

THE CHEMISTRY OF NATURALLY OCCURRING VITAMIN B12

Priyanka

ABSTRACT

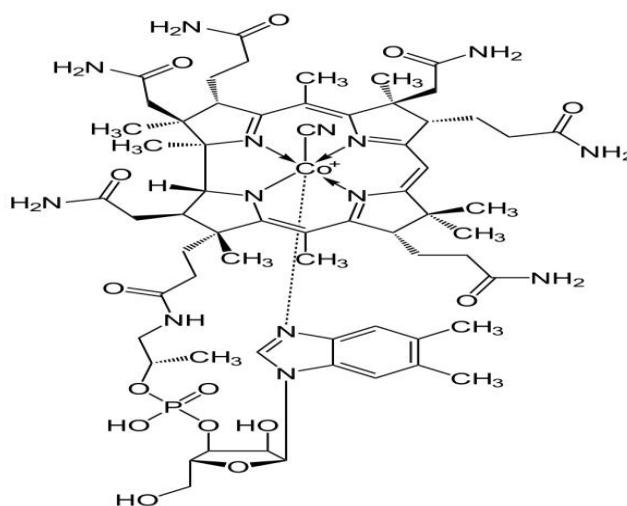
Vitamin B12 is naturally occurring present in some foods, fish, meat, poultry. Water soluble vitamin B12 exists in several forms like methylcobalamin, 5-deoxyadenosylcobalamin that are active in human metabolism. The deficiency of vitamin B12 carries a risk of permanent nerve and brain damage. Anemia is most common cause have fewer red blood cells or abnormal amount of haemoglobin. Prevent from vitamin B12 deficiency by eating enough meat, poultry, cheese, dairy products and take vitamin B12 in a multivitamin or other supplements or foods fortified with vitamin B12.

I. INTRODUCTION

In 1948 an "anti-pernicious anemia factor" was isolated, crystallized and named vitamin B12 or cyanocobalamin. Vitamin B12 is water soluble vitamin that is naturally present in some foods, available as a dietary supplement and prescription medication and travels through the bloodstream. The human body doesn't store cobalamin. Methylcobalamin and 5-deoxyadenosylcobalamin are the forms of vitamin B12 that are active in human metabolism.

II. MOLECULAR STRUCTURE OF VITAMIN B 12

The molecule is built around a corrin ring containing a cobalt(3) atom. The corrin is a modified porphyrin ring in which one of the =CH- bridges between two of the pyrrole-type rings is missing, contracting the ring. The fifth and sixth coordination sites on the cobalt are filled by a nitrogen atom from an imidazole ring and a cyanide ion. The latter is an artifact of the isolation procedure and is not present in the biological system, where the sixth position appears to hold a loosely bound water molecule.





III. SOURCES OF VITAMIN B12

Food- vitamin B12 is naturally found in animal products,including fish,meat,poultry,eggs,milk and milk products.Vitamin B12 is generally not present in plant foods,but fortified breakfast cereals are a readily available source of vitamin B12 with high bioavailability for vegetarians.Some nutritional yeast products also contain vitamin B12.Fortified foods vary in formulation,so it is important to read products labels to determine which added nutrients they contain.

Several food sources of vitamin B12 are listed in table:-

Selected food sources of vitamin B12

Food micrograms(mcg) per serving percent DV

Clams,cooked,3 ounces84.1 1,402

Liver,beef,cooked, 3 ounces 70.7 1,178

Breakfast cereals, fortified with 100% of the DV for vitamin B12, 1 serving 6.0 100

Trout,rainbow,wild,cooked, 3 ounces 5.4 90

Salmon, sockeye,cooked, 3 ounces 4.8 80

Trout ,rainbow,farmed,cooked, 3 ounces 3.5 58

Tuna fish,light,canned in water, 3 ounces 2.5 42

Cheeseburger,double patty and bun,1 sandwich 2.1 35

Haddock,cooked, 3 ounces 1.8 30

Breakfast cereals, fortified with 25% of the DV for vitamin B12,1 serving 1.5 25

Beef, top sirloin, broiled, 3 ounces1.4 23

Milk,low-fat, 1 cup 1.2 18

IV. DEFICIENCY

Vitamin B12 deficiency can result in irreversible and potentially severe damage, especially to the human nervous system and brain. It can also cause anemia. Even at slightly lower-than-normal B12 levels, a person can experience depression , confusion memory problems and tiredness. However , these symptoms are not specific enough to diagnose vitamin B12 deficiency.Constipation, loss of appetite, and weight loss can also result.

More serious symptoms include neurological changes ,such as numbness and tingling in the hands and feet. Some people may have difficulty maintaining balance.

Vitamin B12 deficiency carries a serious risk of permanent nerve and brain damage. Some people who do not get enough vitamin B12 have a higher risk of developing psychosis, mania, and dementia.

Infants who lack vitamin B12 may have unusual movements, such as face tremors , reflex problems, feeding difficulties, irritation ,and eventual growth problems if left untreated.

Vitamin B12 or folate deficiency anemia can cause a wide range of symptoms . these usually develop gradually but can worsen if the conditions goes untreated.Anemia is where you have fewer red blood cells than normal or you have abnormal low amount of substance called haemoglobin each red blood cells general symptoms of anemia : fatigue, lethargy, breathlessness, feeling faint, headache, pale skin, palpitations, tinnitus and loss of appetite and weight loss.



V. CAUSES OF VITAMIN B12 DEFICIENCY

Pernicious anemia is the most common cause of vitamin B12 deficiency in the UK. Pernicious anemia is an autoimmune condition that affects your stomach. autoimmune condition means your immune system attacks your body healthy cells. In your stomach, vitamin B12 is combined with a protein called intrinsic factor. This mix of vitamin B12 and intrinsic factor is then absorbed into the body in part of the gut called the distal ileum. Pernicious anemia causes your immune system to attack the cells in your stomach that produce the intrinsic factor, which means your body is unable to absorb vitamin B12. The exact cause of pernicious anemia is unknown, but the condition is more common in women around 60 years of age, people with a family history of the condition and those with another autoimmune condition, such as Addison's disease or vitiligo.

VI. TREATMENT AND PREVENTION

If pernicious anemia or trouble absorbing vitamin B12 , will needs shots of these vitamin at first , take high dose of a supplement, get it nasally after that. Prevent from vitamin B12 deficiency by eating enough meat,poultry,seafood,cheese,diary products and eggs.In case of vegetarians and people suffering with a medical condition that limits how well body absorbs nutrients,take vitamin B12 in a multivitamin or other supplements and eating breakfast cereals or foods

VII. USES

Vitamin B12 plays a vital role in the normal functioning of the brain and nervous system and in the formation of red blood cells.It helps to regulate and synthesize DNA.It is needed in the metabolism of every cell in the body and plays a part in the synthesis of fatty acids and energy production.By helping the human body to absorb folic acid, it facilitates the release of energy.The human body produces millions of red bold cells every minute,but without vitamin B12, cells cannot multiply properly.The production of red blood cells goes down if a person's vitamin B12 levels are low. As the red blood cells count drops,anemia results.The most common symptoms of anemia are fatigue,shortness of breath and palpitations, or irregular heartbeat. People with anemia might also have: a sore mouth or tongue, weight loss, pale or yellowish skin, diarrhea, menstrual problems. fortified with vitamin B12.

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