



**Rocky Mountain Analytical**  
Changing lives, one test at a time

# Adrenal Function

## Information for Patients

### About Stress

Stress is pretty much unavoidable, which is why the body has processes in place to help manage it. The adrenal glands are small glands that sit on top of the kidneys and produce different hormones. Under stress, the adrenal glands produce the hormone cortisol along with the catecholamine hormones adrenaline and noradrenaline. Exposure to stress triggers what is known as the General Adaptation Syndrome, which has three major stages:

#### Alarm Stage

In the Alarm Stage, bursts of the hormones cortisol, adrenaline and noradrenaline are released in response to a stressor, resulting in the traditional “fight, flight or freeze” responses. These hormones help you to fight, run or ‘play dead’ when in the presence of a life-threatening event.

#### Resistance Stage

In the Resistance Stage, you continue to produce cortisol and other hormones to physically resist the stressor. However, since much of modern stress is chronic, a prolonged Resistance Stage may increase the risk of developing stress related diseases. If cortisol levels remain elevated, symptoms like: feeling tired but wired, difficulty sleeping, and anxiety may develop. Excess cortisol also interferes with the action of other hormones (progesterone, testosterone and thyroid), creating more hormone imbalance and more symptoms.

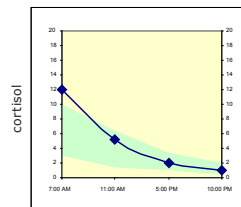
#### Exhaustion Stage

At this stage, the adrenal glands react to the prolonged negative effects of high cortisol (i.e. bone loss, erratic blood sugars), prompting them to significantly decrease cortisol production as a protective measure. Symptoms of low cortisol may include fatigue (particularly morning fatigue), increased susceptibility to infection, decreased recovery from exercise, allergies, low blood sugar, burned out feeling, depression and low sex drive. Other hormones can be affected, particularly aldosterone and DHEA. Low aldosterone may result in reduced sodium and potassium levels. Symptoms of low DHEA are not well defined, although low DHEA often occurs with chronic illness.

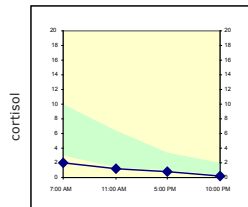
**Since cortisol is the major stress hormone produced by the adrenal glands, measurement of cortisol levels is an excellent means of assessing adrenal gland function.**

### Why Test Saliva Cortisol?

- Measuring cortisol levels at scheduled times throughout the day provides important information on how your adrenal, hypothalamus and pituitary glands are managing your stress.
- Saliva collection is painless and easy to do at home. Blood collection requires a trip to the laboratory, which is impractical for multiple measurements.
- Saliva measures hormone that actually gets into tissue, because hormones pass through the tissue of the saliva gland before getting into saliva. Blood measures hormones that might eventually get to tissue.
- The stress of a needle puncture for blood collection tends to raise cortisol levels. Saliva collection is generally not considered stressful and therefore does not raise cortisol levels.
- Saliva testing of cortisol is widely accepted in the research community and is rapidly becoming the preferred method for measuring cortisol.



Graph 1  
Single Elevated Cortisol



Graph 2  
Low Cortisol Throughout Day

- The green shaded area in the above graphs indicates the normal range for cortisol levels throughout the day. Saliva samples are indicated by the dark blue circles and are taken first thing in the morning, before lunch, before supper and before bed.
- Graph 1 shows an elevated morning cortisol. A single elevated cortisol point may indicate the Alarm Stage, and be a response to a specific single stressor, or it could be a marker of the beginning of the Resistance Stage.
- Graph 2 shows markedly low cortisol levels throughout the day. This is a classic profile for Adrenal Exhaustion. These people typically have trouble getting up in the morning, feel exhausted, depressed and ‘burned out’.

Adrenal Graphs

## Restoring Adrenal Function

Caring for the adrenal glands means applying body, mind and spirit to the task. The fact is, there is no 'magic pill' that improves adrenal function, so it is important to work with a healthcare professional who can develop an adrenal care program for you.

Naturopathic doctors or other regulated health professionals trained in functional medicine are often the best choice for treating mild adrenal dysfunction. Patients who are not at either extreme of adrenal dysfunction (Addison's disease or Cushing's syndrome) often have difficulty getting their symptoms taken seriously.

**Cortisol Insufficiency:** allergies, fatigue, muscle aches and pains, feeling cold, morning sluggishness, low sex drive, feel unable to cope, feel 'burned out', impaired memory, symptoms of poor thyroid function.

**Cortisol Excess:** irritability, feel 'tired but wired', weight gain around waist, sleep disturbances, bone loss, high blood pressure, loss of muscle mass, insulin resistance, low sex drive, loss of scalp hair.

Low morning cortisol is often associated with dehydration and low sodium (salt) levels. This is because the adrenals also produce the hormone aldosterone, which helps regulate salt/water balance. Therefore, healthcare professionals sometimes recommend using sea salt and drinking plenty of water.

## Why Test?

*Good health has a lot to do with maintaining balance: the right balance of work and play, the right balance of nutrients in the diet, and the right balance of hormones.*

*Hormone imbalance may be a result of illness, or may produce symptoms and biochemical changes that eventually lead to illness.*

*Rocky Mountain Analytical is committed to offering laboratory tests that identify hormone imbalances and other conditions - so they can be corrected before disease develops!*

## Lifestyle

- Get lots of sleep. At least 8 hours of sleep are needed to properly rest the adrenal glands. It is important not to watch television or review work or other stressful materials in bed as these activities may raise cortisol levels.
- Reduce consumption of refined carbohydrates like bread and high-sugar foods. Refined carbohydrates cause insulin to be released. Insulin release triggers the release of more cortisol, which causes further stress on the adrenal glands. So, stick to complex carbohydrates like fruits and vegetables.
- Eliminate caffeine. Caffeine stimulates the release of adrenaline and noradrenaline, adrenal hormones that increase the stress response.
- Reduce stress as much as possible. Take time during the day to relax with meditation, yoga, or some other quiet activity.

## About Us

*Rocky Mountain Analytical was founded in 2002 with a mission to offer tests that focus on early identification and prevention of disease.*

*Rocky Mountain Analytical is an accredited medical laboratory located in Calgary, Alberta. Accreditation means tests performed by Rocky Mountain Analytical are regularly reviewed for quality, accuracy and reproducibility by the College of Physicians & Surgeons of Alberta.*

*Ask your healthcare professional whether a test is right for you.*

## Supplements

- Supplements are vitally important in supporting the adrenal glands. Specific vitamins and minerals are needed to make adrenal hormones. Some examples include: the B vitamins, vitamin C, magnesium and various trace minerals.
- There are a variety of herbs and herbal formulae used in treatment of adrenal issues. Many function as adaptogens: natural substances that assist the body in adapting to stress. Adaptogenic herbs help lower or raise cortisol levels depending on the body's needs at that time. Some examples include: rhodiola, ashwaganda, schisandra and ginseng.
- Other supplements like phosphatidylserine, MSM, and tyrosine may also be useful in supporting adrenal function.
- Purified adrenal extracts from animal sources, which contain natural substances that help support the function of the adrenal glands, may also be recommended.

These are just a few strategies that may be used to assist adrenal function. Your healthcare professional can devise a protocol for you to get you started on the path to wellness.

Information is for educational purposes only. It is not meant as medical advice and any treatment decisions should be made with the knowledge or consent of your healthcare professional.



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