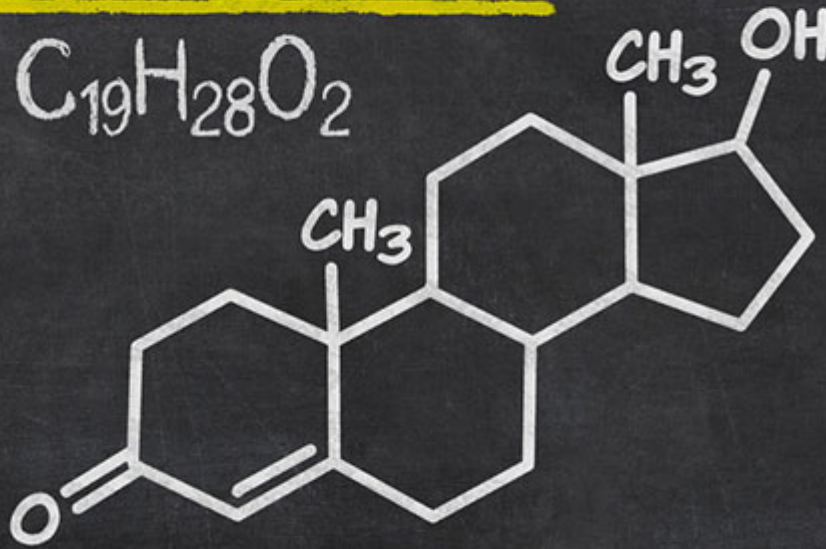
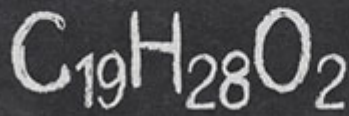


Testosterone

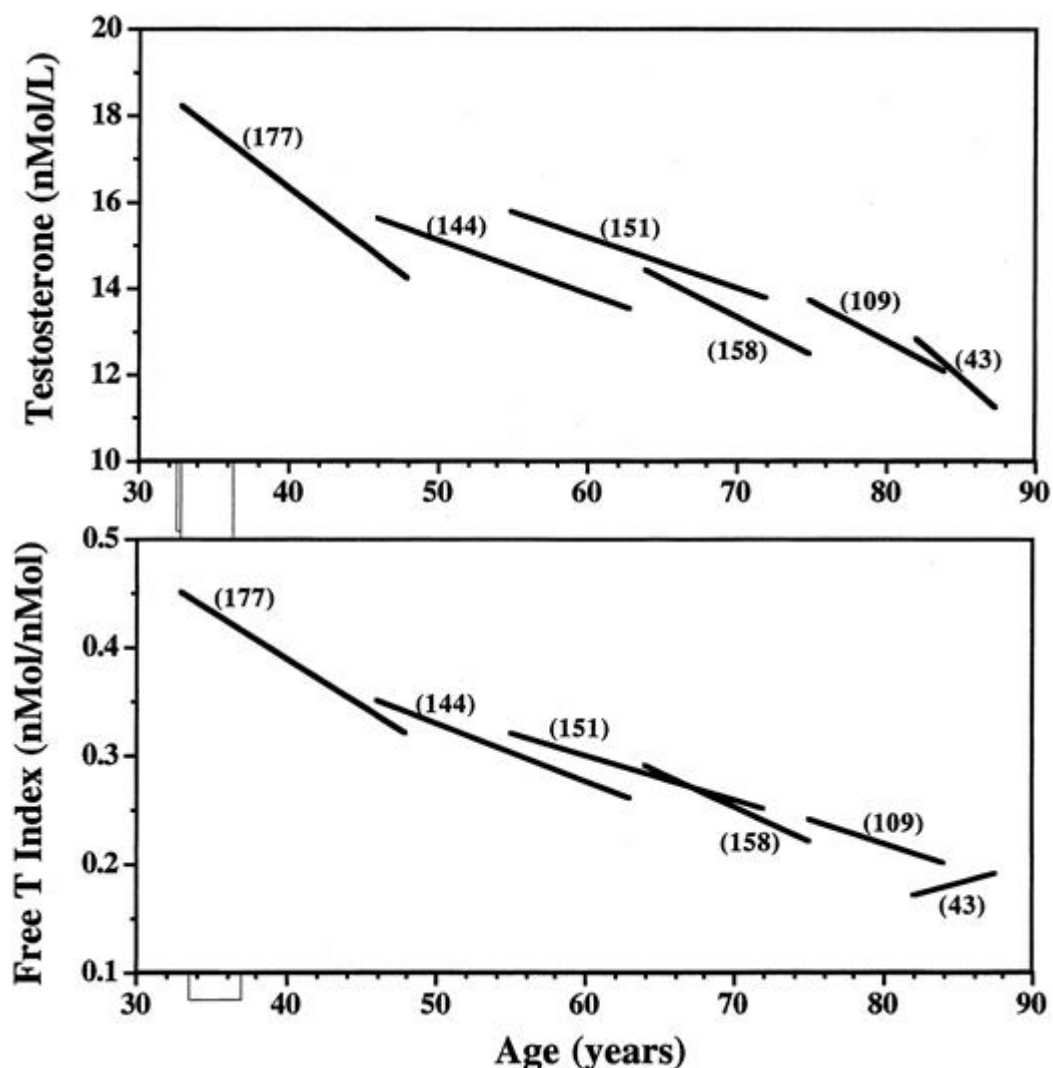


Low Testosterone Is Associated with Insulin Resistance

Testosterone (T), the hormone that gives men their male sex characteristics, [declines with age](#). T is also declining over time, i.e. a men of any age have lower T levels than men the same age 20 or more years ago. Could one factor explain both types of decline? The fact that low testosterone is associated with insulin resistance argues for an answer in the affirmative.

Testosterone and aging

[Testosterone declines with age](#). See chart below. The measurement of T used here is nmol/L (nanomoles per liter); 1 nmol/l equals 28.8 ng/dl.



However, [much of aging is just a consequence of poor health habits](#). Becoming [over-fat](#) and more sedentary are linked to aging as well as poor health habits. So how much of the decline in T with age is due to aging itself, and can it be mitigated?

The authors of the above-linked article note the same question and state that “the finding, in some studies, that **T levels did not fall significantly with age in exceptionally healthy** men raised the question of the relative roles of chronic age-related illness vs. aging *per se* in producing the observed decreases.” [My emphasis.]

In fact, in one study ([cited here](#)) men aged 80 to 89 in the upper 2.5 percentile has T levels averaging 964!

Clearly, decline of T with age is not a foregone conclusion. Good health can keep T levels high, at least in some – and I would argue, most – cases.

Testosterone and insulin resistance

Insulin resistance is characteristic of type 2 diabetes, although diabetes is only the extreme result of insulin resistance, which perhaps [80% of the population has to some degree](#).

[Low testosterone is common in type 2 diabetics](#), with some 47% having T levels that indicate hypogonadism. However, hypogonadism is defined by a number which, while it isn't totally arbitrary, represents a binary division, whereas T levels are on a spectrum. In other words, insulin resistance impacts the T levels of all men, not just diabetics, and just because one isn't deemed clinically hypogonadal doesn't mean that one's T levels are optimal, or all that they could be.

[Insulin sensitivity \(the converse of insulin resistance\) is strongly and positively correlated with T levels](#). This shows that even in men who aren't clinically diabetic, their level of insulin sensitivity has a strong effect on testosterone.

Insulin resistance increases with age, but why? [Insulin resistance is more closely associated with abdominal adiposity \(visceral fat\) than with age](#). When visceral fat was controlled for, aging accounted for <2% of the variance in insulin resistance.

[Obesity and aging are linked](#). T levels are also linked to obesity, specifically visceral fat.

That means you can avoid many of the effects of aging on testosterone and in general many other factors by avoiding insulin resistance and staying insulin sensitive.

[Testosterone therapy also improves insulin sensitivity](#). The two are closely linked.

To maintain the best insulin sensitivity:

- stay lean or lose fat if necessary
- exercise, especially [strength training](#) and [high-intensity interval training](#)
- avoid refined carbohydrates, [sugar](#), and [seed oils](#)
- practice [intermittent fasting](#)

Conclusion

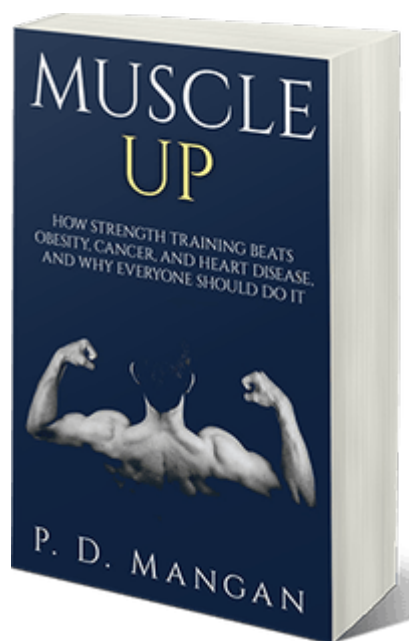
Aging doesn't cause low testosterone.

Unhealthy living that results in abdominal fat and insulin resistance does.

Staying lean, muscular, and insulin sensitive will do more for a healthy testosterone level than anything short of injecting yourself with it.

PS: For the best exercise for getting lean and muscular – and insulin

sensitive – pick up a copy of my book, [Muscle Up](#).



PPS: [Check out my Supplements Buying Guide for Men.](#)

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