

# Botanical Insights into Autoimmune Thyroid Disease



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## Table of Contents

<b>Introduction</b> .....	<b>1</b>
<b>Types of autoimmune thyroid diseases</b> .....	<b>1</b>
Hypothyroidism (Hashimoto’s disease) .....	1
Symptoms .....	2
Hyperthyroidism (Grave’s disease).....	2
<b>Causes of autoimmune thyroid diseases</b> .....	<b>3</b>
Stress .....	3
Environmental hazards .....	4
<b>Treatment goals for autoimmune thyroid diseases</b> .....	<b>4</b>
<b>Botanical adaptogens</b> .....	<b>4</b>
Schisandra chinensis .....	5
Dosing.....	5
Ashwagandha (Withania somnifera).....	5
Dosing.....	6
<b>Herbal medicines for hypothyroidism</b> .....	<b>6</b>
Coleus forskohlii .....	6
Guggul (Commiphora mukul).....	6
Seaweeds (Fucus and Laminaria species) .....	7
<b>Herbal medicines for hyperthyroidism</b> .....	<b>7</b>
Bugleweed (Lycopus spp.).....	8
Club moss (Lithospermum officinale) .....	8
Lemon balm (Melissa officinalis) .....	8
Motherwort (Leonurus cardiaca).....	8
<b>Conclusion</b> .....	<b>9</b>
<b>Contributor’s biography</b> .....	<b>9</b>

# Introduction

Imagine the ability to reduce or cease taking medications for autoimmune thyroid diseases. Herbal medicines, alone or in combination with conventional medication, offer patients that option. Autoimmune diseases, which include hyperthyroidism or Grave's disease, and hypothyroidism or Hashimoto's disease, are characterized by humeral or cell-mediated immune responses in the body. There are autoimmune processes that seem to be precipitated by unique and complex interactions of causative factors. Examination of these factors can lead to a better understanding of these diseases. A systemic approach takes into account the main factors along with any other factors that might be sustaining insult to the thyroid gland or sustaining nutritional insult to the processes of building the thyroid or thyroid hormones. Exacerbating factors that could be present in someone's life, such as lifestyle, environment and diet, have to be taken into consideration when creating a plan for someone with an autoimmune disease. This plan may include botanical adaptogens that can be used to support and improve thyroid function. The following herbal medicines will be discussed in this paper:

- *Schisandra chinensis*
- *Ashwagandha (Withania somnifera)*
- *Coleus forskohlii*
- *Guggul (Commiphora mukul)*
- *Seaweeds (Fucus and Laminaria species)*
- *Bugleweed (Lycopus spp.)*
- *Club moss (Lithospermum officinale)*
- *Lemon balm (Melissa officinalis)*
- *Motherwort (Leonurus cardiaca)*

## Types of autoimmune thyroid diseases

There are two main types of autoimmune thyroid diseases: hypothyroidism and hyperthyroidism. Thyroid dysfunction results from both diseases.

### *Hypothyroidism (Hashimoto's disease)*

Hypothyroidism, or Hashimoto's disease, is a condition in which there is a deficit in thyroid hormone secretion and conversion of T4 to T3. The liver, kidneys, and peripheral tissues are where conversion takes place, so heavy metals or environmental toxins can affect the person's overall health. If the liver is being insulted by a heavy metal, pesticide exposure or another type of toxic substance, this information should be included as possible contributing factors to the overall dynamic seen in a person's health picture. Hashimoto's disease is most common in women, with a female to male ratio of 10:1, with 10-20% over the age of 50 years.

## *Symptoms*

Hypothyroid symptoms may include: fatigue, weight gain, cold intolerance, muscle weakness, mood issues (such as depression), memory loss, insomnia, poor concentration, brittle hair and dry skin. Problems with constipation or sluggish bowels may also be present. Irregularities in menstruation have also been noted. Changes in fertility may also be seen. Hypothyroidism will impact outcomes for pregnancies, and could impact early birth or premature delivery. Hyperlipidemia is often a symptom, causing recurring infections. Tinnitus (ringing in the ears) is also common.

Subclinical hypothyroidism, often with Hashimoto's disease, may occur before a strong presence in the serum is detected, which might be seen in an abnormal lab for TSH. TSH would increase, changing the T4 or T3. In some cases, before Hashimoto's actually becomes full-blown, the thyroid gland may mimic a Grave's disease dynamic before it actually plummets into a lower "hypo" dynamic. If the clinical picture supports it, even without a strong lab result, botanical medicine can be used to help to support and improve the function before it actually is broken or actually truly pathological. With an autoimmune or genetic predisposed disease like Hashimoto's, the manifestation of the disease may be slowed. In Hashimoto's, antibodies are formed against the thyroid peroxidase enzyme, thyroglobulin and TSH receptors, preventing the manufacture of sufficient levels of the hormone.

These antibodies can also bind to parts of the endocrine system, specifically, the adrenal gland, pancreas, as well as acid-producing cells in the stomach, known as the parietal cells. In the endocrine system, a gland-specific antibody that starts to wreak havoc in other glands that are important in the metabolism and the function of the thyroid can cause wider repercussion throughout the system.

As a clinician, the following questions should be considered: Is there a need for adrenal treatment or support here? Is there an issue with blood sugar or insulin? Is there an issue with digestion, either low acidity or a problem with pancreatic secretions into the digestive system? Answering these questions can aid in putting together a plan for treatment options.

## *Hyperthyroidism (Grave's disease)*

The second type of autoimmune thyroid disease is hyperthyroidism, or Grave's disease. Grave's disease is most prevalent in women ages 20-40, with an 8:1 ratio of females to males. In hyperthyroidism, the basal metabolic rate is increased, which can cause impaired glucose tolerance, impaired liver function and increased calcium needs. Excessive thyroxine potentiates the actions of catecholamine, using up glucose, thereby accelerating the degradation of insulin, which further increases the stress on the pancreas. Excess insulin in the system can become involved in other dynamics and create issues. Large amounts of glucose and liver stores of glycogen are depleted, increasing the susceptibility of liver damage.

Antibodies bind to the anti-TSH receptor, causing the gland to be overstimulated. The thyroid gland can become enlarged and increase in function.

Common features of hyperthyroidism include: thyrotoxicosis, goiter, pretibial myxedema and ophthalmopathy. Thyrotoxicosis symptoms include heat intolerance, fatigue and weight loss. Some patients experience the feeling of an increased appetite, but do not satiate, feeling like they cannot get enough food. Palpitations and nervousness have also been observed. T4 levels are higher and can affect the heart, causing palpitations or tachycardia.

The basal metabolic rate is increased in hypothyroidism, which is physically similar to a chronic reaction to stress. In catabolic metabolism, how the glucose is metabolized is impacted, as is liver function. If liver function is impaired because of hyper amounts of thyroid hormone, using supportive herbs can be an effective treatment option.

In a catabolic state, there is more need for calcium, so those who are diagnosed with hyperthyroidism often ask questions about bone health. These women should have good dietary calcium and good digestion for absorbing calcium from diet.

## Causes of autoimmune thyroid diseases

When considering autoimmune thyroid diseases, the list of possible causes is long. These diseases may not arise from a single cause, but from the interaction of a variety of factors. It is essential to understand the causative factors along with the sustaining and exacerbating factors of the disease. Pregnancy and postpartum, food allergies, allergies to PVCs, plastics and chemicals, Epstein-Barr virus, intestinal tract parasite, yeast or bacterial infections, as well as environmental toxins can affect the thyroid. Hashimoto's disease can also have genetic roots.

### *Stress*

Stress, whether from xenobiotics, hormonal environmental disruptors, PCB or phenolic compounds, can be called a silent factor that disrupts hormonal dynamics in the endocrine system. Specifically, the stress causes disruption in thyroid metabolism that includes activation of the thyroid hormone as well as its production. Disruption and ability to see more production of anti-thyroidal antibodies, inhibition of thyroid hormone and inhibition of iodine metabolism are also observed. Stress directly affects thyroid function, both in depressing levels of active T3 as well as reducing peripheral hormonal metabolism. In addition, stress has an effect on the hypothalamus, pituitary, adrenal (HPA) axis, as well as the hypothalamus pituitary thyroid (HPT) axis. If the effect of stress is to depress or decrease the ability to adequately communicate back to the pituitary gland, then the endocrine system will begin to

dysfunction. Stress also impacts the peripheral conversion of the hormone via inhibition of 5'-deiodinase.

### ***Environmental hazards***

Many of the heavy metals that tend to affect the thyroid gland also contain minerals that are used in the thyroid process of metabolism or the gland hormone production. These heavy metals also affect the thyroid gland by robbing the minerals from the gland. Electromagnetic radiation and exposure to computers and other electrical devices suppress the endocrine immune system and white blood cells.

## **Treatment goals for autoimmune thyroid diseases**

When creating a botanical treatment plan, the type of autoimmune thyroid disease, whether it is hypo or hyper, must be taken into account. Both hypo and hyper autoimmune thyroid disease can be affected by infections, allergies, inflammation and toxins.

The first steps in creating the plan include eliminating infection and allergies. If any viral infections are apparent, they must be addressed to limit their impact on the immune system. Food allergies or environmental allergies, like mold and mildew allergies, must be included in the protocol. Inflammation in the system, whether from infection, allergies or immune imbalance, must be reduced. In addition, gut permeability, dysbiosis and toxic load must also be included in the plan.

Finally, toxic load, detoxification and stress reduction should be examined. Stress reduction comes in many forms, including lifestyle, counseling, management and modulation of stress. Botanical medicine offers an avenue via botanical adaptogens. Adaptogens can be used for more than just the adrenal gland. They can help all of the glands in the endocrine system, allowing the body to deal with the effects of stress. If stress is manifesting in the immune system, impacting the thyroid gland, then botanical adaptogens can give some protection and help to modulate the effects of stress on that gland.

## **Botanical adaptogens**

The nature of thyroid dysfunction is often low or high. Botanical adaptogens play a supportive role in helping to normalize thyroid function, moving toward balance and helping to normalize metabolic function. Amphoteric in nature, adaptogens work with the body in a complementary way. If the physiology of the thyroid has gone hyper, for example, adaptogens

help in terms of mediation, but not necessarily by inhibiting the gland function; instead, adaptogens help tonify and change the general fabric of how the body deals with stress metabolism.

### *Schisandra chinensis*

Schisandra is part of the Schisandraceae family and is considered to be a calming nerve tonic. The fruit, red in color and warming, is used to create an extract.

Schisandra is a hepatoprotectant, so it protects liver tissue and function. This is important since the liver contributes to thyroid health and dysfunction. Phase I and Phase II, specifically glutathione and glutathione S-transferase enzymes, are induced by schisandra. Schisandra has good antioxidant qualities that are helpful in the treatment of autoimmune diseases to tone down the dysfunction. Improvement of mental performance, physical endurance and stress reduction can be attributed to schisandra.

There are in vitro studies revealing that polysaccharides help to modulate apoptosis of pathogenic cells and help to inhibit cell proliferation.<sup>1</sup> The polysaccharides decrease some of the auto-immune reaction. The lignans, schisandrin B and schisandrin C, have also been shown to be neuroprotective.<sup>2</sup> Stress reduction and modulation in the immune signal pathway, which can change how cells are proliferating, are affected by these lignans. The thyroid benefits from changes in these factors.

### *Dosing*

When using a liquid delivery, 1:3 liquid extract, the dose would be 3-10 mL per day. This can be divided into two or three doses per day. The whole fruit or fruit powder can also be used. Different types of encapsulated forms can be used for a nice concentrated form of schisandra.

### *Ashwagandha (Withania somnifera)*

Ashwagandha, also known as Indian ginseng or winter cherry, is an adaptogen plant. Part of the Solanaceae or nightshade family, ashwagandha is a tonic that comes from the root.

Ashwagandha calms nerves and improves sleep. It is an amphoteric adaptogen with anti-inflammatory and antioxidant qualities that regulate the neuro-endocrine system. Ashwagandha contains alkaloids, steroidal lactones and saponins active in the hormonal pathways in the body. These constituents increase T4 hormone production and help with the

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<sup>1</sup> Journal of Medical Science Yanbian University; 2010-01

<sup>2</sup> Phytotherapy Research: ISSN: 1099-1573

conversion of T4 to T3. Ashwagandha also increases hepatic glucose-6 phosphatase and reduces lipid peroxidation of hepatic tissues.<sup>3</sup> These processes help protect the liver and detoxification pathways.

### *Dosing*

In fluid extract form (1:2), 6-15 mL can be given daily. The dose can be divided into three doses per day. An extract standardized to contain 1.5% withanolides contains a dose of 300-500mg per day. If using the dried root, the dose is 3-6g per day. Ashwagandha is considered generally safe; however, larger doses, specifically in tincture form, have been shown to cause gastrointestinal upset, diarrhea or vomiting. Because of this, patients with stomach sensitivity might best benefit from ashwagandha in its dried root, capsule-based form.

## **Herbal medicines for hypothyroidism**

A number of herbal medicines that affect the thyroid have been shown to help with hypothyroidism:

- Coleus forskohlii
- Guggul
- Seaweeds

### *Coleus forskohlii*

Coleus forskohlii, a traditional Ayurvedic thyroid herb, contains essential oils and diterpenes. Thyroid hormone production and secretion are increased by coleus. Coleus also activates cAMP production. If a person is sub-clinical, the coleus can help normalize hormone levels. Coleus can be used in combination with thyroid medications to increase gland production, if the person has not been on the medication long-term.

### *Guggul (Commiphora mukul)*

Guggul stimulates thyroid activity by directly working on the thyroid gland. Lipid-soluble steroids are found in the resins in guggul, which are thought to be active.<sup>4</sup> Peripheral conversion of T4 to T3 increases with guggul, bringing up T3 levels. The increase in T3 levels can reduce LDL cholesterol levels in people with functional hypothyroidism. Weight

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<sup>3</sup> Panda, J. Ethnopharmacol 67(2):233-239, 1999

<sup>4</sup> Singh, J Exp Zool 1(2):131-141, 1998



loss may also be stimulated. Guggul can be used in conjunction with synthroid to avoid increasing the dosage.

### *Seaweeds (Fucus and Laminaria species)*

Although there has not been much research done on the effects of seaweeds on the thyroid, these plants have traditionally been used to treat thyroid issues. Seaweeds contain iodine and polysaccharides that affect thyroid hormone production and conversion. Polysaccharides have the ability to bind to heavy metals, decreasing their negative effects on the body. Hormone synthesis may be stimulated by seaweeds by providing precursors to synthesis. Seaweeds are also believed to improve elasticity, support collagen tissue in the body and act as antioxidants.<sup>5</sup>

## Herbal medicines for hyperthyroidism

Four herbs have been shown to help Grave's disease:

1. Bugleweed (*Lycopus* spp.)
2. Club moss (*Lithospermum officinale*)
3. Motherwort (*Leonurus cardiaca*)
4. Lemon balm (*Melissa officinalis*)

Older in vivo and in vitro studies, using aqueous, freeze-dried extracts of these herbs exist, demonstrating their effectiveness, but current clinical studies have not yet been done. The older studies examined herbs in combination, focusing on overall results instead of individual herbs.<sup>6</sup> The results of the studies did not differentiate between any of the herbs as to the specific action of each herb. Results did show these herbs could be used in Grave's disease because there was inhibition of TSH and effects on TSH receptors, which help inhibit the thyroid gland from overproducing thyroid hormone. The studies showed the herbs blocked the effects of anti-thyroid immunoglobulins on the TSH receptors. In blocking this, the immunoglobulins cannot stimulate those receptors. The herbs have also been shown to have some inhibitory effects on peripheral de-iodination of T4 to T3.

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<sup>5</sup> BMC Complementary and Alternative Medicine, August 2009

<sup>6</sup> Endocrinology 1985 May; 116(5): 1687-93

### ***Bugleweed (Lycopus spp.)***

Bugleweed has been shown to be effective in inhibiting TSH effects on TSH receptor sites on thyroid cell membranes. It also blocks the effects of antithyroid immunoglobulins on TSH receptors.<sup>7</sup> There is some inhibition of conversion of T3 to T4.<sup>8</sup> Bugleweed also contains caffeic acid, rosmarinic acid and chlorogenic acid, all considered to have anti-thyroid activity.

### ***Club moss (Lithospermum officinale)***

Club moss influences the hypothalamic-pituitary-thyroid axis. It can inhibit peripheral T4-deiodination, thus activating T3.<sup>9</sup> The older studies that examined herbs in combination show that club moss may act as a block of TSH receptors.

### ***Lemon balm (Melissa officinalis)***

As noted in the older studies, lemon balm is effective in blocking the binding of TSH to the receptor by acting on the hormone and the receptor itself. It also inhibits cyclic AMP production stimulated by TSH receptor antibodies. Lemon balm contains large amounts of rosmarinic acid, which may affect IgG antibodies. Instead of creating a receptor response directly on the thyroid gland, the response is in the immune system by reducing the IgG load, so the IgG antibodies cannot directly affect the thyroid gland. The result being that lemon balm may inhibit autoimmune reaction in the immune system, not just thyroid function. Traditionally, lemon balm has been used to treat symptoms associated with hyperthyroidism, like tachycardia, insomnia, and hyperactivity.<sup>10</sup>

### ***Motherwort (Leonurus cardiaca)***

Motherwort was examined in the older studies in combination with other herbs. Motherwort is an anti-inflammatory, containing flavonoids, more specifically quercetin. In autoimmune diseases, it is important to reduce inflammation, making motherwort a good choice in treating hyperthyroidism. In addition to reducing inflammation, the enzyme 5-deiodanase is inhibited. Traditional uses include treating symptoms of tachycardia, anxiety and palpitations.<sup>11</sup>

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<sup>7</sup> Endocrinology 1985 May;116(5):1687-93

<sup>8</sup> Endocrinology 1985 May;116(5):1687-93

<sup>9</sup> Hormone Metabolism Res 1983;15:503-507

<sup>10</sup> J Endocrinol Invest. 2003 Oct; 26(10): 950-55

<sup>11</sup> Prog Clin Biol Res 1988; 280: 323-340

## Conclusion

Botanical adaptogens have been shown to be effective in the treatment of autoimmune thyroid diseases. Schisandra protects liver tissue and function and has an antioxidant quality. Ashwagandha, which calms the nerves, has anti-inflammatory and antioxidant qualities. It can also increase T4 production. Several herbs can be used to treat hypothyroidism: coleus forskohlii, guggul, and seaweeds. These herbs increase thyroid production and secretion. Finally, there are four herbs that are helpful in treating hyperthyroidism: bugleweed, club moss, motherwort, and lemon balm. Although studies examined combinations of these herbs and are older, all four are shown to help with hyperthyroidism by blocking TSH.

## Contributor's biography

Dr. Mary Bove received her doctorate of naturopathic medicine and midwifery certification from Bastyr College of Nature Health Sciences in Seattle, Washington. She received her diploma of cytotherapy and herbal medicine at the School of Cytotherapy in Great Britain. Dr. Bove practices naturopathic family medicine at the Brattleboro Naturopathic Clinic, in Brattleboro, Vermont and serves as a member of Gaia Herbs Professional Solutions Scientific Advisory Board. She is the author of *The Encyclopedia of Natural Healing for Children and Infants*, and coauthor of *Herbs for Women's Health*. She has been published in many magazines, journals, and other collaborative books on botanical and natural medicine. She also lectures and teaches internationally.