As men age, there is often a decline in libido and sexual function, which frequently interferes with intimacy in romantic relationships and has emotional ramifications, while also eroding self-confidence and quality of life. This has set the groundwork for the popularity of nitric oxide (NO)-enhancing drugs such as Viagra and Cialis, and consumer awareness of prescription testosterone (T) availability courtesy of the low “T” commercials. Here we’ll discuss the etiology of male sexual decline and the potential benefits offered by non-prescription alternatives.

Sexual Decline
Healthy sexual function is a multi-fac-toral process requiring (at least) healthy circulation, healthy hormone produc-tion, adequate energy levels and proper-mental/emotional well-being. Unfortunately, aging and unhealthy lifestyle practices can negatively influence one or more of these processes.

In the case of T, a reduction in its production is common and implicated in reduced libido and sexual function. Research\(^1\) indicates that T levels in men fall progressively with age and that a significant percentage of men over the age of 60 years have serum T levels that are below the lower limits of young adult men (age 20 to 30 years). Some studies\(^2\) show that men experience a gradual and progressive decline in total T levels that takes place at a rate of approximately one percent per year beginning in their 30s, while other studies\(^3\) show an average annual decline of one to two percent total T levels, with an even more rapid decline in free T.

With regard to circulation, consider how it is affected by poor diet and lack of exercise. Beyond ramifications on cardiovascular and cerebrovascular health, poor circulation may also translate into an inadequate blood supply to the genital region, making it difficult to achieve and maintain an erection. Furthermore, inadequate endogenous production of the biochemical NO can exacerbate this problem since adequate NO is necessary for vasodilatation of blood vessels and, consequently, erectile function.

Testosterone Modulation
While there are many nutraceuticals on the market with claims to increase T levels, I have found that much of the human clinical research to support those claims is inadequate or in some cases non-existent. Three exceptions are the herb *Eurycoma longifolia* Jack, vitamin D and zinc.

- *E. longifolia* Jack (aka, Tongkat Ali or Long Jack) is a medicinal herb of South-East Asian origin (especially Malaysia, Thailand and Indonesia), tradi-tionally used for its aphrodisiac activity to enhance male sexual performance.\(^4,8\) Modern scientific research has also demonstrated this benefit, apparently as a result of increasing serum T levels.\(^9,10\) However, it is significant to note that the human clinical research has been done on a specific proprietary extract known as LJ100. This is impor-tant since the LJ100 extract of *E. longifolia* has been standardized for eurypeptides, naturally-occuring compounds which may be the active phyto-chemicals in *E. longifolia*, or at least serve as a marker for extract quality.

Human clinical studies on LJ100 have been conducted at different dosage levels, but 200 mg/day showed the most benefits. Studies included both controlled trials and open-label trials. It will not be possible to provide a detailed review all of the studies; however, here is a synopsis of the research results:

- Depending on the study, T increased 16.4-71.5 percent\(^11-13\)
- Depending on the study, cortisol decreased 16-32 percent\(^14,11\)
- DHEA increased 47 percent\(^9\)
- Sexual health scores improved significantly\(^10,15\), as much as 91 percent\(^9\)

It appears that at least one of the mechanisms of action for LJ100 is the reduction of sex hormone-binding glob-ulin (SHBG) levels. SHBG is a glycopro-tein that binds to sex hormones. While bound to SHBG, T cannot bind to cellu-
lar androgen receptors—which means that it won’t have any of the valuable effects of T in this form. Of course, SHBG-bound T can be unbound, but it can take a while for this to happen. Furthermore, SHBG levels increase as we age. In one of the studies, LJ100 was shown to reduce SHBG levels in 36 percent of the cases after one week, and 66 percent after three weeks.9

- **Vitamin D** deficiency is present outright in 41.6 percent of the U.S. population14, while vitamin D insufficiency (i.e., lacking sufficient vitamin D) is present in 77 percent of the population.17 This is alarming considering that new studies are constantly being conducted that demonstrate a broad range of important functions that vitamin D performs in human health, including its role in maintaining healthy T levels.

Three different cross-sectional studies including thousands of men have demonstrated that higher vitamin D levels are associated with higher levels of T (especially free T), and lower levels of estrogen and SHBG in men.18-20 In regard to supplementation research, 54 healthy overweight men undergoing a weight reduction program participated in a randomized controlled trial.21

Participants received either 3,332 IU vitamin D daily for one year or placebo. Initially, vitamin D concentrations were in the deficiency range and T values were at the lower end of the reference range. The results were that in the vitamin D group, there was a significant 25 percent increase total T levels. By contrast, there was no significant change in any T measure in the placebo group.

- **Zinc** deficiency is prevalent throughout the world, including the U.S.22,23 This is problematic since zinc has been reported to have roles in the synthesis, transport and peripheral action of hormones. In fact, low dietary zinc status has been associated with low circulating concentrations of several hormones including T.24 Conversely, research25 has shown that male subjects with normal T levels had a significantly higher zinc level compared to those with low T levels. Zinc supplementation in marginally zinc-deficient normal elderly men for six months resulted in close to a doubling of serum T levels.26 In addition, research27 has shown that zinc supplementation prevented a decrease in T levels after exercising, and men undergoing hemodialysis28-30 or who had sickle cell anemia31 were able to maintain higher T levels when supplementing with zinc.

**NO Enhancement**

The amino acid L-arginine is a precursor (building material) for the synthesis of NO.32 Supplemental sources of L-arginine appear to augment NO production,33 with the result being a measurable increase in blood flow34 (i.e., vasodilatation). Since penile erection requires the relaxation of the cavernous smooth muscle, which is triggered by NO, it might be expected that supplementation with L-arginine would help promote erectile function. In fact, this is the case.

Studies have shown that when supplementing with L-arginine in doses of 5 g35 or 2.8 g36 daily, men with erectile dysfunction (ED) or impotence experienced significant improvements in erectile function. These studies found that subjects were either responders or non-responders (presumably based upon their levels of NO (i.e., those with low NO would be responders). The responders experienced significant improvements in sexual function.

**Conclusion**

Although the use of prescription drugs may offer a viable treatment for ED, there are alternatives with a high safety profile that may also offer an effective solution. It may make sense to experiment with supplements first to see if results are forthcoming before turning to medications, which are not without adverse effects. VR

**References:**


