

# **Catherine Street Medical Centre**

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## **Vitamin B12 Deficiency :**

A lack of vitamin B12 (B12 deficiency) is one cause of anaemia. Pernicious anaemia is a condition where vitamin B12 cannot be absorbed into your body. It is the most common cause of vitamin B12 deficiency in Ireland. Vitamin B12 deficiency can easily be treated by regular injections of vitamin B12.

### **Understanding Blood**

Blood is made up of a fluid called plasma which contains:

- Red blood cells - which take oxygen around the body.
- White blood cells - which are part of the immune system.
- Platelets - which help the blood to clot if we cut ourselves.
- Proteins - and other chemicals that have various functions.

Red blood cells are made in the bone marrow, and millions are released into the bloodstream each day. A constant new supply of red blood cells is needed to replace old cells that break down. Red blood cells contain a chemical called haemoglobin. Haemoglobin binds to oxygen and takes oxygen from the lungs to all parts of the body. To make red blood cells and haemoglobin constantly you need a healthy bone marrow and nutrients such as iron and certain vitamins, including vitamin B12, which we get from food.

### **What is anaemia and vitamin B12 deficiency?**

Anaemia means that: You have fewer red blood cells than normal; OR you have less haemoglobin than normal in each red blood cell

In either case, a reduced amount of oxygen is carried around in the bloodstream. There are various different causes of anaemia such as lack of iron or certain vitamins.

Vitamin B12 is essential for life. It is needed to make new cells in the body such as the many new red blood cells which are made every day. Vitamin B12 is found in **meat, fish, eggs, and milk** - but not in fruit or vegetables. A normal balanced diet contains enough vitamin B12. A lack of vitamin B12 leads to anaemia and sometimes to other problems.

### **What are the symptoms of vitamin B12 deficiency?**

## Symptoms due to anaemia

These are caused by the reduced amount of oxygen in the body.

- **Common symptoms include tiredness, lethargy, feeling faint, becoming breathless.**
- **Less common symptoms include headaches, a thumping heart (palpitations), altered taste, loss of appetite, and ringing in the ears (tinnitus).**
- **You may look pale.**

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## Other symptoms

**Cells in other parts of the body may be affected if you lack vitamin B12. Other symptoms that may occur include a sore mouth and tongue.**

**If left untreated, problems with nerves and psychological problems can develop. Psychological problems may include depression, confusion, difficulty with memory or even dementia. Nerve problems may include numbness, pins and needles, vision changes and unsteadiness.**

## What are the causes of vitamin B12 deficiency?

### Pernicious anaemia

Normally, when you eat foods with vitamin B12, the vitamin combines with a protein called intrinsic factor in the stomach. The combined vitamin B12/intrinsic factor is then absorbed into the body further down the gut at the end of the small intestine. (Intrinsic factor is made by cells in the lining of the stomach and is needed for vitamin B12 to be absorbed.)

Pernicious anaemia is the most common cause of B12 deficiency in the UK. It is classed as an autoimmune disease. The immune system normally makes antibodies to attack bacteria, viruses and other germs. If you have an autoimmune disease, the immune system makes antibodies against certain tissues of your body. If you have pernicious anaemia, antibodies are formed against your intrinsic factor, or against the cells in your stomach which make intrinsic factor. This stops intrinsic factor from attaching to vitamin B12, and so the vitamin cannot be absorbed into your body. It is thought that something triggers the immune system to make antibodies against intrinsic factor. The trigger is not known.

Pernicious anaemia usually develops over the age of 50. Women are more commonly affected than men, and it tends to run in families. It occurs more commonly in people who have other autoimmune diseases. For example, thyroid diseases, Addison's disease and vitiligo (a condition where white patches develop on skin). The antibodies which cause pernicious anaemia can be detected by a blood test to confirm the diagnosis.

## **Stomach or gut problems**

Various problems of the stomach or gut can be a cause of vitamin B12 deficiency. They are all uncommon causes. They include:

- Surgery to remove the stomach or the end of the small intestine. This will mean absorption of vitamin B12 may not be possible.
- Some diseases that affect the end of the small intestine where vitamin B12 is absorbed may affect the absorption of the vitamin. For example, Crohn's disease.
- Some conditions of the stomach may affect the production of intrinsic factor which is needed to combine with vitamin B12 to be absorbed. For example, atrophic gastritis (where the lining of the stomach is thinned).

## **Medicines**

Certain medicines used for other conditions may affect the absorption of vitamin B12. The most common example is metformin which is a medicine often used for diabetes. Other medicines include colchicine, neomycin, and some anticonvulsants used to treat epilepsy.

**Note:** long-term use of medicines that affect stomach acid production, such as **H2 blockers** and **proton pump inhibitors**, can worsen vitamin B12 deficiency. This is because stomach acid is needed to release vitamin B12 bound to proteins in food. However, such medicines are not causes of vitamin B12 deficiency.

## **Dietary causes**

It is unusual to lack vitamin B12 if you eat a normal balanced diet. Strict vegans who take no animal or dairy produce may not eat enough vitamin B12. Some foods are fortified with vitamin B12 - for example, some soy products, some breakfast cereals and some breads.

## **How is vitamin B12 deficiency diagnosed?**

The level of vitamin B12 can be measured by a blood test. Further tests are then needed to find out the cause of the vitamin B12 deficiency.

These further tests include blood tests for intrinsic factor antibodies and gastric parietal cell-antibodies. These blood tests help to find out whether you have pernicious anaemia.

### **What is the treatment for vitamin B12 deficiency?**

You will need **vitamin B12 injections**. Normally, about six injections are given at first, one every 2-4 days. This quickly builds up the body's store of vitamin B12. Vitamin B12 is stored in the liver. Once a store of vitamin B12 has built up, this can supply the body's needs for several months. An injection is then only usually needed every three months to top up the supply.

If you have pernicious anaemia the injections are needed for life. You should have no side-effects from the treatment, as it is simply replacing a vitamin that you need. If the cause of your lack of vitamin B12 is diet-related rather than due to pernicious anaemia then treatment may be different. That is, after the initial treatment with injections of vitamin B12, dietary supplements of vitamin B12 (cyanocobalamin tablets) may be advised instead of injections. Alternatively, injections of vitamin B12 twice a year may be recommended.

### **Follow-up**

The symptoms of anaemia usually improve quickly once treatment has begun. You may be advised to have a blood test every year or so. This will check that the anaemia is being treated successfully. A blood test may also be done to see that your thyroid gland is working well. (Thyroid problems are more common in people with pernicious anaemia.)

Any psychological or nerve problems caused by vitamin B12 deficiency may take much longer to treat and may not fully resolve with treatment. Prolonged or severe vitamin B12 deficiency may therefore cause permanent brain or nerve damage.

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