

Nutraceuticals and Stress

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“Give your stress wings and let it fly away.”

Terri Guillemets

Can be well said but, It's not that easy. Stress has become a pervading feature of people's life in modern world. The modern world which is said to be a world of achievements in science and technology, along with remarkable growth of economy and sources of luxury still remains a world of “**Stress**”. Stress is in fact a vital part of our physiological make-up and an ancient response to any sort of threat to our existence.¹ A feeling of emotional or physical tension that people have when they are overloaded and struggling to cope with demands. It can come from any event or thought that makes a person feel frustrated, angry, or nervous. It is your body's reaction to a challenge or demand. These demands can be related to finances, work, relationships, and other situations, but anything that poses a real or perceived challenge or threat to a person's well-being can cause stress.

On one hand “**Stress**”- can be a motivator and can be essential to survival. The "fight-or-flight" mechanism can tell us when and how to respond to danger. However on the other hand, if this mechanism is triggered too easily, or when there are too many stressors at one time, it can undermine a person's mental and physical health and become harmful. Thus, although in acute situations or in short bursts, stress can be positive, and can help avoid danger or meet a deadline; when it lasts for a long time and becomes chronic, it may harm one's health.

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. **Coriander Stone**, a functional medicine-trained Nutritional Therapist, has well mentioned in an article about the three main stages of stress.¹

Stage I is the 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 dilates the lungs for increased oxygen flow. The SNS then alerts the adrenals to produce adrenaline and noradrenaline to 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 as well as 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.

Stage II is the Resistance State: It lasts longer than the alarm state, different hormones replace adrenaline leading to damage. In this stage, messages are sent from the hypothalamus to the adrenal glands to release cortisol. 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 also 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 stage III.

Stage III, the Exhaustion State, which is a long term stress damage state The body's resources are depleted and it can no longer maintain the second stage. Exhaustion often leads to the inability to even get out of bed in the mornings. This is where long term physical and physiological damage occurs.

Although the stress response is natural and crucial to the survival of any living organism, the threat is quickly resolved and thus the response is normally 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. 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.

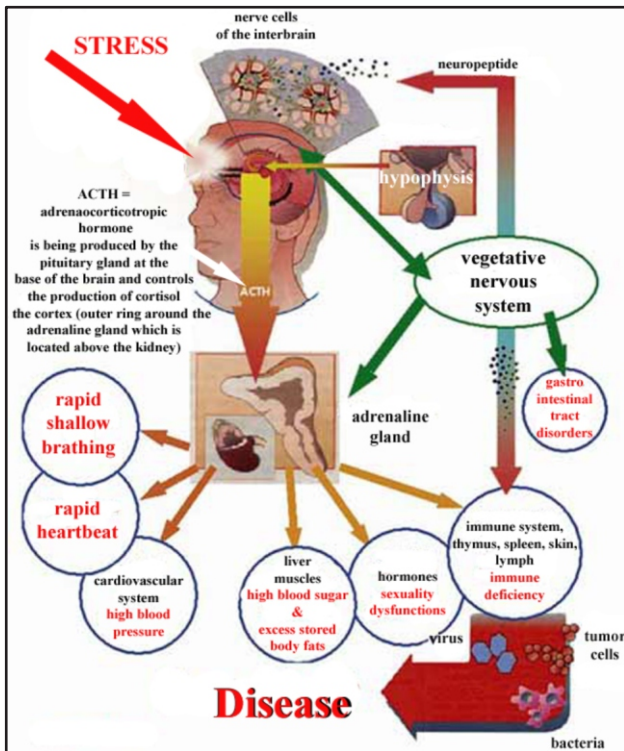


Figure 1: Biological effect of Stress

Adapted from - <http://silvecorostenadrenaline.weebly.com/effect.html>

But then again, today a person has to perform a variety of roles, and while performing them, he/she is likely to accomplish only some responsibilities. However he/she must execute all the roles since our work life and personal life are interconnected and interdependent. The conflict arises when the burdens, obligations and responsibilities of work or the family roles become incompatible. As age advances, the increasing responsibilities on the personal front can also create stress on personal and professional fronts. Tension in the workplace to meet the challenges has an alarming spike in the incidence of reported stress among employees in recent years and its impact on the bottom line and also at home. And this repetitive exposure of the stress response on our body is proven to lead to long lasting psychological and physical health issues; these include cardiovascular disease, diabetes, **anxiety** and **depression**. Ultimately, when one gets to the point of no longer **being able to cope**, they are “burned out,” like a candle. This is where stress management can offer tools, and help people avoid the unpleasant experience.

Stress and its Management

Stress can be effectively managed in many different ways. The following 7 tips are adapted from The American Psychological Association (“Check Out the Stress Tip Sheet,” 2018) to support individuals with a stress management plan:

- Understand your stress
- Identify your stress sources
- Recognize your stress strategies
- Learn to recognize stress signals
- Implement healthy stress management strategies
- Make self-care a priority
- Ask for support when needed

But again everyone has a unique response to stress; there is no “one size fits all” solution to managing it. Therefore, when deciding which option to choose, it's helpful to think of the **four A's: Avoid, Alter, Adapt or Accept**.

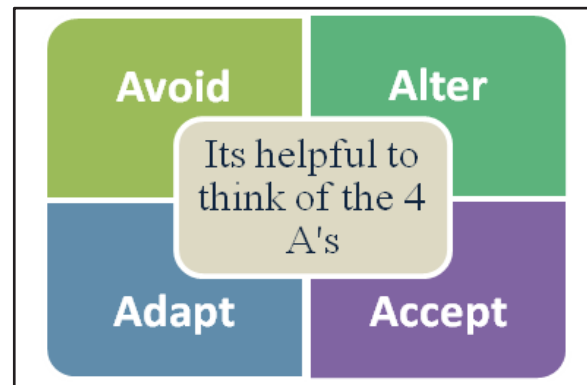


Figure 2: Four A's – basic primary ways to cope with stress

Adapted from: <https://www.helpguide.org/articles/stress/stress-management.html>

Taken together, stress wreaks havoc on your emotional equilibrium, immune system and ultimately your physical health. It narrows your ability to think clearly, function effectively, and enjoy life. To combat that it's important to **implement healthy stress management strategies**. Hence, it is very rightly said that - take care of your body and mind and they will take due care of all types of traumas you face throughout your existence. That is, control stress by adopting a healthful lifestyle which includes eating well, exercising, meditation, yoga, sleeping adequately and enjoying your free time. Likewise, awareness of herbal remedies is growing, people are more open to trying herbs to help reduce the feelings or physical manifestations of stress. The current scenario also has therefore shifted towards organic food and ingredients (nutraceutical substances) which seems to play an important role in prevention and cure of disease burden.

The term “nutraceuticals” was first coined by Dr. Stephen DeFelice, MD in 1989. Who defined it as “a substance that is a food or a part of food and provides medical and health benefits, including prevention and treatment of disease.” Moreover, the term “nutraceuticals” comprises of “nutrient” (a

nourishing food component) and “pharmaceutical” (a medical drug) which refers to extracts of foods claimed to have a medicinal effect on human health. In Eastern philosophy, it is mentioned that “Nasti moolam an aushadham” **नास्ति मूलं अशुषधः**: no plant created by the God is without medicinal values; however, one has to know how to use these and for which disease.

Now a day, nutraceuticals have received considerable interest due to potential nutritional, safety and therapeutic effects.²

The natural bioactive compounds called adaptogens have shown to help against stress related cellular damages. They exert to normalize and provide balancing action for stress and intellectual strength. Thus they gradually increase emotional performance that promotes recovery from stressful situations. Herbal nutraceuticals like aswagandha, rhodiola, L-theanine, ginseng are affective adaptogens that activate the production of stress suppressing heat-shock protein 70 (HSP-70). They also stabilize physiologic process, promote homeostasis, increase resistance to environmental stress, reduce moderate to severe anxiety, improve sleep, reduce depression and improve secondary memory.³

Thus, the newest trend is moved towards ‘nutraceuticals’ yet a new era of medicine and health. It is still in its stage of formative years in India. But in this hype period we must say “let food be your medicine” and “appropriate nutraceuticals daily can keep the medicine away.”⁴

Today, Nutraceuticals have received a noteworthy keenness for their expected safety, impending nutritive and therapeutic effects. These are being used as alternative to modern medicines that promote quality of health, increase nutritive value of the diet and prolong life expectancy. Major constituents of the nutraceuticals are herbals, various nutrients and dietary supplements involved in preventing different diseases and minimizing pathophysiology of the disease too. It also acts as immune boosting, natural antioxidant, anticancer, anti-inflammatory, antidiabetic, cardioprotective, organoprotective agent in addition with different health promoting effects.

Nutraceuticals detoxify our body, restoring our healthy digestion and dietary habits also. They can be classified based on the source of foods, mechanism of action and their chemical properties.⁵ The food sources used as nutraceuticals are all natural and they are dietary fiber, probiotics, prebiotics, PUFA, antioxidant vitamins, polyphenols etc.⁶ Nutraceuticals with various bioactivities towards human body are being widely examined for their ability to provide health benefits.⁷

Several nutraceuticals reported till date having free radicals scavenging capacity. Studies show that onion, garlic, grapes, rosemary, broccoli, spinach, turmeric, parsley possess considerable antioxidant activities.⁸ Mitochondria targeted nutraceuticals (MTNs) too have antioxidant effects at the molecular level and boost mitochondrial bioenergetics.⁹

Herbal nutraceuticals like probiotics play a unique role for healthy digestive function. It may stimulate the growth of healthy gut microflora, slow down harmful bacterium and reinforce the body's natural gut defense mechanisms. It can reduce lactose intolerance and prevent GI tract disorders.¹⁰

Specific nutraceuticals like magnesium citrate, pine bark of pycnogenol, pygeum, potassium citrate, IP6, lutein, lycopene, zeaxanthin play a significant role at our excretory system that includes promotion of healthy urinary oxalate excretion, provide protective activity on kidneys, improve healthy urinary bladder health and sphincter tone, help to balance calcium accumulation, formation of calcium and oxalate crystals, maintain normal microbial flora in the bladder and urinary tract.^{11,12}

Certain nutraceuticals produce significant effects on stem cell growth and proliferation and show significant role in healing and tissue regeneration by stimulating and recruiting endogenous stem cell at the site of injury. Blueberries, green tea, catechins, carnosine, vitamin D3, PUFA and essential amino acids strengthen our immune system.^{11,12}

Nutraceuticals present in citrus fruits and soybean have effects on epigenetic modifications, autophagy and necrosis.^{13,14} Researches have shown that spermidine and its derivatives confer lifespan extension in humans by enhancing autophagy. Caffeic acid and Rosmarinic acid present in fruits, vegetables and herbs are also anti carcinogenic, antioxidant, anti-rheumatic and anti- microbial. They can prolong the healthy life span extension.¹⁰

The scope of nutraceutical field is plenty both in terms of type and the varieties. Nutraceuticals industry in India is one of the rapid growing markets. Higher and upper middle class consumers are perceiving nutraceuticals as alternative to prescribed drugs and exclusively for their beneficial properties without any side effects. Ultimately, they ensure better quality of life.

Finally concluding, the natural properties of nutraceuticals for boosting energy and improving physical endurance and mental alertness, can be very beneficial and one of the best approach to cope with modern day stress.

Lastly, Happiness is a choice. You can choose to be happy. There's going to be stress in life, but it's your choice whether you let it affect you or not. - Valerie Bertinelli

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**" Do the best you can until you know better.
Then when you know better, do better. "**

Maya Angelou