

Healing the Body with Adaptogens

*By Nadia S. Hughes,
Holistic Practitioner of Trichology*

HEALING THE BODY WITH ADAPTOGENS

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Forward: On Healing the Body with Adaptogens

This booklet is not intended to diagnose, treat, cure, or prevent any disease. Please consult with your healthcare provider before beginning any supplemental regimen.

This book is divided into two parts; the first will give a background on the systems of the body that play a role in the stress response, along with their correlating organs and hormones. This will give a better idea about why it is so important for the body to be in balance, in homeostasis.

When hormones are unbalanced, when stress is intense, when you are not getting proper sleep- disease can occur.

The second part describes what adaptogens are and how they can help specific body processes find their way back into a natural balance.

Most of the adaptogens covered in this book are plant-based; they can provide exponential benefits not only for the human body, but for the mind as well.

-Nadia S. Hughes

(Founder of Trichologists on a Mission (TOAM), and Hair Again: Holistic Practitioners of Trichology™)

About Trichologists on a Mission (TOAM)

What is TOAM?

“Trichologists on a Mission, TOAM, was created because there was an unmet need for alternative therapies and holistic-based solutions for hair loss that would provide satisfying, long-lasting, and low-risk results that can be offered as standalone treatments or paired with conventional medicines. TOAM’s signature protocols and holistic solutions offer an unmatched opportunity to restore hope for the practitioner and the client.

We are an inclusive, professional-only organization offering a harmonious and creative learning environment for professional trichologists, hair loss specialists, hairstylists, barbers, naturopaths, holistic practitioners, and medical professionals of all disciplines.

Our philosophy as practitioners is to stress the importance of nurturing the Mind, Body, and Soul- which all play important roles in not only treating hair loss but also in developing a happy and healthy life.”

-Nadia S. Hughes

TOAM’s Objectives

- To educate and share best practices with medical, beauty and wellness professionals in the advancement of hair thinning, hair loss and scalp disorders utilizing a holistic wellness approach.
- To present educational lectures, round table focus groups, and clinical studies on industry advancements while offering the latest in alternative products, holistic treatment protocols- solutions that focus on the whole person.
- To offer the delegates a strong foundation in the study of trichology, allowing them to provide hair loss services and solutions to their clients, which could increase their business-building opportunities.
- To offer our partners the opportunity and assistance in selecting additional educational programs/ partnerships that would help them to broaden their knowledge in this area of specialty.
- To attract new strategic business partnerships and industry alliances, creating mutually beneficial relationships.

For more information, please visit <https://trichologistsonamission.com>

Healing the Body with Adaptogens

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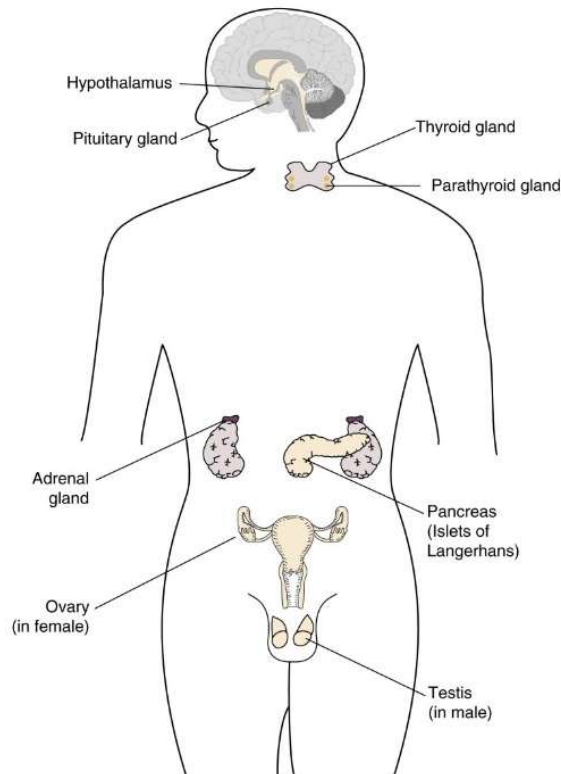
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Part 1: Body System, Hormones, and Stress

The Endocrine System

For the body to function properly, its internal components must effectively communicate with each other so that a constant homeostasis is maintained. Two vital body systems, the nervous system and the hormonal (i.e., neuroendocrine) system, constantly interact- ensuring that communication is made in the body to keep the systems running properly. Stimuli from the nervous system can influence the release of certain hormones from the endocrine system, and vice versa. Hormones are biochemical messengers that help regulate many of the body's functions, including growth and development, metabolism, electrolyte balances, and reproduction. The endocrine glands are located throughout the body and produce/release hormones, which in turn stimulate other glands.

The endocrine glands: hypothalamus, pituitary gland, thyroid gland, parathyroid glands, adrenal glands, and gonads, (i.e., testes and ovaries).



Hypothalamus

The hypothalamus is located in the brain and coordinates the endocrine system. It receives signals, then releases or inhibits hormones that affect the pituitary gland, thyroid gland, adrenal gland, and reproductive organs. It is also involved in non-endocrine functions such as temperature regulation, regulation of the autonomic nervous system, and the control of one's appetite. The hypothalamus produces TSH Releasing Hormone (TRH) that signals the pituitary to tell the thyroid gland to produce more or less of T3 and T4 by either increasing or decreasing the release of thyroid stimulating hormone (TSH).

*The hypothalamus and the pituitary glands communicate to maintain T3 and T4 balance.

Complex communication between the endocrine glands

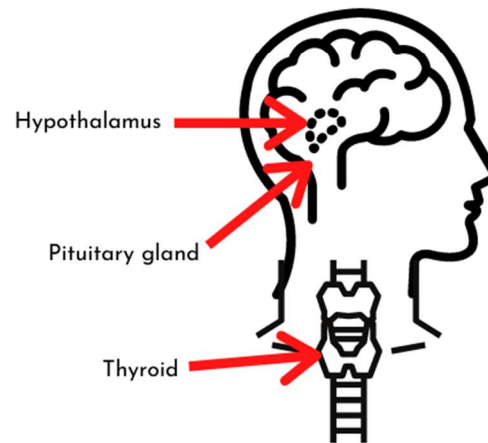
Hypothalamus= produces TRH (thyroid releasing hormone). Its release signals the pituitary gland



Pituitary gland= after being signaled by the hypothalamus, the pituitary releases TSH (thyroid stimulating hormone), signaling the thyroid



Thyroid gland= is signaled by the pituitary gland to make more/less T3, T4

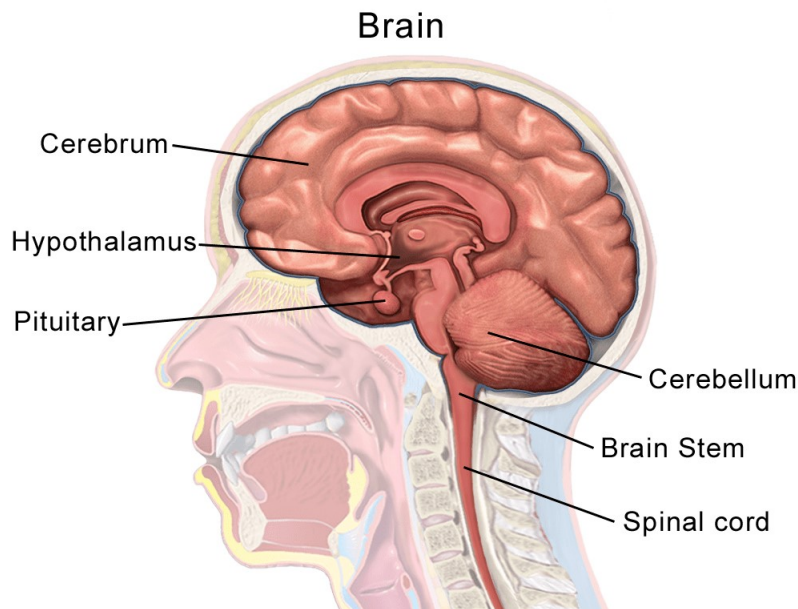


Pituitary gland

The pituitary gland is regulated by the hypothalamus but is known as the “master gland” because of its central role in governing homeostasis, maintaining the reproductive cycle, and directing the activity of other glands.

Adrenocorticotrophic Hormone (ACTH) is released from the anterior pituitary gland in response to the corticotropin-releasing hormone (CRH), which comes from the hypothalamus and facilitates the release of cortisol. The negative feedback from the cortisol regulates the CRH and ACTH. They aid in the secretion of glucocorticoids during stress (1).

Thyroid Stimulating Hormone (TSH) is secreted from the pituitary gland thyrotrophs and occurs in response to the thyrotropin-releasing hormone from the hypothalamus. This TSH then signals the thyroid gland to stimulate the release of T3 and T4. The TSH is regulated by the blood levels of T3 and T4.



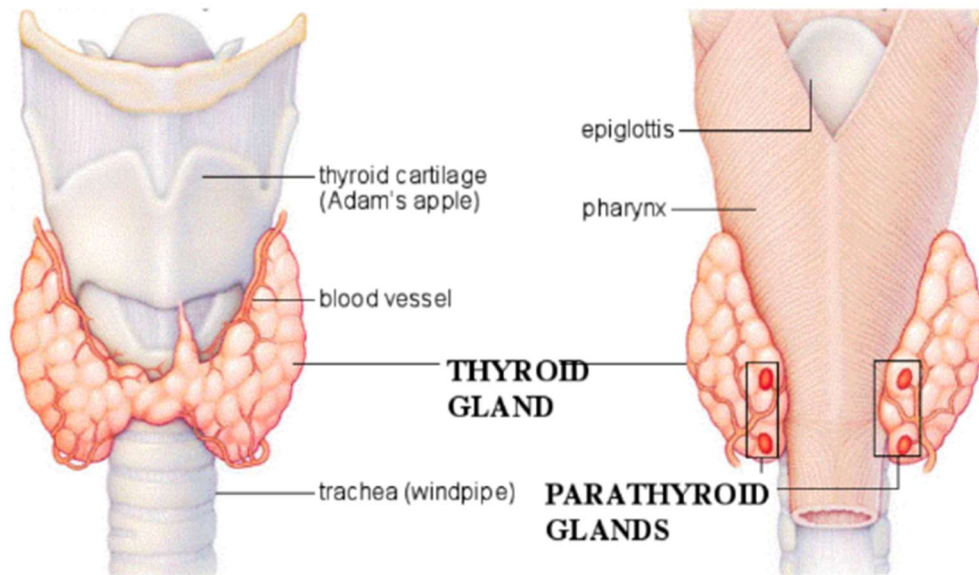
Thyroid gland

The thyroid is a butterfly-shaped endocrine gland that sits low on the front of the neck. It is controlled by the pituitary gland, and releases hormones that control metabolism. Thyroid cells are the only cells in the body that can absorb iodine. These cells combine iodine and the amino acid tyrosine to make Triiodothyronine (T3) and Thyroxine (T4).

T3 and T4 regulate your heart rate and how fast your intestines process food and determine how your body uses energy. These hormones also play an important role in controlling your weight, body temperature, muscle strength, and nervous system. Every cell in the body depends upon thyroid hormones for regulation of their metabolism.

Parathyroid gland

Parathyroid glands control the level of calcium circulating in the blood and does not play a role in metabolism regulation like the thyroid gland does. The parathyroid gland also controls how much calcium is in the bones, and this determines how strong or dense the bones are. Our entire brain works and functions by having specific levels of calcium traveling into and out of the nerve cells. Calcium is also the main element that causes muscles to contract.

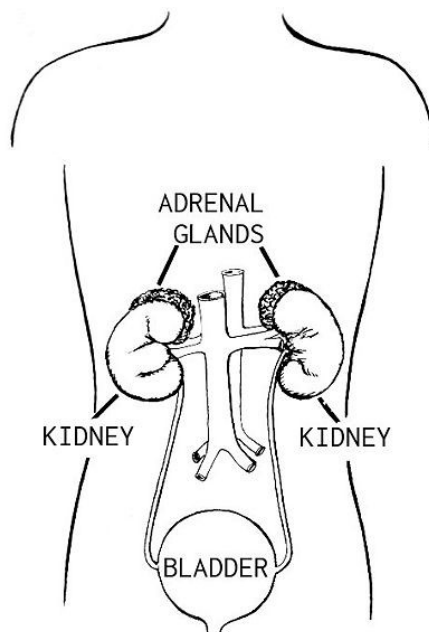


Adrenal gland

Adrenal glands are located just above the kidneys and are also known as the suprarenal glands. They are endocrine glands that produce a variety of hormones (including adrenaline, sex hormones, and the steroids aldosterone and cortisol) that help regulate metabolism, the immune system, blood pressure, and our response to stressors.

Glucocorticoids (GCs) are any steroid hormone that are produced by the adrenal gland. They are known for their anti-inflammatory and immunosuppressive actions, and they are a part of the feedback mechanism for the immune system. They can reduce immune function, such as that seen occurring during a period of inflammation. Glucocorticoids also help promote fat and protein breakdown, as well as glucose synthesis.

Cortisol is a glucocorticoid, and it is synthesized from cholesterol and then released from the cell's mitochondria and the out into the bloodstream in response to stress. Cortisol is one of the major glucocorticoids, and it regulates/supports many important cardiovascular, metabolic, immunologic, and homeostatic functions (2).



Catecholamines are hormones produced by the adrenal glands. The most predominant catecholamines are dopamine, norepinephrine, and epinephrine (adrenaline). During the stress response, the sympathetic-adrenomedullary axis (SAM) is triggered to have the adrenal glands release catecholamines into the bloodstream. This helps the body respond to stress or fright and prepares the body for "fight-or-flight" reactions. Catecholamines increase heart rate, blood pressure, breathing rate, muscle strength, and mental alertness. They also lower the amount of blood traveling to the skin and intestines, but increase blood going to the major organs, such as the brain, heart, and kidneys.

*A negative effect of impaired neurotransmission or an excess of circulating levels of catecholamines can lead to pathophysiologic effects, such as heart failure.

Endocrine Glands and Their Major Hormones

Endocrine gland	Associated hormones	Chemical class	Effect
Pituitary (anterior)	Growth hormone (GH)	Protein	Promotes growth of body tissues
Pituitary (anterior)	Prolactin (PRL)	Peptide	Promotes milk production
Pituitary (anterior)	Thyroid-stimulating hormone (TSH)	Glycoprotein	Stimulates thyroid hormone release
Pituitary (anterior)	Adrenocorticotropic hormone (ACTH)	Peptide	Stimulates hormone release by adrenal cortex
Pituitary (anterior)	Follicle-stimulating hormone (FSH)	Glycoprotein	Stimulates gamete production
Pituitary (anterior)	Luteinizing hormone (LH)	Glycoprotein	Stimulates androgen production by gonads
Pituitary (posterior)	Antidiuretic hormone (ADH)	Peptide	Stimulates water reabsorption by kidneys
Pituitary (posterior)	Oxytocin	Peptide	Stimulates uterine contractions during childbirth
Thyroid	Thyroxine (T ₄), triiodothyronine (T ₃)	Amine	Stimulate basal metabolic rate
Thyroid	Calcitonin	Peptide	Reduces blood Ca ²⁺ levels
Parathyroid	Parathyroid hormone (PTH)	Peptide	Increases blood Ca ²⁺ levels
Adrenal (cortex)	Aldosterone	Steroid	Increases blood Na ⁺ levels
Adrenal (cortex)	Cortisol, corticosterone, cortisone	Steroid	Increase blood glucose levels
Adrenal (medulla)	Epinephrine, norepinephrine	Amine	Stimulate fight-or-flight response
Pineal	Melatonin	Amine	Regulates sleep cycles
Pancreas	Insulin	Protein	Reduces blood glucose levels
Pancreas	Glucagon	Protein	Increases blood glucose levels
Testes	Testosterone	Steroid	Stimulates development of male secondary sex characteristics and sperm production
Ovaries	Estrogens and progesterone	Steroid	Stimulate development of female secondary sex characteristics and prepare the body for childbirth

The Immune System

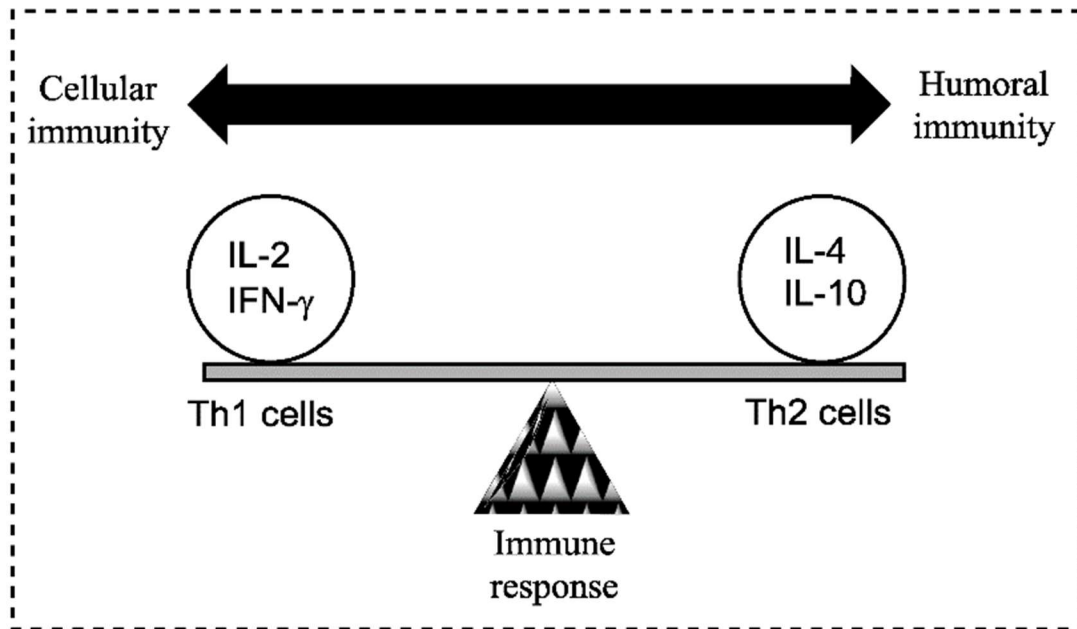
Chronic stress and stress hormones result in complex actions on the immune system. Glucocorticoids, GCs, alter the function of leukocytes and other immune cells and decrease proinflammatory cytokines. Also, GCs as well as catecholamines induce a switch from Th1 to Th2 cells, which increases the risk for auto-immune disorders such as systemic lupus erythematosus, Graves' disease, and allergic conditions (3). Th means "T-Helper". Their job is to recognize and destroy any foreign microorganism that can cause diseases.

Th1 cells tend to be pro-inflammatory and are part of what is called cell-mediated immunity, which is an immune response that does not involve antibodies. Being Th1 dominant means the immune system is constantly amped up, so there is a higher incidence of a person who has Th1 dominance of experiencing autoimmune conditions. (Hashimoto's, Grave's disease, Crohn's Disease, psoriasis, Sjogren's syndrome, celiac disease, lichen planus, rheumatoid arthritis, and chronic viral infections.)

Alternately, Th2 cells work with B cells and typically fight bacteria, toxins, and allergens. They are responsible for stimulating the production of antibodies and are usually not inflammatory. Th2 dominance can also be caused by a variety of issues such as heavy metals exposure (aluminum, mercury, and lead) which are known to lower immune function. Possible diseases linked to Th2 dominant immune systems may include Lupus, allergic dermatitis, atopic eczema, sinusitis, inflammatory bowel diseases, asthma, allergies, colitis, and multi-chemical sensitivities.

In a balanced immune system, the T1 and T2 cells work together, and one does not dominate the other. At times, some people are either T1 or T2 dominant, which can be discerned by having a blood panel test.

*The immune system works best when it is in balance.



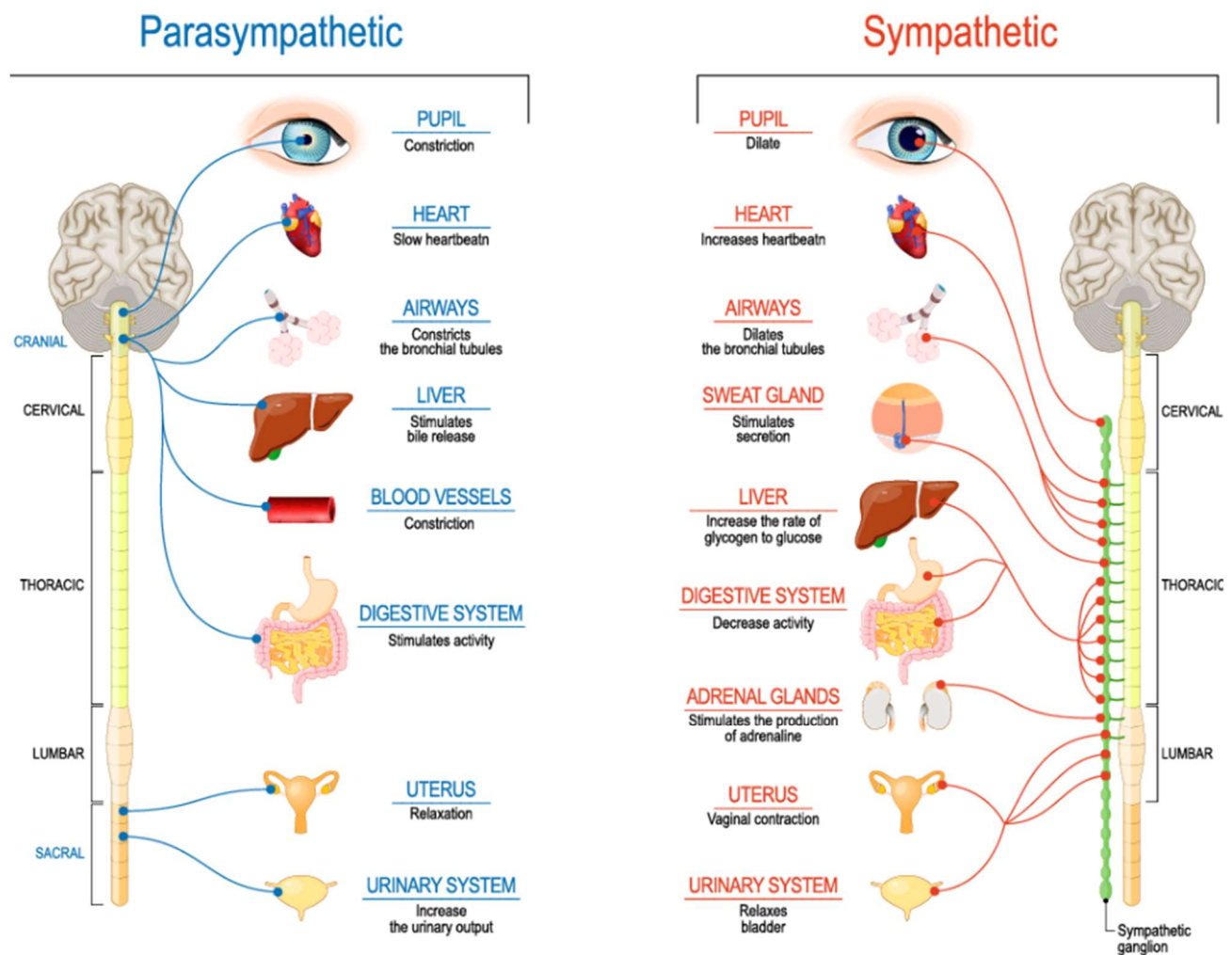
Interferon gamma (IFN γ) is a cytokine that plays an important role in inducing and modulating an array of immune responses.

Interleukins (IL) are any of a class of glycoproteins produced by leukocytes for regulating immune responses. The primary function of interleukins is to modulate growth, differentiation, and activation during inflammatory and immune responses.

The Autonomic Nervous System

Neurologically, we function on a back and forth effort between the sympathetic (fight or flight) and parasympathetic (rest and digest) systems. These make up the autonomic nervous system, which acts largely unconsciously to regulate bodily functions. The sympathetic nervous system (SNS) promotes catabolic tissue breakdown and fat metabolism to mobilize glucose for energy and promotes arousal, alertness, motivation, and goal-directed behavior.

The parasympathetic nervous system (PNS) promotes healing, repair, immunity, and growth required for restored energy reserves and longevity (4).



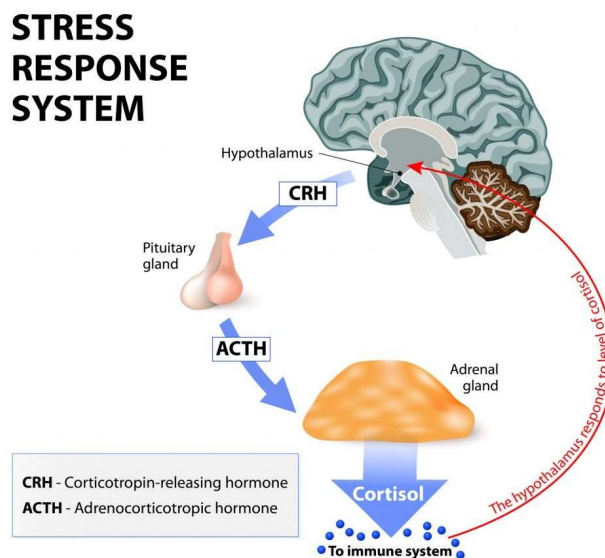
The Stress Response System

As humans, we have a complex network of metabolic machinery that works hard to maintain normal homeostasis and internal balance. Stress is described as a state of threatened homeostasis or disharmony. When the body is exposed to stress, a complex surge of adaptive stress responses occurs. A cascade of physiological (hypertrophy of the adrenal gland, atrophy of the lymphatic organs, and ulcers in the stomach) and behavioral responses occur with the goal of reestablishing body homeostasis.

The stress response system is comprised of the hypothalamic-pituitary-adrenal (HPA) axis and the sympathetic nervous system (SNS).

The integrity of HPA axis function and normal diurnal (daytime) patterns of cortisol release are essential for maintaining internal homeostasis; therefore, excessive or inadequate regulation of the stress response systems can cause individuals to suffer adverse health consequences. The stress response system was not designed to be constantly activated.

The stress response system can be divided into three parts: stressor, stress response and stress performance (5). The stressor is the object that induces physical strain; therefore, a stressor may be biological (infection), physical (external force, extreme environment), chemical (medicine, ethanol), or psychological (sadness, argument). When an organism is exposed to a stressor, the neuroendocrine system of the body changes.



General Adaptation Syndrome (GAS)

The GAS includes a three-stage process: an alarm reaction stage, an adaptation stage, and an exhaustion stage.

1. **Alarm reaction:** The “fight-or-flight” response is activated, which is the natural physiological response to stress that prepares you to either flee or protect yourself in dangerous situations. The endocrine glands release cortisol, causing the heart rate and blood pressure to increase, and adrenaline (epinephrine), which stimulates glycogenolysis in the liver. This leads to higher circulating serum glucose levels in order to provide energy for a defensive reaction (6).
2. **Adaptation:** After the alarm reaction slows down, the body is still on a “high alert” for a time. If the stress subsides, the body begins to repair itself by releasing a lower volume of cortisol, and the heart rate and blood pressure begin to normalize.
 - If the stress is not resolved and the body remains on high alert, it eventually adapts and learns how to live with this enhanced level of stress. This causes the body to go through changes with an attempt to cope with prolonged stress. Stress hormones are still being released into the blood, causing the blood pressure to continue to be elevated. Symptoms of this stage are inability to concentrate, irritability, and anger/frustration.
3. **Exhaustion:** Dealing with a high level of stress for long periods can drain your physical, emotional, and mental resources to the point where your body no longer has strength to fight stress.

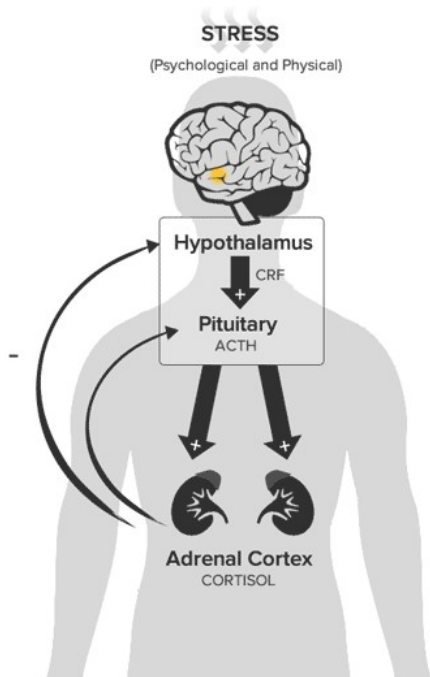
There are four general categories of chronic hypothalamic-pituitary-adrenal (HPA) -axis stressors:

- mental/emotional stress
- sleep disorders
- metabolic/glycemic dysregulation
- chronic inflammation

How Stress affects our Bodies

There are many types of stressors that can alter body homeostasis. They may be physical, chemical, or emotional (perceived or real). The nervous system is not good at distinguishing between emotional and physical threats, so the body can react just as strongly if you are facing a true life-or-death situation or just stress from work. The more your emergency stress system is activated, the easier it becomes to trigger it, and the harder it is to shut it off.

Chronic stress disrupts almost every system in the body. It can suppress immune function, upset your digestive and reproductive systems, increase the risk of heart attack and stroke, and speed up aging. Stress can alter the brain, causing sufferers to be more vulnerable to anxiety, depression, and other mental health problems.



More than 70% of all known diseases are believed to be stress-related.

- Heart disease: high blood pressure and heart problems.
- Asthma
- Obesity
- Diabetes
- Headaches/migraines
- Depression and anxiety
- Gastrointestinal problems: peptic ulcers, ulcerative colitis
- Alzheimer's disease
- The common cold
- Weight gain
- Slower healing capability
- Sleep dysfunction: insomnia
- Back, neck and shoulder pain.
- Rheumatoid arthritis

Mental/Emotional Stress

Grief, excitement, fear, anxiety, guilt, and embarrassment can all trigger an HPA axis response. For example, public speaking, work performance evaluations, extreme sports such as skydiving, or even certain medical appointments can cause ACTH and cortisol to become elevated (7).

Cognition

Constant HPA axis activation is also a characteristic feature of several psychiatric disorders including depression, anorexia nervosa, schizophrenia, and Alzheimer's disease. Prolonged glucocorticoid secretion may also cause deficits in memory and cognition through neurotoxic effects on hippocampal neurons (8).

Sleep disorders

Sleep apnea. Disrupted sleep can cause a rise in cortisol levels in the evening hours and during the initial phases of sleep. Research has shown that the release of cortisol and other adrenal hormones seen in sleep apnea sufferers can promote the development of secondary metabolic syndrome, hypertension, and inflammatory diseases (9).

Insomnia. Several psychological and physiological factors contribute to the onset and perpetuation of insomnia, such as anxious-ruminative personality traits, stressful events, and age-related sleep homeostasis weakening mechanisms (menopause).

Proinflammatory cytokines, Interleukin-6 (IL-6) and Tumor Necrosis Factor α (TNF α) are fatigue-inducing cytokines that are negatively influenced by the quantity and quality of sleep. ACTH and cortisol levels are significantly higher in insomniacs compared to normal sleepers, as insomnia is associated with an overall 24-hour increase of ACTH and cortisol secretion (10).

Metabolic/Glycemic Dysregulation

Cortisol is key in the regulation of glucose production. During stress, an increase in cortisol levels occur so that the brain and muscle can have adequate glucose reserves required for the fight or flight stress response. This response is intended to promote and encourage short term survival, but prolonged stress can become unhealthy for the body. Cortisol can further promote insulin resistance. People who consume high glycemic foods, especially if they already have

symptoms of insulin resistance, will often experience a hypoglycemic crash after a meal- which then triggers a rise in cortisol. It is a dangerous metabolic cycle.

Glucocorticoids (GCs) reduce the sensitivity of the brain to leptin and insulin by enhancing insulin resistance (11). GCs specifically increase a preference for food that is rich in fat and sucrose.

Weight control studies have shown that, on average, most obese individuals (especially those with a significant amount of abdominal fat tissue) have high circulating cortisol levels (12).

Cortisol, a glucocorticoid (GC) hormone, is known to cause a redistribution of white adipose tissue to the abdominal region (causing visceral obesity). This may be due to the greater density of glucocorticoid receptors (GRs) in the visceral adipose tissue than of that in other adipose tissues, causing fat redistribution to the abdominal region. In addition, with a high level of circulating cortisol the appetite increases- with a preference for energy-dense food (“comfort food”) (13). People who are chronically exposed to high levels of glucocorticoids can develop not only abdominal obesity, but also metabolic syndrome, type 2 diabetes, hypertension, dyslipidemia, and eventually cardiovascular diseases (CVD).

Chronic Inflammation

Cortisol is a powerful anti-inflammatory hormone; therefore, any acute or chronic inflammatory condition will signal cortisol release through the body’s inflammatory signaling.

Gastrointestinal inflammation (such as that seen in those with irritable bowel syndrome or food allergies), chronic inflammatory conditions (joints, cardiovascular) or obesity can signal cortisol release/HPA axis dysfunction. Ironically, some pharmacologic agents commonly used to treat the very symptoms of chronic inflammatory diseases (NSAIDs and opiates) can further exacerbate HPA axis dysfunction- and increase the level of cortisol being released.

Cortisol also selectively suppresses cellular immunity to help prevent tissue damage from excessive inflammation. Low cortisol states (hypercortisolism) causes up-regulation of cellular immunity, resulting in an increased production of inflammatory cytokines

An inflammatory cytokine is a signaling molecule that is secreted from immune cells and other cell types that promote inflammation. They include: interleukin-1(IL-1),IL-12, and, IL-18, tumor necrosis factor alpha (TNF- α), interferon gamma(IFN γ), and granulocyte-macrophage colony stimulating factor (GM-CSF). These cytokines can cause immune over-activation, suppressing lymphocyte function and disrupting T-cell signaling.

A balance between proinflammatory and anti-inflammatory cytokines is necessary to maintain an optimal state of health. Excessive/chronic production of inflammatory cytokines from stress can contribute to certain inflammatory diseases (such as atherosclerosis or cancer), autoimmune diseases, obesity, glucose dysregulation, depression, and other neurological disorders (14).



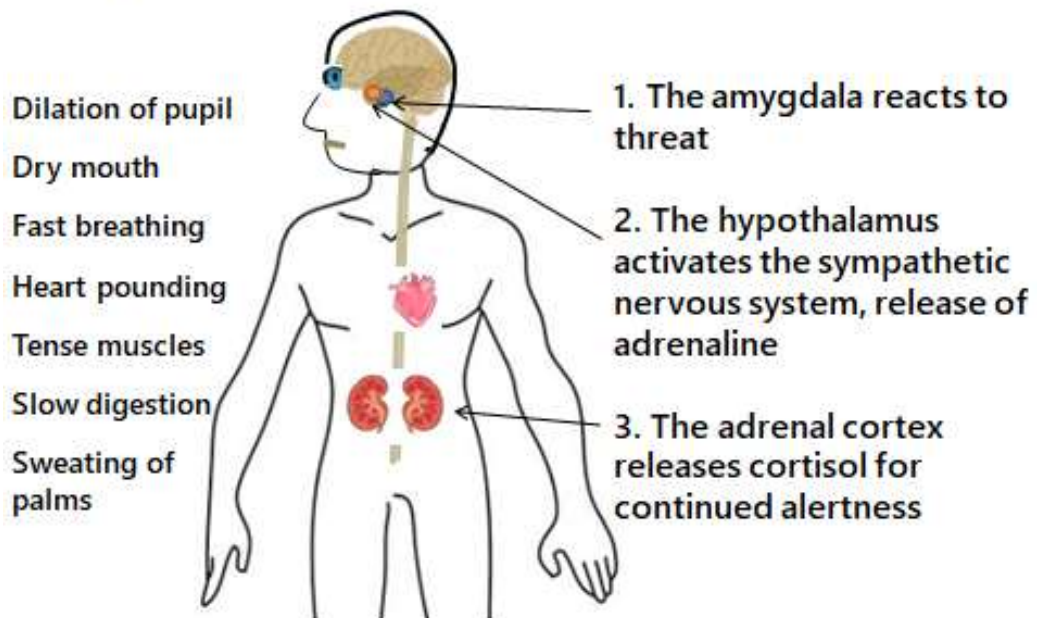
Adrenal Fatigue

The adrenal glands respond to stress by releasing hormones such as cortisol and adrenaline. These hormones are part of the natural "fight or flight" response, and they increase blood pressure and heart rate. When people are faced with long-term stress, the adrenal glands can't keep up with the body's need for these stress hormones.

Prolonged exposure to stress can drain the adrenal glands, leading to a low cortisol state, called hypocortisolism. Adrenal depletion can also cause brain fog, low energy, depressive mood, salt and sweet cravings, and lightheadedness.

People who have hypocortisolism, or cortisol resistance, typically suffer from chronic fatigue, impaired cognition, sleep disturbances, anorexia nervosa, and depression.

The fight or flight response



Typically, a cell is either in:

- balance (dynamic equilibrium - homeostasis), or
- functioning under stressful conditions (threatened homeostasis-imbalance),
- the state of adaptation (tolerance) to stress (*i.e.*, state of non-specific resistance to stress; homeostasis with a higher level of equilibrium),
- the state of apoptosis (dying).

Part 2: Adaptogens and their benefits

What are Adaptogens?

The term adaptogen was first proposed in the 1940s by a Soviet toxicologist named N. V. Lazarev. After the breakup of the Soviet Union, Russian scientists lead the way in adaptogen research, however, news about adaptogens remained a closely guarded secret of the Soviet state. The Russian government took research of adaptogens so seriously that scientists were banned from speaking of their results or publishing their findings outside the country- so until recently, this research never reached Western scientists. Ironically, adaptogens have been used in Eastern, Ayurvedic, and Chinese medicine for generations.

Adaptogens are natural bioregulators, mainly plant-based herbs and fungi/mushrooms, that increase one's ability to adapt to environmental factors (stress) while avoiding the damage caused by those factors. Adaptogens have been shown to correct imbalances within different systems of the body. The major advantage of adaptogens is how they help to minimize the bodily response to stress by reducing the negative reactions during the alarm phase and eliminating, or at least decreasing, the onset of the exhaustion phase that is part of the general adaptation syndrome , GAS (15).

In 1998, the United States Food and Drug Administration (FDA) defined an adaptogen as a new kind of metabolic regulator that has been proven to help in environmental adaptation and to prevent external harms. Many studies have shown that adaptogens can non-specifically enhance the resistance of the human body under a wide range of external stress conditions. They can improve our ability to recognize, respond, recover, and restore or regenerate. Adaptogens can also increase the bodily rates of oxygen, protein, fat, and sugar utilization. Adaptogens are also stress response modifiers that non-specifically increase resistance to various stressors, such as chemicals in the environment, overwork, poor diet, and emotional factors. They work as immune stimulants by increasing the resistance to pathogens, viruses and bacteria, thereby promoting adaptation, survival, and enhancing one's quality of life.

For an herb to be classified as an adaptogen it must:

- Show nonspecific activity
- Have a normalizing influence independent of the nature of the pathological state
- Be innocuous and not influence normal body functions more than required.

Adaptogens act on several levels.

- 1) They augment the level of adenosine triphosphate (ATP), which controls energy levels.
- 2) They contain strong antioxidants that protect the mitochondria (the part of the cell that creates energy), cell membranes, and the DNA from damage.
- 3) They improve cardiovascular function which helps enhance oxygen levels that reach tissues.
- 4) They increase protein synthesis that aid in repairing damaged tissue.

There are three classifications of adaptogens:

Primary Adaptogens:

Primary adaptogens can help maintain or recover homeostasis and can also promote anabolic recovery. They can produce positive stress responses along with the associated hormone expression. Primary adaptogens also strengthen the functioning of body systems, promote optimal response, promote recovery of function, and help regulate energy use by improving the function of neuroendocrine system. This enhances cellular energy transfer, which can help the body utilize oxygen, glucose, lipids, and proteins very effectively- providing the body with a steady supply of energy (16).

Secondary Adaptogens:

Secondary adaptogens do not influence the HPA axis directly; however, these adaptogens can and do affect the immune, nervous, and endocrine systems, and can enhance anabolism. The secondary, plant-originated adaptogens include fatty acids, sterols, and phenols.

Companion Adaptogens:

Companion adaptogens have similar functions as the primary and secondary adaptogens, but these are not officially called adaptogens. These are classified as adaptogen companions because they can act synergistically with the other two kinds of adaptogens, improving their effects. Companion adaptogens do provide beneficial effects on the HPA axis and on anabolism to support the adaptogen functions (17).

Studies have confirmed that the following plants are *true* adaptogens (note they are mainly ginseng):

- Chinese ginseng: *Panax ginseng*
- Siberian ginseng: *Eleutherococcus senticosus* (also called *Acanthopanax senticosus*)
- Tibetan ginseng: *Rhodiola crenulate*
- Peruvian ginseng, maca: *Lepidium meyenii*
- Five-flavor fruit: *Schisandra chinensis*

Most ginseng species worldwide are internationally recognized as plant-originated adaptogens. They can enhance the resistance of the human body and can provide various beneficial effects, such as anti-fatigue, anti-ageing, anti-stress, anti-anxiety, anti-inflammatory, and anti-depression. Ginseng species may improve the circulatory system and immune system, and their anti-inflammatory properties can protect DNA from damage as well as prevent frequent colds or other illnesses.

How Adaptogens Help Heal Our Body

Immune System and Inflammation

Inflammation is an important bodily process that, when triggered by factors like an unhealthy lifestyle, stress, and toxic exposures, can spin out of control. When inflammation is allowed to run wild, it can damage the body by creating too many pro-inflammatory cells and molecules, such as tumor necrosis factor (TNF), interleukins (ILs), nuclear factor-kappa B (NF-kB), prostaglandins, and free radicals. Having too many of these pro-inflammatory substances being produced can cause damage to the body, leading to inflammation-related health issues and conditions, such as autoimmune disease.

Adaptogens provide the body with the strength to resist infection, strength to fight microbes, strength to mitigate our immune response, and strength to recover. The immune system requires tremendous amounts of energy to fight off infection, and adaptogens improve cellular energy production. They help modulate our immune response and prevent over-inflammation.

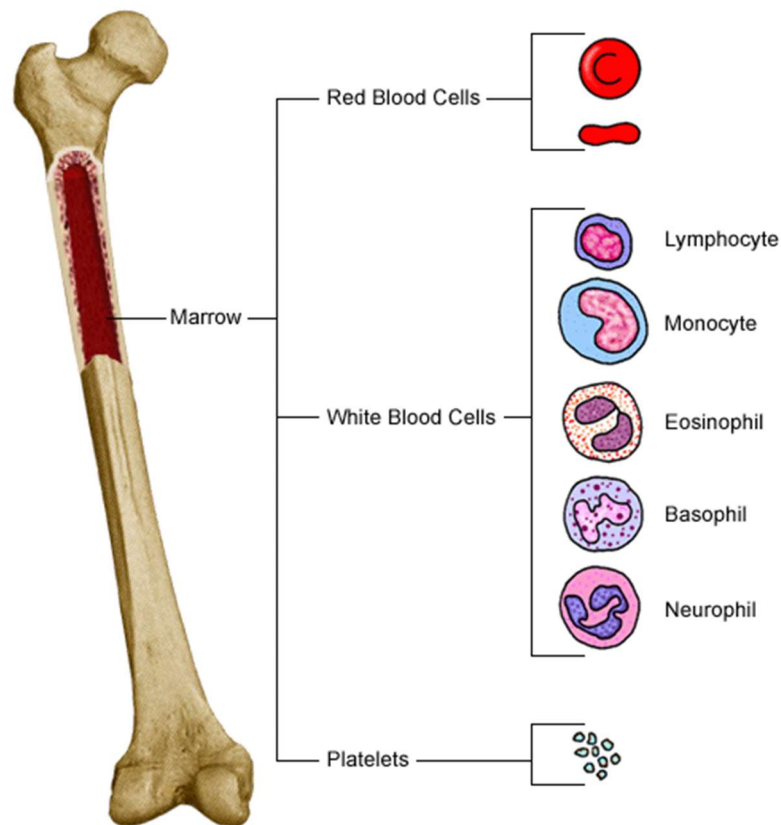
Adaptogens contain a diverse array of carotenoids, flavonoids, and phytosterols, which offer direct protection to our own cells from the oxidative stress produced by the immune system. Adaptogens also bolster our T regulatory cells (18).

Adaptogenic herbs have the ability to stimulate macrophages, white cells that are part of the immune system that search out and destroy pathogens in the blood (bacteria, yeast, and viruses). Macrophages predominately live in the mucus membranes, but also travel through the internal organs. They are the first line defense as far as the immune system goes, and their activity protects us from infections.

Adaptogens can also promote the production of bone marrow, the spongy tissue found in certain bones (such as your hip and thigh bones). Marrow contains stem cells, and these stem cells can develop into the red blood cells that carry oxygen through your body, the white blood cells that help fight infections, and the platelets that assist in blood clotting (19).

Herbs and fungi that have adaptogenic properties:

- Reishi mushroom (*Ganoderma lucidum*) is a highly researched adaptogen that supports the bone marrow reserve- which is where the macrophages and all other immune effector cells (t-cells) are produced. Reishi mushroom can increase production of interleukin 1 and 2, increase white cell count, and enhance natural killer (NK) cell activity. Reishi enhances immune function and helps in detoxification, which is especially useful when you've been exposed to allergens or toxins.
- Astragalus, Huáng Qí (*Astragalus propinquus*), increases the total number of white blood cells, strengthens the activity of macrophages, and promotes cellular immunity.



- Maitake mushroom (*Grifola frondosa*) is a macrophage activator.
- Malaysian ginseng, Longjack (*Eurycoma longifolia*) contains epigallocatechin-gallate (EGCG) which helps prevent the development multidrug resistance when medications are taken for infections (20).
- Chinese ginseng (*Panax ginseng*) and Siberian ginseng (*Acanthopanax senticosus*) both enhance overall immunity, including antibody response, natural killer (NK) cell activity, and interferon production (a group of signaling proteins made and released by host cells in response to the presence of several viruses.) Siberian ginseng can also increase t-cell count.
- Huáng Qí, astragalus (*Astragalus propinquus*) helps reduce the inflammatory-causing C-reactive protein (CRPs), a marker for inflammation. Astragalus also has immune-boosting properties and can activate T-cells
- Ashwagandha (*Withania somnifera*) reduces C-reactive proteins (CRPs), which are produced by the liver. CRP levels rise when there is an inflammation in the body; they are linked to an increased risk of heart disease.
- Turkey tail mushroom (*Trametes versicolor*) and Holy basil, Tulsi (*Ocimum tenuiflorum*) improve immune function by activating the immune response.
- Licorice root (*Glycyrrhiza glabra*) helps nourish a weakened and depleted immune system.

Other adaptogenic herbs that stimulate the immune system are:

- American ginseng (*Panax quinquefolius*)
- Echinacea (*Echinacea purpurea*)
- Thuja (Thuja occidentalis)
- Wild indigo (*Baptisia australis*).

The spices curcumin, turmeric, ginger, and omega-3 oils may also help in counteracting an inflammation imbalance in the body.

The Endocrine System

Adaptogens can positively affect different tissues and organs, adjusting each of these to reach a state of homeostasis. One of the most important functions of adaptogens is their ability to help stabilize the internal environment of the human body by positively affecting the neuroendocrine system.

- Five flavor fruit, magnolia berry (*Schisandra chinensis*) can prevent and resist stress because they activate the secretion of cortisol and nitric oxide, NO, in the plasma and saliva, allowing the body to adapt to heavier stress loads. Exposure to stressful stimuli (such as exercise) has been found to be associated with the activation of nitric oxide synthase and generation of NO, which reacts with spontaneous oxygen species to aid formation of active nitrogen radicals. High concentrations of reactive nitrogen radicals may cause damage to intracellular proteins, in addition to causing impairment to components of the mitochondrial transport chain- leading to cellular energy deficiency.

After the consumption of adaptogens, physical exercises do not increase the level of cortisol and NO in the human body; in fact, the levels decrease and are lower as compared to those present prior to the physical exercise. They have even shown the ability to enhance exercise endurance and provide an easier recovery afterwards.

- Rhodiola (*Rhodiola rosea*) is an estrogen receptor modulator, and it provides thyroid support.
- European black currant (*Ribes nigrum*) is a neuroendocrine adaptogen that has adaptogenic actions on damaged tissues.
- Oak (*Quercus pedunculata*) is an adaptogen with endocrine distributing actions.
- Peruvian ginseng, Maca (*Lepidium meyenii*) encourages overall hormone balance, which can support regulation of a woman's cycle.

The Adrenal glands

When the adrenals are weakened from stress, fatigue and suppressed immunity generally occur. Adaptogens help increase the effectiveness of adrenal gland secretion, reducing excessive stress hormone production (21). In the absence of stress, adaptogens can accelerate the closure of the adrenal gland; they can also increase cellular energy levels and prevent oxidative damage, leading to the maintenance of normal adrenal function.

- Ashwagandha, Indian ginseng (*Withania somnifera*) reduces cortisol levels.
- Chinese ginseng (*Panax ginseng*)
- Southern ginseng, Jiaogulan (*Gynostemma pentaphyllum*)
- Reishi mushroom (*Ganoderma lucidum*)
- Roseroot stonecrop (*Sedum rosea*)
- Golden root (*Rhodiola rosea*)
- Chinese licorice (*Glycyrrhiza uralensis*) is used for treating adrenal gland disorders such as Addison's disease.
- Codonopsis (*Codonopsis pilosula*) reduces the production of adrenaline. In addition, it is used for general physical and mental fatigue.
- Oak (*Quercus pedunculata*) corrects adrenal hormone deficiency.

The Digestive System

- Peptic ulcer was one of the first conditions ever to be associated with an overactive stress response. Licorice root (*Glycyrrhiza glabra*) has demonstrated efficacy against *Helicobacter pylori*, which is believed to cause peptic ulcer, including the clarithromycin-resistant strains. It also helps with healing a leaky gut.
- Passion flower (*Passiflora incarnata*) anti-*Helicobacter pylori*, heals gastric ulcers.
- Gotu kola (*Centella asiatica*) inhibits nitric oxide (NO) and facilitates gastric ulcer healing.

- Long pepper (*Piper longum*) increases permeability and partitioning of the gut lining, promoting rapid absorption and better assimilation of nutrients via the gastrointestinal tract.
- Amla, Indian gooseberry (*Phyllanthus emblica*) aids digestion and helps with metabolic disorders.
- Turmeric (*Curcuma longa*) helps the body maintain healthy levels of body weight.
- Astragalus (*Astragalus propinquus*) helps to soothe intestinal irritation.
- German chamomile (*Matricaria chamomilla*) helps with irritable bowel syndrome, dyspepsia, intestinal cramps, indigestion, and heartburn.
- Common hops (*Humulus lupulus*) aids digestive issues.
- Turkey tail mushroom (*Trametes versicolor*)
- Holy basil, Tulsi (*Ocimum sanctum*)

The Respiratory System

- Siberian ginseng (*Eleutherococcus senticosus*) Studies from Russia involving thousands of people showed as much as 50% reduction in respiratory illnesses by daily use of Siberian ginseng.
- Reishi mushroom (*Ganoderma lucidum*) acts as an expectorant.
- Long pepper (*Piper longum*) contains a constituent known as piperine, which demonstrates stimulant activity that supports poor circulation and shifts congestion within the respiratory and reproductive systems.
- Holy basil, Tulsi (*Ocimum sanctum*) is an expectorant for bronchitis.
- Passion flower (*Passiflora incarnata*) has anti-asthmatic, and anti-cough properties.

The Cardiovascular System

- Golden root (*Rhodiola rosea*) can help with vascular hypotension.
- Maitake mushroom (*Grifola frondosa*) reduces blood pressure and helps to lower LDL cholesterol.
- Holy basil, Tulsi (*Ocimum sanctum*) helps to lower cholesterol and triglycerides, as well as blood pressure.
- Aloe vera (*Aloe barbadensis Miller*) can help alleviate symptoms associated with cardiovascular disease.
- Chaga mushroom (*Inonotus obliquus*) lowers cholesterol and triglycerides.
- Turmeric (*Curcuma longa*) helps the body maintain healthy levels cholesterol.
- Codonopsis (*Codonopsis pilosula*) increases the number of red blood cells and the levels of haemoglobin in them, but it lowers the number of leukocytes. It also lowers blood pressure.

The Integumentary System (skin)

Most skin conditions can often be traced back to a hyper- or hypo-adrenaline condition, or digestive disorders.

- Gotu Kola (*Centella asiatica*) aids in the treatment of various skin conditions such as leprosy, lupus, varicose ulcers, eczema, and psoriasis. It is rich in amino acids, beta carotene, fatty acids, and numerous potent phytochemicals. Extracts have been found to calm inflammation, speed wound healing, stimulate new cell growth, build collagen, and improve circulation.
- Ashwagandha, Indian ginseng (*Withania somnifera*) is antimicrobial, antioxidant, and has skin-softening abilities. It also helps the skin to retain moisture.
- Golden root (*Rhodiola rosea*)
- Amla, Indian gooseberry (*Phyllanthus emblica*) is high in vitamin C and minerals and supports the immunity of the skin against bacterial infection. It also helps strengthen the digestive system, and aids in detoxifying the liver.

Arthritis

The following plant-based adaptogens have been shown to effectively reduce arthritis-associated inflammation and pain (22):

- Ashwagandha, Indian ginseng (*Withania somnifera*)
- Chinese ginseng (*Panax ginseng*)
- Southern ginseng, Jiaogulan (*Gynostemma pentaphyllum*)
- Reishi mushroom (*Ganoderma lucidum*)
- Roseroot stonecrop (*Sedum rosea*)
- Chinese licorice (*Glycyrrhiza uralensis*)
- Rosemary (*Salvia rosmarinus*) reduces osteoarthritis and pain in the knees.

Sleep Disorders

The following plant-originated adaptogens have been shown to act as sleep aids:

- American ginseng (*Panax quinquefolius*)
- Ashwagandha, Indian ginseng (*Withania somnifera*)
- Five flavor fruit, magnolia berry (*Schisandra chinensis*)
- Southern ginseng, Jiaogulan (*Gynostemma pentaphyllum*)
- Roseroot stonecrop (*Sedum rosea*)
- Passion flower (*Passiflora incarnata*)
- Golden root (*Rhodiola rosea*) helps with insomnia.
- Valerian root (*Valeriana officinalis*) helps with insomnia.
- Goji berry (*Lycium barbarum*) improves quality of sleep.
- Common hops (*Humulus lupulus*) is a sleep aid that prepares the mind and body for sleep.

Physical Fatigue

These adaptogens help build a resistance to physical fatigue and enhance endurance:

- Five flavor fruit, magnolia berry (*Schisandra chinensis*)
- Huáng Qí, astragalus (*Astragalus propinquus*)
- Cordyceps fungi (*Cordyceps militaris*)
- Siberian ginseng (*Eleutherococcus senticosus*) helps build a resistance to physical fatigue.
- Goji berry (*Lycium barbarum*)
- Chinese ginseng (*Panax ginseng*)
- Shilajit: a mineral-rich substance formed by the compression of organic material between layers of rock over hundreds of thousands of years. It contains 85 minerals and has been found to reduce the effects of chronic fatigue syndrome, iron-deficiency anemia, high altitude sickness, and more. It's also rich in **fulvic acid**, which reduces inflammation and may protect against free radicals and cellular damage.

Neurological Disorders and Cognition

- Siberian ginseng (*Eleutherococcus senticosus*), golden root (*Rhodiola rosea*), and five flavor fruit, magnolia berry (*Schisandra chinensis*) can all aid in the protection of brain neurons from various injuries, which means that they may have an influence on neurodegenerative mechanisms seen in Parkinson's disease (23).
- American ginseng (*Panax quinquefolius*) can help enhance memory.
- Five flavor fruit, magnolia berry (*Schisandra chinensis*) can help enhance mental performance.
- Golden root (*Rhodiola rosea*) assists in reducing mental fatigue and improving cognition.
- Goji berry (*Lycium barbarum*) enhances mental performance and reaction time.
- Cordyceps (*Cordyceps militaris*) enhances mental stamina, memory, and supports brain function. It has been shown to promote the growth of neuron pathways, which is crucial for memory development, neuroplasticity, and regeneration.

- Siberian ginseng (*Eleutherococcus senticosus*) helps to improve focus and reduces mental/cognitive fatigue.
- Turmeric (*Curcuma longa*) can enhance brain functions.
- Chinese ginseng (*Panax ginseng*) helps to improve cognition, focus, memory, and mental performance.
- Ashwagandha, Indian ginseng (*Withania somnifera*) helps improve memory recall and can reverse the effects of neurological toxins associated with neurodegenerative diseases (Alzheimer's) due to its neuroprotective properties. Ashwagandha has also been shown to support the regeneration and reconstruction of nerve cells and synapses. This suggests that ashwagandha could help reverse states of brain and nervous system degeneration.
- Holy basil, Tulsi (*Ocimum tenuiflorum*) can help increase cognitive functioning.
- Maral (*Rhaponticum carthamoides*) can stimulate neurological activity.
- Brahmi (*Bacopa monnieri*) promotes communication between neurons by increasing the growth rate of nerve endings. It enhances cognitive function, re-vitalizes the brain and nervous system, helping to increase attention span and concentration. It also enhances memory recall and is protective against the oxidative and adverse effects of heavy metals on the brain, namely iron, aluminum, and mercury.
- Aloe vera (*Aloe barbadensis Miller*) has been shown to reduce neurodegeneration.
- Rosemary (*Salvia rosmarinus*) helps improve memory, cognition, may prevent beta-amyloid induced neurodegeneration that has been seen in Alzheimer's disease.

Mood/Mental/Emotional Disorders

Adaptogens do not alter the mood, per say, but they do improve the body's reaction to negative emotions that come from stress.

- Five flavor fruit, magnolia berry (*Schisandra chinensis*) helps with depression and schizophrenia symptoms.
- Holy basil, Tulsi (*Ocimum sanctum*), reduces depression, is used as a stress reducer, antioxidant, and anti-anxiety supplement.
- Turmeric (*Curcuma longa*) reduces depression, mental stress, and anxiety.
- Golden root (*Rhodiola rosea*) helps with depression, irritability, promotes calmness and well-being
- American ginseng (*Panax quinquefolius*) promotes calmness.
- Southern ginseng, Jiaogulan (*Gynostemma pentaphyllum*) reduces mental stress.
- Licorice root (*Glycyrrhiza glabra*) helps reduce stress.
- Goji berry (*Lycium barbarum*) promote calmness and well-being.
- Lion's mane mushroom (*Hericium erinaceus*) reduces anxiety symptoms.
- Ashwagandha, Indian ginseng (*Withania somnifera*) reduces anxiety and depression.
- Brahmi (*Bacopa monnieri*) reduces the effects of physiological stress, helps with anxiety and depression.
- Velvet bean (*Mucuna pruriens*) has a high content of L-dopa, a precursor to the neurotransmitter dopamine. It lowers stress, improves mood, reduces anxiety, depression, and helps enhance mental focus. Some people with ADHD find it works as well as Adderall at keeping them calm and productive.
- Gotu kola (*Centella asiatica*) is believed to promote mental clarity, relaxation, and relieve anxiety (24).
- Kava (*Piper methysticum*) helps ease the symptoms of anxiety and calms the mind.
- Lemon Balm (*Melissa officinalis*) provides a calming effect on the nervous system.
- American skullcap (*Scutellaria lateriflora*) promotes calmness and support during stress.

- German chamomile (*Matricaria chamomilla*) restores calm after emotional upset.
- Valerian root (*Valeriana officinalis*) contains anti-anxiety properties.
- Passion flower (*Passiflora incarnata*) reduces anxiety and symptoms of mental stress by increasing the efficiency of GABA, a neurotransmitter (chemical messenger) in the brain. It may also boost other chemicals in the brain that can affect mood.

The Liver

When your liver is not functioning properly it can't remove the toxins from the body, so they build up. These toxins affect the immune system, causing conditions such as fibromyalgia, chronic fatigue, and chronic illnesses.

- Reishi mushroom (*Ganoderma lucidum*) and maitake mushroom (*Grifola frondosa*) help protect the liver from damage.
- Five flavor fruit, magnolia berry (*Schisandra chinensis*) can detoxify the liver, help treat chronic hepatitis by stimulating liver enzymes and new liver cell production.
- Holy basil, Tulsi (*Ocimum tenuiflorum*) is a liver protector, and is especially potent when paired with milk thistle, another liver supporter.
- Milk thistle (*Silybum marianum*) is composed of silymarin- which works directly on the liver to increase its effectiveness.
- Chinese Skullcap (*Scutellaria baicalensis*) provides liver support for a stressed liver.

Glucose metabolism

Adaptogens have positive effects on glucose metabolism:

1. Increase blood glucose level by stimulating the liver to convert glycogen to glucose
 2. Enhance the entry of glucose into cells
 3. Enhance the utilization of glucose within cells
- Reishi mushroom (*Ganoderma lucidum*) helps balance blood sugar

- Ashwagandha, Indian ginseng (*Withania somnifera*) can lower fasting blood sugar levels.
- Chaga mushroom (*Inonotus obliquus*) lowers blood glucose levels.
- Chinese ginseng (*Panax ginseng*) balances blood glucose levels, increases insulin production, and could possibly be effective as a complimentary diabetes therapy.
- Turmeric (*Curcuma longa*) helps the body maintain healthy levels of blood glucose.
- Aloe vera (*Aloe barbadensis Miller*) may help with symptoms of diabetes.
- Passion flower (*Passiflora incarnata*) has antidiabetic properties.
- Siberian ginseng (*Eleutherococcus senticosus*) can decrease and moderate insulin levels.

The Kidneys

- Huáng Qí, astragalus (*Astragalus propinquus*) may help improve kidney function in those with kidney disease. It may also prevent infections in those with reduced kidney function.

Cancer

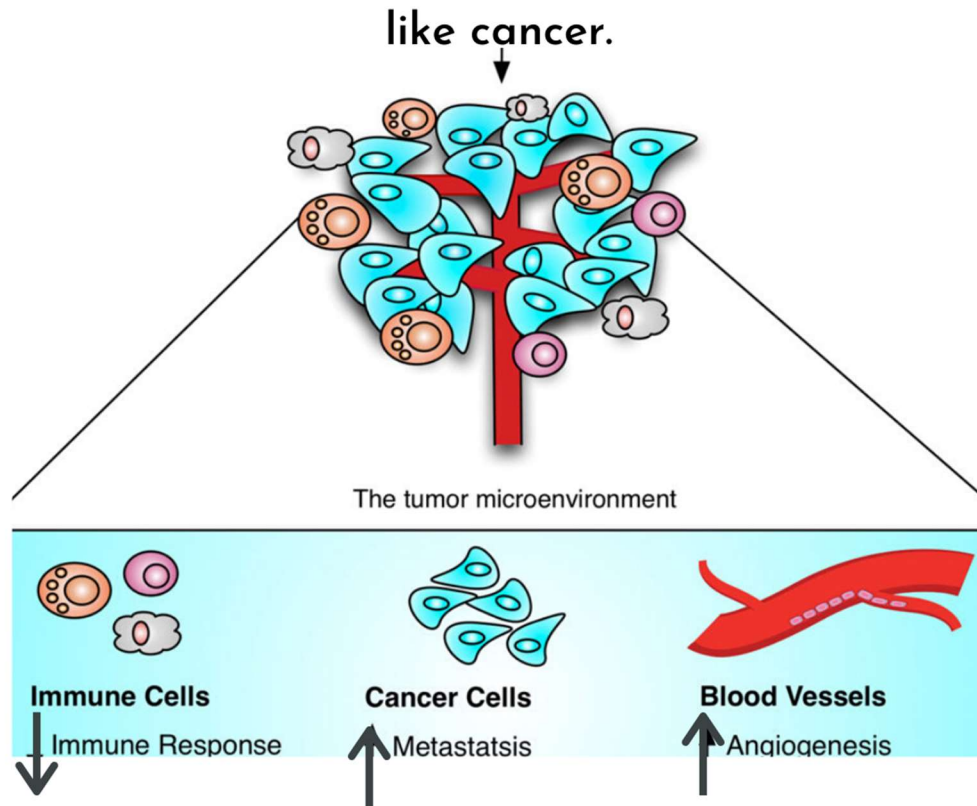
Cancer studies have shown that plant-originated adaptogens can reduce the risks of developing certain kinds of cancers (25).

They work by activating macrophages, T-lymphocytes, NK cells to inhibit the growth of tumors and cancer cell production, tumor metastasis and cancer cell aggregation. They stabilize the functions of the human body, while promoting cellular repair (26).

The use of adaptogens improves the tolerance of humans to drug cytotoxicity, namely fatigue, as seen in patients who are undergoing chemical cancer treatments (27).

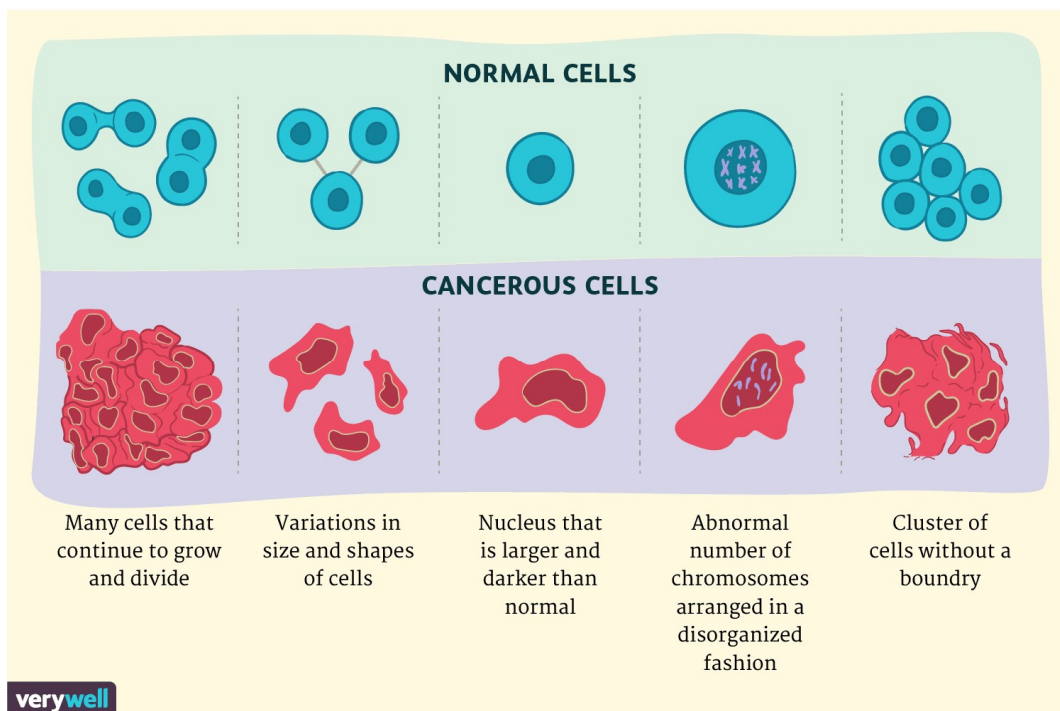
Adaptogens can strengthen and greatly enhance the lethal effects of chemotherapy and radiotherapy on cancer cells (28), and they can reduce stress hormone levels during immune dysfunction, which is associated with tumor growth (29).

Stress can weaken your immune system, leaving you prone to diseases like cancer.



- Shiitake (*Lentinula edodes*), Maitake (*Grifola frondosa*) and Reishi (*Ganoderma lucidum*) mushrooms have antitumor properties.
- Reishi mushroom (*Ganoderma lucidum*) works as an antitumor and cancer preventative, especially for breast and prostate cancers.
- Shiitake mushroom (*Lentinula edodes*) has been considered a support nutrient during chemo and radiation therapy- often leading to longer survival times for cancer patients.
- Chaga mushrooms (*Inonotus obliquus*) have been shown to reduce tumor size, and suppresses tumor growth in liver, lung, and breast cancers. *Chaga can also greatly support the immune system during chemotherapy treatments.

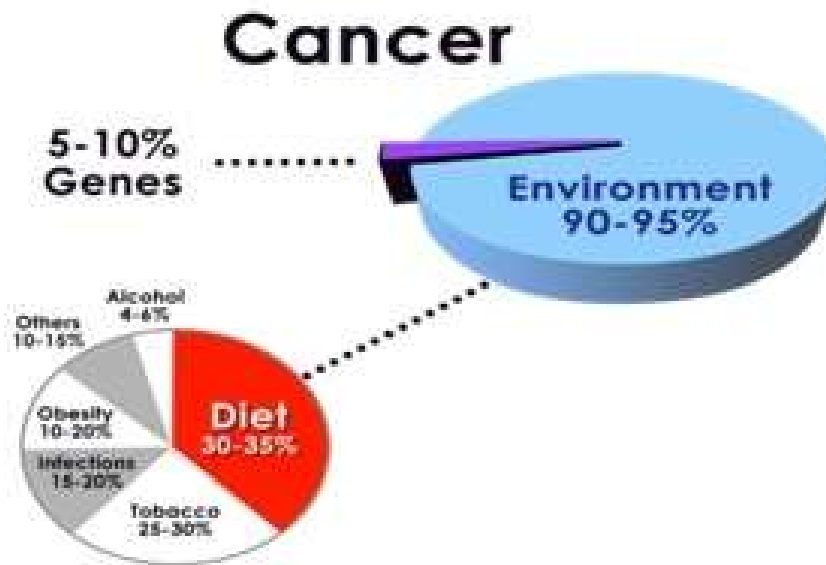
- Chinese ginseng (*Panax ginseng*) and Siberian ginseng (*Eleutherococcus senticosus*) both have anti-tumor properties, and they have also shown some ability to protect the body during radiation therapy as part of treating cancer (30).
- At times, cancer cells can begin to adapt to chemotherapy, and the main consequence is the development of multidrug resistance by the cancer cells. Chinese ginseng, (*Panax ginseng*) has been shown to successfully reduce drug resistance from cancer medications on tumor cells.



- Five flavor fruit, magnolia berry (*Schisandra chinensis*) helps to detoxify the body of chemical toxicity (especially after chemotherapy treatments).
- Gotu kola (*Centella asiatica*) is useful for the prevention of radiation-induced behavioral changes during clinical radiotherapy (31).
- Holy basil, Tulsi (*Ocimum tenuiflorum*) can help prevent tumor growth due to its immunomodulatory and anti-inflammatory constituents.
- Rosemary (*Salvia rosmarinus*) has been shown to be an adaptogen for **methylation**. Whether you hypomethylate or hypermethylate (have too little or too much methylation) rosemary adapts to balance methylation and can help prevent DNA

damage which could lead to cancer. *Rosemary may also be a preventative in lung, breast, colon, and pancreatic cancers.

- Siberian ginseng (*Eleutherococcus senticosus*) may affect tumor growth and provide an anti-fatigue effect for cancer patients, particularly for those suffering from lung cancer. There is some evidence that a carbohydrate in Siberian ginseng may possess not only immune stimulatory but also anti-tumor effects (32).



Not only can stress contribute to the development of cancer, but also diet, alcohol, tobacco use, and genetics can greatly impact cancer development.

How to Take Adaptogens

It is recommended that you contact your healthcare provider before beginning any herbal/adaptogen regimen. *Pregnant or nursing women especially need to be cautious of what adaptogens (and prescription medications) they consume.*

Inform the physician on the current herbs and prescription medications you are taking so that they will know if you have a potential risk of having negative effects from mixing certain adaptogens with others, or with your current medications.

Also discuss your health history, any known allergies, food sensitivities, existing medical conditions, and symptoms you have so the physician can help you in the best that they possibly can.

A naturopathic physician can recommend specific adaptogens and reputable formulas or tinctures that are right for you, and they can adjust your dosage as needed based on the desired effect you hope to achieve.

There are many ways to take adaptogens and incorporate them into your daily life. They can easily be taken in the form of teas, drinks, powders, pills, tinctures, glycerites, eaten raw, cooked, sprinkled on food, or topically applied as a salve.

Along with daily meditation, healthier eating, physical activity, sunshine, water, and ample sleep- adaptogens could be an essential part of helping to manage your stress and the associated negative effects of stress on your body and mind.

Adaptogens should not be considered a quick miracle cure. They should, however, be considered as part of a natural, whole-body, holistic treatment that can help you live a stress-free, happier, and healthier life!

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