

# Demystifying Women's Midlife Hormonal Imbalance: The Endocrine Symphony

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Natural medicine strives to keep the body in constant balance to allow for optimum health. The wholistic approach used by many natural medicine practitioners is to listen to the body's signals and address their origin. Once origin of the symptom is found and addressed, the progression of disease can be reversed.

Reproductive challenges such as pre-menstrual syndrome (PMS), and peri-menopause come in many different packages. No two people seem to experience the same combination of symptoms. Additional hormonal aberrations are common during this transition and may compound the picture. Common symptoms may include but are not limited to forgetfulness, irritability, depression, anxiety, insomnia, restless legs, heavy or erratic periods, sore breasts, hot flashes, night sweats, bloating, bowel habit changes and fluid retention. And the list goes on!

When treating women who experience acute and severe PMS and menopausal symptoms, the temptation to focus only on the normalization of reproductive hormones with natural remedies or bio-identical hormones is great. However, in many women, this approach does not lead to the resolution of their symptoms over the long term.

Reproductive hormone imbalance is a harbinger of global hormonal dysfunction. Since the body is an integrated organism, continual dialogue between all endocrine organs (adrenals, pancreas, thyroid, parathyroid and ovaries) determine a woman's sense of wellbeing. The endocrine system also networks with the nervous and immune systems while being nurtured and cleansed by the primary elimination organs (liver, kidney and digestive tract) to complete the orchestra of life. As clinicians, our familiarity with the intricacies of the endocrine system enhances clinical outcomes.

## Hormonal Health Challenges

As the onset of menopause approaches, symptoms typically increase in number, duration and severity. Depending on the health of the individual, symptoms can start very early in a woman's reproductive life. Today, young girls often start with irregular periods, progress to challenges with fertility, develop PMS, which forms a part of perimenopause ending with the cessation of menses.

When faced with the challenge of multi-system dysfunction, it can be difficult to forge an effective and timely management plan. Getting to the root of the problem can feel like trying to hit a moving target! What system do we treat first?

Since the adrenal gland acts like the "spoiled child" of the endocrine system – stealing resources from all others - correcting adrenal dysfunction can bring immediate symptom relief.

## Adrenal Glands

The adrenal glands are very unique in that there are two separate and yet interwoven functions within the same gland. The medulla secretes stimulatory neurotransmitters adrenalin (epinephrine) and norepinephrine. In contrast, the cortex synthesizes a plethora of steroid hormones, including cortisol, DHEA, aldosterone and testosterone (in women).

In the fetus, the adrenal glands are twice the size of their companion kidney by mid-gestation, containing cells that manufacture steroid hormones.<sup>9</sup> It is no surprise that, when measured, cortisol levels are strongly elevated at birth. Fetal adrenals almost double in size between day 24 and 26 of pregnancy and their cortisol content increases more than 10-fold during this period.<sup>10</sup> Even in-utero, the adrenals play an important role in the adaptation to stress.

The control center for the sympathetic response is the adrenal gland. The first stage of adaptation response is the alarm reaction, marked by the secretion of epinephrine from the adrenal medulla. Endocrine changes are reflected to meet the various demands for adaptation such as providing readily available sources of energy by converting glucose from glycogen depots and free fatty acids from the triglyceride stores of adipose tissue; it also quickens the pulse, raises the blood pressure to improve circulation into the musculature, and stimulates the CNS. In addition, epinephrine accelerates blood coagulation to protect against excessive hemorrhage.<sup>11</sup> During the alarm phase, if the stressor is so severe that continued exposure is incompatible with life, the organism will die within a few hours during this stage; otherwise, a stage of resistance will ensue followed by adrenal exhaustion.<sup>11</sup>

Later in life, as ovarian function declines, the adrenals produce estrogen and progesterone. If there is already strain on the adrenal gland from chronic stress, menopausal symptoms worsen.

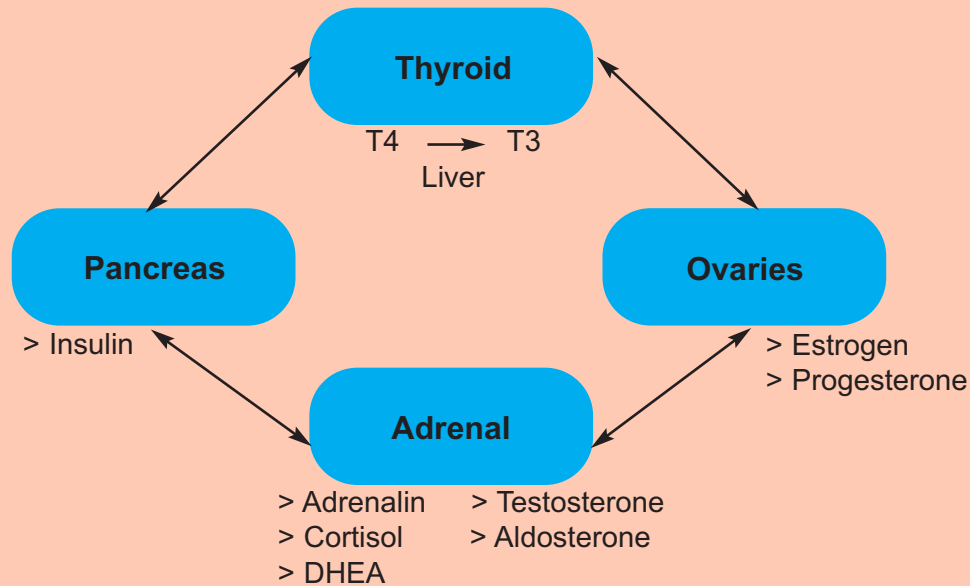
## The Insulin Connection

There is a direct connection between insulin/glucose balance and variations in sympathetic tone. Insulin resistance is influenced by the augmented release of "diabetogenic" hormones, including adrenalin, glucagon, cortisol and growth hormone.<sup>1</sup> Among these hormones, adrenalin exerts the



## about the author

Bev worked in research for over ten years after graduation with a BSc (Hon) in chemistry. She then completed four years of intensive studies in medical sciences and clinical training in the UK to become a medical herbalist. Since 2000, Bev's primary focus at Maya Natural Health is wholistic functional endocrinology. Bev also practices at the West Coast Women's Centre for Midlife Health in Vancouver. She is a member of the National Institute of Medical Herbalists and a professional member of the American Herbalists Guild. Bev is one of 20 professionally trained medical herbalists in Canada.



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strongest antagonistic effect against insulin.<sup>1</sup>

In a challenge test, acute secretion of cortisol was shown to increase plasma glucose with unchanged glucose production and a decrease in glucose uptake by 15%, resulting in hyperglycemia.<sup>2</sup> Clinically, tremors, irritability, headaches and a lack of concentration are experienced once available glucose supply decreases in the blood.

Hyperglycemia leads to insulin resistance in hepatocytes, which results in uncontrolled glucose production and uptake in the peripheral cells. The resultant hyperinsulinemia causes decreased insulin sensitivity on the cell membrane and ultimately the development of metabolic syndrome.<sup>3</sup>

Metabolic syndrome is characterized by excess abdominal weight, uncontrollable carbohydrate and sugar cravings, dyslipidemia and hypertension.<sup>4</sup> Metabolic syndrome is also associated with an increased risk of late onset (type II) diabetes, high blood pressure, heart disease, breast cancer, polycystic ovary syndrome, uterine cancer and nervous system disorders including Alzheimer's disease. Although 20 percent of the North American population is affected by metabolic syndrome, the incidence is much higher in menopausal women.<sup>7</sup> In a study of patients with "sub-clinical" Cushing's syndrome (cortisol of 2.0 microg/dL; range = 1.1-6.1), clinical examination revealed unexplained weight gain and abnormal fat pads, consistent with metabolic syndrome.<sup>5</sup> Since adipose tissue synthesizes estrogen, an increase in body fat leads to estrogen dominance relative to progesterone and increases the risk of both breast and endometrial cancer.<sup>8</sup> In addition, chronic hyperglycemia and hyperinsulinemia results in an overproduction of ROS (reactive oxygen species), which increases the risk in the development of dementias such as Alzheimer's disease.<sup>6</sup>

Because many of the symptoms seen in glycemic dysfunction are also hallmarks of PMS, perimenopause and menopause, it is clear that both insulin and reproductive hormones are affected by adrenal dysfunction.

### Thyroid: Body Temperature

The thyroid manufactures T4 that is bound to thyroxine binding globulin (TBG), rendering it inactive in the tissues. T3 is considered to be the most active form of all thyroid hormones.<sup>4</sup> Approximately 80 percent of T3 is generated from the conversion of T4 to T3 in the liver and the kidneys.<sup>4</sup> The pituitary and nervous system are also able to carry out this conversion. In times of optimum thyroid function, conversion of T4 to T3

occurs with the use of a selenium-dependent enzyme called 5' - deiodinase. T3 has a strong effect on cellular metabolism, especially in the brain, heart, lungs and skin, as well as the sensory organs involved in vision and hearing.

T4 is also converted into a metabolite that acts as a competitive inhibitor to T3 called reverse T3 (rT3). Under normal circumstances, approximately 45 to 50 percent of T4 is converted to rT3.<sup>4</sup> rT3 is created with an enzyme that does not require selenium for its production called 5-deiodinase.

The body strives to maintain a temperature of 98.6 Fahrenheit (37 Celsius) through adequate T3 concentration. This temperature is critical to allow all enzymes to function at their peak efficiency. Since enzymatic reactions are the core of every synthetic pathway in cellular metabolism, even small deviations in body temperature can have a profound effect on cellular harmony.<sup>13</sup>

When endogenous cortisol levels are raised in sympathetic stimulation, TSH is blunted, less T4 is converted T3, and rT3 is elevated resulting in symptoms of hypothyroidism.<sup>14</sup>

### Endocrine Organ Symphony

In his work entitled *The Stress of Life*, endocrinologist Hans Selye described three stages of adaptation to stress (alarm, resistance and exhaustion) called the "general adaptation syndrome" (GAS).<sup>12</sup>

Clinical experiences show that the adrenal glands impact every endocrine organ through a multi-directional communication network as illustrated above. Synthesis of steroid hormones fueling adrenal and ovarian function (estrogen, progesterone, cortisol, DHEA and testosterone) depend on optimal function of hepatic phase I and II detoxification pathways and appropriate enzyme production. The building blocks for these hormones are produced from cholesterol manufactured in the liver and transformed into the pro-hormone pregnedelone. Pregnedelone supply is "stolen" by the adrenal in times of increased sympathetic tone. Chronically elevated cortisol levels decrease the amount of circulating T3 and disorder insulin function. Therefore, resolution of adrenal dysfunction is paramount to achieving global hormone balance. Ultimately, familiarity with such an interwoven symphony suggests it is a combination of supportive measures which best serves our patients. When all endocrine organs are addressed this increases the likelihood of resolving a broad range of interrelated symptoms.

References available at: [www.unifiedhealthjournal](http://www.unifiedhealthjournal) or upon request.