

# “B” Aware of B12

## A New Look at an Old Vitamin

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Vitamin B12 has several important functions, including a central role in the maintenance of normal hematopoiesis, the production and repair of myelin and integrity of the gut lining. It also acts in conjunction with folic acid to lower homocysteine levels.

To maintain normal serum B12 levels five criteria have to be met:

1. An adult has to ingest at least 2.5 micrograms a day;
2. gastric acid is required to uncouple B12 from the foods that contain it;
3. there must be a healthy ileum
4. Adequate levels of specific ileum carrier protein and
5. transcobalamine 2 must be present to circulate it.

### Norm's case

- Norm, 72, complains of increasing fatigue and generalized aches and pains.
- Upon examination, nothing of concern is found.



- It is noted that Norm's hemoglobin is 118 g/L and his red cells are macrocytic-MCV 93 (normal 78-86 fL) MCH 34 (27-32 pg).

### Question

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...drinking more alcohol and  
...ing well since his wife died two  
years ago. Both excessive alcohol  
consumption and poor diet may result in  
macrocytosis. However, further  
investigation confirmed that he does have  
pernicious anemia. Since starting on oral  
B12, his red cell morphology has  
normalized and, of greater importance, he  
feels better.

### ► *B12 and vegetarianism*

It is known that vegans are likely to become B12 deficient, but new research suggests that vegetarians may also be at risk. Lacto-vegetarians avoid eggs, dairy products and meat—the three prime sources of B12.

Approximately 750,000 Canadians are of Indian or Pakistani origin and many follow diets low in B12. In a recent observational study, 32% of south Asians younger than 65 years and 82% older than 65 years were found to have low B12 levels, defined in this case as < 132 pmol/L.<sup>1</sup> There is, however, no consensus as to the definition of low levels—anywhere from < 120 pmol/L to < 150 pmol/L have been cited.

Nevertheless, as the prevalence of low B12 levels in the general population is quoted as being from 3% to 5% among young people and from 5% to 20% among those aged 65 and older, the high rates in south Asians are

certainly noteworthy.

B12 acts as a co-factor with folic acid to reduce homocysteine levels and hyperhomocysteinemia is gaining recognition as a further modifiable risk factor for coronary artery

*V*egans and vegetarians are likely to become B12 deficient.

disease. Southeast Asians are known to be at particularly high risk of premature atherosclerosis and it is tempting to speculate that low B12 levels may play a role in this.

At present, it is not known if taking B12 and folic acid supplements is effective in the primary or secondary prevention of cardiovascular disease, but studies are underway.

### ► *B12 and the elderly*

Achlorhydria, with its associated failure of uncoupling B12, is quite common, especially in the elderly. Food cobalamin malabsorption, first described in 1995, accounts for two-thirds of low B12 cases in the elderly.<sup>2</sup>

This diagnosis is made when low serum B12 levels are found, despite adequate intake, the Schilling test is normal and atrophic gastritis is present. Chronic *helicobacter pylori* infection and/or the long-term ingestion of histamine 2 receptor antagonists or proton pump inhibitors have also been incriminated.

Many elderly people complain of non-specific gut or brain-related symptoms. The Cochrane Collaboration reviewed the results

*F*ood cobalamin malabsorption accounts for two-thirds of low B12 cases in the elderly.

of several studies using oral B12 supplementation and found insufficient evidence that supplementation improved mood disorder, behavioural disturbance or cognitive function.<sup>3</sup>

### ► *Diagnosing pernicious anemia*

It is important not to miss the diagnosis of pernicious anemia (PA), as permanent neurologic damage can result if treatment is delayed.

Until recently, definitive diagnosis depended either on bone marrow aspiration or a two-step Schilling test. The Schilling test requires two accurate 24-hour urine collections performed on two separate occasions, initially using radioactive B12 and then with B12 bound to an intrinsic factor. This test costs

about \$700 and requires several visits to the nuclear medicine department and laboratory.

A simpler and less expensive alternative now exists. If the patient has a personal or family history of autoimmune disease and the mean cell volume is reported as > 110 fl, PA is likely. The diagnosis can then be confirmed by detecting the presence of antiparietal antibodies. This has a sensitivity of 90% and specificity of 50%.

### ► *Oral B12 is preferable to save health-care costs*

Until recently, treating PA with oral B12 would have been tantamount to medical malpractice. Monthly injections of B12 from diagnosis until death was universally recommended. However, there is new evidence that with high doses of

parenteral B12 therapy was \$145 per person

for an approximate cost of \$25,000,000 to the health-care system in a five-year period.<sup>4</sup> Depending on how many visits were solely for the vitamin injection, which would be

avoided by switching to oral therapy, it was estimated that between \$2.9 million and \$17.6 million would be saved. The cost of 100 over-the-counter tablets of 1,200 micrograms of B12 is a mere \$7.

It has been said that oral B12 therapy is one of the best kept secrets in modern medicine. For all the reasons cited above—convenience, efficiency, safety and cost—it should no longer be kept a secret. **Dx**

*Parenteral B12 therapy costs approximately \$25,000,000 to the health-care system.*

oral B12, 1,000 micrograms to 1,200 micrograms daily, it is possible to treat PA effectively and safely and to save health-care costs.

Several studies have confirmed that non-compliance is the only reason for failure of oral B12 and routine monitoring of serum B12 levels during treatment is not necessary.

Significant cost-savings can be achieved by switching all B12 recipients from injections to

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