

Jace Wellness Center

Adrenal Fatigue

Symptoms, Causes, Conventional
ACTH testing, Nutrient and
Steroid Treatment, and
Our Approach



Stress

Primary Causes:

Classic Textbook Causes:

(Addison's DZ) When first discovered Tuberculosis, now its autoimmune, destruction by infectious diseases, malignancy, lymphoma, and rarer causes like leukodystrophy.

What we see: (Fatigue vs..... true Addison's) Dysfunction due to adrenal burnout from STRESS, high carbohydrate intakes, alcohol, toxins, autoimmune etc.

Secondary and Tertiary Causes:

✦ Secondary:

Any process that interferes with ACTH secretion by the pituitary.

e.g.: viral infections, chronic fatigue syndrome (?)

✦ Tertiary:

Sudden discontinuation of high dose corticosteroid therapy.

Clinical Manifestations:

- ✦ Lassitude. Fatigue worsens with exercise and is relieved by rest.
- ✦ Exercise intolerance
- ✦ Weakness is generalized and not restricted to certain muscle groups.
- ✦ Anorexia and weight loss.
- ✦ Sensitive to opioid analgesics or sedative drugs and slow recovery from minor surgeries that may not precipitate a frank crisis.

Clinical Manifestations:

- ✦ **Gastrointestinal Manifestations:(Rare)**
Nausea, abdominal pain, diarrhea alternating with constipation.
- ✦ **Hypotension:**Postural dizziness and hypotension. (Aldosterone related)
- ✦ **Salt Craving:**Lack of aldosterone leads to salt wasting and hence the craving for more salt.

Clinical Manifestations:

- ◆ Hypoglycemia
- ◆ Hyperpigmentation: High ACTH stimulates melanocyte activity. More in areas exposed to light and friction.
- ◆ Occasionally hypopigmentation (vitiligo) due to decreased melanocyte activity in secondary adrenal failure

Clinical Manifestations:

- ✦ Sexual Dysfunction: In women, since most androgen production is in the adrenal. Loss of axillary and pubic hair.
- ✦ Myalgia and arthralgia
- ✦ Neurological and Psychological:
Anxiety, Memory Disturbance, Depression (in 20 - 40 %), and Psychosis that can manifest in many different ways.

Clinical Manifestations: Tintera

Most Frequent Symptoms:

Fatigue (94%)

Nervousness and irritability (86%)

Depression (79%)

Apprehension (71%)

Excessive Weakness (65%)

Lightheadedness (47%)

Faintness or Fainting Spells (42%)

Insomnia (40%)

Clinical Conditions that may be associated with Adrenal Fatigue:

- ✦ Chronic Fatigue Syndrome/
Fibromyalgia
- ✦ Chemical Sensitivities
- ✦ Multiple hard to treat food and/ or
environmental allergies.
- ✦ Refractory Asthma
- ✦ Glaucoma
- ✦ Anxiety Disorder
- ✦ Weight Loss

Testing At The Jace Wellness Center

◆ Urine

◆ Saliva

◆ Blood

We Commonly Use Static Testing

- ◆ Static and dynamic tests:

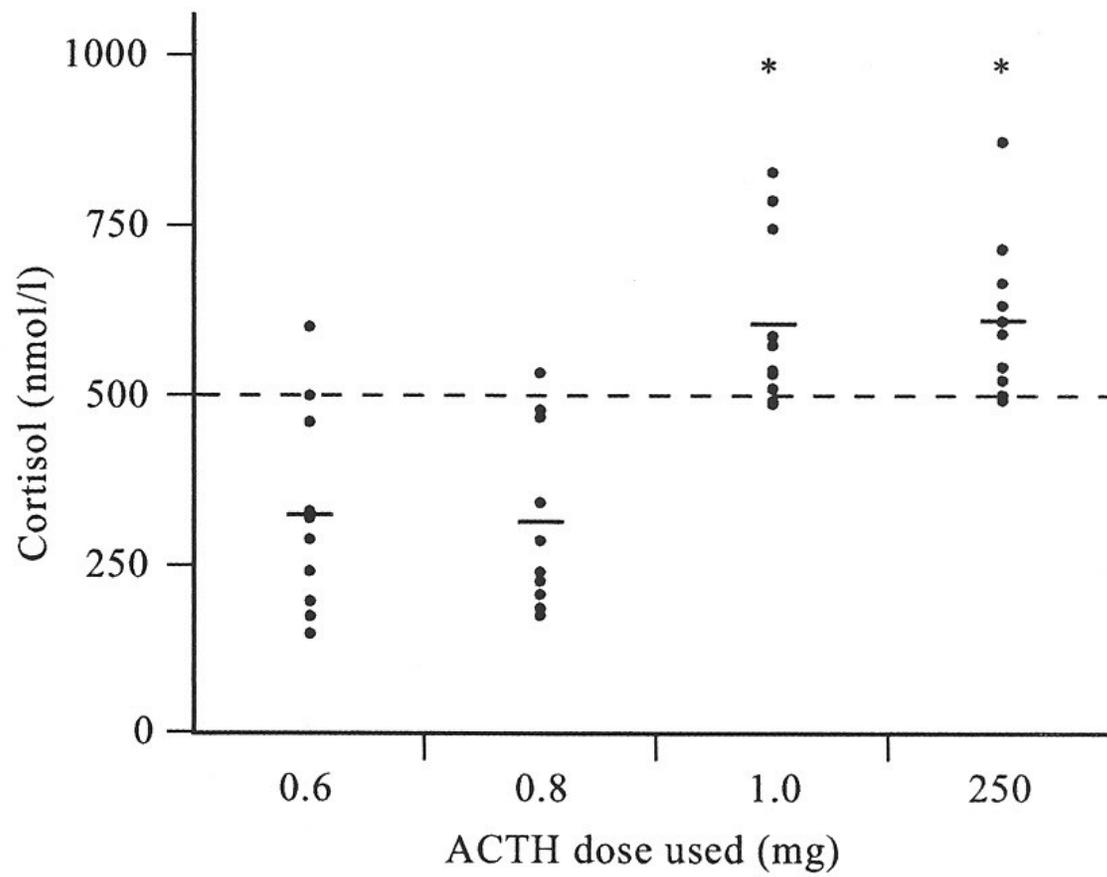
A static test measures levels of adrenal hormones in the normal unstressed condition.

A conventional endocrinologist will use a dynamic test like the ACTH stimulation Test to measure adrenal reserve but by biochemically stressing the adrenal gland.

If Being Treated By A
Conventional
Endocrinologist
Before Coming To
Our Clinic, We
Recommend The 1ug,
Not The 250ug ACTH
Test

ACTH Stimulation Tests: 250 ug versus 1 ug (IV)

- ✓ One microgram is the lowest ACTH dose to cause a maximal cortisol response. There is no diurnal variation of cortisol response to sub maximal ACTH stimulation Dickstein, D Spigel, E Arad, and C Shechner *Division of Endocrinology, Bnai Zion Medical Center, Haifa, Israel*
- ✓The lowest ACTH dose to achieve maximal stimulation was found to be 1.0 microgram, with which dose cortisol concentration increased to 607.2 +/- 182 nmol/l, compared with 612.7 +/- 140.8 nmol/l with the 250 micrograms test (P > 0.3). The use of smaller doses of ACTH (0.8 and 0.6 microgram) achieved significantly lower cortisol responses (312 +/- 179.4 and 323 +/- 157.3 nmol/l respectively; both P < 0.01 compared with the 1 microgram test).
- ✓These results show that 1.0 microgram ACTH, used latterly as a low-dose test, is very potent in stimulating the adrenal, even when baseline cortisol is suppressed; smaller doses cause reduction of this potency.



1 ug Best To Check For Mild Adrenal Insufficiency

- ✓ [J Clin Endocrinol Metab.](#) 1995 Apr;80(4):1243-6.
- ✓ **Low-dose adrenocorticotropin test reveals impaired adrenal function in patients taking inhaled corticosteroids.**
- ✓ [Broide J](#), [Soferman R](#), [Kivity S](#), [Golander A](#), [Dickstein G](#), [Spirer Z](#), [Weisman Y](#).
- ✓ Department of Pediatrics, Dana Children's Hospital Faculty of Medicine, Tel Aviv University, Israel.
- ✓ **Compared a .5 ug ACTH stimulation to the standard 250 ug. First looked at normals and found 32/33 passed test. Peak cortisol levels were similar in the low and high dose tests.**
- ✓ **Then looked at kids on steroid inhalers for asthma and did both low and high dose tests. In the low dose test 16/ 46 failed. The low dose test picked up one case that the standard dose failed to pick up.**
- ✓ **Therefore, it appears that a low-dose ACTH test is capable of revealing mild adrenal insufficiency, which is not detected by the high-dose ACTH test.**

1ug More Sensitive!

- ✓ A comparison between low-dose (1 microg), standard-dose (250 microg) ACTH stimulation tests and insulin tolerance test in the evaluation of hypothalamo-pituitary-adrenal axis in primary fibromyalgia syndrome.
- ✓ Department of Physical Medicine and Rehabilitation, Erciyes University Medical School Kayseri, Turkey.
- ✓ OBJECTIVE: Primary fibromyalgia syndrome (PFS) is a nonarticular rheumatological syndrome characterized by disturbances in the hypothalamo-pituitary-adrenal (HPA) axis. The site of the defect in the HPA axis is a matter of debate. Our aim was to evaluate the HPA axis by the insulin-tolerance test (ITT), standard dose (250 microg) ACTH test (SDT) and low dose (1 microg) ACTH test (LDT) in patients with PFS.
- ✓The 1 microg and 250 microg ACTH stimulation tests and the ITT were performed consecutively. RESULTS: Peak cortisol responses to both the low dose test (LDT) and standard dose test (SDT) were lower in the PFS group than in the control group ($P < 0.0001$). Peak cortisol responses to ITT in the PFS group were lower than in the control group ($P < 0.0001$). There was a significant difference between the peak cortisol responses to LDT (589 ± 100 nmol/l) and peak cortisol responses to ITT (730 ± 81 nmol/l) in the PFS group ($P < 0.0001$). CONCLUSION: We conclude that the perturbation of the HPA axis in PFS is characterized by underactivation of the HPA axis. Some patients with PFS may have subnormal adrenocortical function. LDT is more sensitive than SDT or ITT in the investigation of the HPA axis to determine the subnormal adrenocortical function in patients with PFS.
- ✓ Clin Endocrinol (Oxf). 2001 Oct;55(4):455-9.

1 ug Reproducible!

- ✓ **Reproducibility of the cortisol response to stimulation with the low dose (1 microg) of ACTH.**
- ✓ **Park YJ, Park KS, Kim JH, Shin CS, Kim SY, Lee HK.**
- ✓ Department of Internal Medicine, College of Medicine, Seoul National University, Seoul, Korea.
- ✓ **OBJECTIVE:** Previous studies have shown that the rapid ACTH stimulation test using a low dose of 1 microg is more sensitive than that using 250 microg ACTH for detecting subtle cases of adrenal insufficiency. However, there are controversies for the reproducibility of the 1 microg-test. To evaluate the reproducibility of the 1 microg-test, we assessed both day-to-day and diurnal variations of cortisol responses to 1 microg ACTH injection..
- ✓ **CONCLUSIONS: We conclude that the cortisol response to 1 microg ACTH stimulation was reproducible in both healthy subjects and patients with secondary adrenal insufficiency.**

Why Is the ACTH Test Normally Not Done At The Jace Wellness Center?

◆ We have found that many patients who showed a negative 250 ug ACTH stimulation test had low cortisol metabolites in the baseline 24 hour urine or saliva. Low baseline levels of cortisol metabolites are a good indicator of adrenal function. Only in rare cases is the ACTH test used at our clinic.

Treatment Strategies:

- ◆ Lifestyle Changes
- ◆ Nutrients
- ◆ Other Therapies
- ◆ Hormone Replacement

Treatment

- ✦ Diet: A sugar and high refined carbohydrate diet is stressful to the adrenal gland. However a fatigued adrenal gland is unable to tolerate high protein diets like the Atkins diet. A balanced diet with whole carbohydrates, fat and protein is best. Frequent small meals and avoidance of prolonged hunger is recommended. Salt intake should be liberalized.

Pantothenic Acid (B-5):

- ✦ Pantothenic Acid (PA) plays a major role in the production of adrenal hormones, specially in times of high stress situations. Deficiency can cause atrophy of the adrenal glands. Once inside cells, PA is used for the production of coenzyme-A.

Pantothenic Acid:



Vopr Pitan. 1985 Jul-Aug;(4):51-4.

Adrenal cortex functional activity in pantothenate deficiency and the administration of the vitamin or its derivatives

Tarasov IaA, Sheibak VM, Moiseenok AG.

Study of the corticosteroid content in the adrenals and blood of rats under pantothenate deficiency has demonstrated a decrease in adrenocortical function. A single administration of pantothenate in a dose of 3.3 mg/kg reduced the influence of hypovitaminosis on the adrenals.

The Effects of Pantothenic Acid Deficiency on the Secretion of Corticosteroids by the Albino Rat

- ✓ Endocrinology 1958; 62: 565
- ✓ Longwell et al. Lovelace Foundation, Albuquerque, NM.

Pantothenic Acid deficiency was shown to significantly reduce the production of corticosterone - the predominant steroid in the rat adrenal.

Much of the literature on pantothenic acid in adrenal fatigue is found in Japanese literature. (Look up authors Kosaka C and Onuki M. in 'Horumon To Rinsho')

Ascorbic Acid:

- ◆ Ascorbic Acid is found in the highest concentrations in the cortex and the medulla of the adrenal gland. It is a cofactor in the production of both catecholamines and adrenal steroids.

Ascorbate stimulates monooxygenase-dependent steroidogenesis in adrenal zona glomerulosa

✓ Biochem Biophys Res Commun. 2005 Dec 9;338(1):483-90.
Epub 2005 Aug 29.

✓ Mitani F, Ogishima T, Mukai K, Suematsu M.

✓ Department of Biochemistry and Integrative Medical Biology,
School of Medicine, Keio University, 35 Shinanomachi, Shinjuku-
ku, Tokyo 160-8582, Japan.

Vitamin C is an important cofactor for both adrenal cortex and adrenal medulla

Endocr Res 2004 Nov;30(4):871-5

Department of Endocrinology, Diabetes, Rheumatology, Heinrich-Heine University, Duesseldorf, Germany.

The adrenal gland is among the organs with the highest concentration of vitamin C in the body. Interestingly, both the adrenal cortex and the medulla accumulate such high levels of ascorbate. Ascorbic acid is a cofactor required both in catecholamine biosynthesis and in adrenal steroidogenesis.

Mutant mice lacking the plasma membrane ascorbic acid transporter (SVCT2) have severely reduced tissue levels of ascorbic acid and die soon after birth. There is a significant decrease of tissue catecholamine levels in the adrenals. On the ultrastructural level, adrenal chromaffin cells in SVCT2 null mice show depletion of catecholamine storage vesicles, signs of apoptosis, and increased glycogen storage. Decreased plasma levels of corticosterone and altered morphology of mitochondrial membranes indicate additional effects of the deficiency on adrenal cortical function.

Scurvy and adrenal insufficiency

[Ugeskr Laeger.](#) 2002 Sep 23;164(39):4548-9.

Rye K, Weeke J, Moller N.

Arhus Universitetshospital, Arhus Kommunehospital, medicinsk afdeling M (endokrinologi & diabetes), Aarhus Universitet, Institut for Eksperimentel Klinisk Forskning.

We describe a case of scurvy in a 32-year-old woman. The disease was associated with bilateral tumours of the quadriceps muscles and malignancy was considered. Adrenal insufficiency was also diagnosed. All abnormalities subsided in response to vitamin C therapy. It is unknown whether there is a causal link between the two diseases, but evaluation of adrenal function seems justified in future cases of scurvy.

Mixed Tocopherols (Vitamin E)

- ✦ Plays an important role in steroidogenesis in the adrenal gland. Has been found to be present in the highest concentrations in adrenal glands and liver. Has to be replaced in adequate doses to help adrenal gland recovery.

Suppression of steroidogenesis and activator protein-1 transcription factor activity in rat adrenals by vitamin E deficiency-induced chronic oxidative stress.

- ✓ J Nutr Biochem. 2004 Apr;15(4):
- ✓ Abidi P et al.
- ✓ Geriatric Research, Education and Clinical Center, Veterans Affairs Palo Alto Health Care System, Palo Alto, CA 94304
- ✓ **Plasma, liver, and adrenal tissues from vitamin E-deficient animals had negligible levels of this vitamin and showed high susceptibility to in vitro lipid peroxidation.**

Synthesis and secretion of corticosterone in response to corticotropin (ACTH), dibutyryl-cAMP, or 20alpha-hydroxycholesterol in vitro was significantly reduced in adrenocortical cells prepared cells from rats deficient in vitamin E.

Vitamin A

- ✦ Important cofactor is steroidogenesis

Vitamin B-6

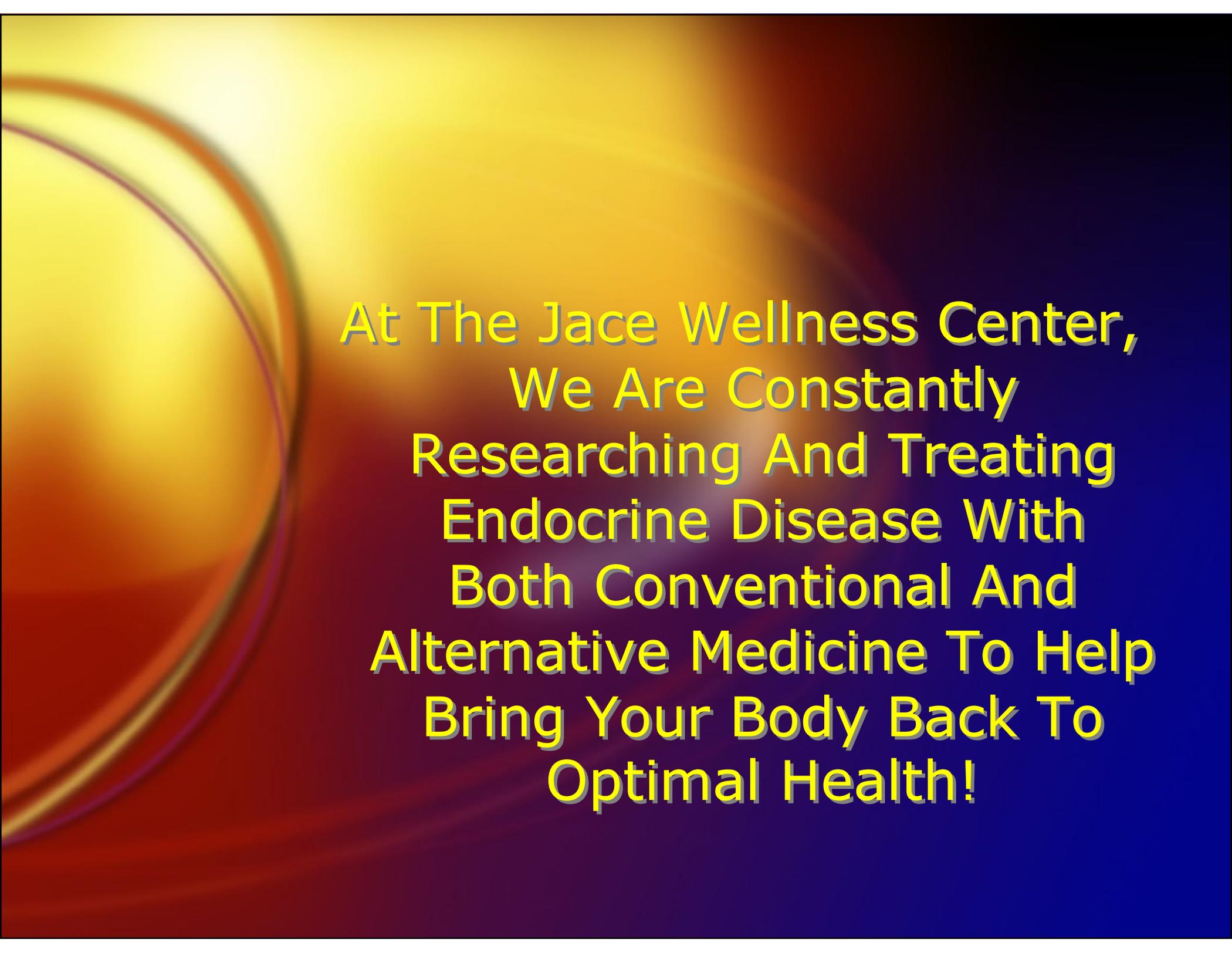
- ◆ Pyridoxal phosphate helps stimulate release of adrenal catecholamines. P5P also alters cell receptor response to steroid hormones.

Treatments

- ◆ Herbs, Glandulars, IV therapies, Injection Therapies Are Possible Treatments
- ◆ Colon Hydrotherapy and Mild Detoxing Are Also Used If Needed

Hormone Replacement

- ◆ Bio-identical Hormones such as Hydrocortisone and Aldosterone are used if necessary.
- ◆ Beware of Practitioners stating that Homeopathics or Nutrients are all that is needed in severe adrenal dysfunction
- ◆ We also test and treat all other gland dysfunctions with bio-identical hormones



At The Jace Wellness Center,
We Are Constantly
Researching And Treating
Endocrine Disease With
Both Conventional And
Alternative Medicine To Help
Bring Your Body Back To
Optimal Health!