



— MYOSPAN GUIDE

The Muscle Longevity Guide

A practical framework for why muscle matters as we age and how protein quality, amino acid signaling, training, recovery, and daily habits work together to keep you strong for life. Backed by published science, with sources.

Protein

Amino acids

Training

Recovery

Daily habits

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Educational information only — not medical advice. See full disclaimer inside.

— WELCOME

A note before you start

For decades the protein conversation has been about grams — grams on the label, grams per scoop, grams per day. But your muscle doesn't respond to grams. It responds to a signal: the right amino acids, in the right amount, at the right time, in a body that can still hear them. That distinction is the heart of muscle longevity, and it's what this guide is about.

Everything here is grounded in published research, full citations can be found on the last page of this guide.

This guide is education, not medical advice

The information here is for general education only. It is not medical, nutritional, or clinical advice, has not been evaluated by the FDA, and is not intended to diagnose, treat, cure, or prevent any disease. Always talk to your physician before changing your diet, exercise, supplements, or medication — especially if you take a GLP-1, have kidney disease, or manage a chronic condition.

— WHY IT MATTERS

Muscle is a longevity organ

Muscle is often framed as a fitness goal, but it is much more. It supports mobility, metabolism, glucose regulation, recovery, balance, and independence. Loss starts in midlife and accelerates: after about age 30, adults can lose roughly 3–8% of muscle mass per decade, and strength fades even faster — around 12–15% per decade after 50. And it's not cosmetic: lower muscle strength is one of the most robust predictors of all-cause mortality in older adults.

3–8%

muscle lost per decade after 30

Cleveland Clinic

12–15%

strength lost per decade after 50

Harvard Health

2–5×

mortality risk with low fitness

JAMA Netw. Open, 2018

The goal is to keep more of your strength, capacity, and freedom — for longer.

Muscle lowers inflammation, and fitness predicts lifespan

When muscle contracts it releases signaling molecules called myokines — making muscle an endocrine organ that helps counter the chronic, low-grade inflammation that drives many diseases

of aging. And strength is only half the longevity equation: cardiorespiratory fitness ($\text{VO}_2 \text{ max}$) is among the strongest predictors of lifespan we have, with low fitness carrying a 2–5× higher mortality risk. Build strength and aerobic capacity.

The most important idea in this guide

Age-related muscle loss is largely not inevitable. Muscle is arguably the only organ you have direct, voluntary control over — and it stays responsive even if you haven't trained in years.

It is rarely too late to start

In a landmark study, frail adults averaging 90 years old did 8 weeks of strength training and gained an average of 174% in strength, ~9% in muscle size, and 48% in walking speed. If 90-year-olds can rebuild, so can you.

Fiatarone et al., JAMA, 1990

— THE MYOSPAN FRAMEWORK

Muscle longevity is a system

Protein matters — but muscle health isn't determined by grams alone. The body responds to a combination of nutrition signals, training stimulus, recovery, and habits you can repeat over time. Five inputs, working together:

01

Protein quality

High-quality protein supplies the amino acids your body uses to repair and maintain muscle tissue.

02

Amino acid signaling

Specific amino acids (especially leucine) activate muscle-building pathways and shape how the body responds.

03

Resistance training

Muscle needs a reason to adapt. Strength training creates the demand for repair and growth.

04

Recovery

Sleep, stress management, and rest give the body time to rebuild and restore resilience.

05

Daily habits

The best plan is the one you can sustain. Consistency turns the science into results.

Protein beyond grams

The WHO sets a 'safe' protein level of 0.8 g/kg/day for all healthy adults — but that's a floor to prevent deficiency, not to preserve strength. Research using newer methods suggests healthy older adults benefit from ~1.0–1.2 g/kg/day — and toward the higher end, up to ~1.5 g/kg, if they're inactive, ill, or recovering.

Younger adults build and maintain muscle more easily — their muscle responds to protein in an almost linear way. With age that response becomes blunted (anabolic resistance), so it takes more protein, and more leucine, per meal to flip the same switch. That's why the targets rise by decade — aim for this at each of three meals:

Age band	Daily protein	Protein / meal	Leucine / meal (the trigger)
Under 30	~1.0 g/kg	~25–30 g	~2 g
30–49	~1.0–1.2 g/kg	~25–30 g	~2.5 g
50–64	~1.0–1.2 g/kg	~30–35 g	~2.5–3.0 g
65+	~1.2 g/kg (more if inactive/ill)	~35–40 g	~3–4 g

Under 50 the targets barely move — anabolic resistance hasn't set in yet, so a 30-year-old and a 45-year-old build muscle about the same way. The real shift comes at 50 and again at 65, as each meal needs a bigger, higher-quality signal to get the same result.

Training changes how much you need

These targets assume your muscle can still respond — and that depends on movement. Being sedentary worsens anabolic resistance (even ~2 weeks of low activity blunts the response in older adults), so an inactive person needs more protein just to maintain — and gets less from each gram. Resistance training does the opposite: it re-sensitizes muscle to protein and keeps the building response elevated for 24–48 hours. The less you move, the more protein it takes just to tread water; the more you train, the more every gram works. Protein and training don't add — they multiply.

Leucine is the master switch — and quality varies

Leucine is the amino acid that flips muscle-building on. Animal proteins (whey, eggs, dairy, meat, fish) are most leucine-dense and score highest on DIAAS, the modern protein-quality measure; most single plant proteins score lower because they're low in a key amino acid — so combine sources (legumes + grains, or soy/pea blends) to raise the signal.

How much leucine you need rises sharply with age. A young adult needs only ~2 g per meal to flip the switch; older muscle needs far more — current research puts the threshold for adults over ~65 at roughly 3–4 g per meal, higher than long assumed and more than double what a typical breakfast delivers. That's why per-meal protein quality matters so much with age.

Eating plant-based?

It's absolutely doable. It just takes intention. Lean on soy (edamame, tofu, tempeh, soy milk), your most leucine-dense option; combine legumes with grains to complete the amino-acid profile; eat a bit more total protein per meal to offset lower digestibility; and a soy- or pea-based protein powder is the easiest reliable way to hit ~3 g leucine.

Food	Typical serving	~Leucine	Hits ~3 g alone?
Whey protein	1 scoop (~25 g)	~2.5–3.0 g	Yes — efficient
Chicken / turkey / lean beef	palm (~100 g)	~2.3–2.7 g	Nearly
Cottage cheese	1 cup	~2.6–3.0 g	Yes
Greek yogurt	1 cup	~1.2–2.0 g	Combine
Eggs	2 large	~1.1 g	No — needs ~5–6
Edamame / soybeans	1 cup	~2.8 g	Nearly (best plant)
Lentils / beans	1 cup	~1.3 g	No — combine

What to pay attention to

- Quality: does the protein source provide a strong amino acid profile?
- Distribution: are you spreading protein across breakfast, lunch, and dinner — not saving it all for dinner?
- Signal strength: are meals giving enough of the right amino acids to cross the muscle-building threshold?
- Consistency: can you repeat the pattern on a normal workday, travel day, or stressful week?

The supporting cast — and an honest frontier

- Arginine boosts blood flow to muscle (a nitric-oxide precursor) but doesn't itself build muscle — think delivery, not construction.
- Methionine restriction extends lifespan in animals, creating a real tension with high-protein eating; human evidence is early. We flag it, we don't prescribe it — the future is signal quality and balance, not one dial.

— THE OTHER HALF

Training and recovery work together

Resistance training creates the demand for adaptation; recovery gives the body the environment to respond. One without the other is incomplete. For longevity, training doesn't need to look like bodybuilding — it should be sustainable, progressive, and built around the strength you want to preserve: standing up, carrying, climbing, balancing, pushing, pulling.

- Strength-train 2–3×/week, full-body, with progressive overload.
- Train for power, not just strength: add some fast, explosive reps and balance work — power fades faster than strength and better predicts staying steady on your feet.
- Build VO max with aerobic work — even brisk walking with some harder intervals.
- Recover on purpose: muscle is built during rest, not the workout. Protect sleep; ~48 hours before training the same muscle hard again. Constant soreness is not progress.

— GO DEEPER

Six levers that protect muscle

Underneath the habits sit six mechanisms that actually decide whether you keep muscle as you age. Pull all six — they reinforce each other.

¹ Hit the per-meal threshold

~30–45 g of high-quality protein in one sitting clears the leucine trigger and switches on mTORC1, the master growth signal — overcoming age-related anabolic resistance.

² Load heavy enough for fast-twitch

Aging selectively shrinks Type II (fast-twitch, power) fibers. Only challenging, progressive resistance — real mechanical tension — rebuilds them and their stem cells. Easy movement won't.

³ Protect your sleep

Asingle poor night raises cortisol and cuts the muscle-building response to protein by ~18%; chronic short sleep tips you toward muscle loss. Aim for 7–9 hours — training partly offsets a bad night.

⁴ Lower chronic inflammation

'Inflammaging' suppresses protein synthesis and blunts muscle stem cells. Calm it with regular exercise, omega-3s and good sleep. Skip high-dose antioxidant pills around training — they can blunt adaptation; get antioxidants from food.

⁵ Break up sitting

Long sitting worsens anabolic resistance and lets muscle capillaries — your amino-acid delivery system — decline. Short 'movement snacks' (a few minutes of walking or sit-to-stands each hour) keep blood flow and the nerve-muscle link alive.

⁶ Fuel the cell (mitochondria)

Your muscle's energy comes from mitochondria, which decline with age. Exercise is the most powerful way to rebuild them — supported by enough total energy and key micronutrients, especially magnesium, which underpins muscle energy metabolism.

The short list of supplements worth considering

Most supplements are noise. A few have real evidence for muscle as you age: creatine monohydrate (~3–5 g/day) – the most proven, safest and cheapest adjunct to resistance training; vitamin D – worth correcting if you're low (common after 50); and omega-3s. Get magnesium and antioxidants from food, and skip high-dose antioxidant pills around training.

Don't out-diet your muscle

Aggressive dieting (or a GLP-1) without enough protein burns muscle along with fat. In a meaningful calorie deficit, push protein toward the higher end (~1.6–2.0 g/kg) and keep lifting – done right, you can lose fat and even gain lean mass at the same time.

— SELF CHECK

Your muscle longevity self-check

A quick reflection—not a medical assessment. A simple way to spot which inputs may deserve more attention.

☐ I eat protein at breakfast most days.

Breakfast is often the easiest place to improve daily protein distribution.

☐ I do resistance training at least twice per week.

Training creates the stimulus muscle needs to adapt.

☐ I recover well enough to feel ready most days.

Sleep and stress change how well your body responds.

☐ I have a repeatable plan for busy weeks.

Adherence matters more than the perfect plan you can't maintain.

☐ I track at least one meaningful marker.

Strength, body composition, energy, or recovery can guide decisions.

☐ I know why maintaining muscle matters to me.

The strongest systems connect the science to a reason you care about.

Start with one

You don't need to check every box. Pick the one input that would make your week easiest to repeat – and start there.

SPECIAL CASE

If you're on a GLP-1 (Ozempic, Mounjaro, Zepbound)

These medications are powerful tools for fat loss, but rapid weight loss has a catch: a meaningful

share of the weight lost can come from lean mass, which includes muscle — in some trials up to around 40%. Don't stop your medication; protect muscle while you lose fat, which matters even more when appetite is suppressed.

- Prioritize high-signal protein FIRST at every meal — hit your age's leucine threshold even while eating less.
- Resistance-train 2–3×/week to give your body a reason to keep the muscle.
- Track strength, not just the scale. A leaner, stronger you is the goal — not a smaller, weaker one.

START HERE

A 7-day starter plan

A simple first week to help you notice your patterns and begin building a system.

DAY 1 Write down why muscle longevity matters for your next decade and choose one at-home muscle age baseline test, such as the 30-Second Chair Stand, to track.

DAY 2 Audit protein distribution across all three meals and note where intake falls thin or fails to clear the leucine threshold, often around 30–45 g of high-quality protein.

DAY 3 Complete one 20-minute full-body bodyweight strength session, using squats, bridges, and planks, to re-sensitize muscle tissue to protein signaling.

DAY 4 Plan one highly convenient, high-leucine protein backup, such as whey isolate or Greek yogurt, to help hit your meal threshold on your busiest day.

DAY 5 Notice sleep quality and afternoon energy slumps, then identify where sedentary sitting blocks may be contributing to muscle capillary stagnation.

DAY 6 Intentionally execute one 2-minute movement break during a long sitting block to re-activate nerve-muscle links and Type II fast-twitch fibers.

DAY 7 Reflect honestly on what felt easiest this week, keep that habit locked in, and choose your next small upgrade across the six levers.

Want a more personal system?

The Muscle Longevity System is Myospan's small, guided program for adults who want personalized support with protein, training, recovery, and sustainable healthy-aging habits.

Apply at myospan.co

Small cohort. Real, founder-led work.

— CHECK IT YOURSELF

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