

Traish A, Saad F, Guay A.

The dark side of testosterone deficiency: II Type 2 diabetes and insulin resistance.

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**Abstract:** A considerable body of evidence exists suggesting a link among reduced testosterone plasma levels, type 2 diabetes (T2D), and insulin resistance (IR). Hypogonadal men are at higher risk for T2D. Here we evaluate the relationships between testosterone, metabolic syndrome (MetS), T2D, and IR and discuss the relationships among androgen deficiency and these factors, especially as it ultimately relates to the development of cardiovascular disease and erectile dysfunction (ED). Thus, a comprehensive literature search was carried out using PubMed, and relevant articles pertinent to androgen deficiency, T2D, IR, MetS, and ED were reviewed and discussed. Low testosterone precedes elevated fasting insulin, glucose, and hemoglobin A1c (HbA1C) values and may even predict the onset of diabetes. Treatment of prostate cancer patients with surgical or medical castration exacerbates IR and glycemic control, strengthening the link between testosterone deficiency and onset of T2D and IR. Androgen therapy of hypogonadal men improves insulin sensitivity, fasting glucose, and HbA1c levels. We suggest that androgen deficiency is associated with IR, T2D, MetS, and with increased deposition of visceral fat, which serves as an endocrine organ, producing inflammatory cytokines and thus promoting endothelial dysfunction and vascular disease