

# Aging Changes in Hormone Production

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The endocrine system is made up of organs and tissues that produce hormones. Hormones control the target organs, but some organ systems have their own internal control systems along with, or instead of, hormones.

As we age, changes naturally occur in the way body systems are controlled. Some target tissues become less sensitive to their controlling hormone. The amount of hormones produced with aging will also change.

Blood levels of some hormones increase, some decrease, and some are unchanged. Hormones are also broken down (metabolized) more slowly.

Other hormones control many of the organs that produce hormones. Aging also changes this process. For example, an endocrine tissue may produce less of its hormone than it did at a younger age, or it may produce the same amount at a slower rate.

## AGING CHANGES

The hypothalamus is located in the brain. It produces hormones that control the other structures in the endocrine system. The amount of these regulating hormones stays about the same, but the response by the endocrine organs can change as we age.

The pituitary gland is also located in the brain. This gland reaches its maximum size in middle age and then gradually becomes smaller. It has two parts:

- \* the back (posterior) part stores hormones produced in the hypothalamus.
- \* The front (anterior) part produces hormones that affect growth, the thyroid gland (TSH), adrenal cortex, ovaries, testes, and breasts.

The thyroid gland is located in the neck. It produces hormones that help control metabolism. With aging, the thyroid may become lumpy (nodular). Metabolism slows over time, beginning at around age 20. Because thyroid hormones are produced and broken down (metabolized) at the same rate, thyroid function tests are most often still normal. In some people, thyroid hormone levels may rise, leading to an increased risk of death from cardiovascular disease.

The parathyroid glands are four tiny glands located around the thyroid. Parathyroid hormone affects calcium and phosphate levels, which affect bone strength. Parathyroid hormone levels rise with age, which may contribute to osteoporosis.

The pancreas produces insulin. It helps sugar (glucose) go from the blood to the inside of cells, where it can be used for energy. The average fasting glucose level rises 6 to 14 milligrams per decilitre (mg/dL) every 10 years after age 50 as the cells become less sensitive to the effects of insulin.

The adrenal glands are located just above the kidneys. The adrenal cortex, the surface layer, produces the hormones aldosterone, cortisol, and dehydroepiandrosterone.

- \* Aldosterone regulates fluid and electrolyte balance. Aldosterone release decreases with age. This decrease can contribute to light-headedness and a drop in blood pressure, with sudden position changes (orthostatic hypotension).

\* Cortisol is the "stress response" hormone. It affects the breakdown of glucose, protein, and fat, and it has anti-inflammatory and anti-allergy effects. Cortisol release also decreases with aging, but the blood level of this hormone stays about the same.

\* Dehydroepiandrosterone levels also drop. The effects of this drop on the body are not clear.

The ovaries and testes have two functions. They produce the reproductive cells (ova and sperm). They also produce the sex hormones that control secondary sex characteristics, such as breasts and facial hair.

\* With aging, men sometimes have a lower level of testosterone.

\* Women have lower levels of estradiol and other estrogen hormones after menopause.

### **EFFECTS OF CHANGES**

Overall, some hormones decrease, some do not change, and some increase with age.

Hormones that usually decrease include:

- \* Aldosterone
- \* Calcitonin
- \* Growth hormone
- \* Renin (angiotensin)

In women, estrogen and prolactin levels often decrease significantly.

Hormones that most often remain unchanged or only slightly decrease include:

- \* Cortisol
- \* Epinephrine
- \* Insulin
- \* Thyroid hormones T3 and T4

Testosterone levels usually decrease gradually as men age.

Hormones that may increase include:

- \* Follicle-stimulating hormone (FSH)
- \* Luteinizing hormone (LH)
- \* Norepinephrine
- \* Parathyroid hormone

The pituitary gland is a small gland that sits in the sella turcica ('Turkish saddle'), a bony hollow in the base of the skull, underneath the brain and behind the bridge of the nose. The pituitary gland has two main parts, the anterior pituitary gland and the posterior pituitary gland. The gland is attached to a part of the brain (the hypothalamus) that controls its activity. The anterior pituitary gland is connected to the brain by short blood vessels. The posterior pituitary gland is actually part of the brain and it secretes hormones directly into the bloodstream under the command of the brain.

### **What does my pituitary gland do?**

The pituitary gland is called the 'master gland' as the hormones it produces control so many different processes in the body. It senses the body's needs and sends signals to different organs and glands throughout the body to regulate their functions and maintain an appropriate environment. It secretes a variety of hormones into the blood

stream, which act as messengers to transmit information from the pituitary gland to distant cells, regulating their activity.

For example, the pituitary gland produces prolactin, which acts on the breasts to induce milk production. The pituitary gland also secretes hormones that act on the adrenal glands, thyroid gland, ovaries and testes, which in turn produce other hormones. Through secretion of its hormones, the pituitary gland controls metabolism, growth, sexual maturation, reproduction, blood pressure and many other vital physical functions and processes.

### **What hormones does my pituitary gland produce?**

The anterior pituitary gland produces the following hormones and releases them into the bloodstream:

- \* adrenocorticotrophic hormone, which stimulates the adrenal glands to secrete steroid hormones, principally cortisol
- \* growth hormone, which regulates growth, metabolism and body composition
- \* luteinising hormone and follicle stimulating hormone, also known as gonadotrophins. They act on the ovaries or testes to stimulate sex hormone production, and egg and sperm maturity
- \* prolactin, which stimulates milk production
- \* thyroid stimulating hormone, which stimulates the thyroid gland to secrete thyroid hormones.

Each of these hormones is made by a separate type of cell within the pituitary gland, except for follicle stimulating hormone and luteinising hormone, which are made together by the same cell.

Two hormones are produced by the hypothalamus and then stored in the posterior pituitary gland before being secreted into the bloodstream. These are:

- \* anti-diuretic hormone (also called vasopressin), which controls water balance and blood pressure
- \* oxytocin, which stimulates uterine contractions during labour and milk secretion during breastfeeding.

Between the anterior pituitary and the posterior pituitary lies the intermediate pituitary gland. Cells here produce:

- \* melanocyte-stimulating hormone, which acts on cells in the skin to stimulate the production of melanin.

This why every month I have 20 days off from: Sugar, Gluten, Dairy and Caffeine.

### **DAILY PRACTICES**

Every day, I'm trying to keep a vegetarian diet with predominantly alkaline foods, do 50 minutes exercising and walking, a minimum 7-10000 steps per day and taking Ayurvedic Herbs as replacement phototherapy therapy for my hormonal systems. Also, meditation and yoga help a lot to deal with rising 3 kids, working full time, travelling to different places around the world with my Hollywood Lifting Facial Massage classes.