

Factors That Affect Testosterone Levels in Men

DHEA

Dehydroepiandrosterone (DHEA) is a hormone produced from cholesterol that then follows one of two pathways, both involving two-step enzymatic conversions, to yield either estrogens or testosterone. Thus, levels of DHEA can have a role in determining levels of estrogen and testosterone, though DHEA alone is seldom enough to sufficiently restore testosterone levels in aging men.

Aromatase

One of the most important factors that affect testosterone levels and the ratio between testosterone and estrogen is the aromatase enzyme. Aromatase converts testosterone to estrogen, further depleting free testosterone levels and increasing estrogen levels.

Obesity

Obesity and associated hyperinsulinemia suppress the action of luteinizing hormone (LH) in the testis, which can significantly reduce circulating testosterone levels, even in men under the age of 40. In addition, increased belly fat mass has been correlated with increased aromatase levels.

The vicious circle of low testosterone and obesity has been described as the hypogonadal/obesity cycle. In this cycle a low testosterone level results in increased abdominal fat, which in turn leads to increased aromatase activity. This enhances the conversion of testosterone to estrogens, which further reduces testosterone and increases the tendency toward abdominal fat.

Sex hormone-binding globulin (SHBG)

Most testosterone circulating in the bloodstream is bound to either sex hormone-binding globulin (SHBG) (60%) or albumin (38%). Only a small fraction (2%) is unbound, or “free”.

Testosterone binds more tightly to SHBG than to albumin. Consequently, only albumin-bound testosterone and free testosterone constitute the bioavailable forms of testosterone, which are accessible to target tissues and carry out the actions of the essential hormone. Thus the bioavailability of testosterone is influenced by the level of SHBG.

Aging men experience both an increase in aromatase activity and an elevation in SHBG production. The net result is an increase in the ratio of estrogen to testosterone and a decrease in total and free testosterone levels. It is crucial that this skewed ratio be balanced.

Liver Function

The liver is responsible for removing excess estrogen and SHBG, and any decrease in liver function could exacerbate hormonal imbalances and compromise healthy testosterone levels. Thus it is important that aging men also strive for optimal liver function.