

# Vitamin B12 Deficiency

*"Fatigue, depression and brain fog are just a few of the many symptoms of a B12 deficiency. And who couldn't use a little more mental clarity?"*

I must confess that sometimes as I write these Tuesday Minutes I feel like I get medical student syndrome; you know where you think you have the symptoms of the topic you are studying. However this time, I definitely reached for the supplement bottle, before I even finished my first paragraph. Fatigue, depression and brain fog are just a few of the many symptoms of a B12 deficiency. And who couldn't use a little more mental clarity?

B12 is needed for every single cell in our body. My thanks to Dr. David Brownstein for his new book "Vitamin B12 for Health" which inspired much of this material. Let's consider some of the factors needed for absorption and then why B12 is so critical for the body.

B12 is a large molecule and is difficult to absorb. The process starts in the mouth with thorough chewing. Adequate HCL in the stomach is needed for the parietal cells to secrete intrinsic factor



which binds to B12. The B12 intrinsic factor complex is absorbed in the lumen of the small intestine then transferred via liver circulation where another protein transcobalamin transports it through the body.

Immediately you should be wondering about those patients that inhale their food or the ones who take medication to reduce stomach acid. The pH of the stomach chyme should be acidic below 2.0 to kill the bacteria on our food, turn on other digestive enzymes and to cleave B12 from the protein

carrier. Inadequate levels of HCL will disrupt the absorption of B12. That means reflux medications will inhibit this process. Currently reflux medicines are the "2nd most prescribed" class of drugs.

Next we add the "over-the-counters" like Tagamet, Pepcid, Zantac or anything that reduces the secretion of HCL; even Maalox impedes B12 absorption. Metformin, the first line therapy for diabetes is also linked to B12 deficiency. Over 48 million prescriptions were doled out in 2010 alone.

It is estimated that 50-80% of the world's population has the bacteria *H. pylori*. *H. pylori* has been linked to atrophic gastritis which is further linked to B12 deficiency. Other factors that impede B12 absorption are pernicious anemia, bariatric surgery, IBS as well as other GI disorders.

In terms of symptoms, B12 deficiency affects the peripheral nerves and in later stages the spinal cord. It's an important component for healthy myelin, our protective nerve covering. So, a B12 deficiency can create tingling and numbness in the extremities, difficulty maintaining balance and coordination, abnormalities of gait, muscle weakness, tremors, age related hearing loss, spasticity and symptoms mimicking MS or Parkinson's disease. Just as disturbing are the mental symptoms of irritability, depression or mania, paranoia, loss of concentration, memory loss, or dementia.

In terms of testing, serum B12 levels range from 260-935 pg/ml depending on the lab. However, any amount of oral B12 will alter the results and cause a false reading. Another functional test is methylmalonic acid or MMA. MMA is converted to Succinyl-CoA and ultimately used by the Krebs Cycle for energy. However, B12 is needed for the conversion from methylmalonic acid to Succinyl-CoA. An elevated level of methylmalonic acid shows a need for B12.

Another functional test is an elevated homocysteine. Homocysteine needs B12 and folate to make methionine. So elevated levels of homocysteine are a signal to look for B12.

Years ago, Dr. Harry Eidenier shared an indirect test that I think is more sensitive than the tests mentioned.

We need B12 and folate for healthy red blood cells. If we don't have optimal amounts, our spleen doesn't break down or cannibalize the old red blood cells and they became larger.

So a simple CBC with differential can be a valuable tool to detect B12/ folate deficiencies. Look at the mean corpuscular volume (MCV). If it is above 89.9 that is a good indicator that a deficiency exists. But if the mean corpuscular hemoglobin is also elevated, above 31.9, you can be pretty sure you have a B12 or folic acid deficiency. Regardless of the numbers Dr. David Brownstein feels that if symptoms exist, a clinical trial is merited. 80% of his patients feel better on B12.

B12 is not always well absorbed via the stomach and as such should be supplemented with a product that will yield good oral sublingual absorption. The key to this therapy, however, is to allow the tablet to dissolve slowly in the mouth. B12-2000 Lozenges contains 2000 mcg of hydroxocobalamin, 800 mcg of folate and 2.0 mg of B6 in the P-5-P form.

Be careful of sublingual forms that contain methylated B12 as many experts claim they will release and activate heavy metals in dental fillings. B12-2000 Lozenges are safe and so tasty that the tendency is to chew them like candy. Research shows that for most people sublingual supplementation can be effective, especially if you are already supplementing with HCL. Some patients may need B12 injections so follow up and monitoring are necessary.

It's possible that 80% of YOUR patients will also feel better on B12. The right form of B12 may be the missing spark some of your patients are looking for.

Thanks for reading this week's edition. I will see you next Tuesday.