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Vitamin B12 or B9 (commonly called folate) deficiency anaemia occurs when a lack of vitamin B12 or folate causes the body to produce abnormally large red blood cells that cant function properly. Red blood cells carry oxygen around the body using a substance called haemoglobin. Anaemia is the general termfor having either fewer red blood cells than normal or having an abnormally low amount of haemoglobin in each red blood cell. There are several different types of anaemia, and each one has a different cause. For example, iron deficiency anaemia, which occurswhen the body doesnt contain enough iron. Vitamin B12 and folate perform several important functions in the body, including keeping the nervous system healthy. A deficiency in either of these vitamins can cause a wide range of problems, including: extreme tiredness a lack of energy pins and needles (paraesthesia) a sore and red tongue mouth ulcers muscle weakness disturbed vision psychological problems, which may include depressionandconfusion problems withmemory, understanding and judgement Some of these problems can also occur if you have a deficiency in vitamin B12 or folate, but dont have anaemia. Read about the symptoms of vitamin B12 or folate deficiency anaemia See your GP if you think you may have a vitamin B12 or folate deficiency. These conditions can often be diagnosed based on your symptoms and the results of ablood test. Its important for vitamin B12 or folate deficiency anaemia to be diagnosed and treated as soon as possible because, although many of the symptoms improve with treatment, some problems caused by the condition can be irreversible. Read aboutdiagnosing vitamin B12 or folate deficiency anaemia There are a number of problems that can lead to a vitamin B12 or folate deficiency, including: pernicious anaemia where your immune system attacks healthy cells in your stomach, preventing your body from absorbing vitamin B12 from the food you eat; thisis the most common cause of vitamin B12 deficiency in the UK a lack of these vitamins in your diet this is uncommon, but can occur if you have a vegan diet, follow a fad diet or have a generally poor diet for a long time medication certain medications, including anticonvulsants and proton pump inhibitors (PPIs), can affect how much of these vitamins your body absorbs Both vitamin B12 deficiency and folate deficiency are more common in older people, affecting around 1 in 10 people aged 75 or over, and 1 in 20 people aged 65 to 74. Read about the causes of vitamin B12 or folate deficiency anaemia Most cases of vitamin B12 and folate deficiency can beeasily treated with injections or tablets to replace themissing vitamins. Vitamin B12 supplements are usually given by injection at first. Then, depending on whether your B12 deficiency is related to your diet, youll either require B12 tablets between mealsor regular injections. These treatments may be needed for the rest of your life. Folic acid tablets are used to restore folate levels. These usually need to be taken for four months. In some cases, improving your diet can help treat the condition and prevent it recurring. Vitamin B12 is found in meat, fish, eggs,dairy products, yeast extract (such as Marmite) and specially fortified foods. The best sources of folate include green vegetables such as broccoli, Brussels sprouts and peas. Read about treating vitamin B12 or folate deficiency Although its uncommon, vitamin B12 or folate deficiency (with or without anaemia) can lead to complications, particularly if youve been deficient in vitamin B12 or folate for some time. Potential complications can include: problems with the nervous system temporary infertility heart conditions pregnancy complications and birth defects Adults with severe anaemia are also at risk of developing heart failure. Somecomplications improve with appropriate treatment, but others such as problems with the nervous system can be permanent. Read about the complications of vitamin B12 or folate deficiency anaemia Vitamin B12 or folate deficiency anaemia can cause a wide range of symptoms. These usually develop gradually but can worsen if the condition goes untreated. Anaemia is whereyou have fewer red blood cells than normal oryou havean abnormally low amountof a substance called haemoglobin in each red blood cell. General symptoms of anaemia may include: If you have anaemia caused by a vitamin B12 deficiency, you may have othersymptoms in addition to those listed above, such as: a pale yellow tinge to your skin a sore and red tongue (glossitis) mouth ulcers pins and needles (paraesthesia) changes in the way that you walk and move around disturbed vision irritability depression changes in theway you think, feel and behave a decline in your mental abilities, such asmemory, understanding and judgement (dementia) Some of these symptoms can also occur in people who have a vitamin B12 deficiency, but have not developed anaemia. Additional symptoms in people withanaemia caused by a folate deficiency can include: symptoms related to anaemia reduced sense of taste diarrhoea numbness and tingling in the feet and hands muscle weakness depression See your GP if youre experiencing symptoms of vitamin B12 or folate deficiency anaemia.These conditions can often be diagnosed based on your symptoms and the results of a blood test. Read more about diagnosingvitamin B12 or folate deficiency anaemia Its important forvitamin B12 or folate deficiency anaemia to be diagnosed and treated as soon as possible. Although many of the symptoms improve with treatment, some problems caused by the condition can be irreversible if left untreated. The longer the condition goes untreated, the higher the chance of permanent damage. Vitamin B12 or folate deficiency anaemia occurs when a lack of either of these vitamins affects the bodys ability to produce fully functioning red blood cells. Red blood cells carry oxygen around the body. Most people withvitamin B12 or folate deficiency anaemia have underdeveloped red blood cells that arelarger than normal. The medical term for this is megaloblastic anaemia. A vitamin B12 or folate deficiency can be the result of a variety of problems, some of which are described below. Pernicious anaemia is the most common cause of vitamin B12 deficiency in the UK. Pernicious anaemia is an autoimmune condition that affects your stomach. An autoimmune condition meansyourimmune system (the bodys natural defence system that protects against illness and infection) attacks your bodys healthy cells. In your stomach, vitamin B12is combined withaprotein 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 anaemia causes your immune system to attack the cells in your stomach that produce the intrinsic factor, which meansyour body is unable to absorb vitamin B12. The exact causeof pernicious anaemia is unknown, but the condition is more common inwomen around 60 years of age, people with a family history of the condition and those with another autoimmune condition, such asAddisons disease orvitiligo. Some people can develop a vitamin B12 deficiency as a result of not getting enough vitamin B12 from their diet. A diet that includes meat, fish and dairy products usually provides enough vitamin B12, but people who dont regularly eat these foods such as those following avegan diet or who havea generallyvery poor diet can become deficient. Stores of vitamin B12 in the body canlastaround two to four years without being replenished, so it can take a long time forany problems to develop after a dietary change. Some stomach conditions or stomach operations can prevent the absorption ofenough vitamin B12. For example, agastrectomy (a surgical procedure where part of your stomach is removed) increases your risk of developing a vitamin B12 deficiency. Some conditions that affect your intestinescan alsostop you from absorbing the necessary amount of vitamin B12. For example, Crohns disease(a long-term condition that causes inflammation of the lining of the digestive system) can sometimes mean your body doesntget enough vitamin B12. Some types of medicine can lead to a reduction inthe amount of vitamin B12 in your body. For example, proton pump inhibitors (PPIs) a medication sometimes used totreat indigestion can make a vitamin B12 deficiency worse. PPIs inhibit the production of stomach acid, which is needed to release vitamin B12 from the food you eat. Your GP will be aware of medicines that can affect your vitamin B12 levels and will monitor you if necessary. Some people can experience problems related to a vitamin B12 deficiency, despite appearing to have normal levels of vitamin B12 in their blood. This can occur due to a problem known as functional vitamin B12 deficiency where theres a problem with the proteins that help transport vitamin B12 between cells. This results inneurological complications involving the spinal cord. Folate dissolves in water, which means your body is unable to store it for long periods of time. Your bodys store of folate is usually enough to last four months. This means you need folate in your daily diet to ensure your body has sufficient stores of the vitamin. Like vitamin B12 deficiency anaemia, folate deficiency anaemia can develop for a number of reasons. Some are described below. Goodsources of folate includebroccoli, Brussels sprouts, asparagus, peas, chickpeas and brown rice. If you dont regularly eat these types of foods, you may develop a folate deficiency. Folate deficiency caused by a lack of dietary folate is more common in people who have a generally unbalanced and unhealthy diet, people who regularly misuse alcohol and people following a fad diet that doesnt involve eating good sources of folate. Sometimes your body may be unable to absorb folate as effectively as it should. This is usually due to an underlying condition affecting your digestive system, such ascoeliac disease. You may lose folate from your body if you urinate frequently. This can be caused by an underlying condition that affects one of your organs, such as: congestive heart failure where the heart is unable to pump enough blood around the body acute liver damage often caused by drinking excessive amounts of alcohol long-termdialysis where a machine that replicates the kidney function is used to filter waste products from the blood Some types of medicine reduce the amount of folate in your body, or make the folate harder to absorb. These include someanticonvulsants (medication used to treat epilepsy), colestyramine, sulfasalazine and methotrexate. Your GP will be aware of medicines that can affect your folate levels and will monitor you if necessary. Your body sometimes requires more folate than normal. This can cause folate deficiencyif you cant meet your bodys demands for the vitamin. Your body may need more folate than usual if you: are pregnant (see below) have cancer have a blood disorder such assickle cell anaemia (an inherited blood disorder which causes red blood cells to develop abnormally) are fighting an infection or health condition that causes inflammation (redness and swelling) Premature babies (born before the 37th weekof pregnancy) are also morelikely to develop a folate deficiency, because their developing bodies require higher amounts of folate than normal. If youre pregnant or trying to get pregnant, its recommended that you take a 400 microgram folic acid tablet every day until youre 12 weeks pregnant. This will ensure that both you and your baby have enough folate and help your baby grow and develop. Folic acid tablets are available with a prescription from your GP, or you can buy them over the counter from pharmacies, large supermarkets and health food stores. If youre pregnant and have another condition that may increase your bodys need for folate, such as those mentioned above, your GP will monitor you closely to prevent you from becoming anaemic. In some cases, you may need a higher dose of folic acid. For example, if you have diabetes, you should take a 5 milligrams (5mg or 5,000 micrograms) supplement of folic acid instead of the standard 0.4 milligrams (0.4mg or 400 micrograms). Read more about vitamins and minerals in pregnancy A diagnosis of vitamin B12 or folate deficiency anaemia can often be made by your GP based on your symptoms and the results of blood tests. Different types ofblood tests can be carried out tohelp identify people with a possiblevitamin B12 or folate deficiency. These tests check: whether you have a lower level of haemoglobin (a substance that transports oxygen)than normal whether your red blood cells are larger than normal the level of vitamin B12 in your blood the leveloffolate in your blood However, some people can have problems with their normal levels of these vitaminsor mayhave low levels despite having no symptoms.This is why its important for your symptoms to be taken into account when a diagnosis is made. A particular drawback of testing vitamin B12 levels is that the current widely-used blood test only measures the total amount of vitamin B12 in your blood. This meansit measuresforms of vitamin B12 that are active and can be used by your body, as well as the inactive forms, which cant. If a significant amount of the vitamin B12 in your blood is inactive, a blood test may show that you have normal B12 levels,even though your body cant use much of it. There are some types of blood test thatmay help determine if the vitamin B12 in your blood can be used by your body, but these arent yet widely available. If your symptoms and blood test results suggest a vitamin B12 or folate deficiency, your GP may arrange further tests. If the cause can be identified,it willhelpto determine the most appropriate treatment. For example,you may have additional blood tests to check for a condition called pernicious anaemia. This is an autoimmune condition (where your immune system produces antibodies to attack healthy cells), which means youre unable to absorb vitamin B12 from the food you eat. Tests for pernicious anaemia arent always conclusive, but they can oftengive your GP a good idea of whether you have the condition. You may be referred to a specialist for further tests or treatment. This may include: ahaematologist (specialist in treating blood conditions) if you have vitamin B12 or folate deficiency anaemia and your GP is uncertain of the cause, youre pregnant or symptoms suggest your nervous system has been affected agastroenterologist (specialist in conditions that affect the digestive system) if your GP suspects you dont have enough vitamin B12 or folate because your digestive system isnt absorbing it properly adietitian (specialist in nutrition) if your GP suspects youhave a vitamin B12 or folate deficiency caused by a poor diet

Adietitian can devise a personalised eating plan for you to increase the amount of vitamin B12 or folate in your diet. The treatment for vitamin B12 or folate deficiency anaemia depends on whats causing the condition. Most people can be easily treated with injections or tablets to replace the missing vitamins. Vitamin B12 deficiency anaemia is usually treated with injections of vitamin B12, in a form called hydroxocobalamin. At first, youll have these injections every other day for two weeks, or until your symptoms have stopped improving. Your GP or nurse will give the injections. After this initialperiod, yourtreatment will depend on whether the cause of your vitamin B12 deficiency is related to your diet. The most common cause of vitamin B12 deficiency in the UK is pernicious anaemia, which isnt related to your diet. Read more about the causes of vitamin B12 or folate deficiency If your vitamin B12 deficiency is caused by a lack of the vitamin in your diet, you may be prescribed vitamin B12 tablets to take every day between meals. Alternatively, you may need to have an injection of hydroxocobalamin twice a year. People who find it difficult to get enough vitamin B12 in their diets, such asthose following a vegan diet, may need vitamin B12 tablets for life. Although its less common, peoplewith vitamin B12 deficiency caused by a prolonged poor diet may be advisedto stop taking the tablets once their vitamin B12 levels have returned to normal andtheir diet has improved. Good sources of vitamin B12 include: meat salmon and cod milk and other dairy products eggs If youre a vegetarian and vegan, orare looking for alternatives to meat and dairy products, there are other foods that contain vitamin B12, such as yeast extract (including Marmite), as well as some fortified breakfast cereals and soy products. Check the nutrition labels while food shopping to see how much vitamin B12different foods contain. If your vitamin B12 deficiency isnt caused by a lack of vitamin B12 in your diet, youll usually need to have an injection of hydroxocobalamin every three months for the rest of your life. If youve had neurological symptoms (symptoms that affect your nervous system, such as numbnessor tingling in your hands and feet) caused by a vitamin B12 deficiency, youll be referred to a haematologist, and you may need to have injections every two months. Your haematologist will adviseonhow long you need to keep taking the injections. Forinjections of vitamin B12 given in the UK, hydroxocobalamin is preferred to an alternative called cyanocobalamin. This is because hydroxocobalamin stays in the body for longer. If you need regular injections of vitamin B12, cyanocobalaminwould need to be given once a month, whereas hydroxocobalamin can be given every three months. Cyanocobalamin injections arent routinely available on the NHS. However, if you need replacement tablets of vitamin B12, these will be cyanocobalamin. To treat folate deficiency anaemia, your GP will usually prescribe daily folic acidtablets to build up your folate levels. They may also give youdietary advice so you can increase your folate intake. Good sources of folate include: broccoli Brussels sprouts asparagus peas chickpeas brown rice Most people need to take folic acid tablets for about four months. However, if the underlying cause of your folate deficiency anaemia continues, you may have to take folic acid tablets for longer possibly for life. Before you start taking folic acid, your GP will check your vitamin B12 levels to make sure theyre normal. This is because folic acid treatment can sometimes improve your symptoms so much that it masks an underlying vitamin B12 deficiency. If a vitamin B12 deficiency isnt detected and treated, it could affect your nervous system. To ensure your treatment is working, you may need to have furtherblood tests. Ablood test is often carried out around 10-14 days after starting treatment to assess whether treatment is working. Thisis to check your haemoglobin level and the number of the immature red blood cells (reticulocytes) in your blood. Another blood test may also be carried out after approximately eight weeks to confirm your treatment has been successful. If youve been taking folic acid tablets, you may be tested again once the treatment has finished (usually after four months). Most people who have had a vitamin B12 or folate deficiency wont need further monitoring unless their symptoms return, or their treatment is ineffective. If your GP feelsits necessary, you may have to return for an annual blood test to see whether your condition has returned. As most cases of vitamin B12 deficiency or folate deficiency can be easily and effectively treated, complications are rare. However, complications can occasionally develop, particularly if youve been deficientin either vitaminfor some time. All types of anaemia, regardless of the cause, can lead to heart and lung complications as the heart struggles to pump oxygen to the vital organs. Adults with severe anaemia are at risk of developing: an abnormally fast heart beat(tachycardia) heart failure where the heart fails to pump enough blood around the body at the right pressure A lack of vitamin B12 (with or without anaemia) can cause the following complications: A lack of vitamin B12 can cause neurological problems (issues affecting your nervous system), such as: vision problems memory loss pins and needles (paraesthesia) loss of physical coordination (ataxia), which can affect your whole body and cause difficulty speaking or walking damage to parts of the nervous system (peripheral neuropathy), particularly in the legs If neurological problems do develop, they may be irreversible. Vitamin B12 deficiency can sometimeslead to temporary infertility (an inability to conceive). Thisusually improves with appropriate vitamin B12 treatment. If you have a vitamin B12 deficiency caused by pernicious anaemia (a condition where your immune system attacks healthy cells in your stomach), your risk of developing stomach cancer is increased. If youre pregnant, not having enough vitamin B12 can increase the risk of your baby developing a serious birth defect known as aneural tube defect. The neural tube is a narrow channel that eventuallyforms the brain and spinal cord. Examples of neural tube defects include: spina bifida where the babys spine doesnt develop properly anencephaly wherea baby is born without parts of the brain and skull encephalocele where a membrane or skin-covered sac containing part of the brain pushes out of a hole in the skull A lack of folate (with or without anaemia) can also cause complications, some of which are outlined below. As with a lack of vitamin B12, a folate deficiency can also affect your fertility. However,this is only temporary and can usually be reversedwith folate supplements. Research has showna lack of folate in your body may increase your risk ofcardiovascular disease (CVD). CVD is a general term that describes a disease of the heart or blood vessels, such ascoronary heart disease (CHD). Research has shown that folate deficiency can increase your risk of some cancers, such ascolon cancer. Alack of folate during pregnancy may increase the risk of the baby being born prematurely (before the 37th week of pregnancy) or having a low birthweight. The risk ofplacental abruption may also be increased. Thisis a serious condition where the placenta starts to come away from the inside of the womb wall, causingtummy (abdominal) pain and bleeding from the vagina. As with a vitamin B12 deficiency, a lack of folate can also affect an unborn babys growth and development in the womb (uterus). This increases the risk of neural tube defects such as spina bifida developing in the unborn baby. Foods rich in vitamin A, D, C, K, fiber, calcium, magnesium, phosphorus & iron are good for healthy teeth and the prevention of tooth decay!Good health is key for happiness and productivity, better mental health, higher productivity, and greater life satisfaction!As part of a healthy Mediterranean diet, grapefruit juice can support weight loss and overall wellness when consumed occasionally, particularly in conjunction with balanced snacks and dishes.Fruits have a key role in the famous Mediterranean Diet plan. Eating a bowl of fruit salad can skyrocket your nutrient intake with fewer than 100 calories. Among others, fruit salads support good health, weight loss, and a good nights sleep.Potatoes are a staple in traditional Mediterranean cuisine. Theyre enjoyed in various forms, including roasted, fried, boiled, mashed & baked.Ancient people in the Mediterranean area didnt consume pastas as we know it today, but they enjoyed various grain-based dishes that involved in modern pasta.As part of a healthy Mediterranean diet, grapefruit juice can support weight loss and overall wellness when consumed occasionally, particularly in conjunction with balanced snacks and dishes.Fruits have a key role in the famous Mediterranean Diet plan. Eating a bowl of fruit salad can skyrocket your nutrient intake with fewer than 100 calories. Among others, fruit salads support good health, weight loss, and a good nights sleep.Sweet corn supports weight loss, as fiber, antioxidants, and many other minerals and vitamins regulate appetite & increase metabolism!Squash & pumpkin seeds are ideal food choices for a light dinner that supports a good nights sleep. They regulate hormone synthesis.Good health is key for happiness and productivity, better mental health, higher productivity, and greater life satisfaction!Some plants like Mullein, Lambs Ear & Thimbleberry make excellent alternatives to toilet paper because of their gentle texture & durability.Sweet potatoes are easy to grow. With plenty of sunlight, regular watering, and well-drained soil, you can harvest them in 34 months!Meat is rich in zinc. Beef, in particular, contributes 20% of zinc intake. Beef has 5.84 g of zinc per 100g. A serving provides even 150% DV.Oysters are the richest seafood in zinc, containing 37.9 mg of zinc per 100g, while anchovies & sardines are the richest fish in zinc.Anchovies & sardines are the richest fish in iron, containing up to 3.3 mg per 100g. Octopus, oysters & clams are also iron-rich seafood.Meat has decent amounts of magnesium. Poultry, beef, pork & lamb contain 20-34 mg of magnesium per 100g. A serving provides 4-7% DV.Carrot juice is a great post-workout: It can speed up recovery, promote muscle growth, alleviate muscle & joint pain, and strengthen bones.Squash & pumpkin seeds can improve sports performance & enhance muscle gain. Antioxidants & protein delay fatigue & reduce soreness.Only a few plant-based foods are high in vitamin B12. The richest vegan foods in vitamin B12 are nutritional yeast, cholera, nori & tempeh.There arent plant-based foods high in vitamin D. Vegans require sun exposure, or even better, take supplements.Cyanocobalamin comes as a solution (liquid) to be injected into a muscle or just under the skin. It is usually injected by a healthcare provider in an office or clinic. You will probably receive cyanocobalamin injection once a day for the first 6-7 days of your treatment. As your red blood cells return to normal, you will probably receive the medication every other day for 2 weeks, and then every 3-4 days for 2-3 weeks. After your anemia has been treated, you will probably receive the medication once a month to prevent your symptoms from coming back.Cyanocobalamin injection will supply you with enough vitamin B12 only as long as you receive injections regularly. You may receive cyanocobalamin injections every month for the rest of your life. Keep all appointments to receive cyanocobalamin injections even if you feel well. If you stop receiving cyanocobalamin injections, your anemia may return and your nerves may be damaged.Postal address:Norwegian Institute of Public HealthWHO Collaborating Centre for Drug Statistics MethodologyPostboks 222 Skyen0213 OsloNorwayVisiting/delivery address:Myrens verksted 6H0473 OsloNorway Tel:+47 21 07 81 60E-mail: Copyright/DisclaimerNew searchHide text from GuidelinesB BLOOD AND BLOOD FORMING ORGANSB03 ANTIANEMIC PREPARATIONSB03B VITAMIN B12 AND FOLIC ACIDB03BA Vitamin B12 (cyanocobalamin and analogues)Hydroxocobalamin for treatment of neuralgia is classified here.Combinations with liver extract are classified at separate 5th levels using the corresponding 50-series. Combinations with folic acid are classified in this group by using the 50-series.Combinations indicated for symptomatic treatment of vitamin B12 deficiency are classified in B03BA51.Vitamin B12, see also:A11D-Vitamin B1, plain and in combination with vitamin B6 and B12A11EA-Vitamin B-complex, plainB03A-Iron preparationsThe DDDs are based on maintenance treatment of pernicious anemia. Different DDDs are assigned for oral and parenteral formulations of cyanocobalamin due to great differences in bioavailability.The DDD for mecobalamin is based on the treatment of peripheral neuropathies.ATC codeNameDDDUAdm.RNoteB03BA01cyanocobalamin70mcgN1mgO20mcgPList of abbreviations Vitamin B12 deficiency causes distinctive dyserythropoietic abnormalities in the bone marrow hallmark megaloblastic anemia characterized by large, abnormally nucleated red blood cells, as well as low counts of white and red blood cells, platelets, or combination (1).Pernicious anaemia is the most common cause of clinically evident vitamin B12 deficiency around the world; other conditions at risk for vitamin b12 inadequacy include atrophic gastritis, vegan-based diet, inflammatory bowel disease, and those who have had gastrointestinal surgery (1) .Vitamin B12 is found in foods of animal origin including milk, cheese, yoghurt and eggs.Recommended daily requirement of vitamin B12 is small (1-2 g/day) compared with total body stores (2000-5000 g) much of which is stored in the liver. This explains why it takes a long time, usually years, for vitamin B12 deficiency to develop (2).Dietary vitamin B12 is freed from the food protein by pepsin in the acid gastric environment and binds to haptocorrin, a cobalamin-binding protein in the saliva. In the duodenum, haptocorrin is degraded by pancreatic enzymes, the vitamin B12 is released and binds with intrinsic factor (IF), which is secreted by gastric parietal cells (1,2).The IF-B12 complex is carried through the small intestine and binds to receptors in the terminal ileum where it is actively absorbed.A small fraction (1-2%) of the daily intake is passively absorbed across the entire absorptive surface of the intestinal tract.The cut off varies by method and laboratory. The following observations are offered (2,3):serum B12 180-1000 pg/ml (3) reference ranges provided are for adultsreference ranges for infants and children are dependent on ageresults should be interpreted along with clinical features and other laboratory resultsB12 levels may be falsely low in pregnant women because of the increased plasma volume rather than actual deficiency (2)if the mother has otherwise unexplained anaemia (or has other clinical signs of B12 deficiency), consider a treatment trial of B12 replacement as suggested below (following local standard advice for non-pregnant individuals with low serum B12 values)in clear cut deficiency, levels of B12 are nearly always