



MADISON  
MEDICAL  
COMPOUNDING

Phone 601-707-7545

Fax 601-856-8985

[www.mmcparmacy.com](http://www.mmcparmacy.com)

## PHARMACY

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Thank you for entrusting in the compounding services at Madison Medical Compounding Pharmacy to help meet the unique medication needs of your patients. We are excited to share our monthly newsletter with you and look forward to working with you. Please don't hesitate to let us know how we can assist you and your practice.

*LeAnn Chambers, Pharm.D. and Matthew Chambers, Pharm.D.*

## Chronic Stress and Adrenal Dysfunction

Stress can be caused by environmental, physical, psychological or nutritional factors. Chronic stress is maladaptive – and produces a cascade of dysfunctional metabolic events and HPA Axis dysfunction that ultimately disrupts the adrenal gland's normal diurnal pattern of cortisol release. One of the body's initial responses to fear or stress is the release of hormones such as epinephrine and cortisol that initially help us to react or adapt to a stressful situation. Cortisol raises blood sugar and blood pressure, increases the breakdown of protein while inhibiting protein synthesis, interferes with thyroid hormone action and stimulates visceral fat deposition, which can lead to metabolic syndrome. Medical literature has confirmed the correlation between high levels of cortisol secondary to chronic stress (hypercortisolism), and aging, hormone deficiencies and disease development.



### Health conditions related to hypercortisolism include:

- Insulin resistance/diabetes<sup>1,2</sup>
- Cardiovascular problems including arrhythmias, CHF, MI, atherosclerosis and hypertension<sup>3</sup>
- Osteoporosis
- Dementia/memory loss
- Immune suppression
- Impaired thyroid function
- Decreased kidney function

- Exacerbation of skin conditions (acne, psoriasis, eczema)
- Gastrointestinal problems (GERD, Irritable Bowel Syndrome)
- Mood disorders and depression
- Increased risk of neurodegenerative diseases
- Sleep disorders
- Reproductive disorders
- Premature aging

“Psychological stress decreases insulin sensitivity and increases insulin resistance and may hence be important in the development/onset of type I diabetes.”<sup>1</sup> “In patients with glucose intolerance, cortisol secretion, although normal, is inappropriately high given enhanced central and peripheral sensitivity to glucocorticoids.....thus altered cortisol action occurs not only in obesity and hypertension but also in glucose intolerance and could therefore contribute to the link between these multiple cardiovascular risk factors.”<sup>2</sup>

A prospective study found a specific association between the cortisol:testosterone ratio and the incidence of ischemic heart disease, apparently mediated through insulin resistance.<sup>4</sup>

Subclinical hypercortisolism may be more common than is generally recognized in patients with osteoporosis in whom secondary causes of osteoporosis have been excluded.<sup>5</sup> Osteoporosis may be the only symptom of otherwise asymptomatic cortisol excess.<sup>6</sup> The endogenous cortisol profile of healthy elderly men is a determinant of their bone mineral density and their rate of involutional bone loss.<sup>7</sup>

Factors which influence the development and progression of adrenal dysfunction:

- Duration and severity of stress
- Previous exposure to chronic stressors
- Individual coping mechanisms
- Gender (females are more likely to develop adrenal dysfunction than males)
- Personality (introversion) and low self-esteem

Over time, the body may no longer be able to produce the needed amounts of cortisol and patients can ultimately end up with low cortisol levels (hypocortisolism). Fatigue, pain and stress associated with HYPocortisolism may result in Chronic Fatigue Immuno-Deficiency Syndrome (CFS), Fibromyalgia and Post Traumatic Stress Disorder (PTSD).

### **DIAGNOSTIC ASSAYS for Salivary Cortisol**

“Based on its remarkable reproducibility, easy non-invasive nature, and at least similar diagnostic performance, salivary cortisol appears to be a preferable alternative to 24 hour urine free cortisol as a first line screening test.”<sup>8</sup>

“Salivary cortisol measurements are simple to obtain, easy to measure in most labs, and provide an indirect yet reliable and practical assessment of the serum free cortisol concentrations during critical illnesses...Measurements of salivary cortisol can serve as a surrogate marker for the free cortisol in the circulation.”<sup>9</sup>

To appropriately evaluate adrenal function, multiple cortisol levels must be obtained over a 24 hour period.

Our pharmacist can prepare customized doses of DHEA or Hydrocortisone and other hormones, as well as recommend quality, pharmaceutical-grade supplements to treat adrenal dysfunction. We welcome challenging patients.

### References

- 1 [Neuroimmunomodulation. Jan 1, 2006; 13\(5-6\):301-308.](#)
- 2 [J Clin. Endocrinol. Metab. Dec 1, 2002; 87\(12\):5587-93.](#)
- 3 [J Amer Coll Cardiol. April 1, 2008; 51\(13\):1237-46.](#)
- 4 [Circulation. July 19, 2005; 112\(3\):332-340.](#)
- 5 [Ann Intern Med. Oct 16, 2007; 147\(8\):541-8.](#)
- 6 Recent Prog Med. June 1, 2008; 99(6):309-13.
- 7 [J Clin Endocrinol Metab. Sept 1, 1999; 84\(9\):3058-63.](#)

## Treatment of Adrenal Dysfunction

- Stress reduction techniques –Gentle exercise, Tai Chi, yoga, Pilates, meditation
- Sleep hygiene - Regular sleep-wake cycle, avoid third shift work. The following supplements may be helpful: 5-HTP, Melatonin, Phosphatidylserine, L-Theanine, Calming herbs (Valerian root, Chamomile, Hops, Passion flower)
- Lifestyle modification - Delegating responsibilities to eliminate stressors, regular meals, avoid caffeine and alcohol
- Vitamins and minerals - Magnesium Glycinate or Magnesium Citrate, B Vitamins, selenium, zinc, calcium, manganese, Vitamin E with mixed tocopherols, Vitamin C (Ascorbate)
- Adrenal Extracts
- Adaptogens – Ashwagandha, Rhodiola, Holy Basil
- Pharmacologic therapy for HYPOcortisolism- Low doses of hydrocortisone (by prescription, and closely monitored) have been found to help when the body fails to produce sufficient amounts of cortisol.

Among older healthy adults, daily administration of DHEA has a modest and selective beneficial effect on BMD and bone resorption in women.<sup>10</sup>

***Please contact our compounding pharmacist for more information.***

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