Nutraceuticals that Optimize the Stress Response and Protect Cardiovascular Health

Introduction: Stress and Cardiovascular Health

Multiple areas of medical research are conancing to form an integrated picture of chronic disease and aging. Researchers in cardiovascular disease, metabolic diseases (notably type 2 diabetes), degenerative disorders, and nutrition are piecing together a complex interrelationship among the multiplicity of conditions that now stand at the forefront of national health concerns. The focal point is the metabolic syndrome, that combination of type 2 diabetes, hypertension, obesity, dyslipidemia, and chronic low-grade inflammation that is reaching pandemic proportions throughout the developed world.

From this body of data emerge many common mechanisms, within which stress and sugar metabolism play central roles in adversely modifying signaling pathways, redirecting synthetic and degradation processes, and generating harmful chemical byproducts that include reactive oxygen species (ROS) and advanced glycation products (AGE), which are important contributors to oxidative stress. A clear relationship has been identified between this complex of chronic disease conditions and stress, hyperglycemia, oxidative pathways, production of ROS and AGE, and chronic inflammatory states.

Stress is not universally harmful. As part of human adaptive physiology, stress is a vital mechanism for functioning in this world. It is the dynamic interplay of stress and relaxation within the physiology of each individual that dictates the health of the organism. Therefore, optimization of the milieu in which stress occurs is more important than stress reduction in its simplest terms.

Although allopathic medical science has made some progress in treating the effects of these diseases, their causes remain beyond the reach of the magic bullets that are effective in treating acute conditions such as infections. It is clear that a composite approach, such as recommended by the National Cholesterol Education Project’s Adult Treatment Panel III, is necessary. Such an approach emphasizes primary prevention by major lifestyle modifications (weight reduction, proper nutrition, exercise, cessation of tobacco and excess alcohol) and the use of pharmaceuticals for secondary prevention, once the conditions have produced identifiable manifestations.

The use of nutritional supplements is no less complex. Not only does their effectiveness depend markedly upon the complete metabolic environment and other nutrients and supplements present, the effectiveness of nutritional supplements also relies on very exacting product preparation to assure that ingredients are actually present and present in adequate amounts.

Stress and Adrenal Function

One area of importance is the relationship between stress and adrenal hormones. The hypothalamic-pituitary-adrenal (HPA) axis appears to have a dual role in stress response, both facilitating and recovering from stress. In the brain, corticosteroid activity is mediated by two distinct nuclear receptor types – mineralocorticoid receptors (MRs) and glucocorticoid receptors (GRs). The phase of the response is dictated by the concentration of the hormones and the sensitivity of their receptors. An imbalance of these responses disturbs metabolism, impairs immune function, and alters cardiovascular control - in other words, many of the alterations underlying chronic disease conditions.

Hypercortisolism brings about the recovery phase. Although most stress generates raised cortisol levels in this phase, some chronic stress conditions - e.g., pain, fatigue - appear to generate a hypocortisolemic response that may be protective against the deranged metabolism underlying the metabolic syndrome and the other chronic conditions settling into the same complex of deranged physiology. It is therefore important to approach stress at a physiologic level, understanding its biochemistry in order to optimize interventions.

Reactive Oxygen Species (ROS) and Advanced Glycation Products (AGE)

Closely involved with the same metabolic system are two categories of byproducts known to produce far-reaching damage to necessary biochemicals. ROS are the main intermediaries in producing oxidative damage to lipids, DNA, and proteins. Their production is increased along with the other aberrations of chronic disease dysregulation, notably hyperglycemia, as is evident from studies of diabetes and aging.

AGE is produced by glycation, especially Maillard reactions, and may also found in increasing quantity relative to blood glucose levels. These chemicals also interfere with normal metabolic pathways, cooperating with ROS to further the progress of chronic disease conditions. AGE has been suspected, for instance, in the pathology of neurodegenerative diseases such as Parkinson’s.

The Maillard reaction

The Maillard reaction begins with the chemical combining of a reducing sugar with an amino moiety when heated. Passing through N-glycosylamines and ketosamines, the end-products include brown melanoids to give color to foods and hundreds of other compounds that affect taste, smell, and food texture. Many of these are AGE. A number of intermediate products have other effects. Some are antioxidants. Note that common sugars, including glucose, partake of this reaction and that it occurs in vivo as well as in the kitchen. Although some products are antioxidants, there is strong experimental evidence that the overall effect produces more damage than protection from oxidative reactions. Consequently, a need exists to reinforce antioxidant activity in the presence of these harmful chemicals.

There is also the strong implication that food choice and preparation carry this additional potential for improving health and preventing disease.
Cinnamaldehydes and polyphenols from cinnamon bark (Cinnamomum burmanii) increase glucose removal from the blood in two ways. They directly activate insulin receptor kinase while inhibiting its dephosphorylation. This serves to increase insulin sensitivity in cells. Additionally, these chemicals increase the activity of hepatic glycogen synthetase, stimulating increase hepatic glucose uptake. Cinnamon extracts also lower lipids and function as antioxidants.

Banaba leaf extract (GlucoTrim® - Lagerstroemia speciosa (L.) - a remedy used for ages in the Philippines, appears to have several metabolic benefits, foremost among them being an ability to increase cellular insulin sensitivity. It has also induced a reduction of hepatic lipids and total body adipose deposition in murine laboratory models.

The Importance of Adaptogenic Ingredients

Adaptogenic ingredients increase one's ability to withstand stress while increasing mental alertness and metabolic efficiency. Ingredients like Schizandra berries, Camu Camu berries, and vitamin C are adaptogens that work to help the body adapt to stresses of various kinds and maintain homeostasis (a constant state of balance).

Schizandra berries are unique in that they hold a remarkable blend of five distinct flavor properties: bitter, sweet, sour, salty, and hot. They also contain an array of active constituents, including schizandrin, schizandrois, schizandrers, and schizantherins, collectively referred to as lignans. These substances work together to enhance and protect overall cellular vitality and maintain healthy nerve and adrenal gland function. Accordingly, this berry serves as a valuable general tonic that encourages overall health and stamina, and improves one's natural ability to tolerate both physical and emotional stress.

Wildcrafted Camu Camu Berries (Myrciaria dubia) contain about 2800 mg of vitamin C per 100 g of fruit, about 60 times the concentration in an orange. They are believed to have the highest vitamin C content of any fruit in the world. Camu Camu is also a well recognized and potent antioxidant and offers the additional benefits associated with a substantial content of niacin, riboflavin, phosphorous, potassium, co-factors that enhance vitamin C uptake, the amino acids valine, leucine, and serine, and bioflavonoids. Bioflavonoids assist in the maintenance of mammalian small blood vessel walls. Camu Camu plus vitamin C provide antioxidant protection and enhance energy levels, coordination, and endurance. It is important to look for a Camu Camu extract that has been hand-harvested or wildcrafted in the Amazon rainforest and undergone temperature-controlled processing methods to maintain the essential properties of the C complex.

Vegatarian enzymes are often the missing link that can help one experience the powerful and sometimes miraculous effects of these adaptogenic ingredients. The right blend of vegetarian enzymes will enhance the nutrient availability, phytochemical availability, and desired actions of the adaptogenic ingredients found in a nutritional supplement formula. I am biased towards the use of National Enzyme Company’s® (NEC) vegetarian enzymes and custom formulas, as they are the respected leaders in enzyme research in the industry and their formulas are tried and true. Most importantly, their blends work well. To recognize an enzyme blend produced by NEC®, look for the words "e.d.s.® enzyme blend" in the list of ingredients or for their name somewhere on the label.

Third party clinical studies document the efficacy of the ingredients within the patent pending AHP Adaptogenic Complex™ — a proprietary adaptogenic blend. These ingredients increase the ability to handle stresses brought on by lifestyle and exercise, while increasing endurance and metabolic efficiency.
The AHP Adaptogenic Complex™ includes scientifically proven and exacting amounts of select ingredients including superior quality NEC® vegetarian enzymes, schizandra berry extract, a complete blend of organic concentrated sea minerals, organic wheatgrass juice crystals, wildcrafted Camu Camu berry extract, and vitamin C. Classified as an adaptogenic blend, this complex works to help the body adapt to stresses of various kinds, maintaining homeostasis—a constant state of balance—within the body.

Summary and Conclusion

The confluence of research into many chronic disease conditions is discovering commonalities that dictate composite approaches to both prevention and treatment. Fundamental to imbalances in the body’s homeostatic mechanisms are metabolic activities modulated by the insulin-glucose balance and the hypothalamic-pituitary-adrenal axis. Both of these are affected adversely by the circumstances surrounding imbalanced stress reactions, particularly when they occur in an environment enriched with AGE and ROS, as occurs in diabetic states.

This composite approach necessarily includes substantial lifestyle modifications, but additional benefits can be secured with carefully selected nutraceuticals. A certain product on the market contains all these ingredients in a carefully prepared balance that assures effective absorption, adequate serum levels and optimum effect. LivingYoga Balance® (Aligned Health Products) contains AHP Adaptogenic Complex™, Suntheanine®, green tea extract, brahmi (Bacopa monnieri), organic cinnamon, and banana leaf extract (Glucotrim®). The recommended dosage for this formula is one capsule each morning on an empty stomach.

To learn more about adaptogenic ingredients, and nutraceuticals that protect heart function, balance glucose control and enhance one's ability to handle stress in a healthful manner, visit www.YogiHealth.com.

Gina L. Nick, PhD, ND, has published a new book entitled Yogic Nutrition. In this book, Dr. Nick marries modern medical research with the age-old wisdom of Ayurvedic medicine to help you on your path to greater health and vitality. Learn more about the book and new supplements researched and formulated by Dr. Nick by visiting www.YogiHealth.com.

References

6. University of British Columbia Faculty of Land and Food Systems. Available at www.landfood.ubc.ca.