



— YOUTUBE RESEARCH SUMMARY

Research Summary: Testosterone Availability

As featured in Dr. Kenny Mittelstadt's video: [Why the Testosterone Food List Stops Working](#)

— Research Context

Testosterone availability is a system story, not only a production story. Even when food choices are genuinely supportive, research points to a layer most men never hear about: the liver, metabolic signaling, and a carrier protein called SHBG all determine how much of what the body makes actually reaches the tissues that need it. The studies below help connect those dots in plain language, shifting the frame from what to eat toward understanding which part of the system is the actual constraint.

— Key Findings from the Research

STUDY 1 • PMID 33139661

SHBG is made by the liver. When it binds to testosterone in the bloodstream, that testosterone becomes locked away and unavailable to tissues. Only the unbound fraction, called free testosterone, does anything in the body. This study found that SHBG production is regulated by factors the liver controls directly: insulin signaling, fatty liver changes, and androgens themselves. A man can have a total testosterone reading in a technically normal range while his free testosterone is genuinely low, because too much of what his body produced was bound before reaching receptors. The liver's metabolic environment determines how much of that locking occurs, often quietly, without any formal flag on a standard blood panel.

STUDY 2 • PMID 36676087

This systematic review examined the relationship between bisphenol A (BPA), a chemical found in many plastics and food containers, and a cluster of hormonal and metabolic patterns. Higher BPA exposure was consistently connected to lower SHBG levels alongside higher markers of low-grade chronic inflammation, insulin resistance, and fatty liver changes, all occurring together. SHBG can be suppressed by factors entirely outside the diet, including everyday chemical exposures. When SHBG drops in the context of insulin resistance and inflammatory load, the hormonal environment shifts in a way that a food list alone cannot address. Cleaning up the diet is a meaningful step that works best when the broader environmental and metabolic picture is part of the conversation.

STUDY 3 • PMID 8875519

This study examined zinc status and testosterone levels in two groups: young men whose zinc intake was deliberately restricted, and older men with marginal zinc deficiency. When zinc was restricted in younger men, their testosterone levels dropped significantly. When older men with low zinc status received supplementation, their testosterone levels came back up toward normal. Zinc matters when it is missing. In men who are genuinely depleted, correcting deficiency can move the picture meaningfully. In men already getting adequate zinc, adding more is unlikely to push testosterone higher. The nutrient supports a floor, and the food-first framing for zinc is sound dietary advice. The expectation that it will raise testosterone in already-replete men is where the reasoning tends to overshoot.



— Functional Medicine Connections

Testosterone production runs through three checkpoints. The first is supply: raw materials including cholesterol and micronutrients like zinc and selenium need to be present for the conversion chemistry to proceed. The second is signal: the Leydig cells that produce testosterone need a relatively quiet inflammatory environment to respond to the brain's production signals. Chronic inflammatory signaling acts like static on that communication line, reducing output even when materials are available. The third is availability: once testosterone is produced, how much stays free and usable versus bound and locked away depends heavily on the liver, insulin levels, and SHBG dynamics.

Food-based approaches mostly work at the first checkpoint, supporting the supply side. That is a real and meaningful contribution. When the second or third checkpoint is the primary constraint, food inputs are entering a system that cannot fully use them. The man who has cleaned up his diet and whose levels have barely moved is usually dealing with a gate-two or gate-three situation: inflammatory load suppressing Leydig cell output, or a metabolic and liver environment raising SHBG and locking more testosterone away.

The liver sits at the center of this picture more than most people realize. It manufactures SHBG, processes hormones for clearance, and its function is shaped by insulin signaling, inflammatory burden, and environmental chemical exposure, all before any standard liver enzyme test formally notes a problem. Addressing the hormonal picture without addressing the metabolic and liver context tends to produce partial results.

— Practical Reflections & Takeaways

If you have made consistent dietary changes in support of testosterone and your lab values have not moved as expected, it may be worth asking: which gate is the actual constraint? Is the supply genuinely limited, or is something in the signaling or binding environment limiting what gets through? Your own history, including stress patterns, dietary fat ratios, and how your energy and metabolic markers have shifted, can offer real clues.

When a doctor reviews your testosterone labs, do you know whether they looked at free testosterone and SHBG alongside total testosterone? If only total was measured, you may be working with an incomplete picture of what is actually circulating and available. That is a conversation worth having, and your curiosity about it is a legitimate starting point.

— References

Qu X, Donnelly R. Sex Hormone-Binding Globulin (SHBG) as an Early Biomarker and Therapeutic Target in Polycystic Ovary Syndrome. *Int J Mol Sci*. 2020;21(22):8567. doi: 10.3390/ijms21228567. PMID: 33139661.

Smovršnik T, Virant-Klun I, Pinter B. Polycystic Ovary Syndrome and Endocrine Disruptors (Bisphenols, Parabens, and Triclosan): A Systematic Review. *Life (Basel)*. 2023;13(1):138. doi: 10.3390/life13010138. PMID: 36676087.

Prasad AS, Mantzoros CS, Beck FW, et al. Zinc status and serum testosterone levels of healthy adults. *Nutrition*. 1996;12(5):344-348. doi: 10.1016/s0899-9007(96)80058-x. PMID: 8875519.

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