The adrenal glands play an essential part in many bodily functions, primarily as a consequence of the hormones they secrete. As such they supply components necessary for numerous biochemical reactions. As a consequence of these hormonal factors, they significantly affect the functioning of every tissue, organ and gland in the body. They also exert an effect on both mental processes and the overall feeling of wellness. Taking into account all of these actions, their primary function is to enable the body to cope with stress. In fact they have been subjectively classified as “the glands of stress.”

Adrenal dysfunction can take many forms, the most severe form being Addison’s disease, which if left untreated is life threatening. Adrenal fatigue, although less serious, affects millions each year, and usually goes undiagnosed. Diminished function or adrenal hypofunction results from a deficiency in the function of the adrenal glands, and may present as a broad spectrum of disorders. Cortisol has a broad reaching effect in the body, as not only affects glucose but also has an influence on both protein and fat metabolism. As a consequence of adrenal dysfunction, changes in carbohydrate, protein and fat metabolism may occur, as well as alterations in fluid and electrolyte balance, heart and cardiovascular system problems or a reduced sexual desire.

Vitamins associated with Adrenal Support

Vitamin C. In the adrenal glands the concentration of vitamin C is among the highest in the body, being roughly 100 times that of blood plasma levels. As such the adrenals are extremely sensitive to inadequacies in vitamin C. In catecholamine synthesis, vitamin C is required as a co-factor in the conversion of dopamine to norepinephrine. In humans vitamin C secretion occurs as part of the stress response via hormone regulation, specifically in response to stimulation via the adrenocorticotrophic hormone (ACTH). Utilizing adrenal vein catheterization, it was demonstrated that following ACTH stimulation, the mean adrenal vein vitamin C level increased approximately four fold, and then subsequently returned to near pre-stimulation levels approximately 15 minutes thereafter. Peak adrenal vitamin C and cortisol concentrations have been strongly correlated (r²=0.35, P<0.001), suggesting a local action of vitamin C on the adrenal glands. Additionally, it has been noted that, although being of unknown function, the increase in vitamin C secretion suggests that “adrenal vitamin C secretion is an integral part of the stress response.” Stress, fever and viral infections, as well as habitual actions, such as smoking and alcohol use, cause a rapid decline in the blood level of vitamin C, and the vitamin C requirements tend to be higher in stressed or traumatized persons.

Thiamin (B1) (as cocarboxylase). As a coenzyme, thiamin plays central role in intracellular glucose metabolism, making it a vital adjunct in adrenal dysfunction, as blood sugar fluctuations (hypoglycemia) are a known correlating symptom. Thiamin is required for the metabolism of carbohydrates, as part of the coenzyme cocarboxylase, also known as thiamin pyrophosphate (TPP). The energy produced from oxidation of glucose is highly dependent upon TPP, and in the absence of thiamin a slowing or complete blocking of this enzymatic reaction occurs, due to a lack of TPP. An inadequate production of TPP has the potential to...
degradation has been observed. Both the overall human lifespan. NAD functions associated with a vital effect on biological entities, essential to all living cells. NAD metabolism has been implicated in the regulation and production of growth hormone. Additionally, riboflavin is required for red blood cell formation and respiration, antibody production, and in the regulation and production of growth hormone.

Riboflavin (Vitamin B2). Riboflavin is found primarily in the body as a fundamental component of the coenzymes flavin adenine dinucleotide (FAD) and flavin mononucleotide (FMN). In both adrenal and thyroid insufficiency the conversion of riboflavin into FAD and FMN is impaired. A deficiency in riboflavin has also been correlated to an increase in oxidative stress. Along with other B vitamins, riboflavin is utilized to support energy transfer and production via its action in the metabolism of fats, carbohydrates and proteins. As such it plays a vital role in energy production. Additionally, riboflavin is required for red blood cell formation and respiration, antibody production, and in the regulation and production of growth hormone.

Niacin (as niacinamide). Niacin is an essential component of the coenzymes flavin adenine dinucleotide (FAD) and flavin mononucleotide (FMN). In both adrenal and thyroid insufficiency the conversion of riboflavin into FAD and FMN is impaired. A deficiency in riboflavin has also been correlated to an increase in oxidative stress. Along with other B vitamins, riboflavin is utilized to support energy transfer and production via its action in the metabolism of fats, carbohydrates and proteins. As such it plays a vital role in energy production. Additionally, riboflavin is required for red blood cell formation and respiration, antibody production, and in the regulation and production of growth hormone.

Vitamin B6 is also required for the conversion of tryptophan to niacin and serotonin, as well as for the conversion of tyrosine to dopamine. In one study a deficiency in vitamin B6 was correlated to a slower extracellular dopamine release (43% longer with deficiency). Dopamine is known to be an active participant in the secretory modulation of both aldosterone and catecholamine from the adrenal gland, and dopamine depletion is correlated with physical and/or psychological stress. In an animal study a single dose of B6 was demonstrated to stimulate the secretion of adrenal catecholamines.

Vitamin B12 (as cobalamin). Fatigue is a common symptom in adrenal dysfunction, and a deficiency in vitamin B12 may be correlated to symptoms of fatigue. Vitamin B12 plays an integral part in the biosynthesis of pyridines and purines, making it an essential component in the synthesis of nucleic acids. Vitamin B12 is required as a coenzyme for multiple enzymes, including N5-Methyltetrahydrofolate homocysteine methyltransferase, which is a required component of the synthesis of pyridines and purines, making it an essential component in the synthesis of nucleic acids. Nicotinic acid has also been shown to result in clinically prevalent symptomatology, including muscle spasms, personal- ity changes, and neuromuscular symptoms, as well as disorders of the peripheral nerves. Vitamin B12 serves as a coenzyme in well over 100 reactions, as adrenal fluctuations are associated with hypogly- cemic symptoms. In niacin deficient DNA repair models, a dramatic inhibition in DNA repair has been demonstrated. A deficiency in niacin is commonly recognized by changes in the skin, including the mucosa of the mouth, tongue, stomach, and intestinal tract, as well as changes in the nervous system. Vitamin B6 is a coenzyme in well over 100 reactions, which makes it functionally important in both metabolism and health. The active coenzymes of vitamin B6 are pyridoxal-5-phosphate (PLP) and pyridoxamine-5-phosphate (PMP). PLP functions as a cofactor in lipid metabolism. Consequently with vitamin B6 deficiency, decreased body fat, decreased levels of liver lipids, as well as impaired lysosomal lipid degradation were observed. Both the nervous and immune systems require an adequate supply of vitamin B6 for efficient function.

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Minerals Associated with Adrenal Support
Iron (as ferrous gluconate). Iron is a major component of hemoglobin, the primary component of red blood cells, accounting for greater than 6% of iron in the body. In addition to hemoglobin, other iron containing compounds include myoglobin and the cytochromes. Myoglobin’s primary function is in the transport and storage of oxygen within the muscle, while the cytochromes, specifically cytochromes a, b and c, function in the mitochondrial electron transport chain, and thus are critical to respiration and energy metabolism. Significant iron deficiency has been correlated with depleted levels of cytochromes b and c, resulting in limited rates of oxidation by the electron transport chain. Iron is also required as a cofactor in the synthesis of the neurotransmitters dopamine, norepinephrine and serotonin. Epinephrine is derived from the amine norepinephrine, and epinephrine levels are known to be affected in adrenal fatigue, characteristically being decreased. Norepinephrine and epinephrine also act as aids in the maintenance of normal blood glucose levels by stimulating glucagon release, glycolysis and food consumption, and by inhibiting insulin release. As a final point, iron deficiency is noted as the most common nutritional deficiency worldwide, affecting predominantly women and children.

Magnesium (as magnesium malate). As a cofactor in over 300 metabolic reactions, including those involved in the production of metabolic energy, magnesium serves as an extremely important mineral in vivo. A deficiency in magnesium is characterized by diverse symptomatology, including muscle spasms, personality changes, and neuromuscular symptoms, as well as impairments in emotional memory, and central nervous hyperexcitability. Magnesium is a necessary component in the adrenal hormone cascade, thus magnesium status is closely correlated to the ability of the adrenals to recover from stress. Additionally, the absorption capacity of magnesium decreases with increasing age, emphasizing the need for added magnesium with increasing age.

Zinc (as zinc citrate). Zinc performs many diverse actions in the body; however three are considered vital, those being its function as a structural component, as a catalyst, and as a cocatalyst. An added role is its function as a regulatory factor. Zinc is an essential component of the zinc containing metalloenzymes, which includes alkaline phosphatase and lactate dehydrogenase, and in this role may have dual functions, for example playing both a functional and a structural role. Consequently, a depleted zinc status affects the function of these enzymes, resulting in either diminished or complete loss of enzymatic activity. Proper functioning of the adrenal glands relies on adequate zinc status. Thus it is not surprising that zinc deficiency has been correlated to ‘adrenohypophyseal-adrenal cortex function’ as well as to an increased
stress response. The adrenocorticotropic response was demonstrated to be positively correlated with serum zinc status. Also, with zinc deficiency an increase in neuronal damage has been observed, which was associated with an increase in the formation of free radicals. Supplemental zinc has demonstrated to be an efficient means of improving zinc status.

Manganese (manganese glycinate). Manganese functions as a component of the mitochondrial manganese containing superoxide dismutase (SOD), which plays a critical role in protecting the cell from damage due to oxidative stress. Manganese deficiency in animals has been reported to downregulate the mitochondrial manganese SOD, at the level of gene transcription. Manganese-activated enzymes also play important roles in the metabolism of carbohydrates, amino acids, and cholesterol. Both manganese-containing and manganese-activated enzymes play critical roles in gluconeogenesis.

Copper (as copper gluconate). Copper is an essential trace element for both humans and animals, as it plays a critical role in the oxidation/reduction reactions of the body, primarily due to its ability to easily accept and donate electrons. This capacity also makes it an important mineral in the scavenging of free radicals. In addition to being a vital component of the copper containing enzymes, known as the cuproenzymes, it is also involved in multiple enzyme processes, including the production of cellular energy, via its vital function as part of the enzyme cytochrome c oxidase. As a result it may be viewed as a vital component for adrenal support.

Malic Acid (as magnesium malate). A deficiency in malate, an essential component of the Citric Acid Cycle, has been linked to physical exhaustion. Exogenous Malate in very small amounts is required to increase ATP production and mitochondrial oxidative phosphorylation. Additionally, Malic Acid, known to be an aluminum chelator, may support aluminum detoxification.

Botanicals Beneficial for Adrenal Support

Rhodiola rosea (extract) (root). In many parts of the world Rhodiola has been utilized for decades to alleviate everyday symptoms of anxiety, despair, and insomnia, and is a popular adaptogen and anti-stress plant in both Europe and Asia. Its use has been correlated to mood improvement, and the alleviation of both depression and fatigue. In one study the use of R. rosea was demonstrated to significantly improve the rate-limiting step in catecholamine biosynthesis, as an essential nutrient in humans, primarily due to its role as the precursor of phospholipids, as well as to the neurotransmitter acetylcholine. Acetylcholine functions as a crucial component for the structural integrity of the cell membrane. The phosphorylation of choline, via the Kennedy pathway, yields phosphatidylcholine, the major form of cellular choline. Over 1,000 genes associated with neural precursor cells, including those involved in cell proliferation, differentiation and apoptosis require choline for activity, thus choline is an essential factor in gene expression. In addition to other functions, choline participates in lipid and cholesterol metabolism, cholinergic neurotransmission, and transmembrane signaling.

Superoxide Dismutase and Catalase (vegetable culture sources). Superoxide dismutase and Catalase both function as potent antioxidants, shown in human studies to decrease both oxidative damage, as well as other types of damage to DNA. Since adrenal dysfunction may potentially result in an increased production of reactive oxygen species, antioxidants may be an important adjunct for adrenal support.

Glandular Support

Adrenal Gland Concentrate (porcine), Lamb Pituitary/Hypothalamus Complex (ovine), Parotid Tissue (bovine). Glandular components serve to provide raw materials which aide in the functional support of the respective organ. Glandular components also contain vital chemical messengers, which are potentially lacking in those with adrenal dysfunction. They function in supporting the adrenals by relieving the burden of underfunctioning adrenal glands, which may be particularly important in the initial phases of adrenal repair. They have also been demonstrated to speed recovery of the organ, and specifically with the adrenals may lead to increased energy.

In addition to a good diet, natural adrenal support utilizing vitamins, minerals, botanicals and glandular components serves to aid in promoting the restoration of healthy adrenal function.

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**Supplement Facts**

<table>
<thead>
<tr>
<th>Serving Size: 2 Tablets</th>
<th>Amount Per Serving</th>
<th>% Daily Value</th>
</tr>
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<tbody>
<tr>
<td>Vitamin C</td>
<td>75 mg</td>
<td>125%</td>
</tr>
<tr>
<td>Tryptophan (B5)</td>
<td>5 mg</td>
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<tr>
<td>Riboflavin (B2)</td>
<td>5 mg</td>
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<tr>
<td>Nicotinamide (B3)</td>
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<tr>
<td>Vitamin B6</td>
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<tr>
<td>Folate (as folic acid)</td>
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<tr>
<td>Vitamin B12</td>
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<td>100%</td>
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<td>Pantethenic acid</td>
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<td>Iron (as ferrous gluconate)</td>
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<td>Magnesium (as magnesium malate)</td>
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<td>Zinc (as zinc citrate)</td>
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<tr>
<td>Manganese (as manganese glycinate)</td>
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</tr>
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</table>

Other Ingredients: Stearic acid (vegetable source), cellulose, modified cellulose gum, silica and food glaze.

**Recommended**: Take two (2) tablets each day as a dietary supplement or as otherwise directed by a healthcare professional.

**Caution**: Not recommended for pregnant or lactating women.

**Keep Out Of Reach Of Children**.

**WARNING**: Accidental overdose of iron-containing products is a leading cause of poisoning in children under 6. Keep this product out of reach of children. In case of accidental overdose, call a doctor or poison control center immediately.

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.