Adrenal Fatigue 
and other hormones

By Dr. Rachel West

Dr. West…my child...
- Loves sweets or simple carbs (bread, pasta, cereal)
- Licks salt off foods or his sweat
- Has poor weight gain, or is too heavy
- Has low muscle tone
- Has dark circles under eyes
- Has allergies, colitis, eczema, asthma
- Has insomnia, is hyper, is fatigued
- Does not heal from viruses quickly

Let’s learn about adrenals
- These symptoms may be related to adrenal imbalance!
- So many of us have fatigue — ever hear of Starbucks?! Many of us depend on superficial forms of energy because our adrenals are imbalanced.

This imbalance causes many other imbalances internally.

Adrenals and cortisol

The adrenal glands sit above the kidneys. The adrenal cortex almost exclusively produces cortisol.

The cortisol levels are highest in the morning (6 AM - 8 AM) to wake us up, so sunshine, activity and a bite of food stimulates cortisol production.

Cortisol is lowest in evening to prepare us for sleep. Growth hormone and melatonin suppress cortisol at night to help us sleep.

Adrenals and cortisol

Being alive means experiencing the “stress” of waking every day, which takes cortisol.

It is important to have enough cortisol to handle the amount of stress in our life. If you sit in meditation all day, you need less cortisol.

Definition clarification

Glucocorticoids = family name for hormones, both natural and synthetic, that can raise glucose and prevent hypoglycemia.

Cortisol is the body’s most potent glucocorticoid. It is endogenous (it is also a mineralocorticoid).

Hydrocortisone is a medication containing exogenous cortisol.

Cortisone is the natural precursor to cortisol and has 80% of cortisol activity. It is the storage form of cortisol.

Prednisone, prednisolone, methylprednisolone, dexamethasone, and betamethasone are synthetic derivatives of cortisol to increase its properties.
3 properties of cortisol that keep us alive

- Increases blood sugar, thus energy and blood pressure
- Neutralizes inflammation (it’s the body’s strongest anti-inflammatory), thereby enhancing mood, dynamism, work capacity, stress resistance; it is anti-rheumatic, anti-pain.
- Calms excessive activity of the sympathetic nervous system that produces adrenaline, the stimulating neurotransmitter responsible for emotional outbursts.

How the adrenals are stimulated in the body

- The hypothalamus in the brain secretes CRH
- This stimulates pituitary gland in the brain
- The pituitary gland releases ACTH
- This stimulates the adrenal glands (above the kidneys)
- Adrenal cortex, the outer layer of the adrenals, releases cortisol
- The cortisol affects systemic organs and feeds back to the hypothalamus to say “slow down”

Stressors of the adrenal glands – 1 –

- Anger/fear/worry/anxiety/depression/guilt
- Overwork, physical or mental
- Sleep deprivation
- Excessive exercise
- Light cycle disruption/late hours
- Surgery/accidents/trauma/injury
- Noise
- Inflammation and pain

Stressors of the adrenal glands – 2 –

- Toxic exposure/chemical/heavy metals
- Malabsorption/maldigestion/nutritional deficiencies
- Allergies-food and environmental
- Mold
- Temperature extremes
- EMR/radiation/geophysical

General adaptation Syndrome - How we adapt to stress

- Alarm reaction
  - First reaction to stress, resistance diminished
- Resistance stage
  - Alarm gone and resistance increase as we adapt to the stress
- Exhaustion stage
  - Long exposure wears down body resistance, adaptation energy gone, signs reappear, body closes down

Progression of adrenal fatigue

- Stage 1 — cortisol runs high, dhea (in adults) dives down and pregnenolone normal, so we start to steal pregnenolone to feed the cortisol pathway.
- Stage 2 — cortisol, dhea and pregnenolone are all lowering (because we started stealing the pregnenolone)
- Stage 3 — cortisol, dhea and pregnenolone are all low
Stage 1

- We get these hormones from the breakdown of our fats, which, as we know may already be low in cases of malabsorption.
- As our need for cortisol goes high in response to stress we see: overvoltage, agitation, euphoria, creating stress and drama
- Cortisol too high causes bone loss, low growth hormones, low muscle strength, loss of calcium in urine from the bone

Stage 2

- So now we have been stressed for some time and are using up our stores of stress hormones. As cortisol and pregnenolone lower, it is important to begin to supplement them, to prevent failure.

Stage 3 and failure

- As cortisol and pregnenolone are lowered, symptoms of low levels are present.
- They must be supplemented to correct the imbalance.

Chronic stress (high cortisol) response causes

- Low insulin sensitivity
- Low glucose utilization
- Higher blood sugar
- Bone loss
- Fat accumulation
- Protein breakdown increased

Chronic stress (high cortisol) response causes

- Salt and water retention (bloating in face)
- Low secretory IgA (stool test)
- Inc antigen penetration
- Inc IgG circulating
- Lower NK cell activity (to fight viruses)
- Low interleukin 2
- Low T lymphocytes

Low Cortisol—childhood symptoms

- Thinner narrow face
- Thinner narrow body
- Ear, nose and throat infections
- Allergies, including skin rashes, food allergies, asthma
- GI troubles including colitis and liver
- Excessive emotions, anger/irritability/outbursts
- Anorexia, difficulty to make eat except sweets
Low cortisol - mental and emotional symptoms

- Anxiety in stressful situations
- Depression in stressful situations
- Extreme moodiness
- Confusion, absentmindedness, especially in stress
- Poor resistance to stress, experiencing stress as too much, as unfair
- Excessive compassion for others pain, and sensitivity to human suffering
- Irritability
- Negativism
- Victimization
- Paranoid, quarrelsome, accusatory
- Frequent screaming or yelling

*** Remember - These effects are due to adrenaline, high catecholamines, low blood sugar and inflammation

Physical complaints

- Thin, underweight, difficult to gain weight
- Sometimes obesity because of sugar and salt cravings
- Hair loss
- Headaches with stress
- Skin rashes-eczema, Psoriasis, vitiligo, keloids, brown spots - tans easily.
- Myalgias (muscle cramps), tendonitis, arthritis.
- Inflammatory diseases (acute-allergies, conjunctivitis, otitis, rhinitis, pharyngitis, asthma, food allergies)(chronic-rheumatic and connective tissue).
- Prone to bacterial and viral infections.
- Intolerance to meds.

Physical complaints

- Excessive sensitivity to pain.
- Digestive inflammation-nausea, colitis, bloating, diarrhea.
- Hunger attacks, sweet and salty craving.
- Decreased appetite, especially for meat.
- Difficult to function after emotional outburst, burned out, empty-headed, distracted, absentminded, daydreaming, vertigo, fatigue, low energy during stressful situations.

Signs of low cortisol

- Thin, but obese if after years of sugar craving
- Hair loss
- Painful sinuses, hollow cheeks, yellow-brown face, brown spots (from ACTH)
- Rhinitis, otitis, pharyngitis, tonsillitis
- Swollen lymph
- Bloated abdomen, colitis
- Heavy sweating in armpit
Signs of low cortisol

- Brown elbow folds and armpits and skin folds in palms
- Wet palms and soles
- Hypermobile joints, sitting into joints
- Low blood pressure

Signs of low cortisol

- Nervous and irritable
- Victim and accusatory language
- Melodramatic sharp verbal negative/aggressive retorts (terrible, horrible, impossible)
- Wheezing, fast heart rate, low blood pressure, high if stressed
- Painful muscles and tendons, joints inflamed, rheumatoid
- Painful spleen
- Skin rashes including eczema, psoriasis, Vitiligo, keloids, dark scars, brown spots in buccal mucosa, brown skin folds
- Patient will crave bites of carbs throughout the day to boost cortisol because it is boosted every time we put food in our mouth (grazer) — always hungry until levels of cortisol are sufficient

Tests

1. **BLOOD** - total cortisol, CBG (transcortin), free cortisol, ACTH
   - Morning, afternoon, evening
   - ACTH stimulation test (1 ug of ACTH injected)

2. **URINE** - 24 hr for cortisol and total corticosteroids, 17-hydroxysteroids

3. **SALIVA** - tests-morn, noon, eve, night

4. **DNA genetic testing** - Ace mutation

Treatments for low cortisol to raise it

- **Glandulars** — adrenal gland—cortex — many different companies make these by freeze-drying either the whole gland or just the cortex of cow adrenal glands and put them in capsules. This was actually the original steroid before the pharmaceutical companies started making it.

- **Cortisone** — Comes as hydrocortisone, is shorter acting, usually dosed from 2.5 to 20 mg, 3 to 4 times a day, depending on needs. Not to be taken 4 to 6 hours before bedtime. Some schools of thought do supplement at bedtime. Also comes as a topical creme, which is given for eczema or allergic reactions. By taking the shorter acting, you can take as needed. But compliance is more difficult.

- **Prednisolone** — longer acting
- **Methylprednisolone** — longer acting
- **Prednisone** — longer acting

- **Desamethasone** — longest acting.
- **Pulmicort (budesonide)** — inhaled steroid used for inflammation of the lungs such as in asthma, or severe bronchitis.
- **Pregnenolone** — supplement if low to feed the pathways, especially if memory problems, available from most companies, can be compounded into a creme. Typical dosing is 25 to a 100 mg.
- **Progesterone** — if low, especially if anxiety/hyper/insomnia. Available as a compounded capsule or creme, the pharmaceutical version is called Progesterone. Make sure to get progesterone in a bio-identical form. Typical dose is 25 to 400 mg a day.
Treatments for low cortisol to raise it

- **Extra minerals** throughout the day to help hydrate body and restore minerals lost in urine from high cortisol - (why kids lick salt and sweat) dead sea salt baths and sea salt helpful. Potassium especially helpful founds in coconut water, bananas, and pecans.
- Fix why the adrenals are tired (root cause).
- Make sure patient rests - restore and renew.

Alternative treatments

- Adaptogens help move cortisol throughout the pathways and can help adrenals.
- Ashwaganda
- B5-pantothenic acid
- Ginseng (be careful: this gives energy).
- Rhodiola
- Schizandra berry
- Reishi mushrooms
- Maca root (be careful: this gives energy)
- Balancing blood sugar in general: lipoic acid (R-lipoic is the best), chromium (500 to 1000 mg 2 times a day).

Balance blood sugar

- Exercise
- Fiber
- Phytonutrients
- Insulin sensitizing: lipoic acid, chromium, vanadium, cinnamon
- Eat meals

High dose steroid treatment protocol for Autism

- **www.aheadwithautism.com** is a website where a panel of pediatric neurologists are promoting the use of higher dose steroids to decrease the inflammation associated with autism, especially in the brain
- Look under the research section for full details.
- 3 months of high dose steroids biweekly and then 3 months of lowering the dose for a total of 6 months of treatment. I have treated about 8 patients with this – and many of them have reported increased socialization, increased speech, healthier bowels, no eczema, and a calming effect.
- 3 of the patients have done 2 rounds of treatment, and 1 has done 3 rounds. One does need to be careful of side effects but I believe this treatment regimen is a possibility and needs to be studied more.

High dose steroid treatment protocol for Autism

- My recommendation at this point: a trial of **Celebrex**. Celebrex is being studied in Autism also as an anti-inflammatory. It is warranted because the side effects are low.
- A 6 months trial of the above protocol may indeed help your child if done along with a physician’s support.
- The dosing that I have used is 75 to 100 mg of Prednisone on Friday and Saturday for 3 months, then 50 mg x 1 month, then 25 mg x 2 weeks, then 12.5 mg x 2 weeks, then 5 mg x 2 weeks, then 2.5 mg x 2 weeks.
- Please refer back to the above website for reference.

Lowering cortisol for bedtime or too high values as in level 1

- Melatonin and growth hormone lowers it
- Phos serine
- Progesterone supports the pathway and is calming for bedtime
- L theanine
- Skull cap
Lowering cortisol for bedtime or too high values as in level 1

- Ashwaganda (regulates it)
- Pregnenolone (because it is being stolen) – must get blood levels tested
- Dhea (if past puberty) – must get blood levels tested
- Calming herbs
- Licorice (decreases cortisol and converts to cortisone for storage)

Other regulators

- Sunlight (especially in the morning), small frequent meals, frequent mineral intake, paleolithic diet, protein
- Avoid milk, grains, sugar and sweets, vinegar, caffeine, alcohol, chronic stress, OCP

Too much

- Emotional, agitated, euphoric, insensitive to suffering, craves and creates stress for others, insomnia, swollen hands, face and feet, petechiae, high blood pressure, atrophic skin

Problem solving

- Lower dose if agitated versus others
- Make sure to have proper protein and anabolic hormone levels (growth hormone, sex hormones in adults)
- Longer acting treatment needed for inconsistent or variable effects with ups and downs
- Synthetic derivatives of cortisol have better activity for inflammatory conditions
- For vertigo or low blood pressure, you may want to add aldosterone or fludrocortisone
- For acute illness or skin rash, acute asthma, increase dose of cortisone for 1-7 days
- For persistent viral/bacterial and yeast infections, make sure to get enough proteins to boost thymus activity for the immune system

Other hormones

- Thyroid
- Pregnenolone
- Progesterone
- Growth hormone
- Melatonin
- Sex hormones for adults

Thyroid

- Labs – TSH, Free T3, Free T4, T3 reuptake, anti-thyroglobulin antibodies, antiperoxidase antibodies.
- If the adrenals are tired, you may develop signs and even labwork of a slow thyroid. The thyroid is trying to compensate for what the adrenals are not doing. You will be more prone to the elevated antibodies when the adrenals are tired. Some people notice negative effects of thyroid treatment if they have not first treated their adrenals (example: heart palpitations).
- If you have thyroid problems, get your adrenals checked and treated.
Thyroid

- Signs and Symptoms: poor memory, constipation, dry skin, fatigue, sometimes compensatory high activity to avoid the fatigue, flat feet, hair loss, short eye brows, cold hands and feet, cold in general.

Thyroid

- Treatment: depending on Lab results:
  - Natural thyroid - comes as armor or nature's thyroid. This is a combo of T3 and T4. It is dosed in grains.
  - Synthetic T4 – most commonly known as Synthroid or Levothyroxine dosed in ug.
  - Synthetic T3, also known as Cytomel.
  - Compounded T4 if preferred.
  - Compounded T3 if needed.
  - Take iodine/iodide, at 12.5 ug a day; eat seaweed. Make sure mineral levels are healthy, such as selenium.
  - Check for masses on the thyroid and do an ultra-sound if needed.
  - Get orthotics if needed.

Pregnenolone

- Pregnenolone is a precursor to Progesterone – many of my patients come to me with low to no pregnenolone.
- It is great for memory and easy to take.
- Available in easy pill or cream, 25 to 100 mg a day.
- Blood level should be checked in everyone.

Low pregnenolone

- Pregnenolone is indicated for MEMORY
- It is the king of all the hormones
- It is the first hormone our fat (cholesterol) turns into.
- Cholesterol testing on many of the kids has proven to show low levels.
- I have tested many low pregnenolone levels on my kids, and they are often low
- Pregnenolone turns into progesterone which is calming, anti-anxiety and aids in sleep.

Progesterone

- Progesterone is a known anti-anxiety, calming, helpful for sleep. Balances estrogen, testosterone.
- It is a precursor to Cortisol and Aldosterone.
- It is also available as pill or cream, 20 to 50 mg a day for calming, as needed. It is bioidentical, it is also available as a synthetic, which I don't recommend.
- It must be gotten from a compounding pharmacy – it is also available as a yam creme at health stores.
- Blood level should be checked in everyone. Saliva levels are not accurate. (days 3 and 19 through 23 in menstruating women should be checked).

Progesterone

- It is NOT a sex hormone. It is a stress hormone.
- Although it is famous in the world of women’s health, kids and men also need it.
- As a side-note, for you women out there, it will help treat and prevent anxiety, endometriosis, fibroids, fibrocystic breast disease, PMS, and miscarriage (if not due to chromosomes).
- For you dads, it will help you sleep if you need it.
### HGH
- **Human Growth Hormone**
- Measured by IGF-1, which is made by the liver, and IGFBP-3.
- If the IGF is low, then a growth hormone stim test with insulin or arginine is recommended to insure diagnosis. However if an IGF-1 runs on the lower side of normal, I will often prescribe growth hormone but it will not be covered by insurance.

### HGH
- **HGH**
- In pediatrics, an MRI of the brain (pituitary gland) and bone growth X-Rays are often necessary to rule out obscure causes of the illness.
- For insurance coverage, an endocrinologist is often necessary.
- Growth hormone is made at night while we sleep and taking it can help with calming and sleep. It lowers cortisol, it increases lean muscle mass, makes the vessels healthier, increases alertness, helps prevent heart disease, helps with tissue restoration. Some studies encourage giving it after a stroke or brain damage.

### Sex Hormones and DHEA
- Estrogens, Estradiol/Estrone levels should be checked by blood and 24 hour urine hormone in women with hormonal issues and menopause. Bioidentical replacement therapy as needed.
- Testosterone, Free testosterone and DHT should be checked in all men 30 and older. Bioidentical replacement therapy as needed.
- DHEA sulfate should be checked by blood in everyone post-puberty and supplemented as appropriate.
- 5 to 20 mg in women, and 20 to 50 in men.
- In a 24 hour urine hormone test, the need for DHEA (especially in pre-menopause), and cortisol levels can be done at cysteine (cystine) and blood such as high DHT or aromatization of testosterone need to also be addressed.
- This is just a quick overview.

### Rest and Relaxation
- I’m not kidding!
- Take your kids outside, give them massages with oil, play relaxing music, use lavender oil, do gentle stretches with them, especially stretching their back.
- Become more relaxed yourself, they feed off your stress.
- Remember these kids are in a million therapies, working harder than the rest of us for simple tasks, and they are depleted. They need downtime.
- Especially if you just started down this road, you may be passionate about potential treatment options. But take your time, make sure to continue to enjoy life, do not ruin your marriage, still pay attention to your husband/wife and have fun with your child.
- This is a difficult diagnosis, and this is a long and hard journey.

### Rest and Relaxation
- Everyone in the world has stress – it’s how you deal with it that matters.
- Don’t do too much, be on time – being late causes an unhealthy adrenaline rush.
- Be like a spiritual warrior, take deep breaths from the bottom of your belly and up through your heart throughout the day yourself, encourage your kids to do the same.
- Stay as present as you can in the moment, so that you and your children can still experience this thing called life.
Rest and Relaxation

- Try to stop worrying, try to pray more, find acceptance, try and see some of the beauty, let go of your anger once you’ve processed it and use all of that energy towards getting your child better.

- Give 10% back to the community or other mothers and more if your child gets cured!

- You will meet many heroes and healers - don’t focus on their imperfections.

- You and your child will become more soulful because of this challenge ahead of you and your family.