart and blood vessels (cardiovascular diseases), with mixed results. However, there was a trend toward reduced cardiovascular disease in individuals reducing sodium chloride intake.

Intake Recommendations

U.S. health authorities have established an adequate intake level for sodium (Na) and sodium chloride (salt), based on the amount needed to replace losses through sweat in moderately active people and to achieve a diet that provides sufficient amounts of other essential nutrients. Adults are recommended to take 1.2–1.5 g sodium per day, i.e., 3.0–3.8 g salt per day.

Supply Situation

The average intake of sodium and sodium chloride (salt) for populations across Europe and the U.S. is high and significantly exceeds the recommended amounts.

Deficiency

Sodium and chloride deficiency does not generally result from inadequate dietary intake, even in those people on very low-salt diets.

Increased sodium loss can be caused by severe or prolonged vomiting or diarrhea, excessive and persistent sweating, the use of some diuretics, and some forms of kidney disease.

Symptoms of low blood sodium concentrations include headache, nausea, vomiting, muscle cramps, fatigue, disorientation, and fainting. Complications of severe and rapidly developing sodium deficiency may include swelling of the brain, seizures, coma, and brain damage.

Sources

Salt is our biggest source of both sodium and chloride. 75% of sodium consumed in America comes from the salt added during food manufacture, not from that which is added at the table as a condiment, according to estimates.

Examples of foods that are high in salt are canned chicken noodle soup, canned macaroni and cheese, salted potato chips and pretzels, ham, and corned beef.

Safety

Blood volume is increased by excessive salt intake but this can be excreted by the kidneys as long as enough water is consumed.

Nausea, vomiting, diarrhea, and abdominal cramps may result from excessive salt consumption.

Profuse water loss can cause unusually high blood sodium levels.

Dizziness or fainting, low blood pressure, and diminished urine production are all symptoms of elevated blood sodium levels combined with excess fluid loss. Serious cases my result in swelling, heightened blood pressure, increased heart rate, breathing trouble, convulsions, coma, and death.

Tolerable upper intake level
U.S. health authorities have established a tolerable upper intake level for sodium and sodium chloride (salt), based on the adverse effects of high intakes on blood pressure: 2.3 g sodium per day or 5.8 g salt per day for adults.

Drug interactions
Please note:
Because of the potential for interactions, dietary supplements should not be taken with medication without first talking to an experienced healthcare provider.