

# Stress-X

A complete nutritional support formula combining minerals, vitamins and herbs to support the body during periods of stress

## Introduction

Stress is defined as a disturbance in one's physical, mental or emotional equilibrium. More precisely, Melloni's Medical Dictionary defines stress as an abnormal condition that disrupts the normal functions of both the body and the mind.<sup>1</sup> Stress takes on many forms. It can be physical, emotional, or psychological. Examples of physical stressors include exertion, extreme temperatures, illness or injury, or overstimulation, such as being exposed to loud, sudden noise. Examples of psychological and emotional stressors include job and/or family pressures, feelings of anger, anxiety or fear, or feeling out of control. Although stress may be an unavoidable fact of life, especially in today's fast-paced society, the effects of stress can pose serious risks to health and should be taken seriously. Stress depletes important minerals, vitamins and nutrients from the body. This deficit can have a significant impact on one's health, weakening the immune system and leaving one vulnerable to certain acute and chronic health conditions. Therefore, it is critical to provide the body with additional nutrients such as magnesium, B-vitamins and antioxidants during periods of acute or long-term stress.

This technical product paper from Mineral Resources International discusses the three types of stress, including acute, episodic acute, and chronic, and the physiologic effects these three types of stress can exert on the body. In addition, this paper discusses Stress-X, MRI's nutritional stress and burn out formula, and explains the unique features that distinguish this formula from other stress relief products. This paper will conclude with a brief review of the latest nutritional research about certain minerals, vitamins and herbs and their documented effects in reducing the harmful physical effects of stress.

## The Three Types of Stress

There are three main types of stress: acute, episodic acute and chronic.<sup>2</sup> Acute stress has an immediate onset, which forces the body into an immediate reaction. Examples of acute stressors might include a minor traffic accident, an argument, or an impending deadline one is straining to meet.

Episodic acute stress is acute stress that occurs frequently. Forms of episodic acute stress can include escalating demands for personal time and attention or ceaseless worry and anxiety. An

extreme type of episodic acute stress could include “Type A” behavior, characterized by competitive drive, aggressiveness, impatience and urgency.<sup>2</sup>

The third type of stress is chronic, or long-term. Examples of chronic stress can include unrelenting job and family pressures, sleep deprivation, and strained roles and responsibilities at work and home.

## How Stress Affects Our Body

Stress has a very real effect on the body. It causes many specific and documented reactions affecting the hypothalamus and the endocrine, nervous and limbic systems.<sup>3,4</sup> When an individual feels stressed, the body responds through a series of complex physical reactions. This is referred to as the “fight or flight” response. During this response, the adrenal glands release chemicals called catecholamines, including dopamine, epinephrine, and norepinephrine, into the bloodstream, which increases the heart rate, raises blood pressure, and causes the muscles to tense.

Chronic stress, the unrelenting form of stress, poses a serious threat to health and longevity. Persons suffering from chronic stress are more prone to degenerative and inflammatory conditions such as heart attack, stroke, atherosclerosis, and, even cancer.<sup>2</sup> However, it is important to note that stress affects people differently. No two people respond to stress similarly. The same form of stress that may cause one person to develop an ulcer may cause another to develop high blood pressure.

There is one exception to this principle and that is the fact that chronically stressed individuals have suppressed immune function. Stress research has consistently shown that catecholamines suppress the natural killer cell activity of the immune system, thereby weakening the body’s immune response and increasing one’s susceptibility to colds and infections.<sup>4-7</sup>

## Stress and Its Nutrient-Depleting Effects

Stress has one other significant effect on the body: it places additional demands on the body in terms of nutrition and energy. Increased adrenaline production (i.e., catecholamines) accelerates the body’s metabolism of proteins, fats, and carbohydrates. This intricate biological and biochemical response is designed to produce quick energy so that the body can immediately confront the stressor.

However, the increased amount of adrenaline that is suddenly released also has one other effect. It causes the body to mobilize and quickly utilize important vitamins and nutrients such as amino acids, B-vitamins, vitamin C, and minerals like magnesium, potassium and phosphorous. Therefore, it is critical to ensure adequate and consistent replenishment of these important nutrients during times of physical, emotional and psychological stress.

Presently, most individuals lead chronically stressed lives. Without a sufficient intake of essential minerals and vitamins to compensate for their body’s increased need, many are very vulnerable to the damaging physical effects of stress.

## Ingredient Highlights

Stress-X is a dietary supplement that combines the functions of minerals, vitamins, herbs and other important nutrients into one comprehensive stress formula. Most stress management products are either an all-herbal or all-vitamin formula. Most herbal stress formulas typically contain a single herbal ingredient such as a valerian, for instance, or a combination of herbs that have sedative properties. These products are designed to impart a feeling of relaxation. The majority of vitamin stress complex formulas typically contain ample potencies of B-vitamins, and are designed to replace B-vitamins utilized by the body during stress. However, both the herbal and vitamin stress products lack an important component — minerals. Just as the body's requirements are higher for certain vitamins during periods of stress, so it is too with minerals. Minerals are also depleted by stress and need to be replenished as well.

Stress-X from MRI is nutritionally formulated to combat stress. It combines the nutritional benefits of vitamins burned by the body during stress such as A, B-complex, C and E; with minerals, primarily electrolytes, such as chloride, calcium, magnesium and potassium that assist in nerve transmission, muscle contraction, and numerous enzyme reactions. Stress-X is also formulated with important trace elements such as selenium and zinc that play a key role in immune function. To balance this formula, MRI has included an herbal blend containing valerian, chamomile, hops, wood betony, and skullcap that help relax and sooth the nervous system along with Siberian ginseng that helps to re-energize the body

so that one does not feel drowsy while taking this product. To provide complete balance, Stress-X also contains a rich food concentrate complex composed of bioflavonoids, spirulina and enzymes.

As part of a healthy diet, exercise program and stress management program, Stress-X can help individuals fight stress in four ways by helping individuals to relax, adapt, replace and nourish with selected minerals, vitamins, herbs, and enzymes from Stress-X.

MRI has also received feedback from customers that Stress-X is helpful for sleeplessness, jet lag, and pre-menstrual syndrome.

## Vitamins

The following section briefly reviews the biological and biochemical actions of some, though not all of the vitamins, minerals and herbs in Stress-X, with particular regard to its effect on stress and stress-related disorders.

**Vitamin A:** Vitamin A plays an important role in maintaining immune function. As an antioxidant, it protects immune function by helping to maintain the integrity of epithelial barriers to infections. It also activates phagocytes and cytotoxic T-cells. Studies also show that vitamin A confers a protective effect against peroxidation in the heart and brain. Peroxidation is believed to be a risk factor for heart attack and stroke.<sup>8</sup>

**B-Complex Vitamins:** B-vitamins are necessary for numerous body processes including but not limited to energy production, metabolism, signal transduction, and maintenance of genomic integrity. Several studies show a positive association with intakes of certain B-vitamins and health.<sup>8</sup> For instance, in a

study composed of female patients, researchers determined that improved thiamin, or vitamin B<sub>1</sub>, status corresponded with improved mood.<sup>8</sup> Niacin is another member of the B-vitamin family found to be beneficial for stress-related conditions. Niacin has antioxidant activity and studies corroborate its beneficial effect in lowering high cholesterol and triglyceride levels and protecting against atherosclerosis.<sup>8</sup> B-vitamins also are needed for the production of neurotransmitters, which are biochemicals that allow the brain cells to pass messages to one another.<sup>9</sup> B<sub>6</sub> has been identified as important for the production of serotonin, a neurotransmitter required for several functions.<sup>9</sup> Serotonin is believed to be involved in controlling states of consciousness and mood. Vitamin B<sub>6</sub> has also been found to have immunomodulatory effects as well. Immune studies have shown that the elderly as well as individuals with HIV are deficient in B<sub>6</sub>. Supplementation of B<sub>6</sub> produced significant improvement in immune function including lymphocyte proliferative responses to both T- and B-cell mitogens.<sup>8</sup> More recently, reduced levels of B<sub>6</sub> have been associated with hyperhomocysteinemia, a risk factor for heart disease.

**Vitamin C:** Vitamin C is another powerful antioxidant that scavenges free radicals and protects against some of the harmful effects of stress. Vitamin C has antiatherogenic, antihypertensive and immunomodulatory effects.<sup>8</sup> Animal studies indicate that cellular levels of vitamin C (in addition to vitamin E) drop when rats were subjected to a laboratory stress test (hypoxia).<sup>10</sup> Supplementation of Vitamin C was found to be beneficial in this case.<sup>10</sup> In a human study of 120 human male and female subjects,

researchers reported that high doses of vitamin C (3 grams/day) decreased the rise in blood pressure, cortisol and anxiety that typically accompany acute psychological stress.<sup>11</sup> In yet another trial comprising human subjects, this one measuring the immunomodulatory effects of vitamin C, supplementation of C was linked with a 50 percent reduction in common cold incidence.<sup>8</sup> Similarly, four British trials demonstrated an average 30 percent reduction in the incidence of colds in persons receiving vitamin C.<sup>8</sup>

**Vitamin E:** Vitamin E is a fat-soluble vitamin that also has antioxidant activity. Deficiencies of vitamin E correspond with increased risk of certain degenerative disorders such as coronary heart disease, Alzheimer's disease and cancer. Vitamin E has anti-atherogenic, antithrombotic, anticoagulant, neuroprotective, immunomodulatory, cell membrane-stabilizing and antiviral actions.<sup>8</sup>

## Minerals

**Magnesium:** Magnesium is an essential mineral—especially during stress. Magnesium is often referred to as the “anti-stress” mineral.<sup>14</sup> During the stress response (i.e., catecholamine release) the body simultaneously releases magnesium to offset the jarring effects of adrenaline.<sup>14,15</sup> However, chronic stress can induce a vicious cycle of magnesium deficiency and exaggerated stress response. It is well documented that Type A individuals are more prone to heart attacks than type B persons, who are more calm.<sup>15-17</sup> In fact, type A subjects produce more catecholamines than type B subjects when they feel stressed.<sup>16</sup> Researchers in Paris first uncovered this phenomenon more than twenty years ago. In the study, twenty healthy men were subjected to a stress-

FIGURE 1 - STRESS-X NUTRITIONAL INFORMATION

Supplement Facts		
Serving Size 2 Tablets		
Amount Per Serving		% DV*
Calories	5	
Total Carbohydrate	1 g	0%
Vitamin A (Vitamin A Palmitate)	2,000 IU	40%
Vitamin C (Ascorbic Acid)	170 mg	283%
Vitamin D (Cholecalciferol)	70 IU	18%
Vitamin E (d-Alpha Tocopherol Acid Succinate)	10 IU	33%
Thiamin [Vitamin B1] (Thiamine HCl)	10 mg	667%
Riboflavin [Vitamin B2] (Riboflavin)	8 mg	471%
Niacin (Niacin)	20 mg	100%
Vitamin B6 (Pyridoxine HCl)	13 mg	650%
Folic Acid (Folic Acid)	400 mcg	100%
Vitamin B12 (Cyanocobalamin)	40 mcg	667%
Biotin	120 mcg	40%
Pantothenic Acid (d-Calcium Pantothenate)	67 mg	670%
Calcium (Carbonate, Citrate and Herbs)	80 mg	8%
Magnesium (ConcenTrace® Blend)	80 mg	20%
Zinc (Zinc Citrate & Succinate)	10 mg	67%
Selenium (Amino Acid Chelate)	7 mcg	10%
Chromium (Amino Acid Chelate)	14 mcg	12%
Chloride (ConcenTrace® Blend)	260 mg	8%
Sodium (all sources)	30 mg	1%
Potassium (Citrate & ConcenTrace® Blend)	60 mg	2%
PABA (Para-Aminobenzoic Acid)	7 mg	†
Herbal Blend	838 mg	†
Herbs & herb concentrates (equivalent to 1034 mg whole herbs) as follows: Siberian Ginseng Root, Valerian Root, Wood Betony Herb, Borage, Chamomile Flower, Hops Flower, Skullcap Herb, Capsicum Fruit.		
ConcenTrace® Blend	0.2 tsp	†
All the minerals from 0.2 tsp (1 ml) of a unique blend of low sodium ConcenTrace® and Inland Sea Water™, extracted and concentrated from Utah's Inland Sea, the Great Salt Lake (equivalent to the content of about 1/6 cup sea water, sodium reduced).		
Food Concentrate Complex	137 mg	†
Citrus Bioflavonoid Complex, Rice Polishing Concentrate & Spirulina. Plus the following natural source food enzymes: Amylase, Protease, Lipase, Cellulase.		
Sulfate (ConcenTrace® Blend)	20 mg	†
Lithium (ConcenTrace® Blend)	0.47 mg	†
Boron (ConcenTrace® Blend)	0.3 mg	†
* Percent Daily Values (DV) are based on a 2,000 calorie diet.		
† Daily Value not established.		

inducing task while researchers measured their magnesium levels. They found that the type A men experienced a greater decrease in intracellular magnesium levels than the type B men, which researchers postulated increased their risk for heart attack.<sup>17</sup> Catecholamines deplete the body of magnesium which can lead to arrhythmias and sudden cardiac death.<sup>14,16-17</sup> Magnesium deficiency is also seen in patients with diabetes and

hypertension, which are other stress-related conditions. According to Mildred Seelig, M.D., M.P.H., M.A.C.N, a study of middle-aged patients with hypertension who had low blood levels of magnesium had a blood pressure-lowering response to three months of magnesium supplements.<sup>18</sup> In addition, workers in a high noise environment and students preparing for their final examinations taking 6-7 mg/kg/day of magnesium (which is above the recommended daily allowance) did not experience the usual increase in blood pressure that typically occurred during their work or study period.<sup>18</sup>

**Calcium:** As an electrolyte, calcium performs a number of crucial biological functions including muscle contraction, nerve conduction, glandular secretion, energy production, and maintenance of immune function.<sup>8</sup> Calcium has been shown to have a modest effect on the reduction of systolic blood pressure with persons diagnosed with hypertension. In an analysis of 14 clinical studies, calcium supplementation in women (1.5 to 3 grams) was associated with a reduction of 5.40 mmHg in systolic blood pressure compared with women not receiving calcium.<sup>8</sup> In addition, supplementary intakes of calcium have been associated with a significantly reduced risk of stroke.<sup>8</sup>

**Zinc:** Zinc plays a key role in immune defense. Zinc also has secondary antioxidant activity.<sup>8</sup> Studies show if the body is low in zinc, the immune response is suppressed.<sup>8</sup> It increases the activity of lymphocytes, also called natural killer (NK) cells, which destroy viruses or invading bacteria. One animal study found that rats who were given zinc had higher proliferation of lymphocyte and NK cell activity than rats with low zinc.<sup>19</sup> Zinc levels decline rapidly following injury or physical stress and zinc is also rapidly lost in the urine following acute and chronic stress.<sup>13</sup>

**Chromium:** Chromium is an essential nutrient required for normal sugar and fat metabolism. It functions primarily by potentiating the action of insulin.<sup>8</sup> It has glucose-regulatory activity and it also may have hypocholesterolemic and anti-atherogenic activities.<sup>8</sup>

**Selenium:** An essential trace element, selenium functions as an antioxidant and also has immunomodulatory, anticarcinogenic, and anti-atherogenic activities.<sup>8</sup> A deficiency of this trace mineral has been shown to have a depressive effect on the immune system. In humans, selenium deficiency has been associated with depressed IgG and IgM antibody titers.<sup>8</sup> Selenium supplementation has been shown to enhance T-cell responses, stimulate antibody production and reverse age-related cellular immunosuppression.<sup>8</sup> Epidemiological data also associate low selenium status with increased incidence of certain cancers including colorectal, lung, skin and prostate.<sup>8</sup> Clinical studies indicate that diminished selenium status is not carcinogenic, but, rather, that it increases susceptibility to the presence of carcinogens.<sup>8</sup> Epidemiologic studies demonstrate an inverse relationship with blood selenium levels and the incidence of cardiovascular disease.<sup>8</sup>

**Boron:** Boron is a trace element primarily recognized for promoting bone and joint health; however, research indicates that boron enhances cognition. One study found that individuals eating a boron-deficient diet who were then given supplemental boron (3 mg daily) displayed alterations in their brain wave activity that suggested improved behavioral activation and mental alertness in their electroencephalograms.<sup>11</sup> In addition, researchers also noted improved psychomotor skills and improved attention and memory with optimal boron intakes.<sup>8</sup>

**Potassium:** When the body is stressed, potassium is quickly excreted from the body. Important for the transmission of nerve impulses and the contraction of cardiac, skeletal and smooth muscle, there is a plethora of evidence indicating that a low intake of potassium can be an important contributor to hypertension.<sup>8</sup> Accumulating evidence suggests that a diet rich in potassium may be protective not only against hypertension but also against strokes and cardiovascular disease.<sup>8</sup>

**Lithium:** Stress-X also provides natural, trace potencies of lithium, a trace element that has a beneficial effect on human behavior in very small quantities.<sup>13</sup> Historically, people have bathed in and drank lithium-rich water for its calming and relaxing effects.

## Herbs

**Siberian Ginseng:** Siberian ginseng has long been used as a tonic and anti-stress drug.<sup>20</sup> It has demonstrated anti-fatigue, anti-stress, immuno-enhancing and anti-depressive effects.<sup>20,21</sup> According to the *Physician's Desk Reference for Herbal Medicines*, Siberian ginseng was found to enhance the endurance of rodents subjected to various stress tests (i.e., immobilization and coldness).<sup>22</sup>

**Valerian Root:** Valerian has been studied extensively for its sedative, anxiolytic, spasmolytic, muscle relaxing and anti-ulcerogenic effects.<sup>22</sup> Animal experiments have demonstrated an increase in gammaaminobutyric acid (GABA). The increase in GABA may be one factor responsible for the herb's soothing, sedative properties. Researchers have also postulated that the high levels of glutamine may also be responsible. According to the PDR, glutamine more effectively crosses the

blood-brain barrier where it can be taken up by the nerve terminals and converted to GABA.<sup>22</sup>

**Wood Betony:** Wood betony has traditionally been used to treat anxiety and neuralgia. The PDR reports that this herb acts as a tranquilizer. In addition, wood betony contains glycosides that have hypotensive characteristics.<sup>22</sup>

**Chamomile:** Chamomile also has anxiolytic, sedative, and antioxidant effects.<sup>22</sup> Taken internally, chamomile can be used to soothe inflammatory disease of the gastrointestinal tract associated with gastrointestinal spasms, irritation of the upper respiratory tract or oral mucous membranes.<sup>22</sup>

**Hops:** *Humulus lupulus* has a sedative effect. The German Commission E has approved the use of hops for nervousness and insomnia.<sup>22</sup> Hops' bitter acids are antibacterial and antimycotic. Animal studies indicate that hops have a strong spasmolytic effect on the smooth muscle of the gastrointestinal tract.<sup>22</sup>

**Skullcap:** Skullcap has been reported to have sedative, anti-spasmodic, anti-inflammatory, and lipid peroxidation inhibitor effects. Skullcap has also traditionally been used for nervous tension.<sup>22</sup>

## Food Base

In addition to the vitamins and herbs, Stress-X also contains a rich food concentrate complex consisting of citrus bioflavonoids, spirulina and enzymes. Citrus bioflavonoids assist in the absorption and utilization of vitamin C. Spirulina is a form of algae that is rich in protein, beta-carotene, iron and B-12 and other important nutrients. Enzymes such as amylase, protease, lipase and cellulase

are added to assist with the absorption and utilization of the vitamins, minerals and nutrients in this formula.

## Safety

The suggested use of *Stress-X* is two tablets once or twice daily or as needed. For best results, follow the instructions on the label.

Be sure to drink water regularly. Due to the B-vitamins in this formula, slight discoloration of the urine may occur.

If you have or may have allergies to any of the ingredients in this product, please consult a physician before taking this product.

## Conclusion

Stress is an unavoidable fact of life in today's fast-paced society. Stress, especially the chronic form of stress, which is the most common type of stress, poses very real risks to our health and longevity. It is well known that stress depletes intracellular levels of minerals such as magnesium and potassium and vitamins such as B-complex and C. Stress-X, manufactured by Mineral Resources International, is a comprehensive stress formula that replaces essential minerals, vitamins and nutrients utilized by the body during stress.

Stress-X also contains an herbal blend designed to help calm and soothe the nervous system as well as boost sagging energy levels. To complete this product, MRI has also added a rich food concentrate complex containing citrus bioflavonoids, spirulina and enzymes, which complete the nutritional profile of this product and assist in the absorption and utilization of the nutrients in this product.

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