



Chloride:

Why is Chloride Important?

Chloride is an important mineral inside your body. It is the second most abundant ion in the human body. It is primarily found in your extracellular fluid and is the most important extracellular anion (negatively charge ion). Chloride is essential for maintaining osmotic pressure, acid-base balance, and muscle movement. Unlike other ions in your body chloride isn't always maintained at an equilibrium, but in places like your primary sensory neurons and muscle cells your intracellular chloride is kept at a higher level. Chloride is also important for the absorption of other minerals including some forms of calcium and magnesium. Your chloride levels are primarily regulated by your kidneys where most of your chloride is reabsorbed and very little is secreted. Chloride levels are also regulated by your gastrointestinal tract.

What Body Functions is Chloride Important for?

Muscle Movement: Chloride is essential for the regulation of muscle cell excitability through their movement in and out of the muscle cells. This helps prevent unwanted muscle contraction.

Hydrochloric Acid Production: Chloride is an essential part of hydrochloric acid. Hydrochloric acid is composed of a hydrogen ion and chloride ion. Hydrochloric acid is essential for digesting food in your stomach and activates other gastric enzymes that are important for digestion after they food leaves your stomach. It is also important for controlling foodborne microorganisms and limiting growth of microorganisms in your intestines.

Osmotic Gradients in the Brain: Your brain is made up of 70% water and for that water to move throughout your brain you need osmotic gradients which are regulated by ions. Without the right amount of chloride, you can develop certain brain conditions including hypoxic-ischemic encephalopathy, edema, and seizures. Inadequate levels can also cause problems with neurotransmission and neuronal excitability.

Circadian Rhythm: While you are sleeping, your chloride levels in your cortical pyramidal neurons decrease and when you are awake those levels rise. If you don't have adequate chloride levels, this cycle can be disrupted causing problems sleeping and staying awake.

Lung Function: Chloride in your lungs maintains membrane excitability, transepithelial transport, and homeostasis of ions and water. This helps keep your respiratory membranes moist allowing for adequate gas exchange. It has been found that people with cystic fibrosis have increased excretion of chloride in their sweat creating a deficiency of chloride in their lungs creating a thicker, stickier mucus.

*Cortical Pyramidal Neurons: the most numerous neurons in the cerebral cortex

Different Types of Chloride:

Sodium Chloride: This form of chloride is bonded with sodium and is the main form of chloride in your diet. It is found naturally in food as well as the added table salt that you add to your food.

Potassium Chloride: This form of chloride is bonded with potassium and is used in medications and supplements. This form of chloride is used to treat low potassium levels in the body.

Calcium Chloride: This form of chloride is bonded with calcium and is used to treat low calcium levels in the body.

Food Sources Chloride is in:

Food Sources	mg/100g
Nori (dried seaweed sheets)	150-250
Wakame	100-200
Dulse	100-200
Spirulina	150-200

*Any food that you add salt to you are adding chloride to. Canned foods all contain increased amounts of sodium chloride as opposed to their uncanned versions.

Signs and Causes of Chloride Deficiency:

Chloride deficiency in the United States is very rare because most people's diets are high in sodium chloride. If you have a chloride deficiency it is usually accompanied by a sodium deficiency as well. Hypochloremia can be caused by prolonged diarrhea, vomiting, and sweating. If you are taking diuretics or have high blood glucose levels, you can also become deficient in chloride because you are urinating out more water and with water sodium and chloride ions follow. It has also been found that people with a chronic cough also have a deficiency in chloride. Chloride and bicarbonate have an inverse relationship meaning that when chloride levels fall, bicarbonate levels rise creating metabolic alkalosis.

Signs of chloride deficiency include fatigue, weakness, muscle cramps, confusion, shortness of breath, seizures, headaches, irritability, and dizziness.

*Hypochloremia: low blood chloride levels

Signs and Causes of Chloride Toxicity:

Chloride toxicity is rare if you are just getting chloride from your diet and it can be caused by excessive administration of sodium chloride, dehydration, severe diarrhea, kidney disease, excessive chloride consumption, and certain medications can all cause chloride toxicity. A deficiency in the production of aldosterone can also lead to *hyperchloremia. Chloride and bicarbonate have an inverse relationship meaning that when bicarbonate levels drop, chloride levels rise creating metabolic acidosis.

Signs of chloride toxicity include muscle weakness, excessive thirst, fatigue, high blood pressure, and dry mouth.

*Hyperchloremia: high blood chloride levels

Supplementation of Chloride:

Supplementation of chloride can be helpful if you are deficient. It can help make sure that your muscles are working properly, your kidneys are working properly, and your neurons are working properly. Supplementation can be from simply adding more salt to your diet or you can take potassium chloride pills to add more chloride. You must be cautious of taking too much because you can cause a rise in potassium levels which can cause addition problems if you aren't deficient.

***It is important to know that dietary intake of chloride should be your main source of chloride, and any chloride supplements should supplement the chloride you are already ingesting.**

Daily Recommended Dose of Chloride:

Age	mg
0 to 6 months	180
7 to 12 months	570
1-3 years	1,500
4-8 years	1,900
9-13 years	2,300
14-50 years	2,300
51-70 years	2,000
71 and older	1,800
Pregnant and Lactating Females	2,300

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