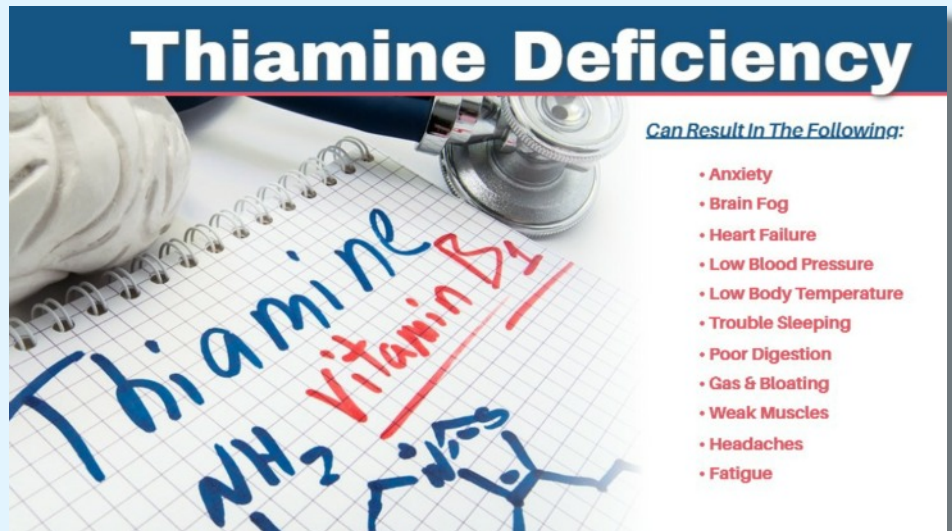


# Thiamine Deficiency

“Thiamine is one of the biggest factors to relieve stress, because it primes mitochondrial pumps, creating more cellular energy.”

One of the first nutrients that is lost when under stress is B1, thiamine. And one of the great champions of thiamine was Dr. Derrick Lonsdale. In his book: Thiamine Deficiency Disease, Dys-autonomia and High Calorie Malnutrition, he shared that chemical toxins, chronic infections, EMF, radiation, and biotoxin exposure significantly contribute to chronic stress. Chronic stress, as you know, triggers the need for more energy to overcome the stress regardless of the cause.

Here's something I didn't know. Thiamine is one of the biggest factors to relieve stress, because it primes mitochondrial pumps, creating more cellular energy. When you look at the citric acid charts, you see that TTP (short for thiamine pyrophosphate) or cocarboxylase is needed for several steps. Glucose is converted to pyruvate which is turn is converted to pyruvate dehydrogenase. Using thiamine pyrophosphate or cocarboxylase then the citric acid cycle begins, but halfway through we need alpha-ketoglutarate dehydrogenase, which as you can see is another thiamine pyrophos-



phate or cocarboxylase dependent enzyme. These thiamine dependent enzymes are depleted during stress, which in turn limits the amount of ATP available. Remember, the citric acid cycle feeds the electron transport chain enzymes and cofactors, which are needed to manufacture ATP. If the cofactors aren't present, we only get 2 units of ATP via glycolysis verses 36, if it goes through the electron transport chain.

Thiamine dependent enzymes have regulatory effects on multiple systems. They act on other enzymes, and these enzymes in turn are rate limiting for other enzymes. For

example, the enzyme transketolase is needed to make glutathione, what I call the holy grail of antioxidants. Guess which nutrient deficiency limits transketolase. Exactly – thiamine.

Here's what Dr. Lonsdale had to say about just one of the results of a thiamine deficiency. “The patient with a thiamine deficiency had a very low concentration of oxygen in the arterial blood but had a high oxygen concentration in the venous blood. The oxygen was picked up at the lung, but it wasn't being transferred to the cell. It was passing through the cell and getting into the venous blood without

being consumed. In other words, thiamine becomes the arbitrator of a normal oxygen balance and utilization in the cell.”

Lack of thiamine creates a lack of oxygen at the cellular level and creates a pseudo-hypoxic condition. What thrives in a hypoxic environment? Bacteria, viruses, even cancer. Stress of any kind depletes thiamine, and that includes chemical toxins, chronic infections, EMF, radiation, and biotoxin exposure. As you know, all these factors create oxidative stress and chronic inflammation. Both oxidative stress and chronic inflammation rob the body of thiamine. By the way, let's make sure we put glyphosate in that chemical toxin category. According to Lonsdale, not only does glyphosate inhibit ATP production by 40%, but it distorts healthy gut biomes allowing dysbiotic bacteria and their byproducts to thrive.

Dietary sources that deplete thiamine include: coffee and tea, consumption of red cabbage, blueberries, red currants, red beets, beans, chickpeas, lentils, seed oils, consumption of raw fish, excess alcohol, medications, especially diuretics.

There are many forms of thiamine: thiamine hydrochloride and thiamine mononitrate, which are both water soluble, benfotiamine, which is fat soluble, and a form called TTFD. But the body converts all these forms to thiamine pyrophosphate, which is also called cocarboxylase.

One of my mentors, Dr. Mark Force gave an incredible webinar titled, “Using B Vitamins in Clinical Practice: Optimizing Patient Outcomes,” focusing on B1, B2, and niacin. It was loaded with clinical pearls. Building on Dr. Lonsdale work and his own clinical practice, he shared that thiamine deficiency can result in the following: an enlarged heart or heart failure, pulse below 65 or an irregular pulse, low blood pressure, varicose veins, spider veins or hemorrhoids, slow reflexes, irregular heartbeat, experiencing worry, anxiety, insecurity, or a highly emotional state, is sensitive to noises or

smells, has trouble with concentration or foggy thinking, poor digestion, experiencing gas, bloating, or indigestion, awareness of muscle twitching, feels drowsy after eating, sore achy muscles after little exercise, constantly fatigued, wakes up at night to urinate, wakes up at night and can't get back to sleep, experiencing back pain when in one position especially in bed at night, a headband like headache like a tight band around the head, itchy skin, sensitive to insect bites, shortness of breath, no stamina, frequently yawns, low body temperature, muscles that feel weak and one's body feels heavy.

Both Dr. Lonsdale and Dr. Force shared direct lab testing is expensive and not readily available. Dr. Force suggested CO2 is a good indicator because it reflects mitochondrial function. Combining a CO2 below 26 and some, but not necessarily all, of the symptoms we discussed, gives you a good idea there is a deficiency. Some doctors may use muscle testing, but another way to test is to use an in-office functional deficiencies test called the Rhomberg. Thiamine deficiency has a major effect on the autonomic nervous system. So, one's balance will be affected. You can see a link to the right that discusses it in more detail.

Biotics Research makes several forms of thiamine both as thiamine mononitrate and cocarboxylase. Thiamine 50 contains 50 mg of thiamine mononitrate, for doctors that want to give higher dose thiamin. Bio-3B-G is a low dose form that contains the cocarboxylase form as well as other B vitamins in their methylated forms.

You can see links to the right for label information. There appears to be a wide range of dosage recommendations from the orthomolecular docs to the low potency practitioners. We'll come back to this topic discussing dosage recommendations in another thiamine deficiency video, part 2.

Thanks for being with me today. I look forward to being with you again next Tuesday.