Hormones & Hormone Balance

Cellular Messengers

Our bodies contain over 60 trillion cells, each of which must be able to communicate with the other in order to carry out bodily functions. Hormones are the chief chemical messengers between cells. Hormones travel through the blood stream, “hitch hiking” on protein molecules, and enter the cells through special "receptor" sites.

Receptor sites are like locks—each lock can only be opened by a specific key. The various hormones are the “keys” that open specific receptors. Once inside the cell, hormones begin flipping the cellular switches that control metabolism, energy, tissue repair and building, growth and development, and most of the mental and physical functions of life.

Balance

The various hormones must exist in the proper balance. When that balance is compromised, either by too little or too much hormone, a whole host of symptoms can occur. Left unchecked, hormone imbalance can lead to toxicity and disease. Hormone balance is related to the foods we eat, the amount of stress in our lives, how much (or little) we exercise, and the amount of environmental toxins to which we are exposed. In addition, while hormone levels can be affected at any age, it is certainly true that hormone levels decline with age, along with potential hormone imbalance.

Key Organs

The main hormone producing and controlling organs are the pituitary, thyroid, and adrenal glands, and the ovaries in women and testes in men.

Pituitary & Thyroid Glands

The pituitary gland is a small gland deep in the brain. Among other things, it makes TSH (thyroid stimulating hormone). TSH triggers the thyroid gland in the neck to make thyroid hormone. The main hormone produced by the thyroid is T4, or levothyroxine (the “4” refers to the number of iodine molecules). T4 gets secreted into the blood and travels to the various tissues in the body, where it then gets converted to the much more potent and active T3. (The thyroid gland does produce T3, but in very small amounts.)

If the thyroid gland starts to get sluggish (hypothyroidism), two things happen. First, TSH starts to back up and the levels in the blood will rise. Second, the thyroid gland produces less T4, ultimately resulting in less T3.

Alternatively, if the body does not adequately convert T4 to T3, even if the thyroid gland and pituitary are working properly, the results can be the same as an underactive thyroid.

The symptoms of hypothyroidism are fatigue or poor energy, lack of endurance, weight gain or difficulty losing weight, thinning or dry hair, nails and skin, depression, poor sleep, and muscle aches.

Adrenal Gland

The adrenal glands are small pyramid-shaped glands that sit on top of the kidneys. Among other things, they produce testosterone, cortisol, and DHEA.

Testosterone often gets a bad rap in the popular press because of athletes who abuse testosterone-derived steroids. But testosterone is an essential hormone that is key to building and maintaining muscle and bone mass, sex drive, and cardiovascular health. Testosterone is essential for basic body repair processes. Women and men alike need and make testosterone, though in vastly differing amounts.

Cortisol is a key stress and immune response hormone. It gets secreted in larger amounts during times of increased stress. But too much stress for long periods can deplete cortisol reserves and the adrenal glands start to “burn out.” Cortisol levels then start to drop.

DHEA (dihydroepiandrosterone) is the most abundant hormone in the body and is also made in the adrenal glands. It is essential for helping to maintain energy and mental clarity and promote and overall sense of well-being. DHEA production declines with age, but, like cortisol, it too can become unnaturally depleted in response to chronic stress.

Ovaries and Testes

In women, the ovaries make estrogens, progesterone, and testosterone. Apart from their obvious function in pregnancy and menstruation, these hormones are essential for the health of tissues, including bones, muscles, skin, breasts, vagina, blood vessels, and the brain. In men the testes mainly produce testosterone. Men also have estrogen and progesterone, though normally in much smaller amounts than in women.

Symptoms of Hormones Being Unbalanced

Estrogens

Deficiency	Excess
Hot flashes	PMS
Night sweats	Tender breasts
Vaginal dryness	Water retention
Foggy thinking	Nervous
Memory lapses	Irritable
Bone loss	Fibroids
Incontinence	Weight gain

Progesterone

Deficiency	Excess
Hot flashes	Breast swelling
Night sweats	Depression
Foggy thinking	Sleepiness
Depression	Low libido

DHEA and Testosterone

Deficiency	Excess
Low libido	Loss of hair
Fatigue	Oily skin
Bone loss	Acne
Loss of muscle	Facial hair

Testing for Hormones

Hormones play a critical role in maintenance of health and our sense of well being, as well as in certain disease processes. Therefore it may be important to know if there are any hormonal imbalances that may be affecting your health. Also, testing is important to monitor the treatment prescribed by your doctor, to make sure the treatment is having the desired effect, and to prevent abnormal hormone levels.

After hormones are made in the various glands, they are secreted into the blood stream where they bind to certain protein "carriers." Only a small fraction (1-5%) of a given amount of steroid hormone breaks loose from the carrier protein in the bloodstream and is free to enter target tissues to exert its effect. This free or unbound hormone is what we want to measure, since it is active or bioavailable to the target tissue. Some hormones, such as thyroid, are very tightly bound to the carrier protein, while other hormones are less strongly bound.

Many studies have shown that there is a strong correlation between the levels of steroid hormones in saliva and urine and the bioavailable (free) levels of steroids in the bloodstream. The amount of steroid hormone that enters the salivary ducts and then the saliva is representative of the fraction of steroids in the bloodstream that is bioavailable. In fact, one study showed that, after administration of progesterone and estrogen cream, breast tissue (target tissue) levels of the hormones increased significantly, saliva and urinary levels increased, but the was no change in the blood levels!

Compared to blood testing, these methods are painless, convenient, and easy. In addition, it can be more easily timed to obtain samples at critical times of the day to get more accurate results than with blood testing.

Most insurance plans do not pay for the cost of saliva or urinary testing. But the cost generally is reasonable, especially considering the potentially positive benefits for your health