

# Case Study

54 year old female with DEPRESSION



Patient was initially seen in June of 2008. She had been suffering from depression for the past 5 years. Her psychiatrist had tried various anti-depressant medications, including Zoloft and Lexapro. At the time of her initial consultation, she was taking Prozac which provided mild relief of her depression. In addition to this, she had been taking Prempro for 3 years. Interestingly, her homocysteine levels were 18.2 umol/L. She had been taking a once-a-day multivitamin and a calcium citrate/vitamin D supplement. She was 20 pounds overweight. Her appetite was described as “too good”. She also has had a long history of poor sleep. SpectraCell’s MicroNutrient testing revealed functional deficiencies of folic acid, vitamin b6, vitamin d, selenium and serine. However, the whole family of B vitamins was at the lowest end of normal. **Based upon these deficiencies, she was administered the following daily nutritional supplement protocol.**

- 1) **B-complex weighted with extra B6 (250 mg). This contained 800 mcg of folic acid**
- 2) **1000 IU of vitamin D3. This was in addition to her calcium/vitamin D supplement which provided 400 IU per day**
- 3) **200 mcg of selenium**
- 4) **100 mg of PHOSPHATIDYLSERINE TID**

**In addition, she was instructed to consume foods high in these nutrients. She was also instructed to receive 15 minutes of direct sunlight each morning.**

**Follow up SpectraCell’s MicroNutrient testing was performed six months later.**

**All deficiencies were resolved except for vitamin D, which was improved but not fully resolved.** She has felt a significant improvement in symptoms. She will be working with her psychiatrist to wean off her antidepressant medication. Sleep has also improved and she is waking up more refreshed. Homocysteine levels dropped to 10.5 umol/L. It was recommended that she continue with a B-complex and vitamin D.

## Discussion:

**So much of depression can be related to neurotransmitter levels. Many nutrients are essential for the production of these biochemical messengers.** Historically, treating depression with nutritional supplements would result in administering a plethora of potentially helpful substances. However, SpectraCell’s MicroNutrient testing provides the ability to individually target functionally deficient nutrients. In this case study, most of the nutrients that were found to be deficient are involved in either the production of key neurotransmitters or can be used to treat depression. Vitamin B6 assists the conversion of tryptophan into serotonin, which is then converted into melatonin. Serotonin is a key neurotransmitter involved in our mood. It is also related to sleep and satiety, which were also part of her symptomatology. Serine is a component of the phospholipids bilayer that creates healthy cell membranes. In addition, phosphorylated serine has been used in multiple studies to treat depression and insomnia. Selenium status can affect psychological conditions and cognitive function. Selenium is necessary for the adequate production of thyroid hormone. Depression can be a symptom of a low functioning thyroid. Folate deficiency is also relatively common in depressed people, with approximately one-third of depressed individuals having a folate deficiency. In addition this vitamin has been found to enhance the effectiveness of antidepressant medication. Elevated homocysteine levels are an independent risk factor for depression. By discovering a low folate and B6 function, their use in being utilized as methylating factors to lower her homocysteine levels was reinforced. Regarding drug-nutrient interactions, prempro can decrease levels of many nutrients, vitamin B6 being one of them.



MicroNutrient  
Testing



SPECTRACELL LABORATORIES  
ADVANCED CLINICAL TESTING

## MOOD DISORDERS and MICRONUTRIENTS

### B VITAMINS

Many important enzymes required for the synthesis of neurotransmitters, such as serotonin and norepinephrine, are dependent on vitamin B6. Similarly, vitamin B12 and folate are required for the synthesis of SAM (S-adenosylmethionine), which is essential for the metabolism of several neurotransmitters. Folic acid supplementation increases methylation reactions in the brain, which ultimately increases levels of serotonin. Observational studies have found that as many as 30% of patients hospitalized for depression are vitamin B12 deficient, and randomized trials have shown improved depression scores after B-vitamin therapy.

### VITAMIN D

Several studies have linked low levels of vitamin D with depression. In fact, studies have shown that the lower the level of vitamin D a patient has, the more severe the depressive symptoms. The cross-talk between vitamin D and specific steroid hormones that has been demonstrated in brain cells is a proposed mechanism for vitamin D's effect on depression.

### VITAMIN E

In a recent study of adults with major depression, levels of  $\alpha$ -tocopherol were inversely related to depression scores. Vitamin E is a major fat soluble antioxidant, suggesting that lower antioxidant defenses against lipid peroxidation may be linked to depression.

### CARNITINE

Carnitine is known to be a powerful antioxidant in the brain and studies have shown improvement in the Hamilton Depression Scale on elderly depressed patients that were supplemented with acetyl-L-carnitine.

### INOSITOL

Several brain neurotransmitters, including serotonin and acetylcholine, require inositol for proper function. In fact, double-blind trials have confirmed the antidepressant effects of inositol, which has also demonstrated clinical benefits for patients with panic disorders.

### MAGNESIUM

Magnesium is a key nutrient in over 300 enzymatic reactions in the body, including the regulation of key neurotransmitters. Deficiency of this mineral has been associated with hypothyroidism, which will often manifest clinically as depression. Animal studies have consistently shown that magnesium depletion leads to anxiety-related and depressed behavior.

### SELENIUM

Considerable evidence suggests that selenium deficiency leads to depressed mood. Trials have shown marked improvement in anxiety levels on patients receiving selenium supplements.

### ZINC

Zinc is an important modulator of the human nervous system by mediating the action of neurotransmitter compounds. Specifically, zinc interacts with NMDA receptors in the brain and evidence suggests that zinc homeostasis is disrupted in mood disorders. Its deficiency is related to depression.

### ANTIOXIDANT STATUS

A patient that has a low Spectrox™ score is experiencing significant oxidative stress, which can affect all systems in the body. Specifically, lipid peroxidation that occurs in neurological tissue can be mitigated with proper antioxidant supplementation. Since depression and stress are known to promote cytokine production, thus contributing to a proinflammatory state, a patient's ability to combat oxidative stress is critical. The Spectrox™ score helps clinicians accurately assess the total antioxidant capacity of the individual, providing insight into possible systemic inflammation that will affect depression symptoms including mood, energy level and pain.