The Link Between Adrenal Fatigue and DNA Methylation

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Editor:
Adrenal function is vital to life: without cortisol we die. This fact has been known since the 1930s when it was described by Banting and Best. Glucocorticords are essential for maintaining carbohydrate, protein and fat metabolism. They also have a permissive effect which allows for glucagon and catecholamines to work. Important glucocorticoid effects include the normal functioning of the nervous system, water metabolism, vascular reactivity, regulation of circulating lymphocytes and the immune system and resistance to stress. Complete lack of adrenal function is a disease state known as Addison's Disease. It is an autoimmune disease usually, caused by antibodies that attack the adrenal gland. Conventional medicine only recognizes two states: you either make cortisol or you don't. Allopathic physicians are unaware of the decline in adrenal function as illness becomes chronic.

The etiology is adrenal fatigue begins with a stressor or in functional medicine terms a trigger. Triggers fall into several categories: psychosocial stress, environmental toxins (radon, mercury, mold), infectious organisms (fungal, bacterial, parasitic), food allergies (wheat, corn, sugar, milk), and other toxins (alcohol, drugs, prescription medications) to name a few. In addition, stressful events such as surgery or car accidents place a huge (usually unrecognized) load on the adrenal glands. The initial response to each of the above events is to elevate cortisol levels to help cope with the stress. However, over time, the adrenals become weakened and lose their circadian rhythm. This is due in large part to poor nutrition. All stressful events require increased amounts of several nutrients: vitamin C, pantothenic acid, B6 (pyridoxine), B12(methylcobalamin), and folate. Interestingly, if the adrenal glands are catheterized and a stressor is introduced, the first chemical to leave the adrenals is not cortisol as one would suspect, but large amounts of vitamin C. These nutrients are severely lacking in the typical American diet or are not found in high enough amounts. More often than not "orthomolecular" dosing is necessary to correct the deficits.

The initial response to any stress is the hypersecretion of cortisol, but over time (approximately one year) there develops a negative feedback and a genuine "fatigue" causing reduced levels of DHEA-S and cortisol . The end result is an organism with reduced immunity, increased likelihood of autoimmune disease, heart attacks, elevated cholesterol and triglycerides, skin disorders, carbohydrate cravings, protein wasting, fatigue and depression (to name but a few). Physicians normally view these as separate events in a given organ and do not see that the symptoms represent a disease process (inflammation) that may occur in one or more organs simultaneously. Therefore everyone with any chronic disease, not just cardiovascular disease, should be screened using DHEA-S and a homocysteine level. As DHEA-S decreases, the level of homocysteine rises, with a concomitant decrease in most B-vitamins, but especially folate and B12. The currently accepted norms for these parameters are too permissive, reminiscent of glucose control in years gone by. All of our organs are linked and nothing that happens is random. We are all the result of our genetic interaction with our environment.

With the establishment of "disease" another pivotal biochemical event happens: abnornal methyl groups nosedives as well. These patients may then present with symptoms of depression (inability to synthesize S-adenosylmethionine), joint pain (inability to make methylsulfonylmethionine), to name a few. Not only does teh abiltiy to convert to a methylated product is also compromised. For example, in chronically ill individuals the sue of B12 - as either the cyanocobalamin or the hydroxocobalamin form seems to do little to improve fatigue or mental functioning. The ideal compound to replenish B12 is methylcobalamin - the only active form. In each case, oral supplementation with the missing methyl-containing substrate ameliorates and symptoms. In each of the scenarios listed, the severity

of the illness correlates with the level of the reduced or deficient DHEA-S and the concomitant elevated homocysteine level. The elevated homocysteine leve is not only a marker for inflammation, but it is a marker for deficient B vitamins as well. The stage is now set for abnormal DNA methylation and the induction of cancer.

Efforts to repair adrenal fatigure include nutrients (in their most active form), glandular preparations, DHEA (and in severe cases cortisol itself), and lifestyle modifications with removal of triggers. Even with these measures, expect adrenal recovery to take 3 to 5 years.

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