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24 Tips To Improve HYPOTHALAMIC-PITUITARY- ADRENAL (HPA) AXIS HEALTH

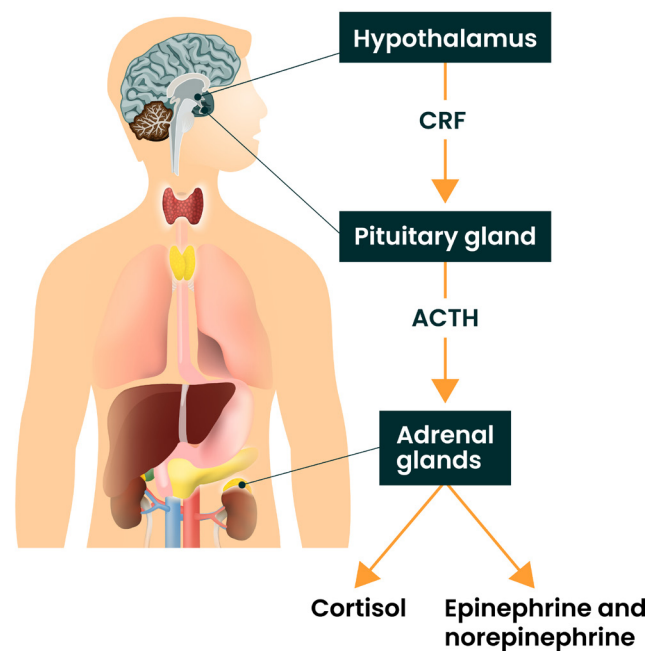
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We've all experienced stress. That's because stress can come from so many places. Stress can come from work, finances and relationships, but stress can also come from inside the body, from illnesses or inflammation. Stress can be acute (e.g., in response to an immediate threat) or chronic (e.g., longer-term stress that occurs over months or years). Acute stress is normal, and can even be healthy. But chronic stress tends to be bad for our health can even lead to disease.

Stressful events initiate activation of the Hypothalamic-Pituitary-Adrenal (HPA) axis (which includes the adrenal glands) [1]. The HPA axis first initiates release of corticotropin-releasing factor (CRF) from the hypothalamus. This triggers the release of adrenocorticotropic hormone (ACTH) from the pituitary gland. ACTH then triggers the release of cortisol, as well as other stress hormones like adrenalin, from the adrenal cortex. Cortisol then attempts to stop the stress response by telling the hypothalamus and pituitary gland to shut down the release of both CRF and ACTH [2]. Thus, the HPA axis is set up to help us quickly respond to stress and then return to homeostasis—or our resting, non-stressed state.



When the HPA axis is activated we may at first feel energized. That's because cortisol actually serves many important functions. These include giving us the energy we need to function, the strength we need to escape predators, and even the bodily energy we need to fight disease and inflammation [1].

This process can start to go awry when our adrenal glands (or more precisely our HPA axis) is activated too much. The excess stress hormones in our bodies can lead us to feel wired or “strung out.” Indeed, our bodies were designed for short periods of stress. The HPA axis was activated when we needed a burst of energy to chase after our next meal or run away to avoid becoming a meal of something else. But now, in our always-on, junk-food-eating, chronic-illness-producing world, the HPA axis is often activated more often than our bodies can really handle.

Some people believe that these high-stress situations—situations that are increasingly common in the modern world—can result in “adrenal fatigue,” adrenal insufficiency or adrenal burnout. Broadly speaking,

this is when we go from feeling wired to feeling drained, lethargic or exhausted. This condition can include unexplained fatigue, weakness, listlessness, weight loss, joint pain, decreased libido, headache and hair loss [1, 3].

Despite anecdotal evidence from people experiencing “adrenal fatigue,” stress- and illness-triggered types of adrenal dysfunction are hotly debated among health practitioners. Some medical professionals believe “adrenal fatigue” doesn’t even exist [4], while other health professionals insist that this condition does exist and it is just poorly understood.

If we look at the research, the disagreement about the existence of adrenal fatigue seems to be driven by a series of misunderstandings in the health community. For example, some people object to the name “adrenal fatigue” because the condition may better be described as HPA axis dysfunction (as the adrenals may not be fatigued, per se) [5]. Other professionals object to the cause of “adrenal fatigue” because evidence does not support the idea that excessive stress weakens the adrenals [6]. Although these may be good arguments for changing the name of the condition from “adrenal fatigue” to “HPA axis fatigue or dysfunction,” they are not compelling arguments that the condition doesn’t exist.

Another thing to consider is that the disagreement about the existence of adrenal fatigue may simply come down to problems with measuring and diagnosing it [1, 7]. Adrenal fatigue—or adrenal insufficiency as it is commonly called in the research—is mostly assessed by measuring people’s cortisol levels. But measuring cortisol can be difficult because cortisol fluctuates through the day and in response to all sorts of stress. This makes it difficult to know what healthy adrenal function actually is.

Moreover, there are multiple different ways to measure cortisol, each of which means something slightly different. For example, one study showed 40% of critically ill patients, who were under extreme amounts of stress, had normally stimulated adrenal function but had low serum total cortisol levels [1]. Do these patients have adrenal dysfunction? Well, that all depends on how we define adrenal dysfunction.

Another challenge with identifying adrenal dysfunction arises because the potential causes of adrenal dysfunction—stress and illness—also cause other bodily changes that make adrenal dysfunction harder to identify. For example, some illnesses can cause tissue-specific resistance to cortisol (possibly driven by low levels of serum albumin <2.5 gm/dl) [1]. So a person could conceivably experience so much stress that the body does not use cortisol effectively. We may currently call this syndrome “adrenal fatigue” when perhaps a better label is “cortisol tolerance” or “HPA axis dysfunction”. But the key thing to keep in mind is that large amounts of stress (often from illness) can indeed impact how cortisol moves through our bodies.

Another potential explanation for the confusion about adrenal fatigue involves the idea of “relative” adrenal insufficiency. That is, it may appear that a person has a normal levels of cortisol, but if it’s not enough cortisol to combat their inflammation, they may still technically have lower cortisol than is needed given their particular illness or situation [1, 8].

Overall, this research shows that we do not yet fully understand the exact mechanisms involved in adrenal or HPA axis dysfunction. However, there is compelling evidence that excessive stress contributes to greater HPA axis activity initially, and then dysfunctional HPA activity over time. For example, some people get adrenal insufficiency when a disease progresses (e.g., AIDS) or after discontinuing steroid use [3, 9].

What happens between normal adrenal functioning and extreme adrenal insufficiency? Well, perhaps it’s the condition we currently call adrenal fatigue.

Although the research in this area is not comprehensive, the HPA axis (which includes the adrenals) does appear to be an important contributor to our overall health. For these reasons, improving our HPA axis functioning seems like a worthwhile endeavor, especially if we have a high stress lifestyle or illnesses.

To sidestep this debate and provide the best information possible, we’ll focus primarily on the HPA axis in this eBook. We’ll talk about how to make meaningful changes to reduce stress reactivity in your life and explore ways to improve HPA axis health. Here are 24 tips to try.



1. GET BETTER SLEEP

Sleep deprivation can contribute to greater HPA axis activation [10]. In addition, waking up in the middle of the night can lead the body to release cortisol. This suggests that getting decent sleep is important for healthy HPA axis functioning. If you're having difficulty sleeping, be sure to block out all blue light 1-2 hours before bed. You can opt to turn off TVs, phones and computers, get light blocking curtains to block out all light, wear blue-light blocking glasses [11] or download f.lux, a computer program that makes the color of your computers' display adapt to the time of day. Or, you could swap out the bulb in your bedside lamp with a red bulb, which has been shown to improve sleep and next day performance [12]. Keeping the room cool, between 60-67 degrees, may also be helpful.



2. LIMIT CAFFEINE

Caffeine gives us energy that we may feel like we really need if we're already having HPA axis dysfunction. But caffeine activates our HPA axis, putting even more load on it [13]. So take a break from coffee, caffeinated tea (like green and black teas), energy drinks and chocolate to give your body a break from caffeine. Caffeine-free alternatives include herbal teas, water, golden milk and herbal coffees like Teechino.

3. DO LOW-INTENSITY EXERCISE

We know exercise is good for health, but if our goal is to manage HPA axis dysfunction, high-intensity exercise can actually do more harm than good. Because exercise increases the demand for energy and activates stress-related systems in the body, it actually increases levels of cortisol [14, 15].

Although high-intensity exercise increases cortisol, low intensity exercises (like walking, swimming, or light yoga) can lower cortisol [15]. So stick to lower-intensity activities when trying to improve HPA axis function.



4. EAT ENOUGH CALORIES

Research suggests that calorie restriction can be good for many aspects of our health [16]. But one notable exception is when we have HPA axis dysfunction. Calorie restriction increases HPA activation (because not having enough food is stressful for the body) [17]. So if you're aiming to reduce stress or manage HPA axis dysfunction, now is not a good time for a calorie-restricted diet. Instead focus on eating enough high-quality food to maintain your body weight.



5. SUPPLEMENT WITH ADAPTOGENS



Research has found adaptogens—or plants that help the body resist stress—are indeed an effective way to moderate the cortisol response [18]. For example in one study, rabbits given adaptogens like rhodiola and schizandra barely had any cortisol rise at all in response to stress [19]. The research further suggests that adaptogens affect several mechanisms associated with the HPA axis [18]. So if you feel like you're hyper-reactive to stress, adaptogens may be good supplements for you.

ADAPTOGENS TO TRY [20]:

- Ashwaganda
- Holy Basil
- Eleuthero
- Jiaogulan
- Rhodiola
- Amla
- Ginseng

6. MAINTAIN ADEQUATE LEVELS OF POTASSIUM (BUT NOT TOO MUCH)



It takes considerable energy for our bodies to maintain HPA axis activity for long periods of time. All sorts of things in our bodies can get out of whack if we're not careful. In particular, ensuring proper electrolyte balance appears to be relevant to HPA axis function. One study found that a low-sodium, high-potassium diet improved mood [21]. Of course it's important to keep in mind balance, as too much potassium can be deadly.

GOOD FOOD SOURCES FOR POTASSIUM INCLUDE:

- Coconut water
- Bananas
- Melon
- Cooked spinach

7. MAINTAIN ADEQUATE LEVELS OF MAGNESIUM

Another key electrolyte for HPA axis function is magnesium. Magnesium has been shown to modulate the HPA axis, with magnesium deficiency leading to greater anxiety behaviors [22]. That's why it's key to make sure your diet includes optimal amounts of magnesium.

GOOD FOOD SOURCES FOR MAGNESIUM INCLUDE:

- Leafy greens
- Legumes
- Nuts
- Seeds (especially pumpkin seeds)



8. MAINTAIN ADEQUATE LEVELS OF VITAMIN A

Research has shown that vitamin A deficiency can increase HPA axis activity. More specifically, vitamin A deficiency can both heighten cortisol response and decreased the expression of cortisol receptors [23]. That means lower vitamin A can increase stress and decrease the body's ability to reduce that stress. So be sure to get adequate vitamin A in your diet. Good food sources for vitamin A include:

- Beef liver
- Sweet potato
- Spinach
- Carrots
- Dairy
- Fish



9. MAKE SURE TO GET OTHER KEY VITAMINS

A few other vitamins appear to contribute to HPA axis function. These include vitamin E, which may lower cortisol secretion in response to stress [24], vitamin D3, which may suppress HPA axis activity [25], vitamin B6, which may lower stress, and vitamin C, which may reduce anxiety and blood pressure in response to stress [26].



10. TRY MEDITATING

Mindfulness meditation may be an effective, affordable and safe way to decrease HPA axis activity. Multiple studies have shown that meditation can decrease cortisol in response to stressful situations [27, 28]. This suggests that taking some time for ourselves to quiet the mind with meditative practices is a worthwhile endeavor when it comes to managing HPA axis dysfunction. You can try out meditation with apps like Calm, Headspace or Insight Timer.

11. AVOID ENDOCRINE DISRUPTERS

Endocrine disrupting chemicals like heavy metals, bisphenol A (BPA; a plastics additive), and others may have negative effects on the HPA axis. More specifically, evidence suggests that heavy metal contamination may lead to chronic stimulation of ACTH and affect adrenal tissue. For example, when fish from metal contaminated water were exposed to stress, they showed delayed cortisol secretion. These fish could also not maintain elevated levels of ACTH [29]. Together these findings suggest heavy metals can cause HPA axis dysfunction.

12. REDUCE INFLAMMATION IN THE BODY

The HPA axis activates in response to inflammation. That means one way to reduce HPA axis activation is to reduce inflammation in the body. Eating anti-inflammatory foods may be helpful [30].

ANTI-INFLAMMATORY FOODS INCLUDE:

- Berries
- Fatty fish
- Broccoli
- Avocados
- Green tea
- Many other veggies and fruits



13. DON'T EAT JUNK FOOD

We may turn to junk food when we're stressed because it can make us feel better in the short term [2]. But eating junk food is exactly what leads to things like diabetes, cardiovascular disease and higher levels of inflammation, which can activate the HPA axis further. So instead of eating junk food when you're stressed, opt for snacks like fruits and veggies that are not only healthy, but also prevent your HPA axis from having to respond to unhealthy foods, toxins or inflammation in your body.

14. CUT OUT SUGAR

Like junk food, some of us may use sugar as an unhealthy way to manage stress [31, 32]. But avoiding sugar is key to reducing our stress. Sugar increases inflammation [33] so it can exacerbate HPA axis issues in the longer-term. A healthier approach for more long-lasting relief with fewer health consequences is to eat healthy carbohydrates like whole fruits and veggies throughout the day and cope with stress using other healthy lifestyle strategies like exercise or meditation.



15. GET HIGH-QUALITY PROTEIN

Research suggests that binding proteins (albumins) are related to poor uptake of cortisol in the body [1]. Remember, your body needs to uptake cortisol to turn off the HPA axis and stress response. So ensuring dietary intake of albumin-containing foods may be potentially beneficial. These include high-quality (grass fed, antibiotic-free) beef, chicken, cheese, eggs, fish, yogurt, protein shakes, meat substitutes, tofu and other high-protein foods. But be careful to avoid processed meat, which can increase inflammation [34].



16. AVOID TRANS FATS

Trans fats are likely the most problematic fats for health. They are thought to greatly contribute to inflammation [35, 36], which can put pressure on the HPA axis. That's why avoiding trans fats (in margarine, hydrogenated oils, and many processed foods) may be helpful for improving HPA axis function.

17. CONSUME HEALTHY OILS

Polyunsaturated fatty acids, which are present in vegetable oils like soybean oil, may also contribute to increase inflammation. Researchers speculate that this is because of their high-level of omega-6 fatty acids [37]. So it seems healthier to consume fruit oils like olive oil, coconut oil, avocado oil and macadamia nut oil when trying to promote HPA axis health.



18. DON'T SMOKE

We already know that smoking is bad for our health and can contribute to lung cancer and other illnesses. Still, many people smoke as a means of stress reduction. Researchers suggest that smoking affects the HPA axis in ways that may decrease stress in the short-term, but despite giving rise to feelings of calm, cigarettes can actually contribute to increased stress hormones [2].

19. LIMIT ALCOHOL

Alcohol stimulates dopamine and endorphin release, generating feelings of relaxation [2]. But just like junk food and smoking, the delayed negative effects alcohol have on our health can be problematic. So try to limit alcohol consumption as much as possible.

20. TRY HUMMING OR CHANTING

Activation of the vagal nerve can help down regulate HPA axis activity. So engaging in behaviors that activate and strengthen the vagal nerve may be beneficial for HPA axis dysfunction. For instance, “OM” chanting, which involves a low vibration sound, can strengthen the vagal nerve. Gargeling and singing have also been shown to activate the vagal nerve. Slow breathing can also strengthen the vagal nerve [38]. For example, you can try the 4-7-8 breathing method. This involves inhaling for a count of 4, holding for a count of 7, and exhaling for a count of 8. Any of the techniques may be useful in improving HPA axis function.

21. STIMULATE YOUR GAG REFLEX

Interestingly, one study shows that the gag reflex can actually activate the vagal nerve [39]. Doing this over time may strengthen the vagal nerve and help to help to deactivate the HPA axis. Some suggest that we can activate the gag reflex with a tongue depressor to stimulate this process [38]. Although this can be an unpleasant experience for most people, it may be a potentially beneficial strategy for down-regulating stress.



22. CONSUME LEMON BALM (ALSO CALLED MELISSA)

One more herbal remedy to try is lemon balm (also referred to as Melissa). Melissa has been shown to reduce multiple aspects of stress including fatigue, insomnia, eating problems and emotional instability [40]. So if you're looking for herbs to help you manage HPA axis dysfunction, this may be a good one to try.

23. CONSUME THEANINE

The amino acids theanine, glutamine and arginine appear to have positive impacts on health in the context of stress. Theanine, in particular, appears to be protective against HPA axis hyperactivity and health issues that result from HPA axis hyperactivity [41, 42]. Theanine can be taken as a supplement or by the easy addition of theanine containing foods in the diet.

THEANINE FOOD SOURCES INCLUDE [43]:

- Green Tea
- White tea
- Oolong tea
- Black tea



24. DO WHATEVER YOU NEED TO DO TO LOWER STRESS

Broadly, ensuring healthy HPA axis function requires managing stress—both stress from external social factors and stress on your body. That's why it's important to engage in stress relief when addressing adrenal or HPA axis dysfunction. Do things that calm you, like getting massages, spending time with friends, listening to calm music or drinking warm tea. These stress-reduction strategies can be valuable tools to add to your HPA axis healing toolkit.



SUMMARY

HPA axis dysfunction and adrenal insufficiency can be tough to manage. The more your stress systems go awry, the greater stress it places on your body. This can create an upward spiral that continues to increase stress reactivity over time. That's why it's key to implement the strategies discussed here to stop the cycle and support your HPA axis.

**HERE'S
TO HEALTH.**



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