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THE IMPORTANCE OF WATER-SOLUBLE VITAMINS B1 IN THE BODY

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Annotation: Although the classification of vitamins is not sufficiently scientifically sound, there is something in common with water-soluble vitamins. This commonality lies in the fact that they possess the ability to dissolve and are part of many coenzymes.

Keywords: vitamin, enzyme, beri-beri, thiamine, anti-neuritis vitamin, cardiovascular, nervous system.

These vitamins form part of the organic matter of enzymes that do not have a protein nature and are directly involved in the catalytic process. The function as a coenzyme has been proven for the following water-soluble vitamins and vitamin-like substances: B1, B2, B6, B12, PP vitamins, biotin, as well as orot, paraaminobenzoic, lipoic acids and fat-soluble coenzyme Q.

Since almost all of these substances are not synthesized in the human or animal body, there is a fundamental disruption of metabolism due to a deficiency or complete absence of these vitamins in the diet and the appearance of symptoms of the hypo-and avitaminosis of one or another vitamin. After certain changes in the structure of these vitamins occur, each of them acts as a coenzyme in the enzyme system.

Vitamin B1 (thiamine, anti-neuritis vitamin).

Vitamin B1 is a thiamine, an anti-neuritis vitamin, which was isolated crystallinely by K. Funk in 1912. Later, its chemical synthesis was carried out. Vitamin B1 contains sulfur along with the amino group, which is why it is called thiamine.

As a result of a deficiency of thiamine in the body, the "beri-beri" disease arises, as mentioned above. This disease leads to paralysis, a sharp disruption of the function of the heart and blood vessels, as well as the gastrointestinal tract. At the same time, there is a change in water metabolism and swelling in the body. In 1886, Ackman, a Dutch doctor in a prison hospital on the island of Java, observed that chickens raised in the prison yard developed a disease similar to "beri-beri" when they were fed rice husks, and that this disease disappeared when they were fed rice husks.

A survey of 25,000 prisoners conducted by the same doctor showed that one in 40 prisoners who ate refined rice suffered from "beri-beri," while one in 10,000 prisoners who ate untreated rice suffered from "beri-beri." So this scientist came to the conclusion that rice bran contained a substance previously unknown to science, which prevented the "beri-beri" disease.

Vitamin B1 is easily absorbed through the intestine, but does not accumulate in tissues and does not have toxic properties. The excess amount of thiamine is removed from the body through urine and feces. In 1931, A. Vindaus isolated vitamin B1 from yeast. The structure

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of thiamine was discovered independently by R. Williams and R. Greve in 1936, and in the same year, R. Williams was able to synthesize this vitamin artificially (1,2).

Avitaminosis and hypovitaminosis. Biological significance.

"Beri-beri" is found in countries where rice is the main food, namely in Asia and Indochina. Vitamin B1 hypovitaminosis is also found in Europe. Because Wernicke and Weiss were the first to study this disease in Europe, it is called "Wernicke's syndrome" or "Weiss's syndrome." Signs of this disease, recorded in Europe, are characterized by damage to the cardiovascular and nervous systems, as well as disruption of the gastrointestinal tract.

Recently, the idea has also emerged that the "beri-beri" disease occurs through the appearance of polyavitaminosis. These vitamins include riboflavin, PP, C, etc., and the disease is caused by their deficiency.

However, animal experiments and experiments with people who voluntarily consented to the experiment have shown that B1 is the main visible sign of aviv-minosis-related diseases

In "beri-beri" with an edematous form, the cardiovascular system disrupts its function. At the same time, signs of polyneuritis are sometimes observed. Avitaminosis, manifested by heart disease, not only becomes acute, but also leads to death.

Early signs of vitamin B1 include damage to the motor function of the gastrointestinal tract, loss of appetite, decreased intestinal peristalsis, and changes in mood, distraction, and changes in the cardiovascular system.

With the deepening of avitaminosis B1, damage to the peripheral nervous system and degenerative changes in the conducting nodes of nerve endings occur. This changes sensitivity, exacerbates pain, and causes joint congestion (Fig. 1).

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B.Stiffening of the leg A. Stiffening of the fingers

(according to Bukin) (according to Bicknell and Prescott).

These injuries lead to disability of the legs first, then the hands, that is, paralysis. Heart disease also begins during this period. The biochemical mechanism of avitaminosis B1 manifests as a negative shift in the nitrogen balance, the release of amino acids and creatinine with urine, and the accumulation of ketoacids and pentose sugars in the blood and tissues.

Patients with "beri-beri" disease have 5-6 times lower levels of thiamine and thiamine pyrofosphate (TPF) in the liver and heart muscle compared to healthy individuals. It has been experimentally proven that vitamin B1 in the form of TPF is present in at least four of the enzymes involved in intermediate metabolism.

The biological significance of thiamine is not limited to this. For example: TPF participates in the oxidative decarboxylation of glycoxylic acid and ketoacids, which are formed by the decomposition of amino acids. The effective use of the drug crystalline thiamine in medicine significantly reduced mortality. In recent times, this disease has significantly decreased due to the use of effective treatment methods. New opportunities have also emerged for the prevention of this disease based on ensuring the full value of nutrition.

When heated, a very small amount of thiamine in food is broken down. When cooking, the vitamin B1 in the product enters the soup portion of the meal.

A person receives most of it from plant and animal products. It is abundant in yeast, wheat bread, grain products: soybeans, beans, peas, and mung beans. It is found in a small amount in potatoes, carrots, and cabbage. Of animal products: liver, kidneys, and brain. Some bacteria synthesize vitamin B1 in the gastrointestinal tract. A person's daily need for vitamin B1 is 1.2-2.2 mg (3).

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