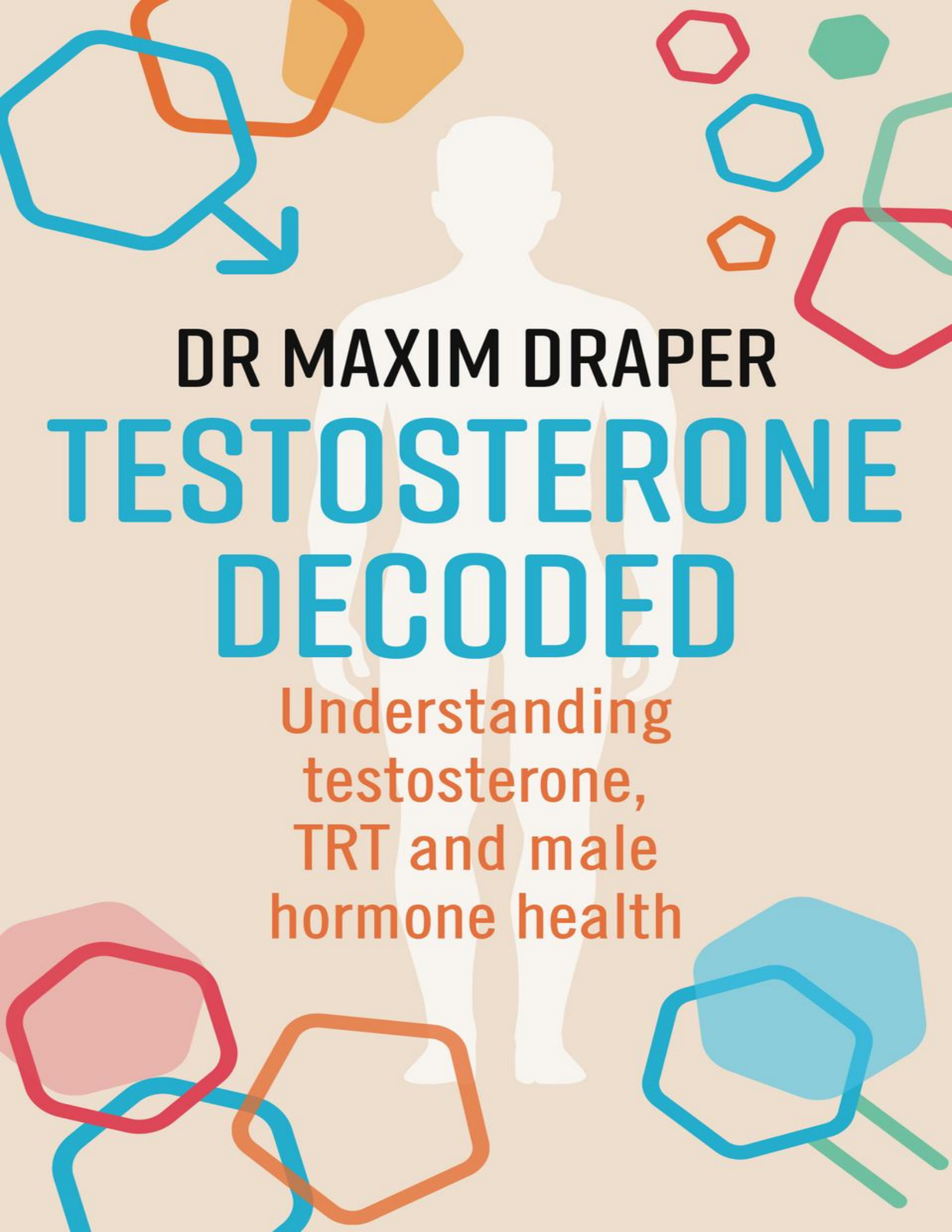
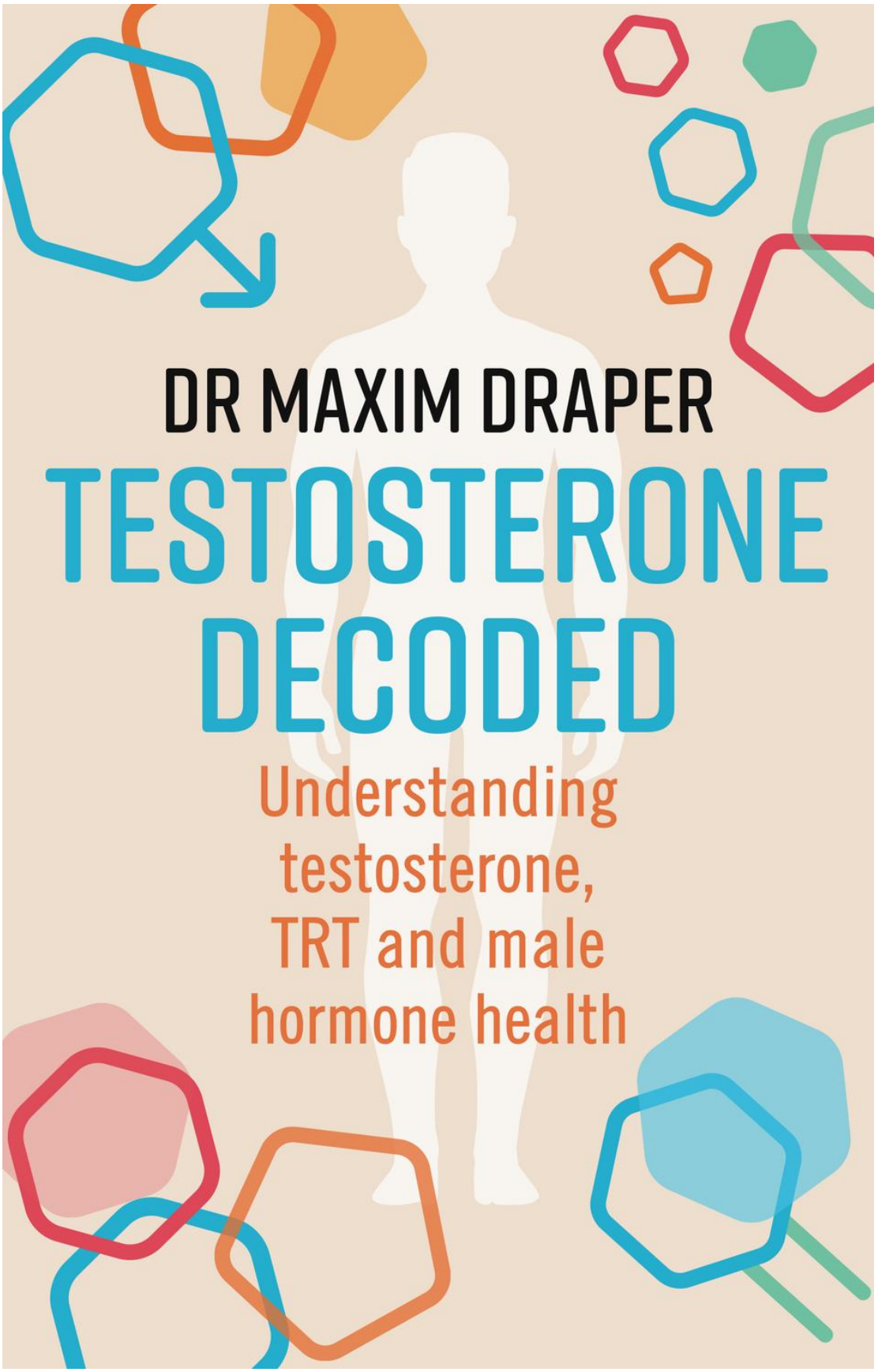


DR MAXIM DRAPER

TESTOSTERONE DECODED

Understanding testosterone, TRT and male hormone health


DR MAXIM DRAPER
TESTOSTERONE DECODED
Understanding testosterone, TRT and male hormone health

TESTOSTERONE DECODED

Understanding testosterone, TRT and male hormonal health

DR MAXIM DRAPER

WITH A FOREWORD BY DAVE LEE

BOOKS

Hammersmith Health Books
London, UK

This book is dedicated to my children, and to my wife.

My children were the reason I kept climbing, the purpose behind every exhausting step. When life felt like an uphill battle, they were the summit I refused to give up on. And my wife, she was right there beside me when my legs felt like buckling. She held my hand in the darkness when my mind and body were failing me. She was my scaffolding, my strength when I had none. She stood beside me when I couldn't see a way forward and believed in me when I no longer believed in myself. She made me fight when the fight felt lost.

On the road to recovery, she listened, patiently, lovingly, as I talked endlessly about the latest research I had learnt about testosterone, the next blood result, the faint glimmers of hope. She supported a complete career pivot, because she saw at first hand what testosterone therapy had done for me. And more than that, she saw what it could do for others.

I had pretty severe symptoms of low testosterone, more extreme than most. If you're reading this thinking, 'Blimey, that sounds worse than me,' you're probably right. Most men with low testosterone don't get as bad as I did. My levels were very low, and the impact was profound. But if I can turn things around from that place, it means there's hope, real hope, for you too.

Contents

Title Page

Dedication

Foreword by Dave Lee

My story: Why this book exists

Introduction: The decline of testosterone – a silent epidemic

1. Understanding testosterone: What it is, how it's made and why it matters
2. Causes of low testosterone
3. Low testosterone signs and symptoms
4. The risks of low testosterone
5. Testing and diagnosis
6. What is a 'normal' result?
7. Lifestyle, supplements and natural boosters
8. What is TRT?
9. The benefits and risks of TRT
10. The misconceptions surrounding oestrogen and DHT
11. Frequently asked questions
12. Other hormones to consider: Thyroid, DHEAS, pregnenolone
13. Resources and tools

Final thoughts

References

Glossary

Index

Also from Hammersmith Health Books

Copyright

Foreword

by Dave Lee

It is an honour and a privilege to be able to contribute the foreword to *Testosterone Decoded*. As of the time of writing and this book being published, I have been working in the industry for seven years, and have been a TRT patient for the best part of a decade. These days, there is no shortage of TRT information available, which is a stark contrast to the limited information available for patients when I started my treatment. However, this increase in content has led to the topic being more confusing and bamboozling than ever, often raising more questions than answers, and leading patients to becoming overwhelmed, anxious and ultimately, misguided in their treatment.

TRT done right is life changing. In fact, it's why I dedicated my career to the field.

TRT done wrong can be worse than having low testosterone.

I've worked alongside and mentored countless practitioners in recent years, and what separates the best from the herd is an intrinsic understanding of not just TRT, but testosterone itself. TRT is not just another pharmaceutical medication. When a man optimises his androgens through bioidentical hormone replacement therapy, there is an acute and prolonged metamorphosis for his physiology, psychology and everything in between. When I speak to my clients years down the line, they often reflect on starting TRT as a major catalyst event in their life to improve not just their day-to-day wellbeing

and overall health, but the trajectory of where they end up in life, and the man they become.

Max has done an excellent job with *Testosterone Decoded*, creating a resource that is not just for practitioners to learn about and consolidate their complete understanding of testosterone's role in male health as well as interventionally, but also for patients to see the bigger picture of what TRT is doing in their own bodies.

All surgeons use the same knives, but deliver different results based on their skillset and expertise. Many patients are injecting the same testosterone products, but have different outcomes and experiences based on the guidance and skill of their practitioner. I get excited when I read books like *Testosterone Decoded*, as I know that the existence of this book, and it falling into the hands of doctors, nurse practitioners, clinic owners and medical students all over the world will lead to thousands of men receiving better quality, life-changing hormone replacement therapy.

When you read this book, if you hadn't already realised it, you will have a 'lightbulb moment' where it becomes abundantly clear that we are facing a crisis of endocrine disruption, and that the male testosterone decline is complicit in many of the struggles facing men of all ages, in both their mental and physical health challenges. We currently face a chronic disease epidemic, and while the increase in these health conditions is multifactorial, the lack of robust, protective primary sex hormones is a major contributing factor.

Without sounding too esoteric, testosterone is truly a man's 'life force'. This can be seen not only in the mechanistic effects in the brain, energy metabolism and immune system, but also in the real-world outcomes from men optimising their testosterone levels. Every day men are walking into their doctor's office with low androgen

levels and textbook symptoms, and are getting sent away in 10 minutes without any comprehensive blood testing or symptomatic discussion, with a script for an antidepressant and an erectile dysfunction medication. This is the reality, and this is unacceptable.

Knowledge is power. Starting TRT is a big decision for patients, and treating patients with TRT is a big responsibility for practitioners. Many patients are apprehensive about starting treatment due to fear of the unknown, while other patients will jump the gun. Informed consent is a must. Sadly, you won't find this information in the package insert for testosterone injections. However, you will find this information inside this book.

In the coming years, this book will fall on a spectrum between saving people's lives and changing the future of medicine. I'm excited to see where on that spectrum it lands.

Dave Lee, HRT specialist health coach

My story:
Why this book exists

After surgery for testicular cancer and a difficult recovery from viral meningitis, I was left with undiagnosed low testosterone for several years. During that time, life became incredibly difficult. I battled anxiety, crushing fatigue, relentless brain fog and a persistent sense of defeat. I went from being active and driven to feeling like a shadow of myself, and I had no idea why.

I saw multiple healthcare professionals, including several general practitioners, a psychiatrist and my oncologist. It wasn’t until I finally discovered that low testosterone was behind these symptoms that everything changed.

The transformation that came from testosterone replacement therapy (TRT) was nothing short of life-saving. My energy returned, my mind cleared, and I started to feel like myself again. What shocked me most was this: I was and am a doctor, a qualified GP for several years by then, and yet I had almost no real understanding of how critical testosterone was to a man's health. I felt frustrated and deeply determined to do better.

Since starting TRT, I’ve made it my mission to truly understand this misunderstood hormone, not just for myself, but for the countless men still suffering in silence.

This journey has not only restored my health, but also reshaped my career and awakened a powerful passion for men's hormonal health.

Introduction

The decline of testosterone: A silent epidemic

Testosterone plays a vital role in shaping how a man thinks, feels, performs and functions, not just in adulthood, but right from puberty and even before. We often reduce testosterone to libido and muscle mass, but its influence reaches far deeper as we'll explore in this book.

Disturbingly, many boys and men today are growing up with chronically low or suboptimal testosterone levels, often without ever realising it. This is one of the most overlooked health crises of our generation.

Over the past few decades, average testosterone levels have been declining at an alarming rate, even when adjusted for age (see Figure 1). We're now seeing younger and younger men struggle with symptoms of deficiency. They show signs of disrupted development, both physically and mentally, with consequences that can echo across a man's entire lifespan. Even if they develop normally, they will experience a lower peak in testosterone levels. As a result, more men will run into symptoms of a deficiency as they age and their hormones naturally, gradually decline.

Low testosterone during adolescence or early adulthood doesn't just change how a man looks; it can shape how he experiences life. It can influence his confidence, his relationships, his ambition, his ability to form identity and purpose. It affects how he handles

pressure, how he expresses himself, and how he recovers from setbacks. Testosterone is critical for maturation, and when it's lacking during key phases of growth, that developmental arc can be permanently altered.

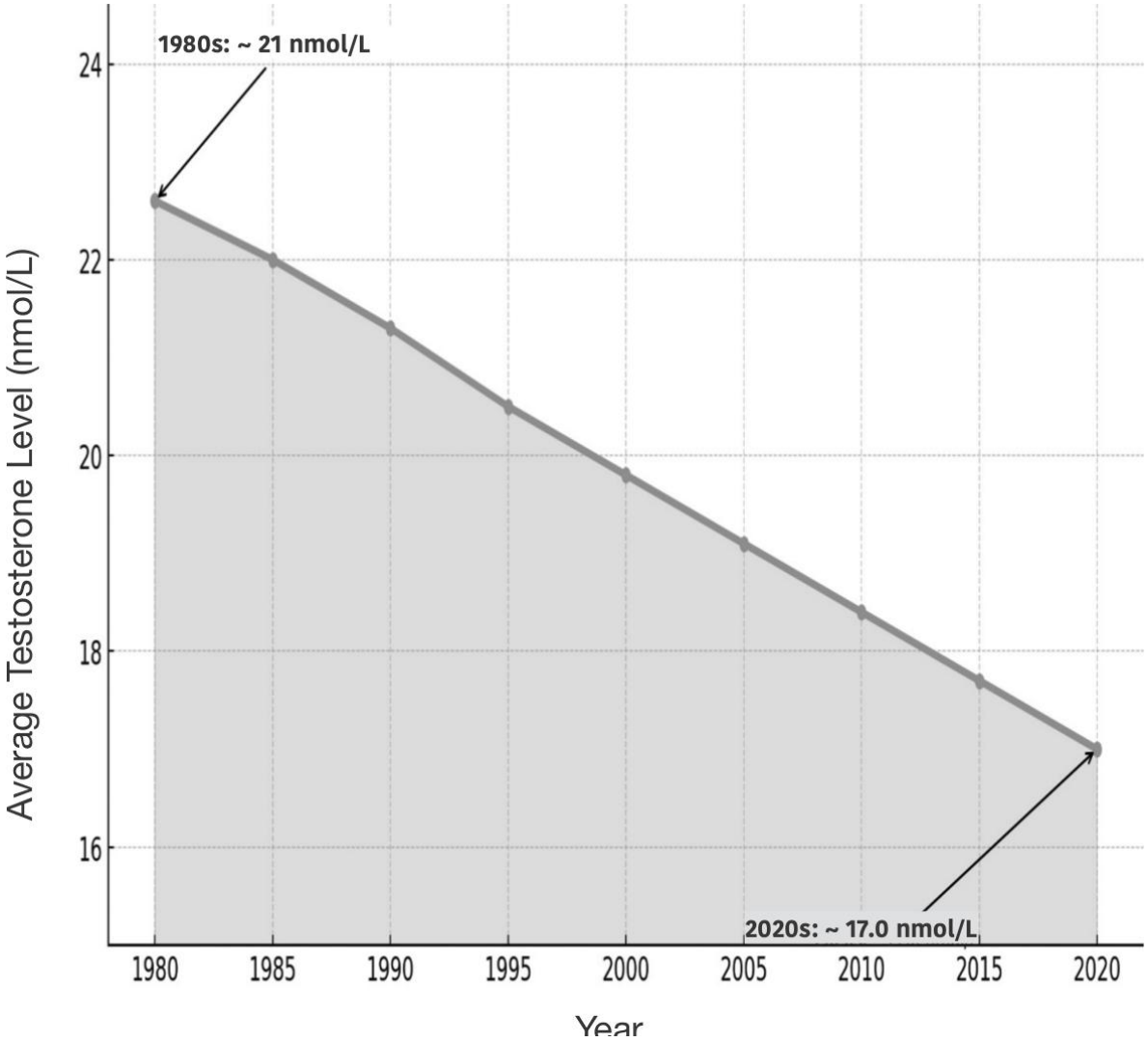


Figure 1: Decline in average testosterone levels in men (1980 to 2020)

If he encounters deficiency symptoms in adulthood, similarly, it can completely derail his life plans and sense of wellbeing. Men can go from confident, energetic and thriving, to a shadow of their former self.

And the impact doesn't stop with the individual. Low testosterone also affects fertility, not just sperm count

and quality, but the capacity to conceive and carry forward healthy genetic material. And emerging research shows that a man's hormonal health at the time of conception can directly impact the epigenetics of his future children. In other words, low testosterone today may set the stage for even greater hormonal and metabolic dysfunction in the next generation.

We are witnessing this already. Sperm counts are plummeting worldwide. Testosterone levels are falling. Rates of anxiety, depression, obesity and metabolic syndrome in young men are climbing. Fertility clinics are seeing more male-factor cases than ever before, and often, these men are in their 20s or 30s. And as we'll see, these modern epidemics could well be tied into declining hormonal levels bi-directionally.

This isn't just a men's health issue; it's a societal one. It's about the future of fatherhood, family and the wellbeing of generations to come.

And sadly, this is an area that remains poorly understood, not just in wider society, but critically within the medical community itself. I was never taught about testosterone in any meaningful detail at medical school or during GP training, and that's not unusual. Male hormonal health simply isn't prioritised or explored in any great depth. This results in testosterone deficiency frequently being missed, misdiagnosed or dismissed altogether.

The information in this book is a structured overview and distillation of everything I've learned over the past four years, through research, clinical practice, patient experience, and my own personal journey. Much of it I had to seek out for myself. And the truth is, many men do. When it comes to hormonal health, you often have to be your own advocate. And that goes for women, too.

That's why this book goes beyond symptom lists and blood test results. This isn't just a resource for men

considering testosterone replacement therapy (TRT); it’s a roadmap for understanding testosterone’s central role in male development, health and identity. It’s about understanding when something’s wrong, and how to address it at the root.

We'll explore what testosterone does, what causes it to decline, how to identify deficiency, and how to rebuild not just hormone levels, but long-term health. In some cases, TRT can be a powerful tool. But the bigger picture includes lifestyle and restoring balance across all systems. This is the difference between simply correcting a number and pursuing true hormone and health optimisation.

Ultimately, this is a conversation about how to reclaim vitality, capability and purpose, and how to help more men become the healthiest, most resilient versions of themselves.

Whether you're struggling personally, helping others, or simply trying to understand what's happening to modern male hormones, this resource is designed to offer clarity, context and direction.

Let’s get into it.

Chapter 1

Understanding testosterone: What it is, how it's made and why it matters

More than just a 'sex hormone'

Before we can understand what happens when testosterone is low, or what to do about it, we need to understand what testosterone actually *is*. This chapter lays the groundwork: how testosterone is made, how it circulates, what controls its production, and how it interacts with other systems in the body. Without this foundation, nothing else makes much sense.

What is a hormone?

Hormones are chemical messengers produced by glands in the body. They travel through the bloodstream to organs and tissues, helping to regulate a wide range of bodily processes. Think of them as the body's internal communication system; they help different parts of the body 'talk' to each other and stay in sync.

Hormones like testosterone work by binding to specific receptors, either on the surface or inside your cells. Once attached, they trigger changes in how that cell functions, often by influencing gene expression. In other words, hormones don't just send signals; they can actually *change how a cell behaves*, sometimes permanently. This

is one reason hormonal health has such broad and lasting effects.

More than just a ‘sex hormone’

Testosterone is commonly called a ‘sex hormone’ because of its well-known role in puberty, sexual development, libido and reproduction. However, that label oversimplifies things. Testosterone’s influence extends far beyond this.

Another label that causes confusion is ‘steroid hormone’. For many, this triggers images of performance-enhancing drugs or bodybuilders abusing anabolic steroids, but in scientific terms, a steroid hormone is simply any hormone made from cholesterol, and that includes many of the body’s most essential messengers.

Testosterone is part of this natural steroid hormone family, along with:

- **Cortisol** – the body’s primary stress hormone, involved in energy regulation and inflammation.
- **Oestrogen** – often thought of as a ‘female hormone’, but it plays vital roles in men too, especially in the brain, bones and cardiovascular system.
- **Progesterone** – less prominent in men, but still important for brain health, mood regulation and as a precursor to other hormones.

These hormones, including testosterone, are essential to life, balance and long-term health, for both men and women.

What are androgens?

Testosterone is a type of hormone known as an androgen: a class of hormones that drive male characteristics and development. While they’re often called ‘male hormones’,

both sexes produce androgens, just in different quantities. Men primarily produce them in the testicles, while women produce smaller amounts in the ovaries and adrenal glands.

Androgens influence traits such as facial and body hair, muscle growth, libido and sperm production in men. In women, they support mood, bone density, libido and general hormonal balance. Other examples of significant androgens include dihydrotestosterone (DHT) and dehydroepiandrosterone sulphate (DHEAS).

These androgens work together in a finely balanced system. Not just the amount, but your body's *sensitivity* to them determine how you feel and function. That's why understanding testosterone, in context, is so important.

Where is testosterone made?

Around 95% of testosterone in men is produced in the testicles, specifically by specialised cells known as Leydig cells. These cells respond to signals from the brain (via luteinising hormone) to produce testosterone.

The remaining roughly 5% in men comes from the adrenal glands (small, triangular glands that sit on top of each kidney). The adrenal glands don't produce testosterone directly, but they release androgen precursors like DHEAS and androstenedione, which can be converted into testosterone in peripheral tissues such as fat and muscle. While this route contributes to overall androgen balance, its role in total testosterone levels is relatively minor in healthy men.

⊙ Key point:
A man's testosterone production depends primarily on healthy testicular function.

More than just testosterone: The role of Sertoli cells

The testicles don’t just make testosterone; they also contain Sertoli cells, which play a crucial role in sperm production (spermatogenesis). Sertoli cells support and nourish developing sperm cells and are essential for healthy male fertility.

Importantly, both testosterone and oestrogen are needed inside the testicles for sperm to mature properly. Testosterone acts directly on Sertoli cells to stimulate sperm production, while local conversion of testosterone into oestrogen also plays a key regulatory role in maintaining the right environment for fertility.

> ⊙ **Fertility insight**:
> You need testosterone inside the testicle, not just in the bloodstream, to make healthy sperm.

When testosterone is made

Men's testosterone production follows a diurnal rhythm, which means it varies over the course of a day in alignment with the body's internal clock. Levels typically peak in the early-morning hours, and gradually decline, reaching their lowest point in the evening. This rhythm is influenced by factors such as sleep quality, age and overall health, making it a dynamic process designed to maintain energy, mood and reproductive functions in men.

How testosterone is made

To produce testosterone, your body relies on a finely tuned system called the HPTA, short for the

hypothalamic–pituitary–testicular axis. This system acts as the command centre for testosterone production and male reproductive health.

The hypothalamus and anterior pituitary gland are two small but powerful control centres located deep inside your brain. Think of them as the masters of your hormone system. The hypothalamus sits just above the brainstem; it's about the size of an almond and acts like a coordinator, constantly monitoring your body's internal environment. When it detects something needs adjusting, like temperature, or hormone balance, it sends signals to the pituitary gland to respond.

The pituitary gland is located just beneath the hypothalamus, tucked behind your eyes, and it's often called the 'master gland' because it controls many of the body's other glands. The anterior pituitary, which is the front part of it, releases important hormones, including LH (luteinising hormone) and FSH (follicle-stimulating hormone), which then travel through the blood to the testes, telling them to produce testosterone and sperm.

⊙ **Key point**:
Even though testosterone is made in the testicles, the whole process is actually managed by the brain.

LH and the role of steroidogenesis

When luteinising hormone (LH) reaches the testicles, it binds to receptors on Leydig cells, triggering the production of testosterone through a process called steroidogenesis, a step-by-step biochemical conversion of cholesterol into testosterone. To do this, Leydig cells can use:

Cholesterol from the bloodstream (via low-density lipoprotein (LDL) particles)

Cholesterol stored inside the cell
Or even cholesterol they manufacture themselves.

In this process, cholesterol is gradually converted into testosterone via several intermediate hormones, including pregnenolone, progesterone, 17-hydroxyprogesterone and androstenedione. While these intermediates aren’t the final product, they are crucial steps and can also be directed into other hormone pathways depending on the body's needs.

The HPTA: The brain–testicle connection (Figure 2)

The hypothalamus releases gonadotropin-releasing hormone (GnRH).
The pituitary gland responds by releasing:

LH → Stimulates Leydig cells to make testosterone.
Follicle-stimulating hormone (FSH) → Supports sperm production.

The testicles produce testosterone.
Testosterone levels feed back to the brain to maintain hormonal balance.

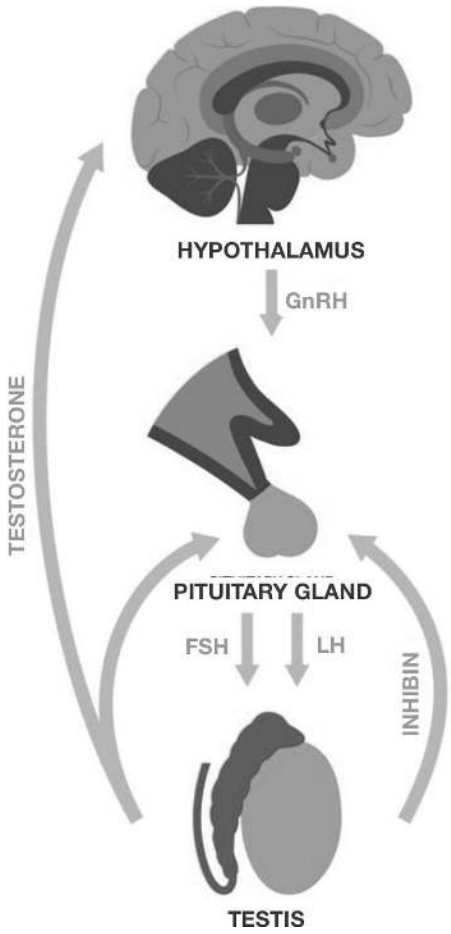


Figure 2: The HPTA

> ⊙ **Key point**:
> The HPTA does not operate in isolation. Any breakdown in this axis can impair natural testosterone production. It is deeply influenced by signals from the rest of the body, including other hormones, energy availability, stress levels, inflammation and overall health. We'll explore these interactions in more detail later – see page 85

TRT and the HPTA: What happens?

If a man goes on testosterone replacement therapy (TRT), the body receives testosterone from an external source