

# White Paper:

## Adrenal Health

### FEATURES:

- Holy Basil (*Ocimum Teuiflorum*)
- Ashwagandha (*Withania Somnifera*)
- Siberian Ginseng (*Eleutherococcus Senticoccus*)
- American Ginseng
- Rhodiola Rosea
- Glycyrrhiza Glabra (Liquorice)
- N-Acetyl-Tyrosine
- Vitamin C
- B-Group Vitamins

### HERBAL SUPPORT FOR ADRENAL HEALTH

#### Holy Basil (*Ocimum Teuiflorum*)

Holy Basil has been used in Ayurvedic medicine for thousands of years for its diverse healing properties. Also known as Tulsi, the Queen of herbs, the legendary 'Incomparable one' of India, is one of the holiest and most cherished of the many healing and health-giving herbs of the orient. Holy Basil reduces the negative effects of stress by lowering cortisol production in the adrenal cortex. The urosolic acid in Holy Basil inhibits COX-2, an inflammatory enzyme. Holy Basil is found to contain eugenol and linolenic acid which are both found to exhibit analgesic, anti-inflammatory, antispasmodic activity by inhibiting both the lipoxygenase and cyclooxygenase pathways of arachidonic acid metabolism. Holy Basil has also shown in many preclinical studies to be hypoglycemic, antimicrobial, cardioprotective, hypolipidemic and antioxidant.<sup>2</sup>

#### Ashwagandha (*Withania Somnifera*)

Ashwagandha is compared well to the Ginseng family in its adaptogenic properties. Standardised to harness one of the main steroidal lactones, withanolides, the root of Ashwagandha is regarded as tonic, aphrodisiac, narcotic, diuretic, anthelmintic, astringent, thermogenic and stimulant. The results of many studies lend support to the hypothesis of tonics, vitalizers and rejuvenators of Ayurveda which indicate clinical use of Ashwagandha in the prevention and treatment of many stress-induced diseases like arteriosclerosis, premature ageing, arthritis, diabetes, hypertension and malignancy.<sup>5</sup>

#### Siberian Ginseng (*Eleutherococcus Senticoccus*)

Chinese healers have prized Siberian Ginseng for thousands of years. Its properties, according to traditional Chinese medicine, are "invigorating qi and strengthening the spleen, tonifying kidneys to relieve mental strain" whereas usage in Siberia and Russia tends to be associated with promoting physical endurance, non-specific immunity, and longevity. The main active phytochemical, eleutherosides, are thought to be responsible for the increase in catecholamines (dopamine, norepinephrine, epinephrine). *Eleutherococcus* has demonstrated stress-relieving effects on the HPA axis, reducing excessive corticotropin release and optimising adrenal response. *Eleutherococcus* may act directly on the hypothalamus to regulate hormones, including mineralocorticoids, glucocorticoids, and reproductive hormones. Syringin, lignans, and sesamin found in this plant have been shown to exert immune-enhancing effects. Studies show that eleutherosides increases endurance and mental performance in patients with mild fatigue and weakness.<sup>3</sup>

**REFERENCES**

1. Groff JL, Gropper SS. *Advanced Human Nutrition and Human Metabolism* (3rd ed.). Belmont, CA: Wadsworth: 2000.
2. Negar Jamshidi and Marc M. Cohen. The Clinical Efficacy and Safety of Tulsi in Humans: A Systematic Review of the Literature. *Evid Based Complement Alternat Med*. 2017;2017:9217567. Published online 2017 Mar 16.
3. Cicero AF1, Derosa G, Brillante R, Bernardi R, Nascetti S, Gaddi A. *Gerontol Geriatr Suppl*. 2004;(9):69-73. Effects of Siberian Ginseng (*Eleutherococcus senticosus maxim.*) on elderly quality of life: a randomized clinical trial.
4. Lian-Wen Qi, Chong-Zhi Wang, and Chun-Su Yuan. Ginsenosides from American ginseng: Chemical and pharmacological diversity. Published online 2011 Mar 9.
5. Narendra Singh, Mohit Bhalla, Prashanti de Jager, and Marilena Gilca. An Overview on Ashwagandha: A Rasayana (Rejuvenator) of Ayurveda. *Afr J Tradit Complement Altern Med*. 2011;8(5 Suppl):208-213.
6. Sana Ishaque, Larissa Shamseer, Cecilia Bukutu, and Sunita Vohra. *Rhodiola rosea* for physical and mental fatigue: a systematic review. *Complement Altern Med*. 2012;12:70.
7. Licorice: Uses, Side Effects, Interactions, Dosage, and Warning. WebMed. <https://www.webmd.com/vitamins/ai/ingredientmono-881/licorice>
8. Young SN. L-Tyrosine to alleviate the effects of stress? *J Psychiatry Neurosci*. 2007 May;32(3):224.
9. P. A. Nasmyth. The effect of some sympathomimetic amines on the ascorbic acid content of rats' adrenal glands. *Physiol*. 1949 Dec 31;110(3-4):294-300.
10. David A. Camfield, 1 Mark A. Wetherell, 2 Andrew B. Scholey, 1 Katherine H. M. Cox, 1 Erin Fogg, et al. Published online 2013 Nov 11. The Effects of Multivitamin Supplementation on Diurnal Cortisol Secretion and Perceived Stress. *Nutrients*. 2013 Nov;5(11).

### American Ginseng (*Panax Quinquefolius*)

Native to Northern America, American Ginseng contains distinctive phytochemicals called ginsenosides, steroidal saponins that show promising cognitive-enhancing properties in preclinical studies. Ginsenosides stimulate the immune system and have a sedating and relaxing effect. Their main action is as a nervine tonic and relaxant to the whole body, with an affinity for the brain. Results from research support this point and demonstrated that ginsenoside Rg1 can increase the weight of immune organs in mice and phagocytic activity of macrophages, improve serum IL-2 and complement C3 and C4, resulting in the stimulation of immune of the body.<sup>4</sup>

### *Rhodiola Rosea*

A number of studies revealed that rosavins, a phenylpropanoid, and salidroside, phenylethanol derivatives, exhibit neuroprotective activities. It is also useful for improving cognitive function, treating addiction. The mechanisms underlying the potential protective effects of the phytochemicals' involvement are the regulation of oxidative stress response, inflammation, apoptosis, hypothalamus-pituitary-adrenal axis, neurotransmission, neural regeneration, and the cholinergic system.<sup>6</sup>

### *Glycyrrhiza Glabra* (Liquorice)

Liquorice root boasts a huge variety of therapeutic properties. But it is liquorice's adaptogenic properties that make it a potential lifesaver for those suffering from adrenal fatigue. Research has found that liquorice can help to modify or even increase the body's levels of cortisol. Studies have found that glycyrrhizic acid found in liquorice root can modify the production of cortisol in the body by inhibiting the enzymes that break cortisol down into cortisone, thus rendering it inactive.<sup>7</sup> This can be particularly useful for those people with low cortisol levels due to adrenal fatigue.

## NUTRITIONAL SUPPORT FOR ADRENAL HEALTH

### N-Acetyl-Tyrosine

Tyrosine is the precursor amino acid from which the body makes dopamine (with vitamin B6 as cofactor), which is then converted to norepinephrine (with vitamin C as cofactor) and then to epinephrine making tyrosine an important amino acid for the stress response.

### Vitamin C

As vitamin C is an important cofactor for enzymes involved in the synthesis of serotonin and norepinephrine, adequate vitamin C levels may help individuals maintain a positive mental outlook and mount a healthy response to everyday stress. Its function in catecholamine synthesis may be why vitamin C has long been recognised as helping to support the adrenal glands.<sup>9</sup> In fact, the adrenal glands contain one of the highest concentrations of vitamin C in the body (in both the cortex and medulla), underscoring that this nutrient is instrumental for far more than antioxidant effects.

### B-Group Vitamins

Also important to adrenal health are the family of B vitamins – pantothenic acid (B5), pyridoxine-B6 (as P-5-P), riboflavin-B2 (as R-5-P) and methylcobalamin (B12) – which play critical roles as enzyme cofactors in the balanced production of stress hormones and can also support energy production.<sup>10</sup>