Case Study

46 year old white female with VITAMIN B12 DEFICIENCY and HYPOTHYROIDISM *Secondary diagnosis – heavy metal toxicity, genetic polymorphisms (mutations)*

This patient endured years of undiagnosed paresthesias all over her body, but worse in her feet. This is despite neurology consultation and multiple labs showing "normal" B12. With concerns over MS, her MRI's of C-spine and brain were repeatedly negative over the years.

Additionally, the patient experienced years of edema, difficulty losing weight despite trainers, adherence to healthy diets (of all kinds) and evening fatigue despite sleeping very well. She also had LapBand placed in desperation. She was always "cold to the bone" going as far as to move from Ohio to Florida to escape the intolerable cold weather. She could not be comfortable in air conditioning that was suitable to everyone else in the room. In January 2007, micronutrient testing revealed a vitamin B12 deficiency. Unfortunately, the patient filed this report and didn't follow physician recommendations. In January 2008, micronutrient testing again revealed a deficiency in vitamin B12 as well as zinc, glutathione and antioxidants. **Based upon her deficiencies found with SpectraCell's micronutrient testing, she was administered the following treatment:**

1) **1,000cc IM Q week x 6 weeks of Vitamin B12**
2) **5 mg sublingual methylcobalamin QD**
3) **100mcg QD of Levothyroxine – later changed to 2.5 grains of Armour Thyroid (150 mg) BID**
4) **30 mg QD of Zinc**
5) **1,200 mg QD of N-acetyl cysteine (a glutathione precursor)**
6) **Topical glutathione cream QD**

Clinical Outcome:
B12 deficiency was easily treated and her paresthesias (that had been present for nearly 10 years) became totally absent . The patient's fears of missed/undiagnosed MS are gone. Follow up testing reveals B12 at adequate levels for cellular function

Hypothyroidism has been successfully treated with rather large doses of Armour thyroid. The patient is still zinc deficient despite mineral replacement. Reasons for this are likely 2-fold; patient is requiring high zinc doses for conversion of large-dose T4 to T3 and the patient has heavy metal toxicity. Chelation with oral suppository forms of EDTA/DMSA have been underway for several months, also depleting the free, available zinc. It is expected that once heavy metal toxicity and its treatment are no longer a clinical issue, the zinc will stabilize and the patient will likely be quickly reduced on dosage of thyroid replacement.

Glutathione is one of the most potent intracellular antioxidants found in the liver. It is required to detox from heavy metals as well as many other critical functions. Supplementation quickly restored adequate functioning levels of glutathione so that the patient could rid herself of heavy metals. Additionally, this patient has a genetic polymorphism at the glutathione-s transferase enzyme, resulting in higher glutathione requirements for her as an individual. These genetic polymorphisms are quite common.

The patient also had additional genetic testing, results of which showed a double mutation at the COMT enzyme. COMT stands for catechol-O-methyl transferase and this enzyme transfers methyl groups to compounds in Phase II detoxification in the liver. Methyl groups needed for this enzyme's function come from B vitamins, including B12. A well-accepted clinical finding of faulty, incompetent B-vitamin metabolism is an elevated Homocysteine, which has been found in this patient and documented on SpectraCell's LPP™ report. COMT is responsible for eliminating 4-hydoxy estrone in the liver, a known carcinogen implicated in breast cancer as well as

Copyright 2010 SpectraCell Laboratories, Inc. All rights reserved. 09.10

(Continued) 46 year old white female with VITAMIN B12 DEFICIENCY and HYPOTHYROIDISM *Secondary diagnosis – heavy metal toxicity, genetic polymorphisms (mutations)*

prostate cancer. This patient has participated in recent scientific conferences where researchers have presented compelling data that 4-OH estrone is the CAUSE for breast and prostate cancer. Knowing that her cells have adequate B vitamins for function is critical in this patient for cancer protection and has brought peace of mind.

Cost Savings and Benefits:
Zinc is involved in not only thyroid metabolism but is required for hundreds of metabolic reactions around the body. The implications for zinc deficiency are profound, for not only acute disease but also long-latency disease.

Cost savings with repletion of B12 are enormous. If nutritional testing had been done on this patient in the beginning, the costs of consultations, several MRI's and repeated labs over the years would have all been avoided. The emotional burden of worry over undiagnosed MS would have been avoided. Additionally, costly investigations into fatigue that frequently are fruitless would also have been unnecessary. Many patients with this complaint end up getting sleep studies, sent to a psychiatrist, put on long-term SSRI's or Provigil. All could have been avoided with nutritional testing and B12 replacement.

Glutathione in our liver is critical for eliminating the heavy metals that we are all universally exposed to. Heavy metal toxicity is strongly implicated in the astronomical rise of autoimmune disease in this country. It is not well-known that blood testing for metals miss most patients with this problem and that a provoked challenge is the best way to test. Glutathione-deficient patients cannot rid themselves of not only heavy metals, but also cannot rid themselves of the toxic burdens of cigarette smoke and carcinogens found in char-grilled meat. These carcinogens are well-associated with increased risk of cancer and glutathione is how our body naturally rids itself of these carcinogens. Simple, inexpensive glutathione repletion is critical for every deficient person, no matter their health, as we are all exposed to these insults. Knowing glutathione status is a simple, cost-effective way to prevent both short-latency as well as long-latency disease and disability.

Copyright 2010 SpectraCell Laboratories, Inc. All rights reserved. 09.10