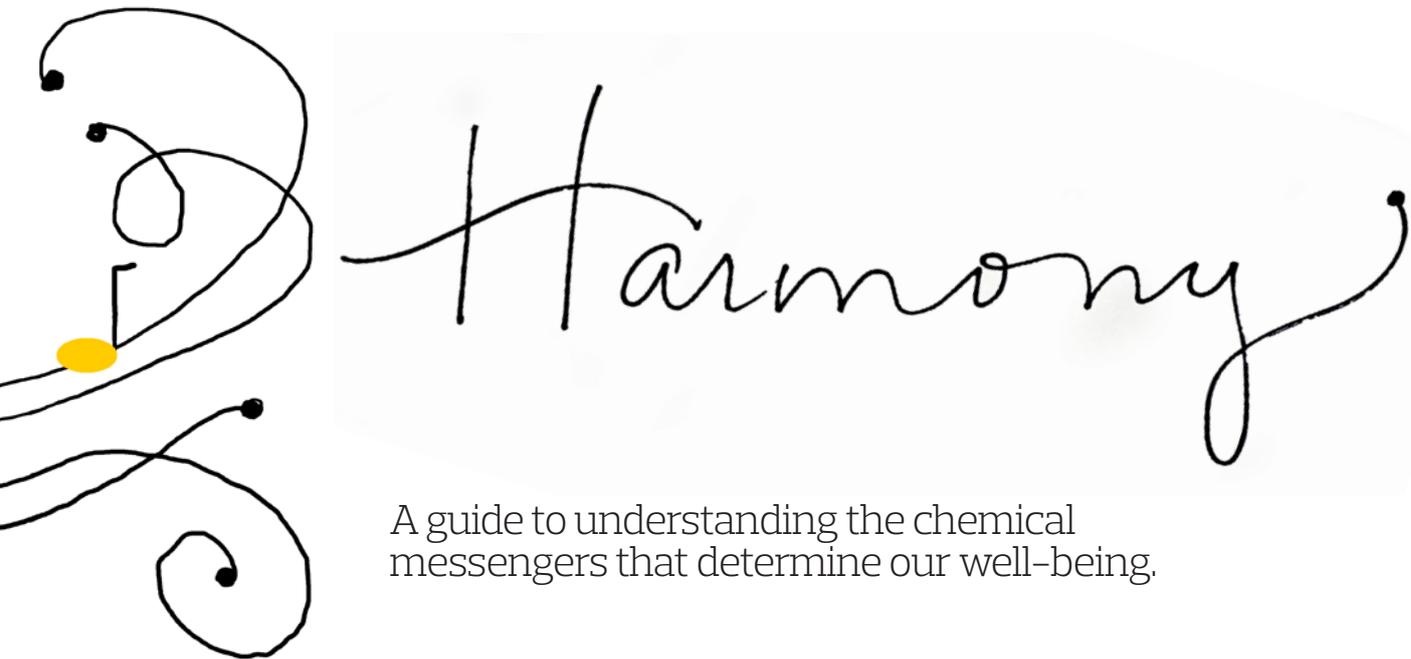

Harmonia



BY LAINE BERGESON BECCO, FMCHC

ILLUSTRATIONS: JAMES YANG



Harmony

A guide to understanding the chemical messengers that determine our well-being.

When we think about hormones — if we think of them at all — it's usually during times of upheaval, like adolescence or menopause. Or when we're faced with maddening conditions such as infertility or sexual dysfunction.

But hormones flow through the bloodstream all the time, in men and women, young and old. These chemical messengers send constant signals to nearly every cell in the body, regulating our weight, our sleep, and our ability to concentrate.

And when they're out of whack, so are we.

Most people have no idea that hormonal imbalances may be making them feel crummy, says functional physician Sara Gottfried, MD, coauthor of *The Hormone Cure*. She sees these imbalances — and their myriad health-stealing symptoms — as a widespread, but largely silent, problem.

Insulin, for instance, is one of the body's master hormones, and up to 35 percent of the U.S. population is

insulin resistant (some estimates put that number as high as 50 percent). Insulin resistance can lead to type 2 diabetes, and it's also been linked to obesity, cardiovascular disease, and cancer.

There's more: Levels of cortisol, the body's key stress hormone, are too high in half of Americans with depression — as well as pretty much anyone dealing with high levels of stress. Twenty percent of depressed Americans also have deficient thyroid function. For all of us, low sex drive is hormone related an estimated 70 percent of the time, and 43 percent of people are reportedly dissatisfied with their sex lives.

Each of these numbers is substantial on its own. Now consider that it's common for people to have a combination of imbalances: for example, high cortisol and insulin resistance, along with high or low levels of estrogen and testosterone.

Poor nutrition, stress, and exposure to toxins all play a major role in triggering hormonal discord. But the real challenge lies in the fact that once any

hormone is off, the others often follow.

No hormone operates in isolation, explains endocrinologist David Ludwig, MD, PhD, a professor of nutrition at Harvard School of Public Health. "One of the most interesting aspects of endocrinology is that it is a holistic picture," he says.

Healthcare providers sometimes compare hormones to instruments in an orchestra: If they're in tune, the body hums along harmoniously. But when even a single instrument is playing off key, cacophony reigns.

This means that focusing on a single hormone is often the best way to rebalance them all. So a hormone-savvy healthcare provider who is concerned about a patient's testosterone or estrogen levels might begin by tending to insulin. If someone is struggling with insulin, his or her treatment may start with managing cortisol levels.

What follows is a look at four of the body's key hormones: what they do, how they interact with each other, and what you can do to help keep them in harmony.

How to Get (and Stay) in Tune

Achieving optimal hormone function requires paying attention to how hormones work together, but this doesn't necessarily mean treating them all simultaneously. The key is addressing them in the appropriate order.

"Beginners tend to think they should dive in and balance all their hormones at once: Take one supplement for their estrogen dominance, another for their slow thyroid, and a third to help their adrenal function," says Gottfried.

She suggests beginning with the adrenal system. "The body prioritizes the stress hormone, cortisol," she says. "So that's the place to start."

1 Cortisol

Key functions: Cortisol is more than just "the stress hormone." It helps regulate many functions related to the nervous system, including energy, metabolism, body temperature, blood pressure, memory, and stress response.

Signs of discord: You're likely to feel wired but tired when cortisol is disrupted. You might have trouble falling or staying asleep or get an unwelcome second wind around 9 or 10 p.m. Other symptoms include brain fog, memory problems, or an inability to concentrate; weight gain (especially around the waist); and elevated blood sugar or blood pressure.

Cortisol is a glucocorticoid hormone, so it raises glucose production when you need energy, such as when you're engaged in intense exercise or you're sick. The body also requires extra energy during mentally or emotionally demanding phases.

"If you experience a major emotional crisis, are physiologically stressed, or suffer a major illness, cortisol goes up as part of the body's defense mechanism against stress," explains endocrinologist Brad Anawalt, MD, a University of Washington professor of medicine who specializes in male reproductive hormones. "Blood sugar and blood pressure go up with it — and that is a good thing when you're stressed or injured."

But if the body remains in this state for long periods of time — which it does for many of us, thanks to our always-on lifestyles — the adrenal glands continue to produce cortisol.

At some point, cortisol's lifesaving message turns into a ceaseless alarm signal to the body, telling it to keep blood sugar at emergency levels. When blood sugar surges, so does insulin, setting the stage for a cascade of chronic health conditions.

Excess cortisol can also interfere with the body's production of reproductive hormones. Cortisol, estrogen, and testosterone share the same precursor hormones, so when cortisol production gobbles up more than its share, there's not enough left to generate healthy levels of estrogen and testosterone. This can diminish libido.

Cortisol also suppresses luteinizing hormone, which stimulates testosterone production in men. "During times of stress, cortisol goes up, testosterone goes down, sperm production goes down, and you are less likely to have sex and procreate," says Anawalt.



Hormones are like instruments in an orchestra: When even a single instrument is playing off key, cacophony reigns.

Tune-up: Balancing cortisol primarily involves rest and restorative activities that reset the adrenal glands: soaking in a hot bath, getting some bodywork, hiking in the woods, playing with kids or pets, socializing with friends, or taking some solo time.

Carving out dedicated time for rest is essential, as sleep plays an outsized role in cortisol balance. Aim for seven to eight hours of quality sleep each night.

Herbs can also help. Adaptogenic plants literally adapt to a person's individual needs, similar to how today's smart refrigerators sense when you're low on kale and text you to buy more. These "smart plants" sense which aspects of the nervous system need to be adjusted, and they deliver the appropriate nutrients.

The adaptogenic herb ashwagandha is a good choice for adrenal support.

2 Insulin

Key functions: Insulin not only regulates blood sugar, but it also helps the body store energy for later use.

Signs of discord: When insulin is running too high, symptoms can include weight gain, sugar cravings, and fatigue after meals. You might also notice skin tags.

When we begin digesting something we ate, the food's glucose flows into the bloodstream. As levels rise, the pancreas produces insulin to escort the glucose into muscle, fat, and liver cells, where it is stored as energy for future use.

These stashes allow us to summon energy for a big prebreakfast workout, fueled by the glucose from last night's dinner. Cortisol draws on these same reserves during times of physical and psychological stress. If that pressure continues unabated, though, the cycle repeats itself: Stress leads to more glucose in the bloodstream, which is followed by more insulin.

Still, the primary trigger for excess insulin is a diet high in sugar and processed carbs. The more sugar we eat, the more insulin the pancreas produces in its effort to regulate all the glucose in the system. Once the body has stored all the glucose it can in the muscles, it starts stockpiling it in fat

cells, leading to weight gain. Excess insulin is so closely tied to overweight and obesity that it has been dubbed the fat-storage hormone.

After an extended period of elevated insulin levels, the muscle, fat, and liver cells become deaf to the hormone's knock, and they refuse to let glucose in. This loss of signaling between insulin and the cells is called insulin resistance, and it is a precursor to type 2 diabetes, which is characterized by high blood sugar and unstable insulin. An estimated 30 percent of Americans suffer from insulin resistance, and some experts believe another quarter are undiagnosed.

Like cortisol, imbalanced insulin disrupts the reproductive hormones. High levels increase the production of androgens (male hormones) in women, which can lead to hair loss on the head and hair growth on the chin and chest. The visceral fat that men accumulate turns testosterone into estrogen, and



excess estrogen can trigger weight gain in both men and women.

Tune-up: The first step to balancing insulin is to follow the protocol to balance cortisol. The next critical step is adopting a low-glycemic, whole-foods diet. Exercise also helps stabilize blood sugar and reduce insulin resistance.

Intermittent fasting — 12 to 14 hours without food during a 24-hour period several days a week — can have a positive effect on insulin regulation. (One note of caution: Intermittent fasting can destabilize cortisol if the adrenals are already stressed, so make sure adrenals are in good shape before trying this.)

MEASURE UP

How to test specific hormones if you suspect they're out of balance.

Cortisol

Because cortisol imbalance is more about the timing of the hormone's release than the amount of it in your bloodstream, experts consider saliva tests to be the best measure. Samples can be collected at home over the course of a day; they show when the hormone peaks and falls. In a healthy pattern, cortisol levels are highest in the morning and gradually diminish throughout the day.

Cortisol saliva tests can be ordered by a licensed healthcare practitioner or through direct-to-consumer labs. Prices start around \$200.

Insulin

A simple blood test can offer a snapshot of your insulin levels. For more detailed information, ask your healthcare provider to test fasting blood sugar at the same time. To measure the effects of a new food protocol on your insulin levels, take a hemoglobin A1c test, which measures blood sugar over the previous three months. Both tests can be ordered by your doctor or through direct-to-consumer labs and are typically \$35 to \$40.

Estrogen

Estrogen levels can be measured in blood, saliva, or urine. Saliva tests can be collected at home over the course of a month, which gives a far more accurate picture of estrogen status than a one-time blood draw. Urine tests can be helpful to evaluate how well the body is eliminating estrogen. A doctor can test blood and urine levels and give you a take-home saliva test. These tests are also sold by direct-to-consumer labs. For 30-day home-collection kits, prices start around \$300. Blood tests cost around \$80.

Testosterone

Testosterone can be tested with blood or saliva. Order a test through your doctor, or purchase it from a direct-to-consumer retailer. Prices start around \$50.

3 Estrogen

Key functions: Estrogen is responsible for a healthy reproductive system, helps control the menstrual cycle, and affects sexual function in women. It also supports energy metabolism, thyroid function, stable mood, clear thinking, smooth skin, and strong bones. Men also produce and require estrogen for bone health and sex drive, though they need less than women.

Signs of discord: For women, signs of low estrogen levels include irregular periods, painful sex, dry skin, mood swings, poor concentration, and hot flashes. When the body produces more estrogen than progesterone (which is called estrogen dominance), symptoms include abnormal periods, bloating, decreased sex drive, insomnia, fibrocystic breasts, and premenstrual headaches.

For men, insufficient estrogen production can cause sore joints, fatigue, lackluster orgasm, dulled emotions, or explosive emotional responses. (Estrogen has a balancing effect on testosterone, which may prevent strong emotions from spinning out of control.) Excess estrogen often produces increased visceral fat, loss of muscle mass, fatigue, and depressed libido.

Estrogen surges in adolescent girls and remains a major hormonal player throughout life. It's produced primarily by the ovaries, but small amounts are also supplied by other tissues throughout the body. In addition to its primary role in female reproduction, estrogen also boosts the feel-good neurotransmitter serotonin, fortifies bones, and enhances carbohydrate metabolism.

Because estrogen supports insulin sensitivity, it helps women use carbohydrates as energy, explains hormone expert Lara Briden, ND, author of *Period Repair Manual*. "Estrogen gives women a superpower — and that's the ability to get away with eating more carbs than men."

Women in their reproductive years

typically need quality carbohydrates to support fertility. Avoiding them can trigger a starvation response and shut down ovulation. What's more, the insulin the body produces in response to carbohydrates supports the conversion of the thyroid hormone T₃ to its active form, T₄. These hormones form a tight trio with estrogen and cortisol, and they all play key roles in energy, weight, mood, and libido. Gottfried has dubbed this hormonal trio the Charlie's Angels of the female system, because it works as a graceful, effective team when all is well.

Contrary to a popular myth, the body still produces some estrogen after menopause, just at more modest levels. The reduction of estrogen (and its insulin sensitivity) may

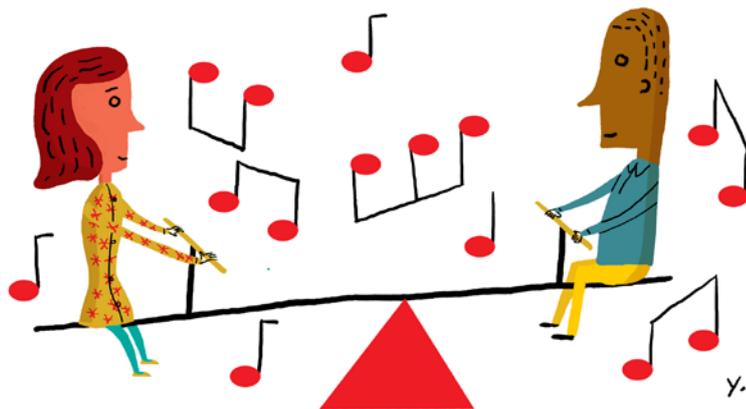
Estrogen may be the main female reproductive hormone, but it is also critical to hormonal balance in men.

be why some women gain weight after menopause. Yet experts insist menopause symptoms aren't a given.

"All the things that lead to hormonal dysfunction at midlife are things that have been going on biochemically since the teenage years," says OB/GYN Christiane Northrup, MD, author of *The Wisdom of Menopause*.

And while estrogen may be the main female reproductive hormone, it is also critical to hormonal balance in men. "Estrogen is important to men for moderating sex drive, erectile function, and sperm production," says John La Puma, MD, director of research at Chef Clinic, a nutrition-focused medical practice in Santa Barbara, Calif.

Tune-up: Diet and stress affect estrogen levels more than any other factors. Focus on eating whole foods to lower blood sugar and balance insulin; this can help reduce estrogen production. Choose liver-supportive foods, especially cruciferous vegetables, such as broccoli and cabbage, to help the liver metabolize excess estrogen. If estrogen levels are low, flaxseeds and maca root (a traditional Peruvian medicinal, available at most natural groceries) may help boost them.





4 Testosterone

Key functions: Testosterone is the primary male reproductive hormone, but it promotes a healthy libido, improves muscle mass, fortifies bone health, and bolsters confidence and assertiveness in both men and women.

Signs of discord: For men, signs of low testosterone include low libido, lost muscle mass, increased body fat, decreased bone mass, depressed mood, hair loss, and fatigue. Too much natural testosterone production in men is rare, but taking supplemental testosterone can lead to excessive levels, which manifest in testicular atrophy, gynecomastia (male breast enlargement), and liver disease.

For women, inadequate testosterone production can show up as diminished libido, muscle weakness, low mood, and fatigue. Excess testosterone in women can lead to acne, menstrual period loss, male-pattern hair loss, weight gain, and fertility problems.

Testosterone is best known for its role in boosting libido, but it's also responsible for strong muscles, a lean physique, and a feeling of self-assuredness. It's often associated with aggression, but normal levels of testosterone actually help support calm confidence, appropriate assertiveness, and optimism — for men and women.

When testosterone and cortisol levels are in balance, they work together to keep us safe, confident, and in the mood. Both regulate dominance, but when we're faced with a threat or a perceived threat, cortisol tells the body to fight or flee, while testosterone tells the body, "Don't worry. Everything will turn out great," says La Puma.

During times of stress, cortisol can overtake testosterone and crush sex drive. "If a man is really stressed . . . cortisol goes up and testosterone drops, and that can result in some men not being very interested," he explains.

On that note, insulin resistance also drives weight gain around the midsection, and beer bellies put

more than the ego at risk. Visceral fat acts as its own endocrine organ, producing hormones and cytokines (inflammatory chemicals) that wreak havoc on tissue throughout the body. Men with type 2 diabetes are twice as likely to have low testosterone levels.

Visceral fat also produces the enzyme aromatase, which, in men, converts testosterone into estrogen. La Puma suggests that one natural way to control higher estrogen levels is to lower body fat. "A lower body-fat ratio has the added benefit of raising testosterone, and with it, achieving the ability to have and maintain a strong erection," he says.

As men age, they produce less testosterone and may experience related shifts in sex drive and health status — a process called andropause, which is similar to menopause. Interestingly, however, some research suggests the changes men experience during andropause may be related to the simultaneous loss of estrogen, which is converted from testosterone. As testosterone production drops, so



Web Extra!

For a look at other factors that influence our hormones, see ELmag.com/hormoneharmony.

do estrogen levels — and while too much estrogen is not ideal for men, too little can cause just as much trouble.

Tune-up: Balancing testosterone levels starts with balancing cortisol production, which means prioritizing self-care and stress management. Diet is next. Eating more healthy fats, such as those found in avocados, nuts, seeds, and pastured meats, is a good way to lower elevated insulin levels, says Ludwig.

La Puma stresses the importance of cruciferous vegetables, such as cabbage and kale. (These may decrease estrogen and increase testosterone production.) He also notes that drinking alcohol can lead to problems with the balance between estrogen and testosterone and recommends that men who have problems with hormone balance take a break from imbibing. ☘

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