

A PLANT-BASED COACHING GUIDE FOR MEN

Strong Through the *Decades*

A science-checked manual for men from 35 on: what testosterone really does with age, how to train for muscle and heart, how to lose belly fat, and how to eat on plants to stay strong, lean and energized.

TESTOSTERONE EXPLAINED

TRAINING PROGRAMS

PLANT-BASED NUTRITION

EVERY CLAIM LABELED



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START HERE

Your Monday-morning start

If you read nothing else, do these steps this week. They carry most of the result in this guide, and each one points to the page that explains why.

TODAY · 20 MINUTES

- ☐ **Measure your waist** at the navel, take one photo, and write down your weight if you track it. A waist over 102 cm (40 in) is the guideline flag. **GUIDELINE**
- ☐ **Put three lifting days in your calendar** (for example Mon, Wed, Fri, 60 minutes). Pick Program A, B or C in Part 4.
- ☐ **Work out your protein number:** your weight in kg $\times$ 1.6 = ____ g (up to $\times$ 2.0 while dieting). **TRIAL**
- ☐ **Add 30–40 g of protein to breakfast** (tofu scramble, soy yogurt plus a scoop, tempeh). Part 5 has the food table.

THIS WEEK

- ☐ **Lift three times and log every session.** Add a rep or a little weight each week.
- ☐ **Count your steps for 7 days,** then add 1,000 a day.
- ☐ **Protect sleep and drinks:** same wake time every day, caffeine before noon, 0–2 drinks this week.
- ☐ **Vegan basics:** start B12 (at least 25 mcg a day or 2,000 mcg a week) and book blood work: lipids, HbA1c, vitamin D, B12, ferritin, thyroid (TSH). **GUIDELINE**
- ☐ **Know when to call a doctor:** three or more of fewer morning erections, low desire, erectile problems; or loud snoring with daytime tiredness. Part 3 explains what to ask for.

SKIP FOR NOW

Testosterone boosters, vitamin D for testosterone, and any crash diet. The evidence is weak, and the best-supported lever is losing excess body fat. Put that energy into lifting, protein and sleep.

AFTER FOUR WEEKS

Re-measure your waist, compare your lifts, and read Parts 1 and 3 with your own numbers in hand. Want help? The last page shows how to reach me.

BEFORE YOU START

Who this guide is for

Men in their late 30s, 40s, 50s and beyond who eat plant-based, or want to. You want straight answers about testosterone, training, fat loss and food: not fear, not supplements sold on a promise.

How to read the evidence in this guide

Every claim carries a label so you know how much weight to give it.

Label	What it means
TRIAL	Randomized controlled trials, or a pooled analysis of them. The strongest kind of evidence.
OBSERVED	Researchers measured people and found a link. Shows what goes together, not what causes what.
THEORY	A plausible mechanism that fits the data but is not proven in people.
GUIDELINE	Standard intake or medical advice from official bodies.
COACH	What works in practice with clients. No trial behind it, and we say so.

The hierarchy: come back to this order when it all feels complicated

- 1 Energy balance.** Eat a little less than you burn to lose fat, a little more to build muscle. Losing excess fat is also the best-supported way to raise testosterone. **TRIAL**
- 2 Resistance training, 3 times a week.** Nothing else protects muscle, bone and metabolism like it. **TRIAL**
- 3 Protein, about 1.6 g per kg a day** (1.6–2.0 g/kg while dieting), spread over 3–4 meals. Plant protein builds muscle as well as animal protein at the same dose. **TRIAL**
- 4 Sleep, fitness and alcohol.** Severe sleep apnea and heavy drinking are the ones that clearly hurt testosterone. **OBSERVED**
- 5 Everything else.** Supplements, meal timing, hacks. The last 5%.

A NOTE FROM LUCA

You do not need to fear carbohydrates, soy or your age. You need muscle, enough protein, decent sleep, a waist that is not growing, and a plan you can repeat for years. That is this guide.

PART 1

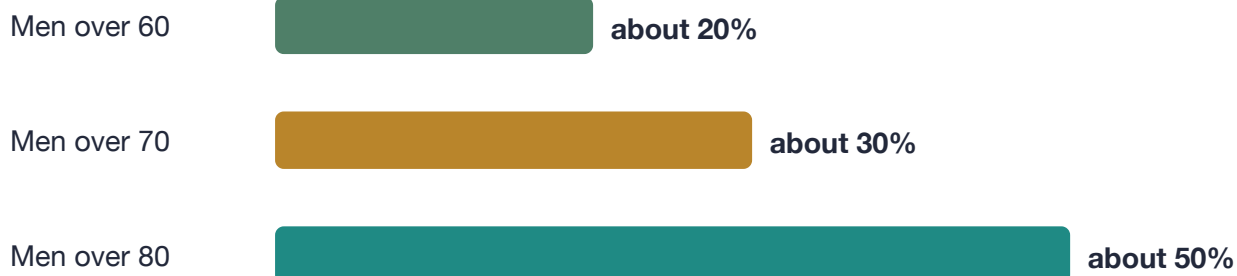
The hormones, honestly explained

Testosterone, insulin, cortisol. All three get blamed for belly fat and low energy, often wrongly. Here is what the research actually shows.

Testosterone: a slow slide, not a cliff

Testosterone drives muscle, bone, sex drive and energy. It does fall with age, but gradually. In the Baltimore Longitudinal Study (890 men followed over time), total testosterone fell by about 0.12 nmol/L a year. Using total-testosterone cut-offs, low levels were found in about 20% of men over 60, 30% over 70 and 50% over 80. **OBSERVED**

Men with testosterone in the low range, by age **OBSERVED**

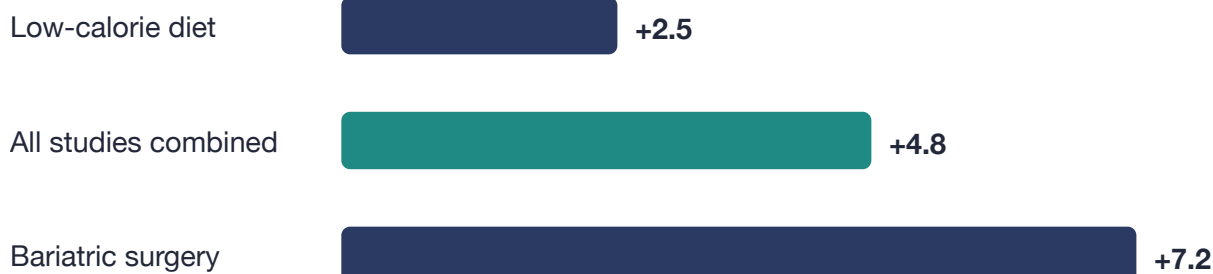


Baltimore Longitudinal Study of Aging, Harman 2001 (890 men), total-testosterone criteria. Bars start at zero. A low number on a blood test is not the same as having symptoms.

The larger European Male Aging Study (3,200 men aged 40–79) found that age explains only part of the picture: other, modifiable factors also move testosterone, which means some of the fall is preventable.

OBSERVED The biggest one we can quantify is body fat.

Testosterone gained after weight loss in men with obesity (nmol/L) **TRIAL**



Meta-analysis of 44 studies, 1,774 men (2024). Gains were larger the higher the starting BMI. Bars start at zero. Men were mostly studied over about 26 weeks.

HOW LOW TESTOSTERONE IS ACTUALLY DIAGNOSED

In the European Male Aging Study, late-onset low testosterone showed up as **at least three sexual symptoms** (fewer morning erections, low desire, erectile problems) **together with** a total testosterone below 11 nmol/L and free testosterone below 220 pmol/L. Fatigue and low mood alone did not track with testosterone levels. Cut-offs differ between populations: a Chinese study of 944 men found symptoms at higher levels, around 13 nmol/L. **OBSERVED**

So: a single "low" blood result with no symptoms is not a diagnosis. If you do have the symptoms, see a doctor and get two morning blood tests.

TAKEAWAY

Age lowers testosterone slowly. Body fat, severe sleep apnea and heavy drinking lower it faster, and these are the ones you can change. Do not take testosterone boosters on the strength of a symptom list.

Insulin: the misunderstood one

Insulin moves glucose into muscle and liver after you eat and tells fat cells to hold their stores. Around training that is useful. The viral claim is that insulin is the *only* fat-storing hormone, so carbs make you fat whatever your calories. That claim has been tested in metabolic wards where every bite is weighed.

Same calories, different carbs and fat: body fat lost per day **TRIAL**

Carbohydrate restriction



53 g/day

Fat restriction



89 g/day

Hall et al. 2015, Cell Metabolism: 19 adults with obesity, 6-day diets in a metabolic ward, same calories. Fat restriction gave the larger loss ($p = 0.002$). The authors' model predicts the gap shrinks over longer diets.

SCIENCE SPOTLIGHT: THE WARD TRIALS

2016. 17 men with overweight or obesity switched from a high-carb to a ketogenic diet at the same calories. The keto diet was not accompanied by more body-fat loss. **TRIAL**

2021. 20 adults ate freely from a plant-based diet (75% carbohydrate) and from a ketogenic diet, two weeks each. On the plant-based high-carb diet they ate about **689 fewer calories a day**. That was the trial's main measurement; it did not set out to compare fat loss. **TRIAL**

The debate, fairly stated. David Ludwig and colleagues (2021) argue high-glycemic carbs raise insulin and drive hunger; Kevin Hall and colleagues (2022) answer that the brain integrates many signals and insulin is one. Ludwig's side argues two-week trials are too short. Both agree calories matter.

LISTEN

Sigma Nutrition Radio #429: Kevin Hall and Stephan Guyenet on the carbohydrate-insulin model versus the energy-balance model. Search "SNR 429" in any podcast app.

TAKEAWAY

Insulin directs traffic; it does not choose the destination. Total energy, protein and training decide whether you gain or lose fat. A high-carb vegan diet is fully compatible with getting lean.

Cortisol and belly fat: a real link, not a settled cause

Cortisol has a job: its morning pulse wakes you and its spikes handle emergencies. Deep abdominal (visceral) fat also contains an enzyme, 11β -HSD1, that turns inactive cortisone into active cortisol inside the fat.

THEORY The human evidence is an association, and it was measured in men:

SCIENCE SPOTLIGHT

In 24 men, higher measured cortisol production went with more intra-abdominal fat but not more subcutaneous fat, and with worse insulin sensitivity (Andrew 2009). **OBSERVED** In Cushing's disease, where the body makes far too much cortisol, central obesity is a textbook sign. That shows extreme cortisol can do it; it does not show ordinary stress does.

TAKEAWAY

Managing stress and sleep is a sensible habit with a real mechanism behind it. It is not proven to be the cause of your belly, so do not let anyone sell it as one. Part 6 turns it into a protocol.

PART 2

Your 30s and 40s: bank muscle now

Testosterone is still doing its job, recovery is good and the waist has not yet taken over. This is the cheapest time to build the muscle and fitness you will spend later.

What is happening

Testosterone has started its slow decline, muscle gradually declines without training, and the first extra centimeters often appear around the waist. None of this announces itself. All of it is easiest to fight early.

Your three priorities

1. BUILD AS MUCH MUSCLE AS YOU CAN

Lift 3–4 times a week with progressive overload (more weight or reps over time), on full-body or upper/lower splits built from squats, hinges, presses, rows and pull-ups. Learn good technique now while your joints are forgiving. **COACH**

2. KEEP THE WAIST IN CHECK

Visceral fat is the fat linked to cortisol and insulin trouble, and weight loss is the best-supported way to bring testosterone back up in men with obesity (Part 1). A widely used guideline flags a waist over 102 cm (40 in) for men as high risk. **GUIDELINE** Measure at the navel, same day each week.

3. EAT LIKE SOMEONE BUILDING SOMETHING

- **Protein:** about 1.6 g/kg a day over 3–4 meals of 30–40 g. **TRIAL**
- **Stop chronic dieting.** Run a focused 8–12 week fat-loss phase at a moderate deficit, then eat at maintenance and build. **COACH**
- **Vegan foundations:** B12 (non-negotiable), vitamin D3 (test, then supplement), iodine (iodized salt), algae omega-3, and enough zinc. **GUIDELINE**

COACH'S NOTE

Think of muscle as a pension. A man who reaches 50 with more muscle and a smaller waist has more strength, better fitness and a lot more options. The deposits are cheapest now.

Checklist for this decade

- ✓ Strength training 3–4 times a week, logged, progressing monthly
- ✓ Protein target hit 6 days out of 7
- ✓ 8,000–10,000 steps most days
- ✓ 2–3 cardio sessions a week (30–45 min, conversational pace) plus one harder session if you enjoy it
- ✓ Sleep 7–9 hours; get checked if you snore and wake tired
- ✓ Annual blood work: lipids, HbA1c, vitamin D, B12, ferritin, TSH; blood pressure checked

Your 50s and beyond: protect what you built

The strategy stays the same, and the margins get tighter. Muscle needs more deliberate feeding and training, fitness matters even more, and some health checks stop being optional.

What is changing

- **Testosterone keeps drifting down**, faster in men with extra body fat (Part 1). **OBSERVED**
- **Muscle responds less to small protein doses** ("anabolic resistance"). Older men needed about 40 g of whey per dose to maximize muscle protein synthesis after lifting, versus 20 g in young men. **TRIAL**
- **Vegan diets can fall short on protein with age**. Older adults on self-selected vegan diets ate 20–28 g a day less protein and carried less muscle. Lifting offset it. **OBSERVED**
- **Sleep apnea matters**. Testosterone was clearly lower in men with severe sleep apnea, independent of age and weight (18 studies, 1,823 men). **OBSERVED**

When to see a doctor **GUIDELINE**

- Three or more of: fewer morning erections, low desire, erectile problems. Ask for total testosterone on two *morning* blood tests.
- Loud snoring, gasping, or tiredness all day despite a full night: ask about a sleep-apnea test.
- Chest pain, breathlessness on stairs, or a blood pressure reading that is persistently high.
- Any urinary change. Prostate checks (PSA) are a conversation to have with your doctor, not a DIY decision.

Exercise and erectile function: average score gain **TRIAL**

Exercise training vs usual care  **+2.9 points**

2025 meta-analysis of 12 randomized trials, 818 men with erectile dysfunction (95% CI 1.7–4.1). The gain was largest when exercise was combined with medication.

TESTOSTERONE THERAPY: WHAT THE BIG TRIALS SHOW

Testosterone therapy (TRT) is a prescription medicine for men with confirmed low testosterone, not a lifestyle product.

TRAVERSE, in men with confirmed low testosterone and raised heart risk: therapy did not increase major heart events compared with placebo (hazard ratio 0.96). Atrial fibrillation (3.1% vs 2.4%), blood clots in the lung (2.0% vs 1.5%) and kidney injury (2.3% vs 1.5%) were numerically more common, and **thick blood (erythrocytosis) was 17.0% vs 3.3%**. **TRIAL**

A pooled analysis of 23 trials (9,280 men, average age 65) found no increase in death, stroke or heart attack, but **heart-rhythm problems were more common (relative risk 1.53)**. **TRIAL**

In obese older men with low testosterone, adding testosterone to a diet-and-exercise program kept muscle and bone during weight loss but did not improve heart and metabolic markers further. **TRIAL**
Where low testosterone is tied to excess weight, fixing the weight comes first.

Verdict. Whether TRT is right for you is a decision for you and your doctor, based on symptoms, repeat blood tests, heart risk and your plans for children (ask about fertility before starting). Everything in this guide works with or without it.

Nutrition upgrades for this phase

- **Protein about 1.6 g/kg, and 30–40 g per meal**, with a full block of tofu, a generous tempeh serving or a scoop of protein. **TRIAL**
- **Fiber 30 g or more a day** from legumes, vegetables, fruit and whole grains. **GUIDELINE**
- **Calcium about 1,000 mg a day** (1,200 mg after 70), mostly from food: fortified soy milk, calcium-set tofu, tahini, kale. **GUIDELINE**
- **Vitamin D3 1,000–2,000 IU a day** after a blood test. **GUIDELINE**

Training: programs and principles

The principles first, then three ready-to-use programs (2, 3 or 4 days). Pick the one you will actually repeat for a year.

The principles

1. PROGRESSIVE OVERLOAD IS THE WHOLE GAME

Muscle adapts to rising demand. Aim for slightly more than last time: a rep, a little weight, a set. Log every session. If your numbers do not move over 4–6 weeks you are maintaining, which is fine sometimes but does not build. **COACH**

2. MORE SETS HELP, WITH DIMINISHING RETURNS

A pooled analysis of 67 studies (2,058 people, mostly young men) found more weekly sets gave more size and strength, with diminishing returns. Training frequency mattered little for size and somewhat for strength. A practical starting point is about 10–20 hard sets per muscle per week. **TRIAL**

3. COMPOUNDS FIRST, MACHINES WELCOME

Squat, hinge, press, row, pull, carry. Dumbbells, cables and machines build the same muscle with less joint stress. Use what lets you train hard without pain.

4. LIFTING IS ALSO HEART AND LONGEVITY MEDICINE

SCIENCE SPOTLIGHT

Across 10 cohort studies, any resistance training went with about 15% lower all-cause death, the largest benefit at roughly 60 minutes a week. **OBSERVED** A review of fitness studies (398,716 people) found unfit people at any weight had about double the death risk of fit normal-weight people, while fit people who were overweight were not at significantly higher risk. **OBSERVED**

Translation: train for fitness and strength, not just the scale.

5. CARDIO AND LIFTING TOGETHER

Doing both is fine for health. If maximal strength is the goal, lift first or separate the sessions by hours, because the interference is real but modest. **TRIAL** Two or three conversational-pace sessions a week cover heart health; add one harder session if you like it. **COACH**

6. STEPS ARE THE SILENT LEVER

In pooled data, each extra 1,000 steps a day went with about 9% lower death risk, with benefits flattening above roughly 12,500. **OBSERVED** 8,000–12,000 a day is the usual coaching target, and when fat loss stalls, steps have usually dropped first. **COACH**

Program A: 3 days a week (the sweet spot) COACH

Day	Session (60–75 min)	Sets × reps
Mon Full body A	Squat Bench press Bent-over row Romanian deadlift Farmer's carry	4×6–8 3×6–10 3×8–10 3×8–10 3 × 40 m
Wed Full body B	Deadlift or trap-bar deadlift Overhead press Pull-up or lat pulldown Walking lunge Ab wheel or plank	4×5–6 3×6–10 3×6–12 3×10/leg 3×10 / 45 s
Fri Full body C	Leg press or front squat Incline dumbbell press Seated cable row Hip thrust Dips or push-ups, curls	3×8–12 3×8–10 3×8–10 3×8–12 2×10–15

Rest 90–150 s on compounds, 60–90 s on accessories. Stop sets 1–3 reps short of failure. Add easy cardio Tue/Thu or Sat (30–40 min) and daily steps.

Program B: 2 days a week (minimum effective dose) COACH

Day	Session (60 min)
1	Squat 4×6–8 · Bench press 3×6–10 · Seated row 3×8–12 · Romanian deadlift 3×8–10 · Core 2×12
2	Deadlift 4×5–6 · Overhead press 3×6–10 · Pull-up or pulldown 3×6–12 · Lunge 3×10/leg · Carry 3 × 40 m

Two hard days beat four half-hearted ones. Add one easy cardio session and keep your steps up.

Program C: 4 days a week (upper/lower) COACH

Day	Focus
Mon	Lower: squat, Romanian deadlift, leg press, calf raise, core
Tue	Upper: bench press, row, overhead press, pull-up, triceps and biceps
Thu	Lower: deadlift, lunge, hip thrust, step-up, core
Fri	Upper: incline press, chin-up, cable row, lateral raise, arms

DELOADS

Every 6–8 weeks, or when sleep, joints or stress pile up, halve the volume for a week and keep the weights moderately heavy.

How to track progress beyond the scale

- ✓ **Strength log.** Are your lifts going up? That is progress, period.
- ✓ **Waist measurement** at the navel, same day each week.
- ✓ **Photos** in the same light and clothes every 2–4 weeks.
- ✓ **Sleep and energy** scored 1–10 each morning. Trends beat single days.

Stop diet-hopping **COACH**

Aggressive cuts cost muscle. The formula: a moderate deficit (300–500 kcal), enough protein, weights 3–4 times a week and patience. If the scale stalls for 3 weeks or more, change one variable, usually steps or calories, not everything at once.

Plant-based nutrition: the complete manual

Protein: plants work

Starting point: about 1.6 g per kg of body weight a day, and 1.6–2.0 g/kg while dieting. For an 80 kg man that is about 130 g a day, or 130–160 g in a deficit. Count the grams for a week; most men are below target, not above it. **GUIDELINE**

SCIENCE SPOTLIGHT: CAN PLANTS BUILD MUSCLE AS WELL AS MEAT AND WHEY?

In a randomized trial of untrained young men eating about 1.6 g/kg of protein, an all-plant diet (whole foods plus soy protein isolate) and a matched mixed diet (with whey) produced **the same gains** in muscle size, muscle-fiber size and leg-press strength. **TRIAL** A 2026 trial of adults on vegan or omnivorous diets doing resistance training found strength rose regardless of diet. **TRIAL** The lesson: protein source is not the limiter. Dose, training and consistency are.

Serving size and spread

Aim for 30–40 g of protein in each of 3–4 meals. An even spread is a reasonable habit but not a proven edge, so do not over-engineer it. **COACH**

Food	Serving	Protein (approx.)
Seitan	100 g	~25 g
Tempeh	100 g	~19 g
Extra-firm tofu	150 g	~18–22 g
Red lentils, cooked	200 g	~18 g
Edamame, shelled	150 g	~17 g
Fortified soy milk	500 ml	~16–18 g
Vegan protein powder	1 scoop (30 g)	~20–25 g
Chickpeas, cooked	200 g	~14–16 g

Approximate. Brands differ, so check the label.

THE 4-MEAL TEMPLATE

Four meals of about 30–40 g protein: a palm-and-a-half of protein, plenty of vegetables, a whole-grain or starchy carb and a thumb of healthy fat. Simple, repeatable, effective. **COACH**

The vegan micronutrient checklist GUIDELINE

A review of 141 studies found vegans' intake and status of B12, vitamin D, iron, zinc, iodine and calcium are generally lower than meat-eaters', and EPA/DHA are lower too. Check them rather than guess.

- **Vitamin B12:** at least 25 mcg a day or 2,000 mcg a week. Non-negotiable.
- **Vitamin D3:** test yearly; most men need 1,000–2,000 IU a day in fall and winter (vegan D3 comes from lichen).
- **Zinc:** 11 mg a day is the standard target for men; vegans may need more because phytates reduce absorption. Legumes, nuts, seeds, pumpkin seeds.
- **Iodine:** 150 mcg a day from iodized salt or a supplement.
- **Omega-3 (EPA/DHA):** 250–500 mg a day from algae oil.
- **Iron:** about 8 mg a day for men. Test ferritin before supplementing; men rarely need extra.
- **Calcium:** about 1,000 mg a day, from fortified soy milk, calcium-set tofu, tahini, kale.

The supplement stack: honest grades

Supplement	Dose	Evidence	Verdict
Creatine monohydrate	3–5 g/day	With lifting in older adults: small strength gain (11 trials, moderate certainty); muscle-mass gain not significant	If you lift
Vitamin B12	25+ mcg/day	Vegans must supplement	Non-negotiable
Vitamin D3	1,000–2,000 IU/day	Corrects deficiency. It did not raise testosterone in a pooled analysis of randomized trials	Test, then supplement
Zinc	to reach ~11 mg	Deficiency lowers testosterone; supplements help when deficient. Mostly animal and few human studies	Only if your diet is low
Algae omega-3	250–500 mg EPA/DHA	Fills a gap vegans commonly have	Reasonable
"Testosterone boosters"	—	No supplement has strong trial evidence of raising testosterone in men with normal levels. Ashwagandha has small trials and rare liver-injury reports	Skip

DOES SOY LOWER TESTOSTERONE?

In a small randomized trial (23 men), eating a high-soy diet did not change testosterone. TRIAL It is a small pilot, so it does not settle the question, but there is no trial evidence that soy foods lower testosterone, and they remain good protein staples.

PART 5 • CONTINUED

Sample days **COACH**

Templates for an ~80 kg man, not prescriptions. Protein is approximate; your coach adjusts portions to your weight, goal and phase.

Fat-loss day (~2,200 kcal • ~155 g protein)

Meal	What	Protein
Breakfast	Soy yogurt 300 g, 50 g oats, berries, 1 tbsp ground flax, 1 scoop vanilla protein	~40 g
Lunch	Tempeh 150 g bowl: 70 g dry quinoa, edamame, kale, tahini-lemon dressing	~46 g
Snack	Smoothie: 400 ml fortified soy milk, banana, 1 scoop protein	~36 g
Dinner	Seitan 100 g with 100 g lentils, roasted vegetables, 150 g potatoes	~37 g

Building day (~3,000 kcal • ~165 g protein)

Meal	What	Protein
Breakfast	Tofu scramble (250 g tofu), 3 slices whole-grain bread, avocado, nutritional yeast	~40 g
Lunch	Seitan 120 g burrito: tortilla, black beans, rice, salsa	~44 g
Pre-workout	Banana, 60 g oats, 1 scoop protein	~30 g
Dinner	Red lentil and chickpea curry (250 g lentils, 150 g chickpeas), 100 g dry rice	~41 g
Evening	300 ml fortified soy milk with cinnamon	~10 g

Eating out and traveling

- Anchor every restaurant meal on the protein: double tofu or tempeh, add edamame, pick the lentil or bean dish.
- Travel kit: protein sachets, roasted chickpeas, oat bars, a piece of fruit.
- One imperfect meal changes nothing. The week is the unit that matters.

PART 6

Sleep, stress, alcohol and recovery

Poor sleep and heavy drinking make training, eating and recovery harder. Here is what the evidence says about testosterone, and what is coaching practice.

Sleep and testosterone: what the pooled data say

Effect on testosterone, in standard deviations (negative = lower) **OBSERVED**

Short-term partial sleep restriction



-0.22 (not significant)

Total sleep deprivation (24 h+)



-0.64

Severe sleep apnea



-1.21

Meta-analysis of 18 studies, 252 healthy men (partial and total sleep deprivation, 2021); meta-analysis of 18 studies, 1,823 men (sleep apnea, 2022). Bars start at zero and show the size of the effect; they are standard-deviation units, not nmol/L.

Pooled data do not show that a few short nights lower testosterone, but total sleep loss does and severe sleep apnea clearly goes with lower levels, independent of age and weight. If you snore and wake tired, get checked. Beyond testosterone, short sleep also makes training and food choices worse. **OBSERVED**

Sleep habits **COACH**

- **Fixed wake time**, weekends too.
- **Morning daylight**: 5–10 minutes outside within an hour of waking.
- **Cool, dark, quiet** room, no screens for 30–60 minutes before bed.
- **Caffeine curfew**: nothing after noon.
- **Bad night, easy day**: cut volume 30–40%, walk, go to bed early.

Alcohol: the honest audit

A review found low-to-moderate alcohol does not lower testosterone, while heavy or chronic drinking does. **OBSERVED** Separately, a 2025 meta-analysis of 27 studies found alcohol delays and shortens REM sleep from about two standard drinks, worse with dose. **TRIAL** Alcohol also adds about 7 kcal per gram with no nutrition, and it is a classic reason the waist keeps growing. Many clients cut to 0–2 drinks a week for a fat-loss phase. **COACH**

Go deeper: podcast and papers

INSULIN AND OBESITY: THE SCIENTIFIC DEBATE

Sigma Nutrition Radio #429: Kevin Hall, PhD and Stephan Guyenet, PhD on the carbohydrate-insulin model versus the energy-balance model. Search "Sigma Nutrition Radio 429".

Key papers, by topic

- **Testosterone and age:** Harman 2001, Baltimore Longitudinal Study (PMID 11158037); Wu 2008, European Male Aging Study (PMID 18270261); Wu 2010, diagnosing late-onset hypogonadism (PMID 20554979).
- **Weight loss and testosterone:** meta-analysis of 44 studies (PMID 37345263).
- **Testosterone therapy:** TRAVERSE review (PMID 42364061); meta-analysis of 23 trials (PMID 40694252).
- **Sleep:** partial and total sleep deprivation (PMID 34801825); sleep apnea (PMID 34536053).
- **Alcohol:** review of effects on testosterone (PMID 36880700); alcohol and sleep meta-analysis (PMID 39631226).
- **Vegan lifting:** Hevia-Larraín 2021 (PMID 33599941); vegan vs omnivore training trial 2026 (PMID 42030574).
- **Supplements:** vitamin D and testosterone (PMID 42451097); zinc and testosterone (PMID 36577241); soy and testosterone (PMID 16775579); creatine in older adults (PMID 42712402).
- **Exercise and erectile function:** 2025 meta-analysis of 12 trials.
- **Insulin and fat loss:** Hall 2015, 2016, 2021; Ludwig 2021; Hall 2022. **Cortisol:** Andrew 2009.

Myth-busting questions

"Do I need testosterone therapy at my age?"

Only if you have symptoms and repeat morning blood tests that show low levels, and your doctor agrees it fits your heart risk and family plans. A low number alone is not a diagnosis.

"Can I raise my testosterone naturally?"

The best-supported move is losing excess body fat: testosterone rose by about 4.8 nmol/L on average after weight loss in men with obesity. After that, treating severe sleep apnea and avoiding heavy drinking. Supplements add little: vitamin D did not raise it, and zinc helps only if you are deficient.

"Does lifting raise testosterone?"

We did not find trial evidence that lifting raises resting testosterone. Lift for muscle, bone, heart and metabolic health, which are all well supported.

"Do vegans have low testosterone?"

We did not find a pooled analysis showing it. What we do know: vegan and mixed diets built the same muscle at the same protein dose, and the one small soy trial showed no testosterone change. Eat enough protein, zinc, B12 and calories.

"Does soy give men breasts or lower testosterone?"

No trial evidence supports either claim for normal soy food intake. The small trial we found (23 men) showed no change in testosterone.

"Do carbs spike insulin and make me store fat?"

In ward trials with matched calories, the higher-insulin diet did not cause more fat gain, and when people ate freely, a high-carb plant diet led to about 689 fewer calories a day than keto. Fear the sustained surplus, not the sweet potato.

"How fast will I see changes?"

Strength: 4–6 weeks. Visible body-composition change: 12–16 weeks of consistency. Anyone promising faster is selling something. **COACH**

"Can exercise help erections?"

Yes: in 12 trials (818 men with erectile dysfunction), exercise training improved erectile function by about 2.9 points, most when combined with medication. See a doctor first, because erectile problems can be an early sign of heart or hormone trouble.

REFERENCES

Every study cited

Each entry was checked against its published abstract. Find any of them by PubMed ID (PMID).

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READY FOR THE NEXT STEP?

You do not have to figure this out alone.

This guide gives you the map. A coach gives you the route: training matched to your age and your joints, nutrition targets that move as your body changes, and someone beside you when life gets in the way.

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Medical disclaimer. This guide is for education only and is not medical advice. It does not diagnose, treat or prevent any condition. Testosterone therapy, supplements and training changes should be discussed with your doctor, especially with heart disease, high blood pressure, diabetes, prostate or fertility concerns, or if you take medication. Stop and get checked for chest pain, breathlessness or pain beyond normal muscle soreness.