by Mark Force, DC

To be well, healthy, robust, and age well, the fundamental processes of your body have to function optimally.

Some of the fundamentals are your body’s ability to carry oxygen to the cells of your body, to control oxidation, to produce energy in your cells, and to detoxify metabolic wastes. These are a few of the fundamentals that have to be in place for you to experience the level of health you deserve.

Of the fundamentals that have to be fulfilled for you to be healthy, balance of your autonomic (unconscious) nervous system is one of the most important. Why? The ANS regulates every part of your body. I know that if I don’t get a person balanced in their ANS, they’re not going to get better. No matter what else I do.

There are two parts to the autonomic nervous system:

• Parasympathetic – It’s like the brakes; slows you down and relaxes you; it controls all your body functions that work in a relaxed state

• Sympathetic – It’s like the gas; speeds you up; it controls everything to do with the “flight or fight” response

Your body needs to normally function in a parasympathetic state because that’s when your body repairs and maintains itself. Your body is anabolic when your nervous system is in a parasympathetic dominant state and catabolic when your nervous system is in a sympathetic dominant state.

If you are anabolic, your body is able to repair itself, you will have good absorption and elimination, you will sleep well and wake rested, you will feel relaxed and energetic, your muscles, bones, joints, hair, and nails will be strong and healthy, your cuts, strains, and injuries will heal readily. Athletes will be able to train intensely and frequently, recover quickly, and respond to exercise rapidly.

If you are catabolic, your body will be unable to heal itself, you will have digestive problems (heartburn, indigestion) and poor elimination, you will sleep fitfully and wake up tired, you will have joint and muscle aches and pains, weak and slow growing hair and nails, muscle atrophy, thin skin and hair, and cuts, strains, and injuries will heal very slowly, if at all. Athletes will be hard gainers, easily overtrain, and have to be very careful to not train too intensely or frequently.
## Comparison Physiology of Parasympathetic vs Sympathetic Nervous Systems

<table>
<thead>
<tr>
<th>Physiology</th>
<th>Parasympathetic</th>
<th>Sympathetic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart rate</td>
<td>Decreases</td>
<td>Increases</td>
</tr>
<tr>
<td>Bronchioles</td>
<td>Constriction</td>
<td>Dilation</td>
</tr>
<tr>
<td>Bronchiole mucus glands</td>
<td>Increases secretions</td>
<td>Decreases secretions</td>
</tr>
<tr>
<td>Lacrimal and salivary glands</td>
<td>Increases secretions</td>
<td>Decreases secretions</td>
</tr>
<tr>
<td>Coronary and pulmonary vessels</td>
<td>No effect</td>
<td>Vasoconstriction (dilation of aorta)</td>
</tr>
<tr>
<td>Urinary Bladder</td>
<td>Relaxation of sphincters</td>
<td>Constriction of sphincters</td>
</tr>
<tr>
<td>Peristalsis</td>
<td>Increases peristalsis and exocrine secretions</td>
<td>Decreases peristalsis and exocrine secretions</td>
</tr>
<tr>
<td>Digestive Enzymes</td>
<td>Increases secretions</td>
<td>Decreases secretions</td>
</tr>
<tr>
<td>Intestinal Sphincters</td>
<td>Relaxation</td>
<td>Constriction</td>
</tr>
<tr>
<td>Iris</td>
<td>Constricts pupil</td>
<td>Dilates pupil</td>
</tr>
<tr>
<td>Sexual Organs</td>
<td>Vasodilation of penis or clitoris</td>
<td>Orgasm and ejaculation</td>
</tr>
<tr>
<td>Sweat glands</td>
<td>No effect</td>
<td>Increases secretions</td>
</tr>
<tr>
<td>Peripheral Circulation</td>
<td>Vasodilation</td>
<td>Vasoconstriction</td>
</tr>
<tr>
<td>Cellular metabolism</td>
<td>No effect</td>
<td>Increases metabolic rate</td>
</tr>
<tr>
<td>Anabolic-Catabolic Ratio</td>
<td>Anabolic</td>
<td>Catabolic</td>
</tr>
<tr>
<td>Liver</td>
<td>No effect</td>
<td>Increases gluconeogenesis</td>
</tr>
<tr>
<td>Kidneys</td>
<td>No effect</td>
<td>Reduced urine output</td>
</tr>
<tr>
<td>Adrenal Medulla</td>
<td>No effect</td>
<td>Stimulates release of norepinephrine and epinephrine</td>
</tr>
<tr>
<td>Adrenal Cortex</td>
<td>No effect</td>
<td>Stimulates release of cortisol</td>
</tr>
</tbody>
</table>
## Signs and Symptoms of Parasympathetic vs Sympathetic Nervous Systems

<table>
<thead>
<tr>
<th>Sign or Symptom</th>
<th>Parasympathetic</th>
<th>Sympathetic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Pressure</td>
<td>Low blood pressure</td>
<td>High blood pressure; may be low, if very chronic</td>
</tr>
<tr>
<td>Heart Rate</td>
<td>Slow pulse</td>
<td>Fast pulse</td>
</tr>
<tr>
<td>Pupils</td>
<td>Constricted</td>
<td>Dilated</td>
</tr>
<tr>
<td>Lacrimal and salivary glands</td>
<td>Tend to have increased saliva</td>
<td>Tend toward dry mouth (may have difficulty swallowing)</td>
</tr>
<tr>
<td>Skin</td>
<td>Warm, dry skin (warm hands and feet)</td>
<td>Cool, moist skin (cold, clammy hands and feet)</td>
</tr>
<tr>
<td>Reflexes</td>
<td>Possible reduced rate and amplitude</td>
<td>Exaggerated rate and amplitude</td>
</tr>
<tr>
<td>Muscles</td>
<td>Relaxed muscles</td>
<td>Excessive muscle tension</td>
</tr>
<tr>
<td>General demeanor</td>
<td>Relaxed</td>
<td>Anxious</td>
</tr>
<tr>
<td>Emotional history</td>
<td>Calm, focused, even disposition (may tend toward laziness or depression)</td>
<td>Mind races; “always has to be doing something”; unable to focus on tasks, nervous exhaustion, fidgets, restless leg syndrome</td>
</tr>
<tr>
<td>Stamina</td>
<td>Low to normal energy with a lot of stamina</td>
<td>Lots of energy but poor stamina</td>
</tr>
<tr>
<td>Digestion</td>
<td>Can digest anything (“cast iron stomach”)</td>
<td>Feel like food “sits in stomach”; get queasy or nauseous easily, “sensitive stomach”</td>
</tr>
<tr>
<td>Elimination</td>
<td>Very regular bowel habits</td>
<td>Tendency to constipation</td>
</tr>
<tr>
<td>Female sexuality</td>
<td>Strong libido; become sexually aroused easily (excessive tone may make orgasm difficult)</td>
<td>Diminished libido and arousal</td>
</tr>
</tbody>
</table>
As you can see, it’s vitally important to your health that you know the balance of your ANS. Your body is meant to operate in primarily a parasympathetic state. Rarely, do people have too much parasympathetic tone; 99% of the time I find people are chronically sick from constantly being in a “fight-or-flight state” (too much sympathetic tone).

When your body is staying in a sympathetic (fight or flight) state for too much of the time, your body will be breaking itself down quicker than it is repairing itself. It’s like having a car that you put gas in but don’t do anything else. Things are going to start falling apart. Some of the terms that describe this state are neurasthenia and nervous exhaustion. Chronic fatigue and fibromyalgia syndromes are typically either primarily caused by or an aggravated by sympathetic dominance of the nervous system.

### Measuring Your Sympathetic-Parasympathetic Balance

So, how do you solve imbalance of the ANS? First assess your status. You can do this by looking through each of the signs and symptoms on the table above and grading each (0 = not applicable, 1 = mild, 2 = moderate, 3 = severe) and adding up the score for each branch (parasympathetic or sympathetic). This can be redone periodically for you to keep score and get a feel for how you’re responding to any strategies you might be using to balance your system.

Another method for assessing your ANS is heart rate variability. It is normal for your heart rate to increase and decrease in a very predictable pattern when your ANS functions well. This phenomenon can be measured with a heart rate variability monitor. Even though they’re not commonly used in clinical settings, heart rate variability monitors have been used extensively in research. Heart rate variability is an excellent tool for measuring sympathetic and parasympathetic tone, response to stress, and adaptive reserve. This is such a reliable overall measure of health that if I were asked to assess someone’s overall health based on one measure I would choose heart rate variability to do so.

In our clinic, *The Elements of Health*, We use use a heart rate variability monitor made by *Nerve Express*. It is an excellent tool, takes only a few minutes to test the ANS, is inexpensive, and can be done periodically to make sure that the work you’re doing is resulting in better tone for your ANS.

<table>
<thead>
<tr>
<th>Male sexuality</th>
<th>Strong libido; strong, easily achieved, and stable erections (possible difficulty achieving orgasm and ejaculation)</th>
<th>Low libido; difficult to achieve and maintain erections (premature ejaculation)</th>
</tr>
</thead>
</table>

As you can see, it’s vitally important to your health that you know the balance of your ANS. Your body is meant to operate in primarily a parasympathetic state. Rarely, do people have too much parasympathetic tone; 99% of the time I find people are chronically sick from constantly being in a “fight-or-flight state” (too much sympathetic tone).
Balancing Your Sympathetic-Parasympathetic Tone

The comprehensive approach to balancing the autonomic nervous system (ANS) can be found in Choosing Health: Dr. Force’s Functional Selfcare Workbook. It is not practical to present all of the tools found there since I’d just be reproducing the book. I will present the most basic of these tools and what you will find below will make profound improvements in your health if you use them.

Therapies
Chiropractic, craniosacral therapy, and acupuncture are very powerful methods to bring balance to the ANS. All of these therapies are brought together through applied kinesiology, making this approach particularly useful for correcting chronic imbalances in the ANS and the resulting illnesses.

Stress Management and Relaxation Techniques
Meditation, visualization techniques, biofeedback, cognitive behavioral therapy, yoga, tai chi, chi gung, and breath work are potent approaches to getting people out of a sympathetic dominant state. Yoga, in particular, makes for excellent cross-training for athletes. I used to advocate all kinds of complicated cross-training formulas for various athletes.

Now I recommend the following amazingly effective and simple formula for cross-training for any and every athlete:

- Compound movement free weight training or calisthenics
- Yoga
- Sport specific training drills

This formula works for any and every athlete and is the most effective training formula for general fitness.

Here I need to present an important truth about weight training. Body building-style training, using isolation (one joint) movements, machine weights, moderate weights, high reps, split routines, forced reps, etc. is only useful for one thing - body building. This style of training is not efficient for strength building or improving athletic performance!

Breathing
Diaphramatic (belly) breathing increases parasympathetic tone and decreases sympathetic tone, resulting in relaxation. Breathing high into the lungs and limiting abdominal movement when breathing increases sympathetic tone and decreases parasympathetic tone, resulting in stress.

Natural diaphramatic breathing improves energy levels and is fundamental to athletic performance.

Most people have been taught that they should suck in their belly and breathe high into
the upper part of their chest. This profoundly limits breathing. By breathing this way, your vital
capacity—the amount of air your lungs can work with, is dramatically limited— and your energy
and endurance suffers. Breathing this way causes imbalances in the
autonomic nervous system, resulting in nervousness, anxiety, and depression while
simultaneously hindering digestion and elimination.

Natural breathing optimizes energy and endurance, creates poise and calm, massages the
organs of the abdomen to improve circulation and tone, and thereby improves digestion and
elimination. Natural breathing also improves and maintains flexibility of the spine, pelvis, and rib
cage through the rhythmic movement of these structures that occurs with full, natural, and
unrestricted breathing. Natural breathing directly improves athletic performance.

Circulation throughout your body is improved with natural breathing, through increased
circulation in the lymphatic system and increased oxygenation of the blood and tissues. Your
body becomes less affected by cold when you breathe fully, and your hands and feet will feel
warmer. Because of improved oxygenation and circulation to your brain, your thinking will be
clearer and faster and your spirits will improve.

So what is natural breathing? It is the breathing of a child before he or she has been
taught differently. It is full and unrestricted and involves movement of your abdomen
(belly), pelvis, spine, and ribcage. With this inclusive movement of your body with each
breath, your lungs are free to expand fully and function optimally.

**Inhalation**
- Inhale through your nostrils (nose).
- Let your abdomen (belly) expand.
- Let your ribs expand and your chest rise slightly.
- Let your pelvis rock forward and downward.
- Let the floor of your pelvis relax and expand slightly.

**Exhalation**
- Exhale through your nostrils.
- Actively contract your abdomen, including the muscles in the sides of your abdomen.
- Contract your ribcage; even contract the muscles between your ribs.
- Your pelvis rocks backward and upward.
- Contract the floor of your pelvis.

Initially, practice standing with your feet shoulder-width apart and your knees slightly
bent. Place your hands with your index and middle fingers meeting on the lower part of
your abdomen just below your umbilicus (belly-button). Follow the directions as above,
focusing on the rocking movement of your pelvis and the expansion of your abdomen.

When done properly, you will feel a slight stretching sensation in your sacrum (back of
your pelvis).

This represents natural breathing, which will dramatically improve your health. Setting
aside 10 minutes once or twice a day to focus on the process will soon make this way of
breathing feel quite natural to you.
Here are some tips:

- When breathing in, imagine the air is coming in through your umbilicus (belly-button).
- Take note of your shoulders—if you’re using your diaphragm fully and breathing efficiently, your shoulders will stay level.
- If you’re having trouble getting a feel for breathing into your abdomen, practice lying on your back. Put a book or some other object on your belly and practice pushing it up toward the ceiling when you breathe in.
- You may feel a little dizzy because your brain isn’t used to the increased oxygen.
- You may experience a vague nausea when first starting this practice. It represents a shift and increase in your level of energy.

**Meditation**

With our hectic lifestyles, our need for true relaxation is great. Meditation is profoundly useful to create relaxation. Whatever preconceptions you may have about meditation, Dr. Herbert Benson’s research on meditation gives great insight into how our minds control our physiology.

Dr. Benson, a cardiologist and founder of The Mind Body Medical Institute, conducted research into the results of meditation in the 1970s. He was particularly interested in the purported cardiovascular benefits of meditation. What Dr. Benson found exceeded his expectations; in addition to cardiovascular, he found hormonal, biochemical, and emotional benefits as well. Dr. Benson's findings are distilled into his clear and insightful book, The Relaxation Response.

He concluded that meditation need not be a complicated or esoteric technique to work. The only requirement is a constant point of mental focus in a quiet and relaxed setting. Philosophy or religious belief is definitely not necessary to create the relaxation response.

Below are two very simple approaches to meditation. Meditation produces parasympathetic predominant (relaxed states) based on the principle of conditioned response (remember Pavlov’s dog?). As you practice meditation regularly, you reinforce a parasympathetic predominant state and over time your nervous system becomes conditioned to operate from this state by default. Practicing either of the meditation techniques regularly (one to two times a day for a minimum of ten minutes) below will train your system to operate from primarily a parasympathetic state and improve your anabolic-catabolic balance.

**Basic Meditation Technique**

- Sit in a comfortable position in a quiet place.
- Close your eyes and pay attention to your diaphragmatic and natural breathing
- Focus your attention on the movement of your breath: the air coming in and out, the filling and emptying of your lungs, the movement of your ribcage.
- Each time your attention drifts, come back to the focus on your breathing.
- Continue for ten to twenty minutes and do this once or (better) twice a day.
- Repetition conditions you to be in a consistently relaxed state.

**Alternate Nostril Breathing**

- Use the basic principles as from the Basic Meditation.
• Block one nostril by pushing from the side with your thumb or fingers.
• Breathe slowly and deeply pausing briefly at the end.
• Breathe out through the opposite nostril and pause briefly at the end.
• Repeat this pattern, breathing in through the right nostril and out through the left, then in through the left nostril and out through the right nostril.
• Focus on your breathing, coming back to that focus each time your mind wanders.
• Pause briefly at the end of inhalation and exhalation.

Biofeedback
Often we have become so ingrained to being stressed all the time that we don’t even realize that we may be in a constantly stressed state. Does a fish know it’s swimming in water? Biofeedback provides objective information about the state of your nervous system and, thereby, allows you a way to measure the effectiveness of any technique you use for relaxation. In this way, biofeedback can help you become more skilled more quickly than when using relaxation techniques alone.

The Heartmath Institute makes a very effective handheld biofeedback device called EM Wave. It is the single most efficient and user-friendly biofeedback device I have ever used and recommend taking a look at it if you don’t experience relaxation from other techniques. “The Heartmath Solution” (Doc Lew Childre) is an excellent book for presenting the underlying physiology of stress, the ANS, and anabolic-catabolic balance. It also lays out some useful and easy to use relaxation techniques.

Nutrition
Trace mineral and vitamin imbalances or deficiencies also affect the autonomic tone. Herbs can also be used to modify or balance the ANS.

Zinc
Most people that are sympathetic dominant have too much copper and too little zinc in their systems. Zinc deficiency can be objectively determined through using the zinc taste test and/or interpreting lab test results as presented in the Choosing Health workbook. There is a common genetic predisposition to utilizing zinc inefficiently that can result in the need to supplement zinc despite a healthy diet. I test virtually everyone who comes in to my office for zinc deficiency and find that the majority are deficient.

Without enough zinc, you can’t make the enzymes needed to digest the food you eat, you can’t make neurotransmitters like serotonin, dopamine, and gamma-amino butyric acid (GABA), your liver can’t make the enzymes it needs to function, you can’t make hormones (including male and female hormones), and the cells of your body can’t divide efficiently so your body can repair and regenerate itself.

Common signs of zinc deficiency are poor immune function, loss of sense of taste or smell, wounds that heal slowly, acne, reduced sex drive, prostate hypertrophy, female and male hormone problems, depression, agitation, and anxiety, chronic yeast infections, macular degeneration, hair loss, dandruff, premature graying of the hair, and white spots on the fingernails.
This deficiency is common. Foods grown commercially are usually lacking zinc due to depletion of soils caused by failure to till under soils, rotate crops, or use natural fertilizers. Zinc is further lost when foods are processed or refined.

Many people need far more zinc than the recommended daily allowance (RDA) of 15mg, with a great number of my patients finding their health improves when using as much as 150mg a day on a regular basis. A need for lots of zinc seems to be genetically determined or, said another way, to run in the family. My experience has been that if the daughter I’m working with has chronic depression due to low serotonin levels resulting from a zinc need, the mom’s depression will likely be alleviated with zinc, too.

Luckily, zinc is one of the few nutrients you can test for without needing an expensive blood test. The Zinc Taste Test is simple, quick, inexpensive, and accurate. You can order the solution (Aqueous Zinc) for doing the test from The Elements of Health, or DSD International (800-232-3183 / 602-944-0104). To do the test, hold two teaspoons of the solution in your mouth for thirty seconds. The taste of the solution will be very strong if your body has sufficient zinc levels. If you’re deficient in zinc, you will either taste nothing, or the taste will be very faint.

Don’t take large doses of zinc over a long period of time without balancing it with some iron and copper. If you’re using high doses (above 50 mg) of zinc for more than two months, take a multiple vitamin that includes iron and copper.

Deficiencies of iron and copper are usually due to poor absorption, not because of inadequate intake. The results of too little zinc and too much iron and copper are nervousness, anxiety, inability to concentrate, fatigue, heart disease, and menstrual imbalances in women.

Taking a multiple-vitamin and -mineral formula without iron and copper helps optimize the absorption of zinc that is present and restores the balance between iron, copper, and zinc.

A very effective iron/copper-free multiple vitamin-mineral supplement is Iron and Copper Free Bio-Multiplus (BRC).

The zinc supplement I prefer is ZN-Zyme Forte (BRC). ZN-Zyme Forte has 25 mg of zinc per tablet. Many times a very specific form of zinc is needed to resolve the deficiency and experimentation over time supplementing with various forms of zinc, using the zinc taste test as a measure of your results, may be necessary.

**Lithium**

Lithium is actually an essential trace mineral. Every body needs it to function properly. The mineral has many functions and a complete discussion is beyond the scope of this article. For our purposes here, lithium controls the set point of stimulation a nerve needs before it “fires” (neuronal cell membrane depolarization threshold - whew!). With too little lithium in your system, you will feel constantly overstimulated and your ANS will be sympathetic dominant.
Lithium deficiency is extremely common due to soil depletion and food refining. Some people seem to be very sensitive to this deficiency due to genetic predisposition. People affected by this deficiency experience agitation and anxiety and their minds race. Often their minds will race while they lay awake at night. Fear of crowds and busy, crowded places is common as is what I call the “Walmart syndrome,” where people feel overwhelmed by the complex auditory and visual stimulation found in many stores.

Supplementing the correct and natural form of lithium resolves this type of depression fairly quickly and this nutritional form of lithium is not related to lithium carbonate, the prescription form of lithium used to treat people with bipolar disorder (manic depression).

The form of lithium I use in practice is LI-zyme forte (BRC). I will typically recommend 1-2 tablets 2-3 times a day for a couple of weeks and then bring the dosage down to 1-2 tabs at night. Taking the lithium at night helps lower cortisol levels at night so that sleep quality improves and your body is in a naturally anabolic (repairing and regenerative) state during the night and early morning.

Typically, you will feel tired when first taking lithium. This is not a bad sign. It is actually a positive response and indicates that your ANS has switched to a parasympathetic predominant state and the underlying fatigue and depletion resulting from being in a chronic sympathetic predominant state will become apparent.

Welcome this fatigue, if you experience it! After a few days to even a couple of weeks in very severe cases of exhaustion, your energy will build and be much deeper and natural.

You will have a very strong, enduring and relaxed energy that will be different than the nervous and over-stimulated kind of energy you probably had before

**Herbs**

Since I work with so many people who suffer from their health problems primarily because of imbalances of the ANS, I needed a very straightforward remedy that is simple and gets immediate results. I know that if I get the ANS balanced in people that are chronically ill, they have a good chance to heal.

There are three herbs, in particular, that I like to use together and find consistently effective. All three herbs are traditionally used for nervous exhaustion and all of them contain compounds that have been researched to improve parasympathetic tone, thereby bringing the sympathetic and parasympathetic systems into balance.

These herbs are damiana, oats, and kava. You can get these herbs from the health food store. Get tinctures of each herb and mix them together in equal parts in a dropper bottle. I usually have people take two droppers full in water three times a day for six weeks. Then take the mixture after that as needed.

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1 Recent concerns about moderate use of Kava root and liver damage have been found to be unsubstantiated upon closer inspection.
If you don’t want to have to find and mix these individual herbs together, you can order Parasympa from The Elements of Health. I formulated this combination of oats, kava, and damiana for use in my clinic. Parasympa is also available from Dragon River Herbals (1-800-813-2118).

Parasympa is an herbal tincture (liquid extract) made of damiana, kava, and oat seed. The oat seed, collected when still green, releases a rich milky liquid when squeezed between your fingers. These herbs are traditionally used to help people with nervous exhaustion, or, as it’s referred to these days, chronic fatigue syndrome. Parasympa increases the tone of the parasympathetic nervous system. It helps people relax. I consider it the first stage of getting someone well when they are unable to relax or suffer from chronic stress.

It’s interesting to note that these herbs are reputed to be aphrodisiacs. Sexual response is controlled mostly by the Parasympathetic nervous system. If you’re in a sympathetic dominant state, it’s very difficult to get in the mood sexually. If your body is stuck in a fight-or-flight response, it doesn’t consider sex to be a high priority. It’s not important for immediate survival. The reason your body can’t respond is because the circuit for getting turned on is shut off. Getting your autonomic nervous system balanced opens up that circuit and your body can respond sexually.

Expect to feel tired when you first start this remedy. That’s actually a good sign and means the herbs are working. Give yourself a chance to get more rest. After a few days (usually 3-14 days) your energy will return and you will feel much better. You must let yourself go through this initial phase. It is required for you to get well. You will know that you’re on the right track because after a few days you will start to feel more rested when you wake up in the morning.

For those people under ongoing stress or having a genetic tendency to being sympathetic dominant do well by taking these herbs on a regular basis. The dosage is best regulated in the long run based on how you feel. You will ideally feel relaxed and more energetic. You will also be able to handle stressful situations more easily.

Any time there has been severe and/or chronic stress in your life and you experience fatigue or even exhaustion, take Parasympa. It is the most consistently useful remedy for stress I have ever used. I usually have people take two droppers-full in water three times a day for six weeks. Then take Parasympa afterwards as needed.

**Cortisol, Stress, ANS, and Anabolic Hormones**

Chronic stress, whether emotional or physical, and sympathetic predominance of your nervous system decreases anabolic hormones and anabolic processes and increases cortisol, the most potent anabolic hormone in your body.

Low cortisol allows your body to repair and regenerate itself while you’re asleep. If cortisol remains high, you may be able to sleep, but your body doesn’t recharge or rebuild. If that pattern continues, things will eventually start to break down.
When the body is able to rebuild during sleep, cortisol will be high upon waking. You will feel recharged and ready to take on the world. If you wake up tired, a low morning cortisol probably has you dragging out of bed.

Under stress, cortisol levels can run very high. Abnormal circadian rhythm normally will not develop until stress is prolonged—usually over years—but it can also occur in just a few months, especially if it is severe and constant.

When the cortisol rhythm stays out of balance, more serious problems can appear, such as arthritis, allergies, asthma, colitis, ulcers, recurrent and prolonged infections, auto-immune diseases, and degeneration of the nervous system.

<table>
<thead>
<tr>
<th>System</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production of Energy</td>
<td>Blood sugar levels and the ability of your cells to make energy are compromised. Insulin resistance results in excess body fat, diabetes, and heart disease.</td>
</tr>
<tr>
<td>Sleep</td>
<td>The rapid eye movement stage (REM) of the sleep cycle is interrupted by high cortisol values at night. Since REM is the most regenerative stage of sleep, fatigue, depression, and lack of mental acuity can result.</td>
</tr>
<tr>
<td>Brain</td>
<td>Damage to neurons and receptors in your brain. This probably accounts for the problems with depression, learning, and memory observed in people who are chronically stressed.</td>
</tr>
<tr>
<td>Muscle and Connective Tissues</td>
<td>Reduced tissue repair, coupled with an increased rate of tissue breakdown (a normal part of body metabolism), leads to an increased risk for muscle and joint injury. The lowered rate of repair and increased breakdown prevents normal repair of injuries, even everyday wear-and-tear, and leads to chronic injuries and chronic pain.</td>
</tr>
<tr>
<td>(Tendons, ligaments, and joints)</td>
<td></td>
</tr>
<tr>
<td>Bone</td>
<td>If the night cortisol is elevated, your bones do not rebuild during sleep and you are more prone to osteoporosis.</td>
</tr>
<tr>
<td>Immune System</td>
<td>Decreased production of white blood cells; decreased immune response in the linings of the lungs, throat, kidneys, bladder, and intestinal tract. Lowered resistance to infection and increased risk for allergies.</td>
</tr>
<tr>
<td>Skin Regeneration</td>
<td>Thin, dry (even crepe-paper-like) skin. Human skin regenerates mostly during the night while you’re asleep. Moist, resilient skin is a sign of healthy cortisol rhythm.</td>
</tr>
</tbody>
</table>
Sympathetic Dominance, Cortisol Steal, Testosterone, & Insulin Resistance

Sympathetic dominance results in an increased cortisol level that causes all of these problems in the table above and a phenomenon called “cortisol steal” where DHEA is used up producing cortisol. When this happens DHEA is unavailable for production of testosterone resulting in lowered testosterone levels.

High cortisol also results in insulin resistance where insulin is unable to exert it’s anabolic effect on repair, regeneration, and building up of body tissues (cells, organs, muscles, connective tissue, bone, etc.). How important is this effect? Insulin is the most powerful anabolic hormone in your body; it is significantly more powerful than testosterone!

So, lowering cortisol and improving insulin sensitivity is incredibly important to your health, overall, and vital to any athlete.

How To Lower Cortisol and Increase Insulin Sensitivity

- Eat whole, unrefined foods
- Eat a low carbohydrate diet
- Eat regularly (every 2 hours preferably)
- Exercise 30 minutes or less each workout session
- Increase exercise intensity

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2 See Foundation diet (page 42) of Choosing Health workbook.
3 See Insulin Resistance (page 154) of Choosing Health workbook.
4 Decreases cortisol levels.
5 Testosterone levels decrease with workouts longer than 30 minutes. Shorter and more intense workouts optimize testosterone levels.
6 Optimizes insulin sensitivity and testosterone levels.
- Exercise one to three times a day
- Fast regularly
- Sleep a minimum of seven hours nightly
- Use relaxation techniques
- Optimize zinc levels
- Optimize lithium levels

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7 Optimizes insulin sensitivity and testosterone levels.

8 Fasting one day a week on water optimizes insulin sensitivity.

9 Anabolic repair, regeneration, and building up of body tissues occurs during sleep and rest.