INSIDER’S GUIDE
ADRENAL STRESS INDEX
PROTOCOLS

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**Adrenal Stress Testing Protocols**

**Key Points to Remember:**

- **Elevated 8:00 am cortisol levels** are suggestive of a hyper-stimulated adrenal gland engaged in glucose counter-regulation during sleep. Nocturnal hypoglycemia.

- **Depressed 8:00 am** cortisol levels are suggestive of adrenal hypofunction.

- **Elevated Noon and 4:00 pm cortisol** levels are suggestive of a tendency towards hypoglycemia.

- **Depressed 4:00 pm cortisol** levels are suggestive of a hypofunctional gland with poor glucose counterregulation and an afternoon performance slump.

- **Elevated 11:00-12:00 midnight cortisol** levels are indicative of hypothalamic-pituitary hyperactivity, insensitivity to negative feedback, or endogenous biological depression.

- **Low DHEA** is a normal finding in children below age of 14 and DHEA augmentation is NOT recommended.

- If augmenting with DHEA and thyroid medication, closely monitor the patient and reduce thyroid medication accordingly.

- **Cortisol augmentation** is contraindicated in diabetic or pre-diabetic patients.

- **Licorice** will not suffice when cortisol levels are less than 5 nM.

- **Pregnenolone augmentation** is necessary when cortisol burden is very depressed <23 or the daily burden of cortisol is >85
Adrenal Recovery Protocol

Adrenal fatigue can be reversed. It may take 6 months to 2 years for the recovery process to take place. The following are some of the important steps:

1. **Removal of the stressors.** This is the most important step. Identify endogenous and exogenous sources of stress. For instance active, subclinical or latent gliadin (from grains) intolerance is a powerful exogenous source of inflammatory stress on the adrenal axis. Other exogenous sources of stress include environmental toxins, toxic emotions (marital, family, relationship, or financial problems), molds, viruses, GI infections, oral infections. These should all be taken into account when seeking to identify the underlying cause or contributing factor to a patient’s symptom complex. Endogenous sources of stress include by-products of oxidative stress, dysbiosis, side effects of prescriptive medications, mal-absorption.

2. **Sleep.** It is important to **go to sleep by 10 p.m.** because physical repair takes place between **10 p.m. and 2 a.m.** when the adrenals work their hardest to repair the body. We should also try to sleep in until 8:30 a.m. or 9:00 a.m. if possible.

   A good night sleep is therefore mandatory. Without a good sleep, our bodies cannot regenerate itself to deal with stressors the next day. We should also rest in a completely dark room to maximize melatonin production.

   If your patients have a tendency to wake up at **2 a.m. to 3 a.m.** and find they are unable to fall back to sleep, that is a **sign of excessive stress.**

3. **Avoid Coffee or Caffeinated Beverages.** Coffee and tea act as stimulants and interrupt sleep pattern. Herbal tea is acceptable because it does not contain caffeine.

4. **Maintain Glycemic Control:** One of the most effective ways to prevent or reverse adrenal stress and improve cortisol balance is to balance the amount of carbohydrates and proteins that are eaten with each meal.

   People have been mis-informed that eating more complex carbohydrates than protein is healthy. However, for people suffering with adrenal stress, this will prove to be the absolute worse thing to do. It is well documented that excess carbohydrates to protein results in excess levels of insulin. Excess levels of insulin puts a significant amount of stress on the adrenal glands. You see when insulin goes up the adrenals have to produce more and more cortisol just to keep the insulin under stringent control. Unfortunately long-term cortisol production will eventually lead to a depletion of cortisol and ultimately **adrenal exhaustion.**
The proper ratios are approximately 2 parts carbohydrates to 1 part protein by weight. For example, 20 grams of protein with 40 grams of carbohydrates is just about right. Proper ratios are influenced by the **glycemic index** of the carbohydrates consumed.

**Glycemic index** is a number given to a carbohydrate measuring how fast that food is converted to sugar (glucose). Each food’s ability to raise the blood sugar is given a value called the glycemic index. This value, a number, indicates how rapidly the food will raise the blood sugar, the higher the number the quicker and higher the glucose rises. The higher and more rapid the rise, the more insulin we need to handle the blood sugar from going too high. Insulin’s job is to put sugar into storage as either glycogen or fat. High glycemic foods release sugar into the bloodstream very quickly, causing insulin to go through the roof.. causing increased adrenal stress (cortisol).

Examples of very high glycemic carbohydrates sources include **rice, potatoes, bread, oatmeal, corn, carrots, sugar, honey, bananas and raisins**

The glycemic control diet requires that adequately balanced portions of protein and carbohydrates be eaten with each meal and snack. **Best to keep the glycemic index below 50.**

**Low glycemic carbohydrates** such as green vegetables should be emphasized over high-density carbohydrates such as bread. In addition, 20% of each meal should consist of one or more high quality fats such as olive oil, almonds, avocado or flaxseed oil. Healthy fats play a major role in helping to maintain blood sugar by slowing down the release of glucose (sugar) into the bloodstream.

Establishing a glycemic control diet generally requires a shift in one’s eating habits. Carbohydrates often need to be reduced substantially. This especially is the case with breakfast which many people consists of very little protein and large amounts of high glycemic carbohydrates.

5. **Avoid or at least minimize TV and Computers.** Some people may be photosensitive. Watching television or working at the computer may prevent the melatonin level from rising to induce sleep. If you are one of these people, you should turn off your television or computer by around 8 p.m. at night.

6. **Exercise.** This is a wonderful stress reducer and a tremendous oxygenator. Exercise reduces depression, increases blood flow, normalizes level of cortisol, insulin, blood glucose, growth hormones, thyroid, and makes you feel generally
much better. The best form of exercise to ensure improve cardiovascular health, lose body fat and improve cortisol/DHEA balance is a combination of **interval aerobics and progressive resistance strength training exercises.**

7. **Minimize Concept Shifting.** This is another name for multi-tasking. The constant shifting of one’s focus from thing to another places tremendous stress on the adrenals. Forcing the brain to constantly shift from one subject to another not only causes stress but also results in a negative impact on your patient’s hormone and immune systems. To minimize this type of stress, try to have your patients organize their schedules so that concept shifting is kept to a minimum. Activities such as meditation, yoga, t’ai chi and prayer all help with lowering the impact of concept shifting.

8. **Nutritional Supplementation.** See below under the heading, **The Simplified Four Question Protocol Guide.** The use of nutritional supplementation in overcoming adrenal fatigue needs to be individualized, based on each person’s history, background, and body metabolic system. One person's nutrient may be another person’s toxin. Each nutrient is like one bullet in the arsenal. Using the right bullet at the right time is critical because there are not many bullets available. Many simply take the whole battery of nutrients without this consideration and that approach seldom works long term in the case of adrenal fatigue.

9. **Do not skip breakfast.** If you are low on sugar, the adrenals are instructed to secrete cortisol because cortisol activates gluconeogenesis to increase blood sugar level and allow the body to function. It is therefore important to have a healthy breakfast soon after waking and **not later than 10 a.m.** This will prevent the body being put in a position to play "catch-up" for the rest of the day.

The best time for lunch is from **11:00 a.m. to 11:30 a.m.** Sometimes, a nutritious snack between **2:00 to 3:00 p.m.** will be needed to sustain our bodies through the dip in cortisol levels that occurs between **3:00 to 4:00 p.m.** Evening meals should be around **5:00 to 6:00 p.m.** Supper, if needed, should be in small quantities and low in glycemic to avoid the steep rise in blood sugar commonly seen in high-glycemic index snacks such as cakes. These snacks will cause the blood sugar to rise and a corresponding increase in insulin output.

10. **No Sugar:** Those with adrenal fatigue often report symptoms such as dizziness and weakness, as the blood sugar level drops below a comfortable level for the body to function normally. To overcome this, the quick fix solution is to take food that is high in refined sugar such as donut or sweets, or drinks that is stimulatory to get the adrenal to put out more cortisol, such as coffee or cola drinks. This
gives the person a boost of energy. However, this hypoglycemic symptom relief only lasts for about 1-2 hours. Inevitably, it is followed by a crash to an even lower blood level. Those suffering from adrenal fatigue are constantly on a roller coaster ride in terms of their blood sugar level throughout the day. The sugar level tends to increase after each quick fix, but drops after a few hours. By the end of the day, the body is totally exhausted. A diet that maintains a constant sugar level in the blood is a critical consideration in adrenal fatigue recovery. This can be done by taking a variety of low-glycemic index food that releases sugar slowly to sustain the body during and between meals. Starchy carbohydrates that are converted quickly into glucose (such as pasta and bread) should be limited. Soda drinks should be totally avoided.

11. Use Salt: The amount of salt in the body is highly dependant and regulated by a chemical called aldosterone. This chemical is manufactured in the adrenal cortex under the direction of the hormone called ACTH (adrenocorticotrophic hormone). Like cortisol, aldosterone follows a diurnal pattern of secretion, peaking at 8 a.m. and at its lowest between 12-4am.

Aldosterone is responsible to maintain the concentration of sodium and potassium in the cell as well as outside the cell playing a significant role in regulation of blood pressure.

As the concentration of aldosterone rises in the body, the concentration of sodium and water rises, more fluid is retained in the body, and blood pressure rises. Conversely, when the level of aldosterone lowers, the amount of sodium and water in the body is reduced. The blood pressure goes down.

Unlike cortisol, aldosterone does not have its own negative feedback loop when there are excessive amounts. If the aldosterone level is too high, aldosterone receptor sites will be down regulated and its sensitivity to aldosterone is reduced.

In the early phases of adrenal fatigue, the amount of cortisol and aldosterone increases in our body due to the ACTH stimulatory effect from stress. As a result, the sodium and water is retained in the body with a feeling of bloated. The baroreceptors of the blood vessels are triggered and blood vessels go into a relaxation mode automatically and this is regulated by the autonomic nervous system. This auto-regulation helps to maintain a stable blood pressure at a time when the total fluid volume increases due to high level of aldosterone triggered by stress.

With increasing levels of stress, the adrenal glands also secrete another hormone called epinephrine. This hormone constricts the blood vessels and
increases blood pressure in order to ensure that our brain have adequate blood flow and oxygen to help us deal with impending danger.

The sum reaction of aldosterone, epinephrine, and the autonomic relaxation response are some of the key factors that ultimately decide the final blood pressure at any point in time. During the early stages of adrenal fatigue, the resulting blood pressure is often normal if all bodily function is well balanced. If the body is unable to overcome the aldosterone and epinephrine response, then the blood pressure is elevated. It is common to find many under stress experiences increase in blood pressure.

As adrenal fatigue progresses to more advance stages, the amount of aldosterone production reduces. Sodium and water retention is compromised. As the fluid volume is reduced, low blood pressure ensues. **Cells get dehydrated and become sodium deficient.**

As with advanced adrenal fatigue reports a low blood pressure as well as a salt craving. The low blood pressure is due to the reduced fluid in the body. Salt craving is because the body is in an absolute deficiency of sodium. **Both are due to the lack of aldosterone.** In order to compensate for this, potassium is leaked out of the cells so that the sodium to potassium ratio remains constant. The loss of potassium is less then that of sodium, and as a result the potassium to sodium ratio is increased. This imbalance causes another set of problems.

Those suffering from adrenal often have a low body fluid volume accompanied by a salt craving due to absolute deficiency in sodium as well as a normal to high potassium level. While lost fluids should be replaced, it has to be done carefully. When the fluid is replaced without adequate sodium, the amount of sodium in the body actually gets diluted, therefore resulting in an even lower sodium level. This is called dilutional hyponatremia, a dangerous condition that can be deadly.

It is therefore important to add salt liberally to fluids that are taken in by anybody suffering from adrenal fatigue.

Sufferers of advanced adrenal fatigue usually have a low cortisol and sodium level.

**They should take filtered drinking water with ½-1 teaspoon of salt on a regular basis, especially in the morning.**

Only a small number of people with adrenal fatigue have concurrent high blood pressure. Those that fall into this category should check their blood pressure carefully during fluid replacement.
Sea salt is better than table salt in that it contains additional trace minerals as well. A good fluid cocktail for adrenal fatigue suffers is vegetable juice diluted with water and sprinkled with sea salt and kelp powder. Kelp contains about 90 mg of potassium and over 200 mg of sodium per serving and is easily absorbed.

12: Balance Carbohydrate, Protein and Fats
It is important for adrenal fatigue patients to balance the amount of protein, fat, and well as carbohydrates. As compared to a normal person, the adrenal fatigue person has an immediate need for sugar when hunger strikes. At the same time, they also need good protein as well as good fat to have sustained energy until the next meal comes.

The primary diet should be high in raw food and that is low in glycemic index. **Fruit juices should be avoided.** Whole fruits should be limited, especially melons, which are high in sugar and causes sugar spikes soon after food enters the body. Good quality protein from meat, fish, and eggs are recommended. These provide a steady source of energy to carry the body through between meals.

Seeds and nuts are critical elements and sources of fatty acids that the adrenal glands need in order to manufacture cholesterol, a precursor to all adrenal steroid hormones. The key is to take nuts and seeds that are raw and free of rancid oils. Oils that are rancid make the symptoms of adrenal fatigue worse and should be avoided at all cost. Raw nuts should be taken on a liberal basis and should be soaked overnight in water.

Nuts such as cashews, almonds, brazils, pecans, walnuts, and chestnuts are excellent. Peanuts should be avoided. Olive oil should be used for light cooking. The cooking heat should be low to moderate. Use coconut oil and butter for any high heat or deep-frying. Vegetables high in sodium include kelp, black olives, red hot peppers, spinach, zucchini, celery, and Swiss chard. Fruits should only be taken in moderation. If you feel worse after food consumption, that is the body’s way of telling you that you are on the wrong track.

Organic fruits such as papaya mango, apples, grapes, and cherry are recommended. Bananas, dates, figs, raisins, and grapefruit are high in potassium and should be limited.

Many people with adrenal fatigue also have a lower level of hydrochloric acid (HCl), which is necessary to break down the protein. Symptoms of this problem include gas, bloating, and heaviness in the stomach after eating a meal containing protein. In such case, the use of digestive enzymes, probiotics, as well as HCl replacement is indicated.

**Dietary Tips**

1. Always eat breakfast, and do it before 10am. The body’s glycogen supply needs to be replenished after going through the evening. Try to each your lunch before noon followed by a nutritious snack between 2 and 3. The evening meal should
be taken before 6pm. Just before bedtime, a couple of bites of high quality snacks are recommended.

2. Combine small amount of whole grains with generous portion of protein and fat at every meal and snack except at bedtime. This will ensure sustained energy is available at and between meals.

3. Eat 20-25% whole grain, 30-40% above the ground vegetables (50% of which should be raw), 10-15% beans, nuts, and seeds, 10-20% animal food, 10-15% good fat, and 5-10% whole fruits (except banana and fruits in the melon family).

   Whole fruits are permitted in lunch and dinner except banana, figs and those in the melon family.

4. Sprinkle sea salt liberally to food to pleasant taste provided that blood pressure is normal. Food that is high in potassium such as bananas and dried figs can make the adrenals worse and should be avoided.

5. Start each morning with a full glass of water and half a teaspoon to one teaspoon of sea salt. The typical breakfast of fruits and yogurt will only worsen the adrenal fatigue sufferer. In fact, those with adrenal fatigue usually experience an increase in shakiness after a breakfast high in fruits. A good breakfast would be one that is high in protein and fats such as eggs and raw nuts. A very small amount of grains is acceptable.

6. Eat 5-6 frequent small meals instead of 3 large meals

7. Take small amount of healthy snacks high in protein and fat such as cottage cheese or nuts before sleep if there is a tendency to wake up in the middle of the night.

8. Take small amount of carbohydrate such as whole grain bread before sleep if there is a difficulty to fall asleep.
The Simplified Four Question Protocol Guide

- Morning Cortisol (7:00 – 8:00 AM) = C1
- Noon Cortisol (11:00 – 12:00 PM) = C2
- Afternoon Cortisol (4:00 – 5:00 PM) = C3
- Nighttime Cortisol (11:00 – 11:59PM) = C4

**Question #1- What is total cortisol?**

If **less than 23** and/or **greater than 85** then **pregnenolone** should be prescribed.

**Question #2: What is total DHEA?**

If DHEA is **less than 7 ng/ml** then DHEA should be prescribed.

*Note: Although the reference range for salivary DHEA is 2 to 10 ng/ml, the ideal optimal range is 7.0 to 8.0 ng/ml*

**Question #3: Are individual cortisols elevated?**

If C1 is elevated
- Rule out high glycemic meal before bedtime
- Rule out 3rd shift occupation resulting in a circadian reversal
- Rule out parasitic infection (check for monocytes > 7 and eosinophils >3)

Elevated cortisols should be treated with **Phosphorylated Serine (Seriphos)**

**Question #4: Are individual cortisols depressed?**

If yes, then licorice extract is recommended.

*Exceptions:*
- Licorice is contraindicated in patients suffering with hypertension.
- If individual cortisol levels are **less than 5 nM**, licorice is likely to **NOT** be effective. In these cases a prescription of hydrocortisone may be indicated.
**Cortisol Prescription Protocol**

Cortisol prescription doses that usually augment to physiological levels include the following:

**Morning dose – 10 to 15 mg**
This dose should be taken between 6AM to 7AM with a piece of toast and plenty of fluid.

**Noon dose – 7.5 – 10 mg**
This dose should be taken between 10AM to 11AM with a piece of toast and plenty of fluid.

**Afternoon dose – 5 mg or less**
This dose should be taken between 3PM to 4PM with a piece of toast and plenty of fluid.

*Prescription Cortisol and/or Licorice should NOT be used for depressed evening cortisols.*

**DHEA Protocol**

**Guidelines**

The maximum recommended dose should not exceed 20 mg per day. The typical dose is 3-7 drops after breakfast and 3-7 drops after dinner

**Female**

**Week 1:** Use 5 drops A.M. only  
**Week 2:** Use 5 drops twice daily thereafter

**Males**

**Week 1:** Use 5 drops A.M. only  
**Week 2:** Use 5 drops twice daily  
**Week 3 and beyond:** Use 7 drops twice a day thereafter.

**Possible Side Effects** include: headaches, light headedness, stomach discomfort, acne, breast tenderness, excess mucous, female spotting.

**Alternative Protocol in the event of side effects:**

In the event patient experiences any of the above side effects it is recommended to decrease the dose to 1 drop twice a day and gradually titrate up to the optimal dosage.
**Pregnenolone Protocol**

Pregnenolone is only prescribed when the total cortisol burden is either **less than 23** and/or **greater than 85**.

**Dosages:**

<table>
<thead>
<tr>
<th>Week</th>
<th>Pregnenolone Extract</th>
<th>Pregnenolone Capsules</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5 drops three times a day with each meal</td>
<td>(1) 50 mg capsule per day</td>
</tr>
<tr>
<td>2</td>
<td>3 drops three times a day with each meal</td>
<td>(1) 30 mg capsule per day</td>
</tr>
<tr>
<td>3</td>
<td>3 drops three times a day with each meal</td>
<td>(1) 30 mg capsule per day</td>
</tr>
<tr>
<td>4 - 6</td>
<td>3 drops three times a day with each meal</td>
<td>(1) 30 mg capsule per day</td>
</tr>
<tr>
<td>7</td>
<td>2 drops three times a day with each meal</td>
<td>(1) 20 mg capsule per day</td>
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<tr>
<td>8 - 9</td>
<td>1 drop three times a day with each meal</td>
<td>(1) 10 mg capsule per day</td>
</tr>
<tr>
<td>10 - 13</td>
<td>none</td>
<td>none</td>
</tr>
</tbody>
</table>
**Phosphorylated Serine Protocol**

The product Seripos made by Interplexus

![Seripos](image)

**Dosage and How to Prescribe:**

A common dose is 1 capsule 20 to 30 minutes before each of the elevated cortisols. For example, if the morning and evening cortisols are elevated then one capsule should be taken 20 to 30 minutes before morning cortisol time *(7:00 – 8:00 AM)* and 20 to 30 minutes before evening cortisol time *(11:00 – 11:59PM)*

**Licorice Protocol**

Whole Licorice Root Extract (Glycyrrhiza) from [http://www.biomatrixone.com](http://www.biomatrixone.com) (one drop is equal to approximately 10 mg)

**Dose:** recommend 5 drops under tongue morning, noon and afternoon but never in the evening.

Licorice Plus from **Metagenics**: Licorice Root Extract *(Glycyrrhiza glabra)* 600 mg [standardized to 25% (150 mg) glycyrrhizic acid]

![Licorice Plus](image)

**Dose:** recommend one tablet with each depressed cortisol time **EXCEPT evening.**
Additional Support to Consider

Adrenal Adaptives

Support Adrenals from [http://www.biomatrixone.com](http://www.biomatrixone.com)
Recommend taking two in morning and two at noon. Never take in late afternoon and evening

Support Minerals: recommend three tablets before bedtime

Re-testing Recommendations

Re-testing needs to be performed approximately 6 weeks following the start of the patient’s protocol.

Credit is contributed to the following labs for their advancement in the field of functional medicine:

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