**Nutritional Aspects of Stress**

**Introduction**

Everyone today uses the word stress, but what does this term really mean? How does stress relate to our nutritional status and abnormal deviations in our body chemistry, which lead to such a wide variety of metabolic dysfunctions.

The stress theory of disease was a brainchild of a Canadian physician, Dr. Hans Selye, MD. According to Selye, stress pertains to a state produced within an organism subject to a stimulus perceived as a threat (stressor). Selye actually described stress as "a common denominator underlying all adaptive responses within the body..."(1) To summarize, stress is the specific way our bodies respond to anything that poses a threat to health. The factors which cause this response are called stressors.

Practically everything and anything can act as a stressor, from physical conditions such as cold, or heat, to psychological stressors such as worry, fear, or anxiety.

**You Can't Avoid Stress - The Positive Effects Of Stress**

Dr. Selye emphasized that stress is neither bad nor good. In fact, we need a certain amount of stress, or our bones will demineralize and our muscles will atrophy, more important, life is not worth living.

Selye authored a book entitled Stress Without Distress to elaborate on the concept that stress cannot be avoided and that there are types and amounts of stress that are actually beneficial and necessary for health.

**Internal And External Stress**

We all too often erroneously think of stressors as external factors such as heat, cold, financial problems, family troubles, etc. What is often overlooked is that stress can arise from within the body. Stress arising from within the body is referred to as internal stress. Nutritional imbalances, negative emotions, unreasonable attitudes and fatigue are examples of internal stress.

External stressors always end-up causing internal stress-induced nutritional imbalances. When the ensuing nutritional imbalances become severe, the body is no longer able to recover from stress, energy levels diminish and disease conditions develop.

**Stress And Nutrition**

Dr. Selye unfortunately did not address the question of how to nutritionally offset the negative effects of stress. However, in 1972, Dr. George Watson,(2) a researcher from U.C.L.A., identified what he referred to as fast and slow oxidation states, as they relate to nutrition. These terms referred to the rate at which the body burns, or oxidizes its food. It soon became apparent to myself (Dr. Paul Eck) that a definite relationship existed between oxidation type and the various stages of stress as described by Selye.

Fast oxidation, which is associated with over activity of the adrenal and thyroid glands, correlated well with the alarm stage of stress. Fast oxidation also correlates well with the recently defined type "A" or aggressive personality.

Slow oxidation, which is associated with underactivity of the adrenal and thyroid glands, correlated well with the exhaustion stage of stress. Slow oxidation correlates well with the type "B" or laid-back personality.

Since Dr. Watson discovered that certain foods and nutrients are specifically required for the different oxidation types, this was the beginning of the development of specific nutritional therapy related to an individual's current stage of stress, a revolutionary nutritional concept discovered by Dr. Paul Eck.

**Various Stages Of Stress Can Be Determined From A Hair Analysis**

The only essential step missing was a reliable way to identify the stage of stress, or oxidation type. Watson had used blood and odor tests to determine oxidation types. Through much experimentation, Dr. Eck discovered that mineral ratios, as determined by a hair mineral test, could be used to calculate the oxidation rate, thereby providing an accurate means to identify the stage of stress a person is currently in.

We define fast oxidation as the mineral pattern which indicates overactive thyroid and adrenal gland activity (alarm stage). Slow oxidation is the mineral pattern indicating underactive thyroid and adrenal gland activity (exhaustion stage).

There exists another oxidation type referred to as mixed oxidation in which the adrenal and thyroid glands are out of synchronization, i.e., one endocrine gland is overactive and one gland is underactive.

**Stages Of Stress**

According to Selye's stress theory of disease, there are three stages of the common disease process.

**The Alarm Stage of Stress and Fast Oxidation**

The first stage of stress, according to Selye, is known as the alarm stage; "a stressor causes an initial activation of the body's defense mechanism. What ensues is a complex physiological response involving several interacting systems within the body. The alarm reaction is basically characterized by the release of adrenal medullary and cortical hormones into the bloodstream. In summary, most investigators today consider the alarm phase of the general adaption syndrome (GAS) to be the sympathetic response. The alarm phase is known as the fight or flight response, with subsequent release of epinephrine into the bloodstream, due to adrenal medullary activation, followed by a ACTH-adrenal cortical response."(3) In the alarm stage the body recognizes that something has gone wrong. The body recognizes that it is under attack. It therefore proceeds to set into motion its first line of defense, the sympathetic nervous system response.

The effect of an accelerated sympathetic nervous system response is to increase the rate of metabolism. We find that the alarm stage of stress is synonymous with fast oxidation. In other words, the metabolic rate speeds-up (energy production) to overcome the problem at hand, whether it is an infection, psychological turmoil, nutritional stress, mechanical, or chemical stress, or whatever the case may be.

To overcome the stressor, the body requires an increase in energy output, which is generated by increasing the activity of the thyroid and adrenal glands. Increasing one's energy level is the body's first line of defense. A fast oxidizer, in general, (unless in burnout, as indicated by a sodium/potassium ratio less than 2.5:1.) has a high energy level due to a high output of these glandular hormones. A high energy level is required to overcome any threat (stressor) to the body's integrity and health. The failure to muster sufficient energy ultimately results in a disease, or diseases of adaptation.

**The Acute Stage of Disease - Fight or Flight Syndrome**

The alarm stage of stress is also referred to as the fight-flight reaction. The fight-flight response is intimately associated with an acute disease stage. As a result of the body's attempt to contain the stressor, acute symptoms such as pain, inflammation and fever commonly result. As long as a person remains in fast oxidation we know that the body is continuing to defending itself - the disease process is still active. If the stressor is overcome, the alarm ceases and the body returns to its resting state.

**The Stage of Resistance**

What happens, if as a result of any kind of stress, the body fails to develop an initial corrective reaction? As a result, the disease process will progress into what Hans Selye refers to as the resistance stage of stress, which is identified on a hair analysis as a sodium/potassium inversion (sodium/potassium ratio less than 2.5:1). During the " . . . stage of resistance, there is a dramatic reduction in alarm reactions, as full resistance to the stressor is developed. Here it is an attempt on the part of the body to maintain homeostasis in the presence of the stressor which initiated the alarm reaction. Cortisol (potassium) secretion is elevated indicating that the body is functioning at heightened levels. If the stressor prevails, then the mechanisms involved in supporting this stage of resistance will weaken."(4)

"...Here, the endocrine activity is heightened. High circulating levels of cortisol begin to produce pronounced effects on the circulatory, digestive, immune, and other systems of the body. Shock, ulcers, and lowered resistance to infection may begin to appear as the adaptation can no longer prevail. Indeed, in many cases, this experience can prove lethal to the organism."(5)

In other words, the organism has failed in its attempt to overcome the stress during the initial alarm stage. As a result, the body enters into a stage of resistance which can be identified on a hair analysis chart by a sodium/potassium inversion. The stage of resistance, as characterized by a sodium/potassium inversion, is reflective of the resistance stage of stress and may occur in both the fast and slow oxidizer.

**The Stage of Exhaustion, Chronicity and Slow Oxidation**

If the resistance stage is inadequate in overcoming the problem at hand, then the body eventually passes into a steadily declining stage of exhaustion which is synonymous with Selye's third stage of stress, or what he called the exhaustion stage. This is the stage in which we find the slow oxidizer with either severely low sodium and potassium levels, or a sodium/potassium inversion.

**Signs, Symptoms And Nutritional Correction Of Each Stage Of Stress**

Signs and Symptoms in the Alarm Stage

Approximately ten to twenty percent of the American population is in the alarm stage of stress response at any given time. In the alarm stage, thyroid and adrenal hormone secretion increases to above normal values. Energy levels are generally high and as a result these individuals are extroverted, energetic types.

Blood pressure and blood sugar levels increase, the pulse is rapid, and reflexes are quickened due to stress-induced calcium and magnesium deficiencies, as indicated on a hair analysis by lower than normal calcium and magnesium values. These physiological reactions are all part of the gearing-up, or the fight or flight syndrome.

Adults in the alarm stage of stress tend to perspire profusely, due to an increased metabolic rate.

Dietary-wise, the fast oxidizer usually enjoys eating fats and meat protein to maintain necessary energy levels and to counterbalance the excessive tissue catabolism commonly associated with the alarm stage of stress. Their health problems, if not resolved, often include high blood pressure, high blood sugar levels (strong tendencies toward diabetes), anxiety, nervousness, insomnia, and often acute aches and pains.

The great majority of young children are fast oxidizers and hence they tend to be hyperactive, irritable, and emotionally oversensitive. All too often they suffer from sleeping problems. Some suffer from learning difficulties because they are unable to concentrate in school, due to a racing mind.

**Hair Analysis in the Alarm Stage of Stress**

The hair mineral test of a person in the alarm stage of stress reveals lowered calcium, magnesium and often zinc levels. As a rule, sodium and potassium levels are relatively high, due to increased aldosterone and glucocorticoid secretion by the adrenal gland. Since aldosterone and glucocorticoid levels are increased in the alarm stage of stress, so the sodium and potassium levels in the hair also tend to be abnormally high.

**The alarm stage of stress is depicted by fast oxidation and the sodium/potassium ratio greater, or equal to 2.5:1.**

**Nutrition for the Alarm Stage**

In the alarm reaction the body either stores, or eliminates through the kidneys, excessive amounts of calcium, magnesium, zinc and copper. The lower level of these minerals results in a necessary adaptive increase in the metabolic rate, muscle tone, and diminished reflex time, thus permitting the body to take immediate action.

For the person who is chronically in the first, or alarm stage of stress, we find that the addition of supplemental calcium, magnesium, zinc and copper assists him to return to the resting, or normal state. Certain "B" vitamins such as choline, inositol and pantothenic acid along with vitamin A and D are helpful in restoring nutritional and biochemical homeostasis in this stage.

Foods that are particularly beneficial during the alarm stage include red meats which contain a higher proportion of fat and zinc than non-red meat protein. Dairy products (rich in calcium) such as butter and good-quality cheeses are beneficial as well. Nuts and seeds are excellent sources of magnesium, one of the nutrients most needed by fast oxidizers. Seafoods, rich in zinc, are also beneficial.

Changing the diet to include more essential fats and oils, and reducing one's sugar and simple carbohydrate intake has been proven to be of value in restoring these individuals to better health. An increased (temporary) fat intake tends to slow an excessively high metabolic rate, preventing excessive mineral loss, whereas sugar intake further speeds-up the metabolic rate, resulting in a flare-up of all the symptoms associated with the alarm stage of stress.

Although increasing one's dietary oil and fat intake appears to go against the modern trend toward low-fat diets, scientific research has clearly proved that fats are beneficial for those individuals in the alarm stage of stress. These individuals (fast oxidizers), unless in a sodium/potassium inversion (burned-out fast oxidizers), normally have low to normal cholesterol and triglyceride levels and burn, or oxidize fats efficiently.

Many times we find that children's erratic behavior improves when all sugar-containing foods, including unsweetened fruit juices, are eliminated from their diet. This is because the great majority of children manifest a mineral pattern (fast oxidation with a sodium/potassium inversion) suggestive of the alarm stage of stress.

**Signs and Symptoms of the Resistance Stage of Stress**

The resistance stage of stress is characterized by a reduction in energy levels as compared to fast oxidation. Energy levels are not constant, they tend to fluctuate up and down.

**Hair Analysis in the Resistance Stage of Stress**

In the resistance stage of stress, either the thyroid, or the adrenal gland, is overactive while the other endocrine gland is underactive. There are many varieties and degrees of mixed oxidation depending on the relative sluggishness, or over activity of the thyroid and adrenal glands.

**The resistance stage of stress is depicted by:**

* fast oxidation with the sodium/potassium ratio greater than 2.0:1 and less than 2.5:1, or
* slow oxidation with the sodium/potassium ratio greater than 2.49:1, or
* mixed oxidation with the sodium/potassium ratio greater than 2.49:1.

**Signs and Symptoms Associated with the Exhaustion Stage/Slow Oxidation**

As stress continues, essential nutrients become further depleted, resulting in further impairment of adrenal and thyroid activity. The result is the exhaustion stage of stress. The great majority of adults suffering from chronic disease are in the exhaustion stage of stress.

In the exhaustion state of stress, adrenal and thyroid activity is diminished, often cholesterol levels rise, toxic metals accumulate in the body, and chronic diseases, such as diabetes, cancer and cardiovascular disease become manifest. Food is burned much more slowly than normal. It is as if the body is attempting to conserve its limited source of reserve energy. Often, constipation, allergies, fatigue and hypoglycemia are present.

**Hair Analysis in the Exhaustion Stage of Stress**

Several mineral patterns, as determined by a hair analysis, are associated with the exhaustion (burnout) stage of stress.

* fast oxidation with the sodium/potassium ratio less or equal to 2.0:1, or
* slow oxidation with the sodium/potassium ratio less than 2.5:1, or
* mixed oxidation with the sodium/potassium ratio less than 2.5:1.

**Nutrition in the Exhaustion Stage of Stress/Slow Oxidation**

Dr. George Watson(6) found that slow oxidizers respond favorably to a low-fat, high protein intake. Fruits and vegetables are helpful because they provide potassium, vitamin C and other nutrients, which are notoriously deficient in slow oxidizers.

Many slow oxidizers suffer from hypoglycemia, or even diabetes, and will feel better by restricting their dietary intake of simple sugars and carbohydrates. This is especially true if their sodium/potassium ratio is less than 2.5:1, or their calcium/magnesium ratio is greater than 8.49:1, or less than 4.51:1. Refined sugars in particular may provide temporary relief but tend to further imbalance body chemistry because not only are they devoid of minerals, but they cause a loss of calcium, magnesium and zinc. This results in an impaired ability to derive energy from these food substances.

Extra quantities of certain vitamins are definitely needed in this stage of stress. The B-complex, particularly B1, B3, B5, and B6 are much needed, as are manganese, zinc, vitamin C and E, and often potassium.

**How To Identify One's Stage Of Stress**

From the above, it can readily be noted that foods and supplementary nutrients that are required in different stages of stress differ. Therefore, to reduce, or correct the detrimental effects of stress, it is essential to recognize the stage of stress that an individual is currently in.

Although it is possible in certain cases to identify fast and slow oxidizers from symptoms alone, many times this is not possible, or even desirable.

Sometimes one's body configuration may yield clues to an individual's oxidation rate. Fast oxidizers have a tendency to carry their weight higher up on their bodies and their legs and arms are more slender. Slow oxidizers tend to have more weight around the hips (pear-shaped body) and legs.

However, a much more reliable method of determining one's stage of stress is by a hair analysis test. Through much experimentation we have learned how to use hair mineral ratios to determine one's oxidation rate with mathematical accuracy.

To arrive at an accurate determination, the hair must NOT be washed at the laboratory, as is done at many labs. The calcium/potassium ratio and the sodium/magnesium ratio are then calculated. The different stages of stress can then be calculated as follows:

**Alarm Stage or Fast Oxidation**

* Calcium/potassium ratio less than 4.0:1 and
* Sodium/magnesium ratio greater than 4.17:1

**Exhaustion Stage of Fast Oxidation**

* Calcium/potassium ratio less than 4.0:1 and
* Sodium/magnesium ratio greater than 4.17:1 and
* Sodium/potassium ratio less than 2.5:1

**Resistance Stage or Mixed Oxidizer**

* Calcium/potassium ratio greater than 4.0:1 and
* Sodium/magnesium ratio greater than 4.17:1 or
* Calcium/potassium ratio less than 4.0:1 and
* Sodium/magnesium ratio less than 4.17:1

**Exhaustion Stage or Slow Oxidation**

* Calcium/potassium ratio greater than 4.0:1 and
* Sodium/magnesium ratio less than 4.17:1 or
* Sodium/potassium ratio less than 2.5:1

By thus determining the stage of stress a person is in, it becomes possible to recommend the proper foods and nutrients to begin reversing the stress process. This allows the individual to move from the exhaustion stage back into a higher energy, or earlier stage of stress.

Using these precise methods, we have been able to reverse even advanced chronic diseases associated with extreme stress. Research is ongoing at Analytical Research Labs to refine these methods as new information becomes available.

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