
Understanding Everyday Stress: Diagnostics and Botanical Solutions



Keri Marshall, MS, ND
Christie P. Egeston, MS

Sponsored by:



Table of Contents

Introduction.	1
What constitutes stress	2
The negative effects of stress	2
Who is affected by stress?	3
How stress is diagnosed	3
The Hypothalamus-Pituitary-Adrenal (HPA) Axis	5
Botanical adaptogens: herbal solutions.	7
Rhodiola rosea	7
Panax ginseng.	8
Eleuthero root.	9
Holy basil	9
Kava.	10
Passionflower	10
The bottom line	11
Contributor’s biographies	12



Introduction

Stress is an underlying causal factor for many acute and chronic diseases. It can impact the body's immune, nervous and neuroendocrine systems. When left untreated, stress can lead to a host of problems including cancer, heart disease, insulin-resistance and depression.

It is critical for medical professionals to recognize and treat this silent enemy. In this paper, Gaia and Metametrix outline:

- What constitutes stress
- The negative effects of stress
- Who is affected by stress and how it is diagnosed
- The Hypothalamus-Pituitary-Adrenal (HPA) Axis
- The science behind these botanical adaptogens and their clinical applications:
 - ◆ Rhodiola rosea
 - ◆ Panax ginseng
 - ◆ Eleuthero root
 - ◆ Holy basil
 - ◆ Kava
 - ◆ Passionflower



What constitutes stress

Stress is the body's response to an environmental pressure. Stedman's Medical Dictionary defines stress as, "reactions of the body to forces of a deleterious nature, infections, and various abnormal states that tend to disrupt its normal physiological equilibrium (homeostasis)." When stress becomes chronic, so do the physiological disruptions, prompting the appearance of physical problems.

It is clear that stress has become epidemic in much of Western culture. Up to 75–90% of doctor visits in the United States are stress related, according to The American Institute of Stress. The U.S. spends more than \$42 billion annually on disorders that are caused or complicated by stress, such as depression and anxiety, back pain and autoimmune diseases.

Stress has become a liability for employers as well. *Property and Casualty Insurance Edition* estimates that \$150 billion are lost to stress in the workplace each year. Stress negatively affects the decision-making process, hinders productivity and increases absenteeism in employees.

The negative effects of stress

The two primary pathways by which stress attacks the body are:

Behavioral. People who are under stress often eat and sleep poorly. They are less likely to exercise and comply with medical treatment, but are more likely to smoke or abuse alcohol.

Physiological. Stress triggers a response by the body's endocrine systems which release hormones that influence other biological systems, including the immune system.

Over time these factors can lead to hypertension, arteriosclerosis, digestive disorders and many other health problems.

Further, any post-traumatic stress experienced by a person often has a sizeable impact on physical well-being. This is a priority topic with veterans, but also applies to victims of sexual and physical abuse and those exposed to domestic violence or other traumatic events.

Emotional stress can present itself very acutely, with symptoms including: a sense of loss, sadness or depression; severe weight loss or gain; irritable bowel syndrome; the inability to focus; frequent crying; and obsessively replaying the course of events in one's head.

Who is affected by stress?

An estimated 19 million people in the U.S. are affected by stress and anxiety-related conditions each year, yet less than a third actually seek treatment. Additionally, 43% of this group are depressed and often have alcohol or substance-abuse problems.

One of the key stressors in today's lifestyle is work. The Washington Business Group on Health found 46% of all employees in the United States to be severely stressed, even to the point of burnout. People are working longer hours and wearing more hats compared to their counterparts of just 30 years ago.

Heavy job load, job insecurity and work that is narrow, repetitive and unstimulating all lead to job stress, and women are twice as likely to be affected as men.

How stress is diagnosed

To diagnose stress, a healthcare professional must assess both the physical and emotional symptoms of a patient.

Emotional. Communication is the single most important tool to use when evaluating a person's emotional well-being. To determine a person's level of emotional stress, ask questions such as:

- Do you enjoy your job?
- Do you have children? How old are they?
- What do you do that brings you joy?

More importantly, listen to the answers.

Physical. There are three key physiologic measures to look at when assessing a patient for stress: heart rate variability, sleep and cortisol.

Heart rate variability

In addition to the well-known symptoms of elevated heart rate and blood pressure, *heart rate variability* serves as an important indicator for stress. A smooth, steady heart rate in the normal range indicates stability and health. An erratic heart rate with extreme peaks dictates a heart rate responding to stress. Both heart rates may average 70 beats per minute, for example, but the health of the heart rate is in its coherence.

Sleep

Proper sleep is one of the most important factors in maintaining good health. Disrupted sleep impacts every system in the body. It affects digestion, mental and emotional health and the immune system.

In 2008, the Center for Disease Control (CDC) released a study stating that, on average, 11.1% of U.S. adults had reported insufficient sleep for the previous month. The study also revealed that people in the Southeast reported the least amount of sleep, and the highest levels of obesity and diabetes, suggesting a link between poor sleep and poor health.

The average person needs seven to nine hours of solid sleep per night, according to the National Sleep Foundation. Sufficient sleep should be thought of as a “vital sign” of good health.

Cortisol deficiency or excess

Symptoms of a cortisol deficiency are chronic weakness, weight loss, fatigue, loss of appetite, muscle and joint pain, and alternating diarrhea and constipation. A salt craving is a primary symptom, which is typically a predictor of low blood pressure.

An excess cortisol state will promote the opposite symptoms: central obesity, sugar cravings, high blood pressure and headaches. In men, excess cortisol can manifest itself in impotence and oily skin. This is due to an increase in testosterone levels from the hormone pathways.

Sleep disturbances are symptoms for both cortisol excess and deficiency.

The Hypothalamus-Pituitary-Adrenal (HPA) Axis

The Hypothalamus-Pituitary-Adrenal, or HPA, axis illustrates the complex interactions between the hypothalamus, the pituitary gland and the adrenal glands.

As demonstrated by the HPA axis [Figure 1.0], when stress is induced, cortisol levels increase. The hypothalamus is signaled first, which triggers the pituitary gland to release corticotropin-releasing hormone. That, in turn, releases adrenocorticotropic hormone in the adrenal cortex, increasing cortisol in an effort to regulate various systems and functions, including the digestive system, glucose levels and blood pressure.

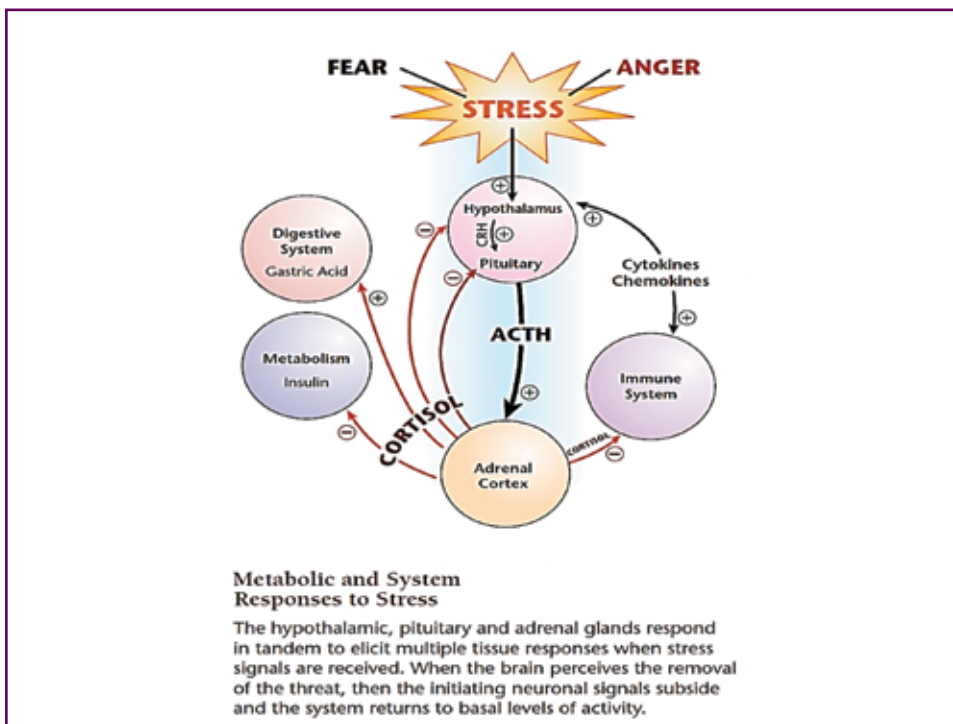


Figure 1.0 shows the Hypothalamus-Pituitary-Adrenal axis.

Understanding Everyday Stress: Diagnostics and Botanical Solutions

The problem is that cortisol levels remain high until stress is removed. A patient in a state of chronic stress depletes their DHEA until the stressor is addressed [Figure 1.1].

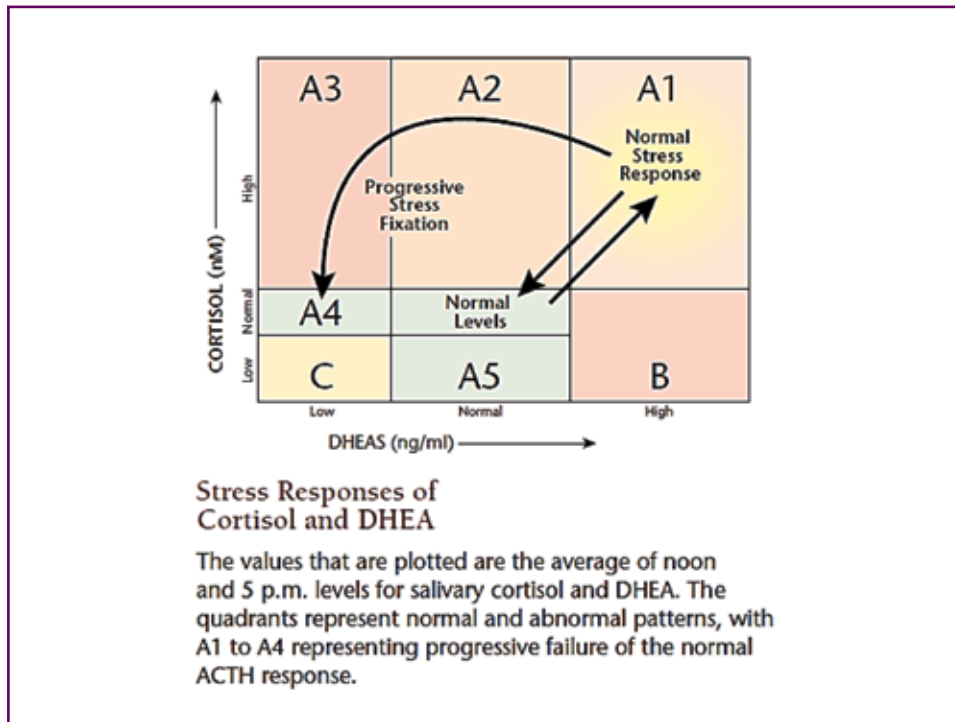


Figure 1.1 shows the phases of adrenal adaption.

Phase A1 is where cortisol levels go when the stress is first introduced. At Phase A2, the cortisol tends to still be high and the DHEA may be normal. At Phase A3, the cortisol level is still high, but the DHEA is low.

If the stress is not addressed, patients can fall into Phase C, an abnormal pattern. The cortisol and DHEA are both low and risk of adrenal fatigue and Addison's disease is high.

Phase B represents patients that may be supplementing with DHEA.

Botanical adaptogens: herbal solutions

The herbal solutions for stress fall into a narrow class of adaptogens: those botanical medicines that are non-toxic, that increase the body's resistance to adverse influences and that have a normalizing effect.

Adaptogens can be anti-oxidant, anti-cancer, hypercholesterolemic or immune modulatory. They can modulate insulin and blood sugar levels. They can also be chemoprotective, anti-inflammatory, anti-bacterial, anti-viral and have been shown to stop the progression of cognitive dysfunction, as well as improve physiological test function.

Anti-stress adaptogens are those that specifically help the body stabilize cortisol levels. The following six adaptogens are particularly effective at reducing a patient's response to chronic stress:

Rhodiola: Stress Related Fatigue

- Phase III clinical: A randomized, double-blind, placebo-controlled study
- 60 individuals were randomized into two groups, (N = 30) taking **576 mg extract/day**, while a second group (N = 30) received a placebo daily.
- Rhodiola exerted an anti-fatigue effect that increases mental performance, particularly the ability to concentrate, and decreases cortisol response to awakening stress in burnout patients with fatigue syndrome.

Olsson EM, von Schéele B, Panossian AG. A Randomized, Double-Blind, Placebo-Controlled, Parallel-Group Study of the Standardized Extract SHR-5 of the Roots of *Rhodiola rosea* in the Treatment of Subjects with Stress-Related Fatigue. *Planta Med.* 2009 Feb;75(2):105-12.

Rhodiola rosea

Rhodiola, sometimes known as Golden Root, contains the active constituents Rosavins and Salidroside and has traditionally been used to increase physical performance and focus. It has also been used to reduce fatigue.


In 2009, a double-blind, placebo-controlled study was conducted to measure stress-related fatigue. The results showed an anti-fatigue effect from the Rhodiola as well as an increase in mental performance and the ability to concentrate. The Rhodiola decreased the cortisol response to awakening stress and helped normalize cortisol response. This herb is ideal for patients in Phase C of cortisol stress [see Figure 1.1].

In a similar study, patients who received either 340 or 680 mg/day improved in overall depression, insomnia and emotional instability.

Suggested dosage: 200-680 mg/day

Ginseng

- Effects of Panax ginseng extract (PGE) on lipid peroxidation and scavenger enzymes induced by an acute exhaustive exercise in sedentary humans.
- Seven healthy male subjects performed 2 exhaustive incremental exercises on the treadmill before and after 8 weeks' PGE ingestion (2 g each time, 3 times a day)
- Significantly increased exercise duration, and elevation in Catalase and Super Oxide Dismutase activities as scavenger enzymes after PGE administration resulted in decrease of malondialdehyde level



Kim SH, Park KS, Chang MJ, et al. Effects of Panax ginseng extract on exercise-induced oxidative stress. J Sports Med Phys Fitness. 2005 Jun;45(2):178-82.

Panax ginseng

Panax ginseng extract (PGE) has been shown to have positive effects on lipid peroxidation and on scavenger enzymes, particularly when looking at exercise exhaustion in sedentary humans.

Suggested dosage: 2 grams/day

Eleuthero root


Eleuthero root is a good option for patients living with stress, experiencing blood sugar irregularities and looking to improve fatigue response. It modulates the immune system by normalizing NK cell activity, which helps with the decreased immunoglobulin level often found in people living with chronic stress. It also inhibits the corticosteroid elevation.

Suggested dosage: 400 mg/day

Holy Basil

- Three new compounds, ocimumosides A (1) and B (2) and ocimarin (3), were isolated from an extract of the leaves of holy basil (*Ocimum sanctum*), together with eight known substances, apigenin, apigenin-7-O-beta-D-glucopyranoside, apigenin-7-O-beta-D-glucuronic acid (4), apigenin-7-O-beta-d-glucuronic acid 6''-methyl ester, luteolin-7-O-beta-D-glucuronic acid 6''-methyl ester, luteolin-7-O-beta-D-glucopyranoside, luteolin-5-O-beta-D-glucopyranoside, and 4-allyl-1-O-beta-D-glucopyranosyl-2-hydroxybenzene (5), and two known cerebrosides.
- Promising **anti-stress effects** by normalizing hyperglycemia, plasma corticosterone, plasma creatine kinase, and adrenal hypertrophy

Gupta P, Yadav DK, Siripurapu KB, et al. Constituents of *Ocimum sanctum* with antistress activity. J Nat Prod. 2007 Sep;70(9):1410-6.



Holy basil

According to a number of recent studies, holy basil has been shown to have promising anti-stress effects by normalizing blood sugar levels for patients with sugar cravings or insulin resistance. Holy basil also modulates corticosteroid activity, regulates inflammation and normalizes adrenal hypertrophy and plasma creatinine kinase levels. It is recommended for patients experiencing Phase A2 of cortisol stress [see Figure 1.1].

Dosage: 300-600 mg/day

Kava

Kava does not typically fall into the adaptogen class, but it very effectively treats anxiety and muscle spasm.


Because of concerns over kava toxicity and liver disease, the commercial sale of kava is currently legal only in the U.S. There has been a recent international movement to reinstate it as a safe botanical.

Taking kava in a non-alcohol form is safe and produces no serious side effects. However, kava should not be taken with alcohol or with any drug that directly affects the liver. Recommended use is by aqueous extract or a phyto-cap, available at Gaia Herbs.

Suggested dosage: As needed

Passionflower

- Double-blind randomized trial on 36 patients with GAD.
- 18 to the Passiflora extract **45 drops/day** plus placebo tablet group, and 18 to oxazepam 30 mg/day plus placebo drops for a 4-week trial.
- Passiflora extract and oxazepam were equally as effective
- Oxazepam was more effective, but more side effects relating to impairment of job performance



Akhondzadeh S, Naghavi HR, Vazirian M, et al. Passionflower in the treatment of generalized anxiety: a pilot double-blind randomized controlled trial with oxazepam. J Clin Pharm Ther. 2001 Oct;26(5):363-7.

Passionflower

When compared to typical anti-anxiety drugs, passionflower proves to be at least as effective as easing anxiety and with fewer side effects. Anti-anxiety drugs can affect job performance, quality of life, libido and more. Passionflower is a much gentler option.

Suggested dosage: 45 drops/day or as needed

Please note that suggested dosages may vary and are dependent age, body weight and severity of symptoms. Contact a Gaia professional with any questions.

The bottom line

Adaptogens are important tools in combating the effects of chronic stress in patients, but it is equally important to identify and treat the cause. Remind patients to:

- Reduce irritating factors
- Take time for themselves
- Forgive
- Exercise
- Eat well

Contributors:

Dr. Keri Marshall is a licensed naturopathic physician who specializes in pediatrics, women's medicine, and chronic disease management. Dr. Marshall has published several scientific papers and magazine articles and has written a book on proteins and amino acids. She appears regularly on nationally syndicated radio shows, and has appeared on ABC's "The View from a Bay" and CBS "HealthQuest." Dr. Marshall received her Naturopathic Medicine Degree from the National College of Naturopathic Medicine in Portland, Oregon; her Master's Degree in Epidemiology from SUNY at Buffalo; and her Bachelor's of Science from George Washington University. Dr. Marshall maintains a small, private practice in Washington, D.C.

Christie Egeston received her B.S. in Biology from Tennessee State University and a Master of Science in Medical Science from Hampton University. Christie has worked in several capacities in the medical field, including medical assistant for a pain management facility and a laboratory assistant at Vanderbilt University Medical Center. She joined Metametrix in 2005 as a client services support specialist and was later promoted to clinical consultant support specialist. While working as a support specialist, Christie helped prepare materials for Hawthorn Institute seminars and compiled research and support of supplement recommendations used in Metametrix testing.