

CHEMICAL SCIENCES

LITHIUM AS A TRACE ELEMENT: ITS EFFECTS ON HUMAN HEALTH AND MEDICAL USE

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In today's world, lithium holds a special place among chemical elements due to its unique physical and chemical properties and wide range of applications. It is actively used in medicine, making it relevant to the topic of this study. In particular, lithium has gained significant attention in recent decades due to its use in psychiatric treatment, where it has proven effective in managing mood disorders such as bipolar disorder. Beyond medicine, its application extends to modern technologies, especially in the production of rechargeable lithium-ion batteries, which power a vast range of electronic devices and electric vehicles.

Lithium is the lightest alkali metal, known for its silvery-white, soft surface and high chemical activity, which prevents it from existing in nature in its pure form. Lithium is a trace element; it is necessary for the human body in minimal amounts, but it is an integral part of many functions.

Lithium is essential for the functioning of many processes in the human body. It is involved in the metabolism of nitrogen-containing compounds, enhances mitochondrial function, and facilitates the transport of sodium ions to nerve and muscle cells. Lithium influences neurochemical processes in the brain and is necessary for the regulation of enzymes, hormones, vitamins and growth factors. It can also readily replace sodium to improve certain cardiovascular diseases, acting as an antagonist.

Lithium is present in many parts of the human body. Its concentration is measured in the blood to monitor therapeutic levels and it can be excreted in the urine depending on kidney function. Lithium affects heart muscle contraction and is also found in the lungs, bones, and liver.

The most important role of lithium is its ability to stabilize mood. In addition, it protects nerve cells, improves cognitive function, maintains serotonin levels, increases antioxidant levels, and affects neuronal activity. A deficiency of this element can lead to antisocial behavior, the development of addictions, deterioration and destabilization of mood, and depression. However, it is important to remember that excess lithium is toxic to humans and can cause side effects such as frequent urination, hand tremors, increased thirst, hypothyroidism (disruption of thyroid function) and diabetes mellitus.

In medicine, lithium is most often used in the form of lithium carbonate (Li_2CO_3) to treat psychological illnesses such as depression, mania, bipolar and obsessive-compulsive disorders. It is also used in the treatment of psychopathological consequences following drug and alcohol use.

Lithium salts are commonly used as the basis for medicines. The most widely used lithium-based preparations include gamma-hydroglutamine, known as Glutalite, which is used to treat bipolar affective disorders and chronic alcoholism syndrome. To maintain lithium concentration in the blood, drugs such as Mikalit, Litozan, Contemmol and others are available.

French scientists Claudio Cuello and Edward Wilson consider lithium-based drugs effective for the treatment of Alzheimer's disease. They claim that lithium can halt the development of the disease in its early stages.

Thus, lithium is a trace element essential for the human body. It influences mood and the functioning of many organs and systems. It is actively used in the treatment of mental illnesses in the form of medication. It is important to use this element correctly to improve the condition of the body, as an overdose can negatively affect health.