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Chloride: The Forgotten Essential Mineral

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Chloride is a highly important, vital mineral required for both human and animal life.

Chloride is an “essential” mineral for humans. It is abundant in ionic trace mineral preparations. It is a major mineral nutrient that occurs primarily in body fluids. Chloride is a prominent negatively charged ion of the blood, where it represents 70 percent of the body’s total negative ion content. On average, an adult human body contains approximately 115 grams of chloride, making up about 0.15 percent of total body weight.¹ The suggested amount of chloride intake ranges from 750 to 900 milligrams (mg) per day, based on the fact that total obligatory loss of chloride in the average person is close to 530 mg per day.

As the principle negatively charged ion in the body, chloride serves as one of the main electrolytes of the body. Chloride, in addition to potassium and sodium, assists in the conduction of electrical impulses when dissolved in bodily water. Potassium and sodium become positive ions as they lose an electron when dissolved, and chloride becomes a negative ion as it gains an electron when dissolved. A positive ion is always accompanied by a negative ion, hence the close relationship between sodium, potassium, and chloride. Electrolytes are distributed throughout all body fluids including the blood, lymph, and the fluid inside and outside cells.² The negative charge of chloride balances against the positive charges of sodium and potassium ions in order to maintain serum osmolarity.

Pivotal Roles of Chloride in the Body

In addition to its functions as an electrolyte, chloride combines with hydrogen in the stomach to make hydrochloric acid—a powerful digestive enzyme responsible for the breakdown of proteins, the absorption of other metallic minerals, and activation of intrinsic factor, which, in turn, absorbs vitamin B₁₂. Chloride is specially transported into the gastric lumen, in exchange for another negatively charged electrolyte (bicarbonate) in order to maintain electrical neutrality across the stomach membrane. After utilization in hydrochloric acid, some chloride is reabsorbed by the intestine, back into the bloodstream where it is required for maintenance of extracellular fluid volume.

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Chloride is both actively and passively absorbed by the body, depending on the current metabolic demands. A constant exchange of chloride and bicarbonate between red blood cells and the plasma helps govern pH balance and transport carbon dioxide, a waste product of respiration, from the body.

With sodium and potassium, chloride works in the nervous system to aid in the transport of electrical impulses throughout the body, as movement of negatively charged chloride into the cell propagates the nervous electrical potential.

Deficiency of Chloride

A deficiency of chloride is rare. However, when it does occur, it results in a life-threatening condition known as alkalosis, in which the blood becomes overly alkaline. A tedious balance between alkalinity and acidity is in constant flux, and must be vigilantly maintained throughout the entire body. Alkalosis may occur as a result of excessive loss of sodium, such as heavy sweating during endurance exercise, and in cases of prolonged vomiting and diarrhea. Symptoms include muscle weakness, loss of appetite, irritability, dehydration, and profound lethargy. Hypochloremia may result from water overload, wasting conditions, and extensive bodily burns with sequestration of extracellular fluids. In a situation in which infants were inadvertently fed chloride-deficient formula, many experienced failure to thrive, anorexia, and weakness in their first year of life.³

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Excess Intake?

Excessive intakes of dietary chloride only occur with the ingestion of large amounts of salt and potassium chloride. The toxic effects of such diets, such as fluid retention and high blood pressure, are attributed to high sodium and potassium levels.⁴ Chloride toxicity has not been observed in humans except in the special case of impaired sodium chloride metabolism, *e.g.*, in congestive heart failure.⁵ Healthy individuals can tolerate the intake of large quantities of chloride provided there is a concomitant intake of fresh water. Another situation in which increased blood levels of chloride are seen include diseases of improper waste elimination, which occurs in kidney diseases. Excess chloride is normally excreted in the urine, sweat, and bowels. In fact, excess urinary excretion of chloride occurs in high-salt diets. Excessive intakes of chloride can occur in a person with compromised health in addition to an unhealthy diet. However, those who follow a healthy diet and lead an active lifestyle may need to consider supplementing their diet with this important mineral.

Chloride vs. Chlorine

The mineral supplement *chloride* is very different from the gas *chlorine*. Elemental chlorine is a dangerous gas that does not exist in the free elemental state in nature because of its reactivity, although it is widely distributed in combination with other elements. Chloride is related to chlorine, however, only as one of the most common chlorine compounds is common salt, NaCl. Chloride is a by-product

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of the reaction between chlorine and an electrolyte, such as potassium, magnesium, or sodium, which are elements that are essential for human metabolism. Chloride salts are essential for sustaining human metabolism and have none of the effects of isolated chlorine gas.

Sources of Chloride

Chloride occurs naturally in foods at levels normally less than 0.36 milligrams per gram of food. The average intake of chloride during a salt-free diet is approximately 100 milligrams per day.

Unfortunately, chloride is found commonly combined with undesirable dietary sources. The most common of these negative sources is table salt. Table salt is made from a combination of sodium and chloride ions. Other unhealthful sources include yeast extracts, processed lunchmeats, and cheeses.

Healthier sources of chloride include kelp (seaweed), ionic trace minerals, olives, rye, tomatoes, lettuce, and celery, but are not in large enough amounts to supply the needs of an active adult.⁶ In its original form, however, chloride is leached from various rocks into soil and water by years of weathering processes. The chloride ion is highly mobile and is transported to closed basins, such as the *Great Salt Lake* or oceans.⁷

“Without chloride, the human body would be unable to maintain fluids in blood vessels, conduct nerve transmissions, move muscles, or maintain proper kidney function.”

Summary

Chloride is a highly important, vital mineral required for both human and animal life. Without chloride, the human body would be unable to maintain fluids in blood vessels, conduct nerve transmissions, move muscles, or maintain proper kidney function. As a major electrolyte mineral of the body, chloride performs many roles, and is rapidly excreted from the body. Active adults that eat a healthy diet devoid of salt as well as illnesses in which vomiting and/or diarrhea are profuse warrant the supplementation of additional chloride.

Replacement of chloride is essential on a daily basis to maintain regular metabolic function. Chloride is safely utilized by the body, without negative health effects. Of the negative health effects that have been associated with diets high in chloride, these are mainly attributable to the accompanying sodium and potassium, two other electrolyte minerals to which chloride is often attached.

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