

Cortisol

Overview

Cortisol is one of the most talked about hormones in wellness and for a good reason. It touches nearly every system in your body. From the moment you wake up to the way you respond to stress, cortisol is working quietly in the background, regulating more than most people realize.

What is Cortisol

Cortisol is a glucocorticoid steroid hormone produced by the adrenal cortex or the outer layer of the adrenal glands, two small but powerful glands that sit just above your kidneys. It belongs to a class of hormones regulated by the hypothalamic-pituitary-adrenal (HPA) axis.

Often called the stress hormone, cortisol is released in response to both physical and psychological stress, as well as low blood glucose. It is essential for survival, playing a critical role in metabolism, immune function, blood pressure regulation, inflammation control, and your circadian rhythm.

How Does It Work

- The hypothalamus detects stress or low blood sugar and releases corticotropin-releasing hormone (CRH)
- CRH signals the pituitary gland to release adrenocorticotropic hormone (ACTH)
- ACTH travels through the bloodstream to the adrenal glands, triggering cortisol release
- Cortisol follows a diurnal rhythm, naturally highest in the early morning (cortisol awakening response) to promote alertness and energy, gradually declining throughout the day, reaching its lowest point around midnight
- In response to stress, cortisol mobilizes glucose for immediate energy, suppresses non-essential functions like digestion and reproduction
- Once the stressor passes, a negative feedback loop signals the HPA axis to reduce cortisol production and return to baseline

Benefits

- Supports natural energy and mental alertness upon waking up
- Regulates blood sugar by promoting gluconeogenesis
- Modulates the immune system, helping the body respond to infection
- Promotes anti-inflammatory responses throughout the body
- Aids in fat, protein, and carbohydrate metabolism
- Facilitates memory consolidation and cognitive function



Current Research Status

- Research continues to explore cortisol disregulation as a contributing factor in a wide range of chronic conditions including metabolic syndrome, autoimmune disease, and cardiovascular disease
- Studies have linked chronic HPA axis activation to accelerated cellular aging, including shortened telomere length
- The relationship between cortisol and the gut microbiome is an emerging area of research, with evidence suggesting that chronic stress alters gut bacteria composition and increases intestinal permeability
- Research on cortisol and neuroinflammation suggests prolonged elevation may contribute to mood disorders including depression and anxiety
- Ongoing studies are examining the role of cortisol in hormone cascades, particularly its relationship with estrogen, progesterone, testosterone, and thyroid hormones

Safety and Side Effects
Chronically elevated cortisol has been associated with:

- Visceral weight gain, particularly around the abdomen, hips, and face
- Disrupted sleep architecture including difficulty in falling asleep
- Anxiety, irritability, and emotional disregulation
- Suppression of reproductive hormones, contributing to irregular cycles, low libido, and fertility challenges
- Increased cardiovascular risk including hypertension

Chronically low cortisol may present as:

- Persistent debilitating fatigue that does not improve with rest
- Hypoglycemia or blood sugar instability
- Brain fog, poor concentration, and memory difficulties
- Increased sensitivity to sensory stimuli
- Difficulty mounting a stress response

Important Notes:

- Cortisol levels can be assessed through blood, saliva, or urine—each offering different insights into cortisol patterns throughout the day
- Lifestyle interventions are foundational and should always precede supplementation or pharmaceutical intervention
- Adaptogenic herbs such as Ashwagandha, Rhodiola, and holy basil have emerging evidence for supporting HPA axis regulation—discuss with your provider before use

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