

NEW NUTRITIONAL PLATFORMS

Nutraceuticals: Innovative Roles in Stress Reduction

While much of modern stress is unavoidable, there is quite a lot we can do to protect our bodies against the detrimental effects of this constant response.

by Coriander Stone

When the American Psychological Association conducted their national 2001 survey on stress, 44% of participants said their stress had increased in the last five years. Of these participants, one-third said they believed stress is purely psychological and has no impact whatsoever on physical health. But experts across the medical board would strongly disagree and Hans Selye, the pioneering endocrinologist who first proved the existence of biological stress famously said, "It's not stress that kills us, it's our reaction to it."

Stress is in fact a vital part of our physiological make-up and an ancient response to any sort of threat to our existence. Our

capacity to "stress" is one of the reasons we are so advanced as a race and it is worth considering that the early flightless birds such as the Dodo had no adrenals glands and thus were incapable of stress - we all know from their lack of existence their famous fate. Early man had to be capable of reacting in the face of a life-threatening stressor, such as attack from wild animals, while hunting and this reaction had to allow the body to become strong enough to either fight the aggressor or flee. This is now famously known as "fight or flight." In order to understand how stress affects the body and what the biological effects of this response might be, it is necessary to look at the various stages of stress.

Stage 1 - Alarm State (fight or flight): When a threat occurs, the brain sends a message to the sympathetic nervous system (SNS) giving instructions to prepare the body for fight or flight. This increases heart rate and blood flow to the liver and heart as well as dilating the lungs for increased oxygen flow. The SNS then alerts the adrenals to produce adrenaline and noradrenaline which increase oxygen and blood to the heart, brain and skeletal muscles for energy supply so that the body can either fight or run from the threat. Blood pressure and heart rate are raised so as to provide sufficient blood to vital organs during the necessary exercise and blood lipids and glucose levels rise to provide the fuel needed. The digestive and reproductive systems are also suppressed to conserve energy for vital organs and survival responses.

All of these emergency systems are in place to prepare us for fight or flight and are very valuable if we need to do either of these things. However, modern life is predominantly sedentary and we generally do not need vast amounts of glucose under modern day stress which often occurs in the work place or at home. The long term effects of these mechanisms on the body are varied and may be highly damaging.

Stage 2 - Resistance State: At this stage, which lasts longer than the alarm state, different hormones replace adrenaline and we start to see the damage that long term stress can cause.

Messages are sent from the hypothalamus to the adrenal glands to release corti-

Table 1: Elements of Each Stage of the Stress Response

| Stress Response Mechanism | Impact on Health |
|---|---|
| Protein breakdown | Muscle wasting, food seeking behaviour stimulated (to replace lost energy), weight gain |
| Glucose & fatty acid release | Excessive weight gain, increased insulin response, T2 diabetes, hyperlipidaemia |
| Cortisol to hippocampus brain area | Desensitisation of hippocampus neurones - impaired memory, confusion, brain fog |
| Cortisol leaches calcium for clotting factors | Osteoporosis, arterial blockages |
| Adrenaline, noradrenaline, increased blood pressure | Inflammation, congestive heart failure or heart attacks |
| Permanent cortisol release | Disrupted circadian rhythm and sleep |
| hGH release | Cell multiplication - increased cancer threat |
| Digestive system suppressed | Gut wall damage, increased infection |
| Reproductive system suppressed | Compromised fertility |



sol. As with adrenaline, cortisol releases glucose and fatty acids into the bloodstream and breaks proteins down into amino acids. These are then used either for energy or to repair damaged cells. It also leaches calcium from bones to aid clotting in case of injury and affects the area of the brain involved in memory, causing a flash back type memory in order to avoid future danger of the same kind. Human growth hormone (hGH) is released to further stimulate fatty acid and glucose release for energy and thyroid stimulating hormone is released which combines with hGH to supply cell energy factors. All the resistance state factors work towards providing additional energy for our bodies so that we are able to continue to fight or run until the threat is combated. However, the resistance state eventually leads to the third stage, the exhaustion state, which is when long term stress damage takes over.

Stage 3 - Exhaustion State: In the exhaustion state, the body's resources are depleted

and it can no longer maintain the second stage. Exhaustion ensues, often leading to the inability to even get out of bed in the mornings. This is where long term physical and physiological damage occurs and if we look at elements of each stage of the stress response, it will become clear why (see table 1).

Stress and Modern Living

Although the stress response is natural and crucial to the survival of any living organism, what is also natural is that the threat is quickly resolved and thus the response short-lived. Stress hormones are not supposed to circulate for long periods of time, yet modern day stress is hugely different from that of early man's. Many westerners live with almost constant low-grade stress - fighting traffic to get to work in an unhappy job environment, multi-tasking and over stimulation all mean the hormones are active in many people's systems on a near permanent basis. We're not designed to flee from predators for 10 hours a day with no breaks. But modern life means that is essentially what we do. While much of modern stress is unavoidable, there is quite a lot we can do to protect our bodies against the detrimental effects of this constant response.

The Role of Adaptogens

Adaptogens are a natural substance that increase the ability of an organism to adapt to environmental factors and to avoid damage from such factors; they cause a non-specific increase in the resistance of an organism to noxious influences. They must be non-toxic and almost free of side-effects. They exert a normalizing and balancing action both for hypo and hyper stress, improve general mental, physical or emotional performance and promote recovery from stressful situations. Some adaptogens which have shown promising reserach results are outlined below.



› Life Seasons Anxie-T Stress Support Dietary Supplement: 60 Vegicaps (US). Key ingredients: Ashwagandha, GABA, Kava Kava, Theobromine, and L-theanine.



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Siberian Ginseng: Its active ingredients are tetracyclic triterpenoid saponins which differ from those in panax ginseng – another adaptogen. It has been shown to reduce the detrimental effects of stress by conserving vitamin C and diminishing adrenal hypertrophy; however care should be taken as it can also raise testosterone levels, possibly resulting in increased aggression. Siberian ginseng also helps balance blood sugar levels – another impor-

tant part of stress management – as well as asserting an anti-coagulant effect. Side effects may include heart palpitations, insomnia and hypertension.

Rhodiola Rosea: *Rhodiola* is a highly active adaptogen which produces a stimulating effect within 30 minutes of administration that continues for at least 4-6 hours. It has been well researched and produced very interesting results, showing improved attention, cognitive function and mental performance in fatigue and in chronic fatigue syndrome as well as supporting immune function and increasing exam performance. It has not been FDA approved to treat or cure any disease however.

Schisandra Chinensis: A traditional Chinese herb, *Schisandra* has been very well studied in Russia as an adaptogen and has also been shown to have hepatoprotective properties. In those trials, it was shown to increase endurance and physical efficacy and decrease sickness in factory workers. *Schisandra* increases levels of nitric oxide which may explain these effects. It has also been shown in clinical trials to improve concentration, coordination and endurance in healthy males.

Glycyrrhiza Glabra (licorice): Licorice is a saponin, defined as capable of foaming in water. It is one of the most highly-regarded herbs used to treat conditions associated with poor adrenal function. As well as balancing oestrogen and progesterone, it also extends cortisol levels by inhibiting its breakdown, thus aiding

low adrenal output. It may cause a slight rise in blood pressure via the increased cortisol in the kidneys and so care should be taken in people with hypertension. Care also should be taken with oestrogen replacements due to its phytoestrogenic properties.

Fish Oils: Not an adaptogen, fish oils have nevertheless been well studied for their positive effects on adrenal output and the effects of stress. They have been shown to decrease fat mass and salivary cortisol levels and prevent the adrenal response to mental stress in healthy subjects, blunting serum adrenaline, cortisol and fatty acids concentrations.

Moving Forward

While the stress response is a vital part of survival, modern day stress means that circulating stress hormones stay in the system for far longer than is healthy. Equally, modern stress is not always avoidable and so techniques and nutraceuticals which help the body cope with the abundance of stress are a very useful part of a busy life. Alongside the above nutraceuticals, relaxation techniques, such as meditation or yoga, may be immensely useful as may balancing blood-sugar levels with a low carbohydrate high protein diet to avoid unnecessary additional stress from elevated glucose levels. ▼

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SOURCE: INNOVA MARKET INSIGHTS



› Raab Vitalfood Bio Rhodiola Dietary Supplement: 60 Capsules (Germany).

Table 2: Adaptogens With Promising Results in Stress Reduction Research

| Nutraceutical | Trial Design | Result |
|----------------------|--|--|
| Siberian Ginseng | 9 recreationally-trained male cyclists took 800 mg/d ginseng or placebo for 8 weeks to test effects on endurance, cardiovascular functions and metabolism. | VO2 rate increased by 12%, endurance improved 23% and heart rate by 4% in the subject group. Blood glucose level also dropped significantly. |
| Rhodiola Rosea | Randomized, double-blind, placebo-controlled, study to measure effect of a single dose of standardized SHR-5 Rhodiola rosea extract on capacity for mental work against a background of fatigue and stress in 161 cadets aged 19-21 years. | The study showed a pronounced anti-fatigue effect in subject group. |
| Schisandra Chinensis | Randomized control trial using 28 athletes given either 2, 5, 10 and 15ml of tincture for 4 weeks. | Respiratory and cardiovascular functions improved, improved muscle function and reduced finishing time. Best results were with 5 and 10ml doses. |
| Glycyrrhiza Glabra | Study undertaken to investigate the effects of liquorice on learning and memory in mice. Three doses of Glycyrrhiza glabra were administered for 7 successive days in separate groups of animals. | The highest dose of 150mg/kg significantly improved learning and memory of mice, possibly due to its anti-inflammatory and antioxidant properties. Furthermore, amnesia was also significantly reversed. |
| Fish Oils | Seven human volunteers were studied before and after 3 weeks of supplementation with 7.2g/day fish oil. They were monitored in basal conditions followed by a 30 minutes mental stress test and a 30 minute recovery period. | In controls, mental stress significantly increased heart rate, blood pressure, adrenaline, fatty acids, cortisol and energy expenditure. After 3 weeks of fish oil supplementation plasma adrenaline, cortisol and plasma fatty acids concentrations were all significantly blunted. |