

Overview

Testosterone production declines naturally with age. Low testosterone, or testosterone deficiency (TD), may result from disease or damage to the hypothalamus, pituitary gland, or testicles that inhibits hormone secretion and testosterone production, and is also known as **hypogonadism**. Depending on age, insufficient testosterone production can lead to abnormalities in muscle and bone development, underdeveloped genitalia, and diminished virility.

Testosterone is the androgenic hormone primarily responsible for normal growth and development of male sex and reproductive organs, including the penis, testicles, scrotum, prostate, and seminal vesicles. It facilitates the development of secondary male sex characteristics such as musculature, bone mass, fat distribution, hair patterns, laryngeal enlargement, and vocal chord thickening. Additionally, normal testosterone levels maintain energy level, healthy mood, fertility, and sexual desire.

The testes produce testosterone regulated by a complex chain of signals that begins in the brain. This chain is called the hypothalamic-pituitary-gonadal axis. The hypothalamus secretes gonadotropin-releasing hormone (GnRH) to the pituitary gland in carefully timed pulses (bursts), which triggers the secretion of leutenizing hormone (LH) from the pituitary gland. Leutenizing hormone stimulates the Leydig cells of the testes to produce testosterone. Normally, the testes produce 4–7 milligrams (mg) of testosterone daily.

Incidence and Prevalence

Testosterone production increases rapidly at the onset of puberty and decreases rapidly after age 50 (to 20–50% of peak level by age 80). Recent estimates show that approximately 13 million men in the United States experience testosterone deficiency and less than 10% receive treatment for the condition.

Studies have shown that men with obesity, diabetes, or hypertension may be twice as likely to have low testosterone levels.