



Chlorine (Cl) - importance for the body and health, where it is contained

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Abstract. The article discusses the main properties of chlorine (Cl) and its effect on the human body. A systematic review of modern specialized literature and relevant scientific data was carried out. The best natural sources of chlorine are indicated . The use of the mineral in various types of medicine and the effectiveness of its use in various diseases are considered. The potentially adverse effects of chlorine on the human body under certain medical conditions and diseases are analyzed separately.

Keywords: chlorine , Cl , chlorine, useful properties, contraindications, sources

Chlorine is one of the main minerals required in relatively large amounts by the body. It has nothing to do with disinfectant and comes naturally from various foods, which mainly contain it as sodium chloride (salt), as well as potassium, calcium and magnesium. The chloride hidden in the shadow of sodium is less understood, but we need it to stay healthy. Does it have the same side effects? Let's get to the facts and research.

Functions of chlorine in the body

Chlorine (Cl) is present in all tissues and various organs: blood, bone tissue, body fluid, etc. Its main part (30–60%) is concentrated in the epithelium. In the body, it makes up 0.15% of the total mass, which is approximately 75–115 g of the substance.

The content of the component in the body depends on intake with food and excretion. It is primarily excreted through the kidneys, although 99.1% may be retained by the body, depending on its needs. Doctors prescribe a test for the content of chlorine in the blood to detect diabetes insipidus, diseases of the kidneys and adrenal glands, as well as to monitor their condition during treatment. ^[one]

Chlorine in food - food sources

Chloride is naturally found in all unprocessed foods in small amounts. For example, unprocessed fish and meat can contain up to 4 mg per gram of food, while fruits and vegetables can contain 1 mg/g.

Chlorine is highest in processed foods, high- [sodium snack foods such as](#) nuts, chips, sauces, canned foods, pickles, hamburgers, cheeses, ketchups, salted fish, bacon, and ham. Table salt and sea salt contain 40% chloride, so you will consume it every time you salt your food. Salt substitutes also contain chloride - only sodium is to be replaced.

The daily rate of chlorine for the prevention of deficiency

How much chlorine the body needs per day depends only on age - the need is the same for men and women. The recommendations also do not change for pregnant and lactating women. Babies get the component from their mother's milk. [2, 3, 4, 5]

Consumption rates per day [6]

Life period	Age	Men, women (g/day)
babies	7–11 months	0.3
Children	1–3 years	1.7
Children	4–6 years	2.6
Teenagers	7–17 years old	3.1
adults	19+ years old	3.2

The minimum requirement for an adult in chlorine is about 0.8 g per day, of which more than 0.5 g is lost. The American Food and Nutrition Council recommends that an adult consume 2.3 g of chloride daily to compensate for the loss of salt through sweat. The need for a macronutrient increases in hot climates, with profuse sweating, increased water intake or strong physical exertion. [7, 8, 9, 10]

Daily consumption of the mineral is mainly associated with the consumption of sodium chloride - eating only 5–10 g of food salt (NaCl) per day, a person covers the need for this element in excess. According to the Institute of Medicine, the tolerable upper dose of chloride for adults is 3.6 grams per day. The Tolerable Upper Limit is the maximum level of daily intake that does not cause side effects.

Top 4 Benefits of Chlorine and Its Benefits for the Body

1. Maintains water and electrolyte balance

Chloride is one of the most important electrically charged minerals. The main anion (negatively charged ion) works with other electrolytes such as sodium and potassium to help balance acids and water in the body. If the level of chlorides decreases, it leads to diseases and dehydration. [11, 12]

2. Participates in the production and release of hydrochloric acid in the stomach, without which food cannot be properly digested and absorbed

Intestinal fluid plays a key role in creating the ideal environment for efficient digestion, nutrient absorption and defecation. Hydrochloric acid activates digestive enzymes, promotes the digestion of protein foods, has an antibacterial effect and stimulates the pancreas. [13, 14]

3. Conducts nerve impulses

Neurons transmit information through nerve impulses. The momentum transfer is chemical in nature, and chlorine takes part in a complex process. ^[fifteen]

4. Helps red blood cells to exchange oxygen, carbon dioxide in the lungs and other parts of the body

The surface of the lungs is formed by a continuous epithelium covered with a layer of fluid. The protective functions of the epithelium depend on the volume and viscosity of this layer - a violation of the fluid balance in our lungs is associated with serious diseases, such as cystic fibrosis. The transport of ions in the epithelium of other organs is also vital. ^[16, 17]

Interaction of chlorine with vitamins and minerals

There is a close relationship between sodium and chloride balance in the body - sodium chloride remains the main source of both electrolytes in the diet. Chloride also works with potassium and magnesium to help maintain fluid balance in the body.

The use of chlorine in medicine

Sodium chloride mixed with water forms a saline solution, which is used for various diseases:

- administered intravenously for dehydration, electrolyte imbalance;
- is prescribed for washing the nose - eliminating congestion, reducing postnasal leakage, maintaining the moisture of the mucous membrane;
- used to clean wounds;
- used for washing the catheter, dropper after the administration of the drug;
- used for inhalation alone and in combination with other medicines to moisturize and improve expectoration.

Chlorides in scientific research

1. Changes in serum chloride concentration independent of sodium and bicarbonate levels are associated with an increased risk of acute renal failure (AKI), morbidity and mortality. Avoiding chloride overdose is a reasonable treatment option for all patients, especially those at risk of developing AKI. Patients with developing AKI should receive balanced solutions rather than normal saline to minimize the risk of disease. ^[eighteen]
2. Chloride deficiency affects infants more often than older children and adults because these age groups consume salt. It also occurs from time to time in infants who are not fed traditional formulas, but home-cooked cereals. In the 1970s, it was proposed to reduce the salt content of baby foods as part of an effort to minimize the development of age-related hypertension, which caused outbreaks of chloride deficiency syndrome. ^[19]
3. Chloride content in fluids used in large volumes for resuscitation is associated with reduced survival. Among patients receiving more than 60 ml/kg in 24 hours, an increase in chloride load was associated with significant adverse effects of survival up to one year, even after adjusting for baseline disease severity. However, the mechanisms responsible for these effects remain unclear. ^[twenty]

Contraindications and possible complications caused by chlorine

High or low blood chloride levels can indicate a variety of medical conditions such as metabolic disorders, kidney disease, heart failure, and certain respiratory conditions that can be life-threatening.

Since excess salt is excreted in the urine, excessive intake of sodium chloride can damage the kidneys. Therefore, it is very important to maintain an optimal level of chlorides in the body.

Symptoms of chlorine deficiency - hypochloremia

Chloride deficiency usually does not occur in adults. This is unlikely if the diet contains processed foods that contain a lot of salt. Deficiency is associated with taking diuretics, gastric lavage and disorders of the body - from hormonal imbalance to food poisoning.

Chlorine deficiency symptoms:

- weakness, fatigue;
- poor appetite;
- increased drowsiness;
- memory problems;
- muscle weakness;
- persistent dry mouth. [21, 22]

Symptoms of excess chlorine - hyperchloremia

"Overdose" of chlorides is usually associated with high sodium intake, making it difficult to identify symptoms of overconsumption. Scientists believe that the consumption of both substances causes the same negative health effects:

- dehydration;
- acute renal failure (ARF);
- high blood pressure;
- diabetes insipidus - a violation of the water balance;
- adrenal hyperfunction. [23, 24, 25]

The interaction of chlorine with drugs

The effect of chlorine depends on which mineral it is combined with. For example, sodium chloride interacts with two drugs (lithium, tolvaptan), and potassium interacts with 139 drugs.

Expert comment

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Chloride is an important electrolyte (a mineral that conducts electricity in water). It accounts for two-thirds of all negative charges in the body and helps maintain normal blood pressure, acid-base balance, and oxygen transport. If you're worried that you're not getting enough of a macronutrient, then you need to eat a balanced diet. Have you been following our dietary guidelines? In this case, you are not threatened with a deficiency of chlorine and other nutrients.

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Received 26.04.2022

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