Testosterone versus Cortisol

Acute suppression of circulating testosterone levels by cortisol in men

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The effect of acute activation of the ACTH-adrenal axis on circulating testosterone (T) levels was investigated. Elevation of circulating cortisol was followed by a rapid decrease in serum T levels. Findings suggest that hypercortisolism of endogenous or exogenous sources suppresses T secretion by a direct action on the testis. This adrenal-testicular axis may have biological implications on the adaptation to stress.

Testosterone vs Cortisol: Winner Determines Fight or Flight

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The study, led by Robert Josephs, professor of psychology at The University of Texas at Austin, and Pranjal Mehta, assistant professor of psychology at the University of Oregon, is the first to show that two hormones—testosterone and cortisol, jointly regulate dominance.

According to research, chronically elevated cortisol levels can inhibit testosterone production in men. In women, chronically high levels of cortisol can produce severe fertility problems and result in an abnormal menstrual cycle.

The stress response, cortisol, and testosterone

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There are two kinds of stress, acute and chronic. Acute stress is a short-term problem, while chronic stress is prolonged, during which cortisol levels stay high for an extended period. *Both forms of stress can suppress your testosterone levels in different ways.*

Chronic stress can cause serious long-term effects on testosterone production in the following ways. *Disturbing hypothalamic-pituitary-testicular axis:* This axis primarily controls testosterone production from the testes. Elevated cortisol levels can disrupt axis function and testosterone production.

Diminishing testosterone production: Cortisol can reduce the production of luteinizing hormone (LH) from the pituitary, which is required to activate the testes for testosterone formation. When you have low LH levels, your testosterone levels decline.

Accelerating testosterone conversion: Raised cortisol levels increase the aromatase enzyme activity that converts testosterone into estrogen (a female hormone found only in small amounts in males). This further disturbs the hormonal balance by decreasing testosterone levels/

Implications of disrupted hormone balance

High cortisol and low testosterone levels can affect your overall health in the following ways.

Muscle breakdown

High cortisol levels are known to cause muscle protein breakdown, leading to loss of muscle mass and muscle strength. Testosterone is important for stimulating muscle protein synthesis and inhibiting muscle fiber degradation. Both effects help maintain muscle mass. Your muscle strength reduces when you have high cortisol and low testosterone. It becomes hard to gain muscle no matter how many muscle-building exercises you try.

Mood changes

When you have high cortisol levels, you become anxious and irritable. Similarly, low testosterone levels make men less motivated and fatigued. A balance in cortisol and testosterone levels is required for emotional well-being and mood regulation in men.

Decreased sexual function

Testosterone is the primary male sex hormone controlling various sexual functions in men, including sex drive, sperm formation, and erection. When you do not have enough testosterone to regulate all these functions, your sexual health declines, impacting your relationship with your partner and your self-confidence suffers as a result.

Low energy levels

Both testosterone and cortisol regulate energy metabolism. When there is an imbalance in their levels, your body produces less energy, causing lethargy, exhaustion, and reduced motivation.

Poor cognitive function

Testosterone regulates different cognitive processes, such as concentration and memory. Low testosterone levels can result in poor memory retrieval, diminished mental clarity, lack of focus, and problem-solving difficulties. High cortisol levels also produce similar effects.

Low bone density

Testosterone controls bone mineral deposition. Low testosterone concentrations can reduce your bone density, making bones brittle and prone to osteoporosis.

Weight gain

Testosterone regulates body fat distribution. Low levels cause fat accumulation, particularly in the abdominal region. High cortisol also increases appetite, frequently resulting in more food intake and weight gain.