

# VITAMIN B12 DEFICIENCY

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## INTRODUCTION:

In 1948, Rickes and his colleagues isolated the vitamin B12 compound for the first time from the liver. Vitamin B12 is otherwise called cobalamin, it was described in detail in 1956 by Hodgkin. Cobalamin is an essential ingredient in the human body. It comes from the group of B vitamins and is an organic compound, soluble in water. The chemical formula is  $C_{63}H_{88}CoN_{14}O_{14}P$ , the system cortical, consists of four reduced pyrrole rings and cobalt is the central atom. The human body cannot synthesize it, therefore it must be supplied with food. Cobalamin is synthesized by bacteria and archaeobacteria - this is why it is often called the dirt vitamin. Synthesis can take place both aerobically and anaerobically.



## FUNCTION:

Vitamin B12 plays a key role in the formation of erythrocytes and the synthesis of DNA and RNA in erythroblasts. Plays an important function in the stabilization of the human genome. Moreover, it participates in numerous metabolic reactions of proteins, fats and carbohydrates. It is responsible for the construction of the myelin sheaths of nerve fibers and the synthesis of neurotransmitters, e.g. serotonin and dopamine. Thanks to cobalamin, it is possible to convert folic acid to tetrahydrofolate (a biologically active compound). Especially important for pregnant women. The level of vitamin B12 concentration indirectly affects the hormonal and mental balance, immunity, and energy levels. It has also been shown to have a positive effect in the treatment of mental illness, AIDS, arthritis, multiple sclerosis and some cancers.

## THE MOST COMMON CAUSES OF DEFICIENCY:

There are many reasons for the deficiency, they have various sources and causes. Starting from the absorption site, i.e. the ileum, where absorption may stop due to receptor dysfunction and after removal of the ileum. The parietal cells that produce glycoprotein, Castle's intrinsic factor, can be damaged, or if the stomach is completely removed. Deficiency of the transcobalamin protein that transports vitamin B12 in the blood. In the case of inflammatory bowel disease, we are also at risk of deficiency and other diseases. Significant impact on the level and absorption of vitamin B12 also have drugs and substances that for example, can block proper absorption.. The risk of deficiency is also a vegan, vegetarian diet or malnutrition.

## RECOMMENDED DOSE:

2  $\mu$ g adults  
0.05  $\mu$ g / 1 kg child's weight (no more than 2  $\mu$ g per day)  
2.2  $\mu$ g pregnant women  
2.6  $\mu$ g breastfeeding women  
0.3  $\mu$ g infants

## EFFECTS OF DEFICIENCY:

- increased possibility of DNA damage and changes in methylation
- increased level of homocysteine - a risk factor in cardiovascular diseases
- disturbed haematopoietic process
- increased probability of anemia or anemia
- increased probability of ataxia
- increased probability of lethargy
- inflammation polyneuritis
- premature cell death

## SOURCES AND ABSORBABILITY:

The richest source of vitamins. B12 can be found in ingredients of animal origin. Especially in livers and kidneys, which contain the highest amounts of cobalamin. We can also find it in eggs, milk, yoghurts, fish and seafood. In products of plant origin (legumes, avocados, nuts), vitamin B12 is found in smaller amounts and it is not a well-absorbed form for humans compared to products of animal origin.. Its absorption in the body takes place in the ileum in the presence of a glycoprotein produced by stomach cells. It can be stored in the liver for 5-10 years.

## SUMMARY

VITAMIN B12 IS ESSENTIAL FOR THE PROPER FUNCTIONING OF THE BODY. NUMEROUS STUDIES AND SCIENTIFIC ARTICLES SHOW THAT VITAMIN B12 DEFICIENCY HAS VERY SERIOUS HEALTH CONSEQUENCES. THEREFORE, AN IMPORTANT ASPECT IS CONTROLLING THE LEVEL OF COBALAMIN IN THE BODY. CONSISTENT CONSUMPTION OF FOOD CONTAINING VITAMIN B12 OR SUPPLEMENTATION IN THE FORM OF DIETARY SUPPLEMENTS.