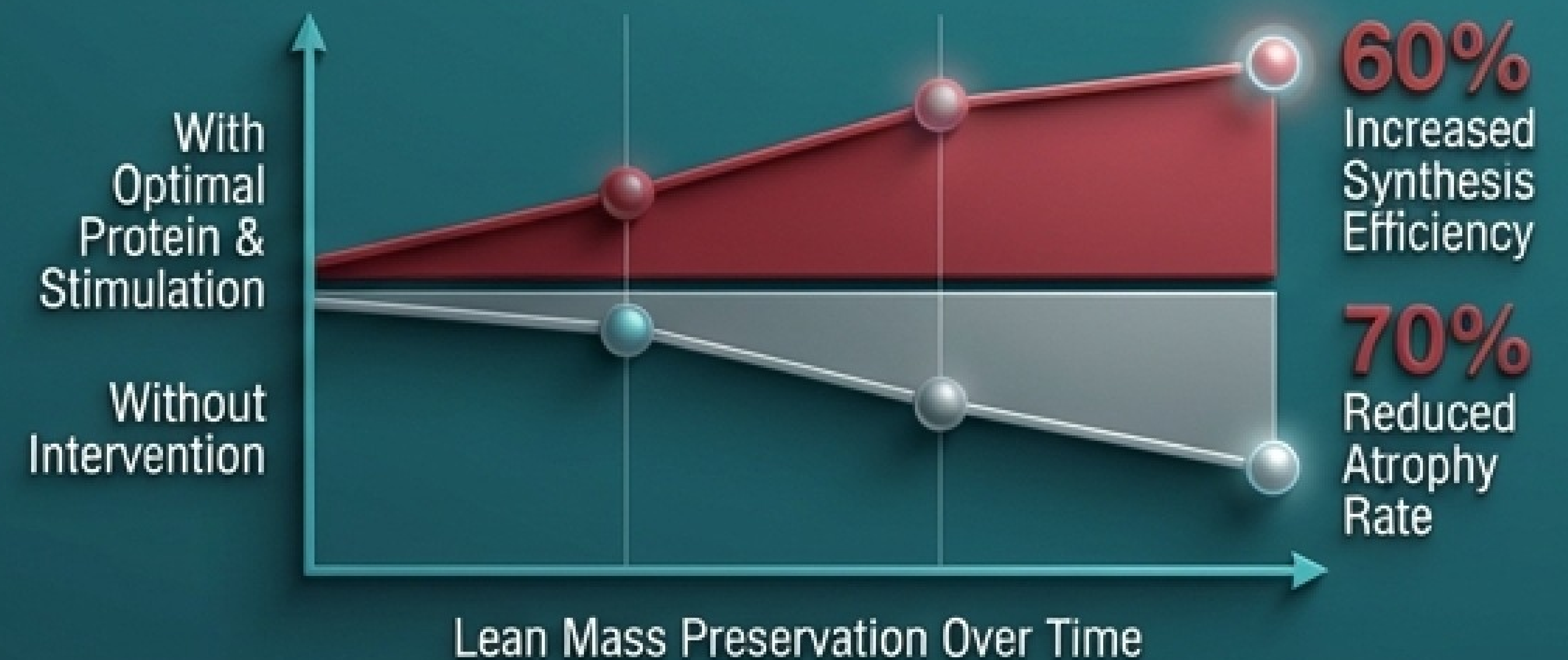
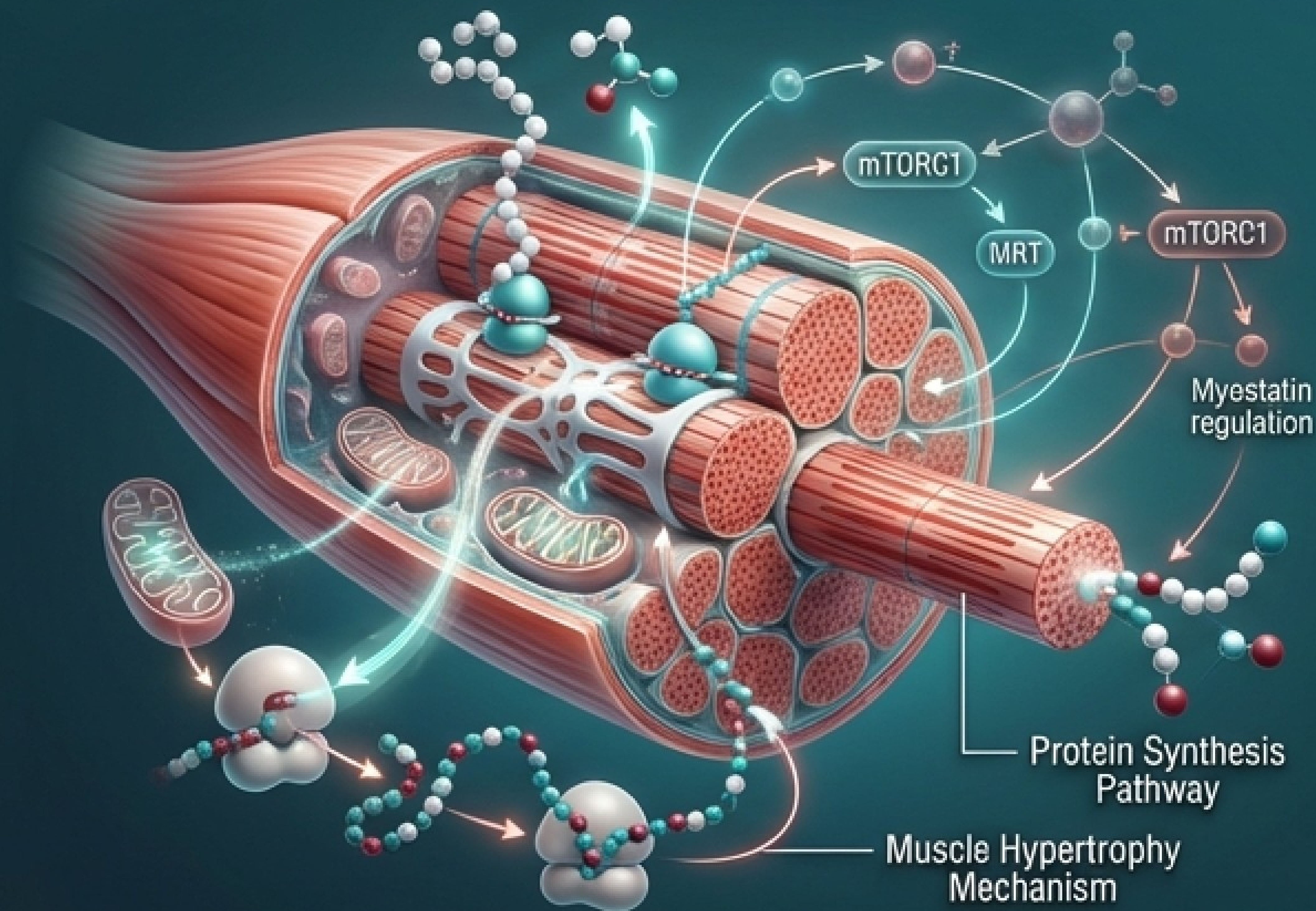


Protein Synthesis & Lean Mass Preservation: The Biology of Building and Keeping Muscle

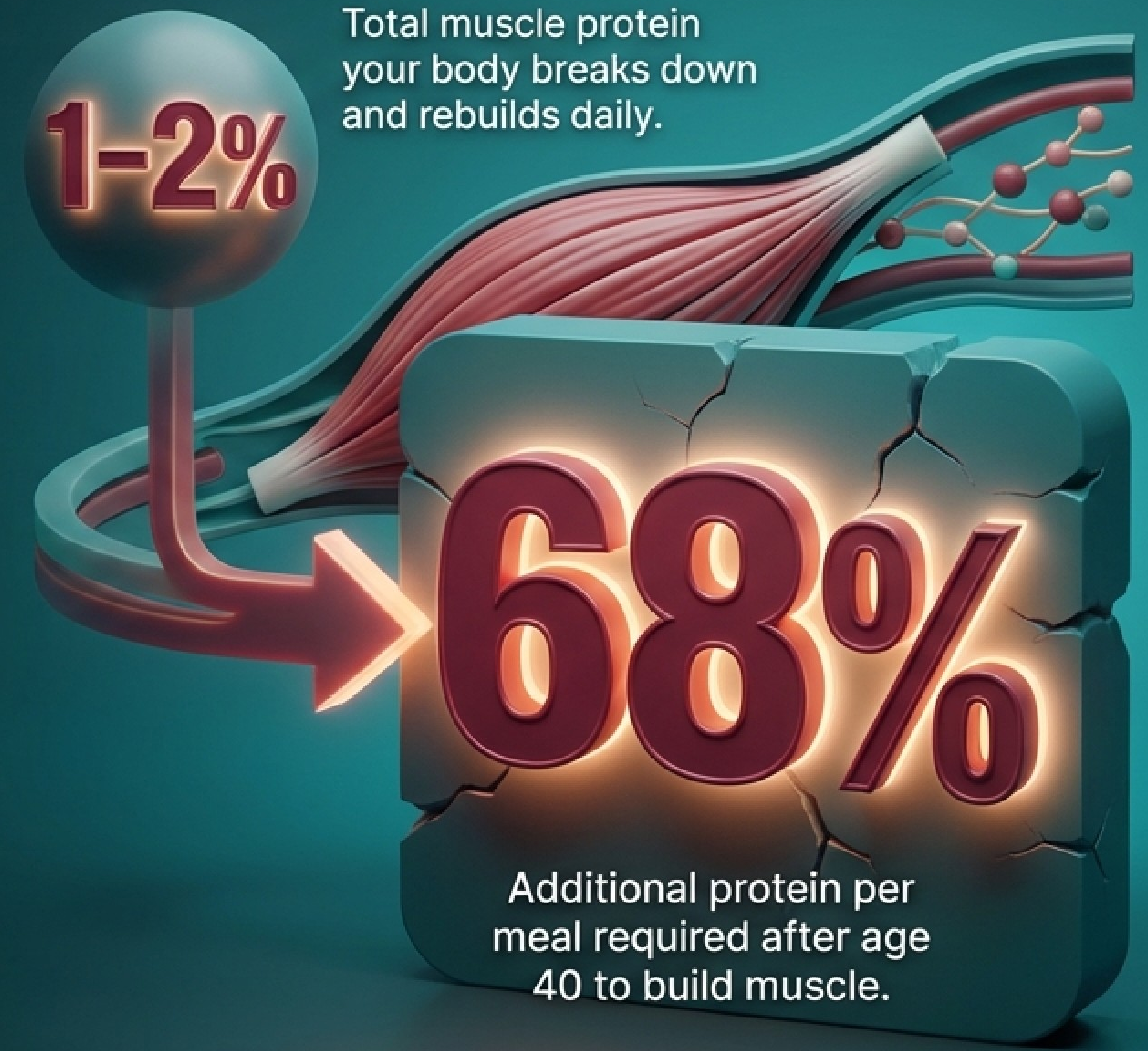
Zvia Weight Loss & Medspa | Biological Science



- Cellular mechanisms drive the assembly of amino acids into contractile proteins.
- Sustained protein intake and mechanical tension are critical for hypertrophy.
- Molecular signaling pathways (e.g., mTOR) regulate protein balance and growth.
- Lean mass preservation is vital for metabolic health, strength, and longevity.
- Counteracts age-related sarcopenia through targeted biological interventions.

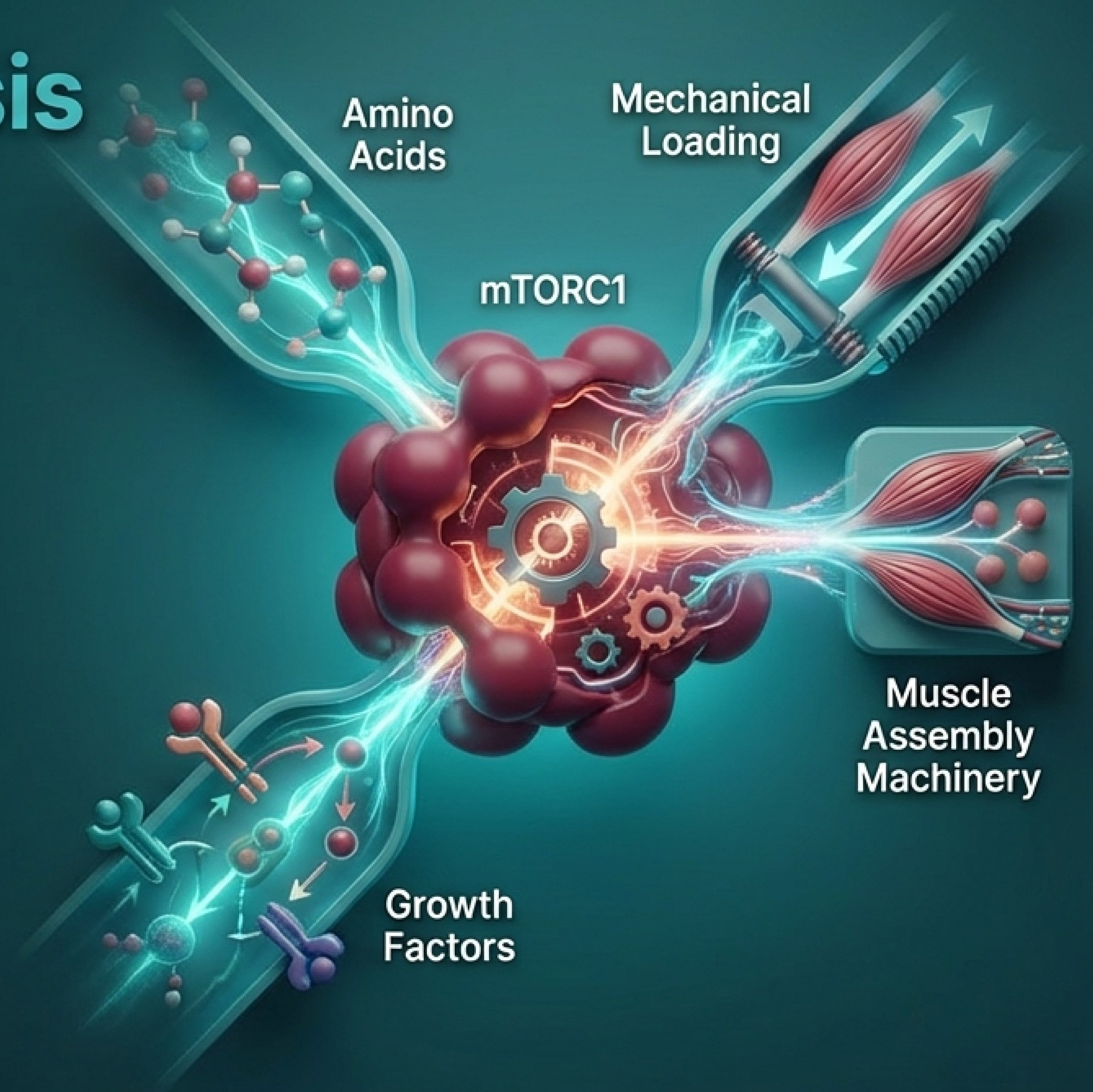
What You're Experiencing

- You're losing weight, but not feeling stronger.
- The scale moves, but body shape doesn't match the effort.
- You're doing everything right—but your biology has shifted.
- Anabolic resistance changes how your body processes protein.



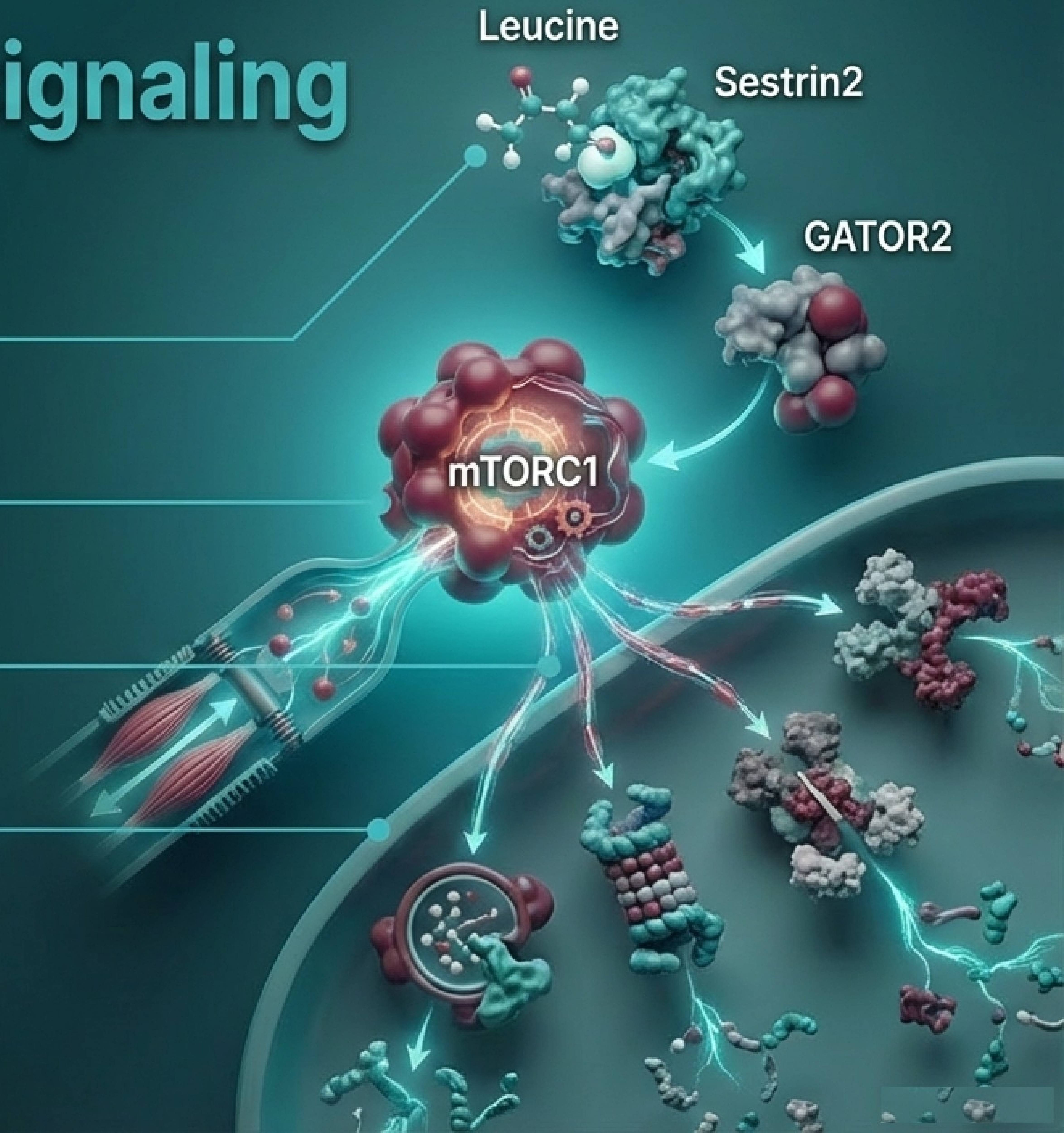
How Protein Synthesis Works in Your Body

- Your muscles are never static; they constantly rebuild through protein turnover.
- mTORC1 is the molecular master switch for building new protein.
- It requires three signals: amino acids, growth factors, and mechanical loading.
- When aligned, mTORC1 activates the machinery to assemble new muscle.



The Biology: mTORC1 Signaling and Protein Turnover

- Leucine binds Sestrin2, releasing GATOR2 to activate mTORC1.
- Active mTORC1 initiates translation of new contractile muscle proteins.
- Four degradation pathways break down proteins when signals are absent.
- Net muscle mass equals the daily balance of synthesis versus breakdown.



Multi-System Impact

mTORC1 Signaling

- Leucine-Sestrin2 activation → New contractile protein assembly.

Protein Degradation

- Ubiquitin-Proteasome balance → Controlled turnover vs. excess loss.

Hormonal Regulation

- Testosterone, IGF-1, cortisol → Anabolic-catabolic balance.

Inflammatory Modulation

- TNF- α , IL-6, NF- κ B → Support or impair synthesis efficiency.

Lifestyle Interactions: Working With This Biology



- Nutrition: **25–40g** protein across 3–5 meals meets the leucine threshold.



- Resistance Loading: Activates mTORC1 through unique mechanotransduction pathways.



- Sleep: One night of deprivation reduces synthesis **18%**, spiking cortisol.



- Omega-3s: EPA/DHA enhance cell membrane response to dietary protein.

How This Biology Unfolds Over Time



Peak Capacity (Ages 18–35)

- ~20g protein maximally stimulates synthesis.
- Robust exercise recovery.

Emerging Resistance (Ages 35–55)

- Dose-response shifts right.
- 35–40g protein now required per meal.

The Adaptation (Ages 55+)

- 0.5–1.0% annual muscle loss naturally.
- Machinery still responds to higher doses.

Amplify Your Results: Supporting Your Biology

- **Nutrition:** Target **3–4g** of **leucine** per meal for adults over 40.
- **Activity:** Pre-meal physical activity restores youthful anabolic sensitivity.
- **Recovery:** Poor sleep triggers the FoxO-MuRF1 protein degradation axis.



“Understanding this biology transforms weight loss from a scale exercise into a body composition strategy.”



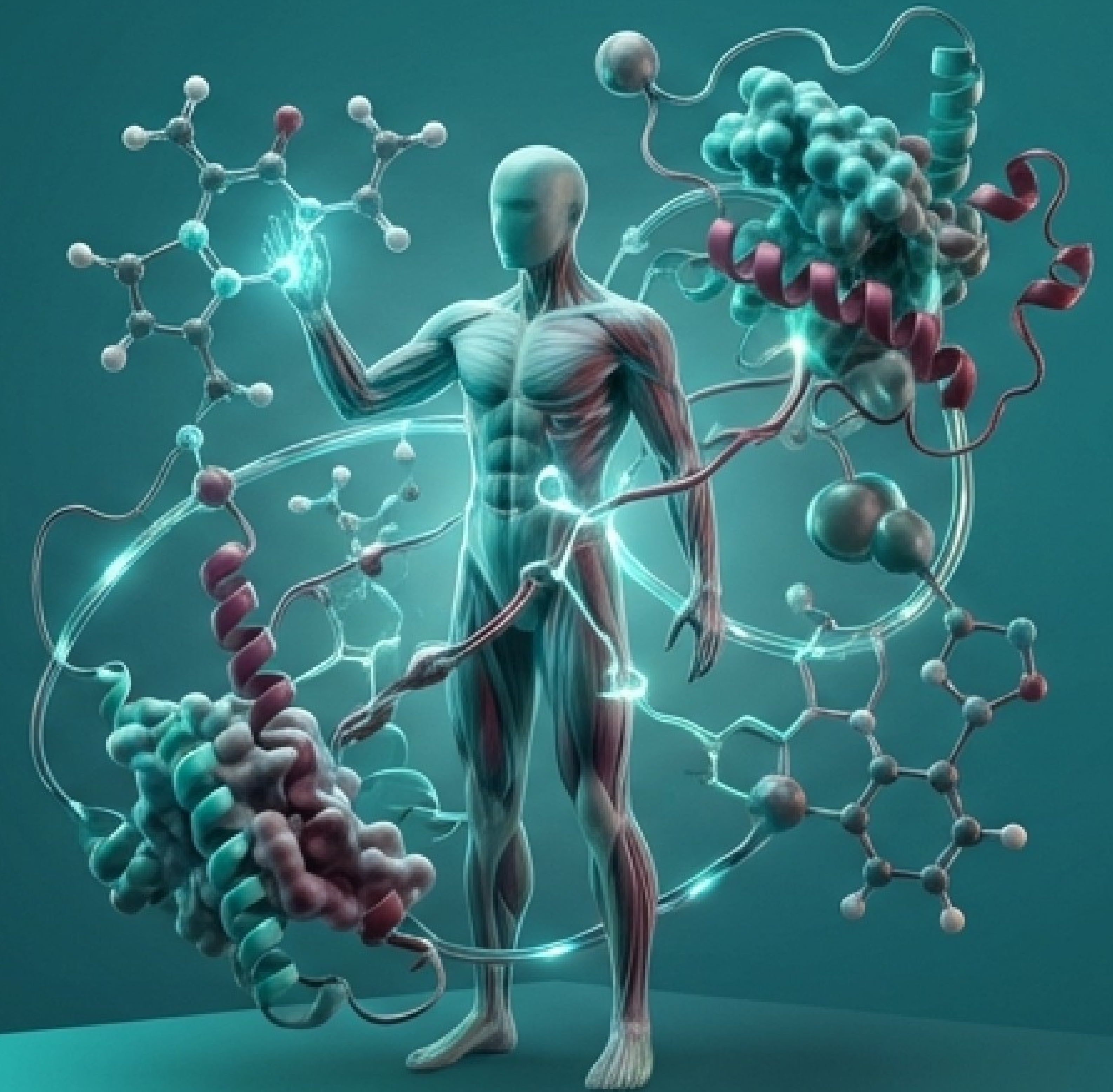
Who Benefits Most From This Science

- **Adults over 40** noticing body composition shifts despite consistent habits.
- **Weight loss patients** wanting to preserve metabolic tissue alongside fat loss.
- **Perimenopausal women** whose estrogen decline impairs exercise synthesis response.
- **Plateaued active adults** requiring recalibration for anabolic resistance.



Your Zvia Team

- Your **Zvia provider** understands the **molecular biology** driving your body composition.
- We help identify where your protein synthesis biology stands—and what **evidence-based strategies** apply to your specific goals.



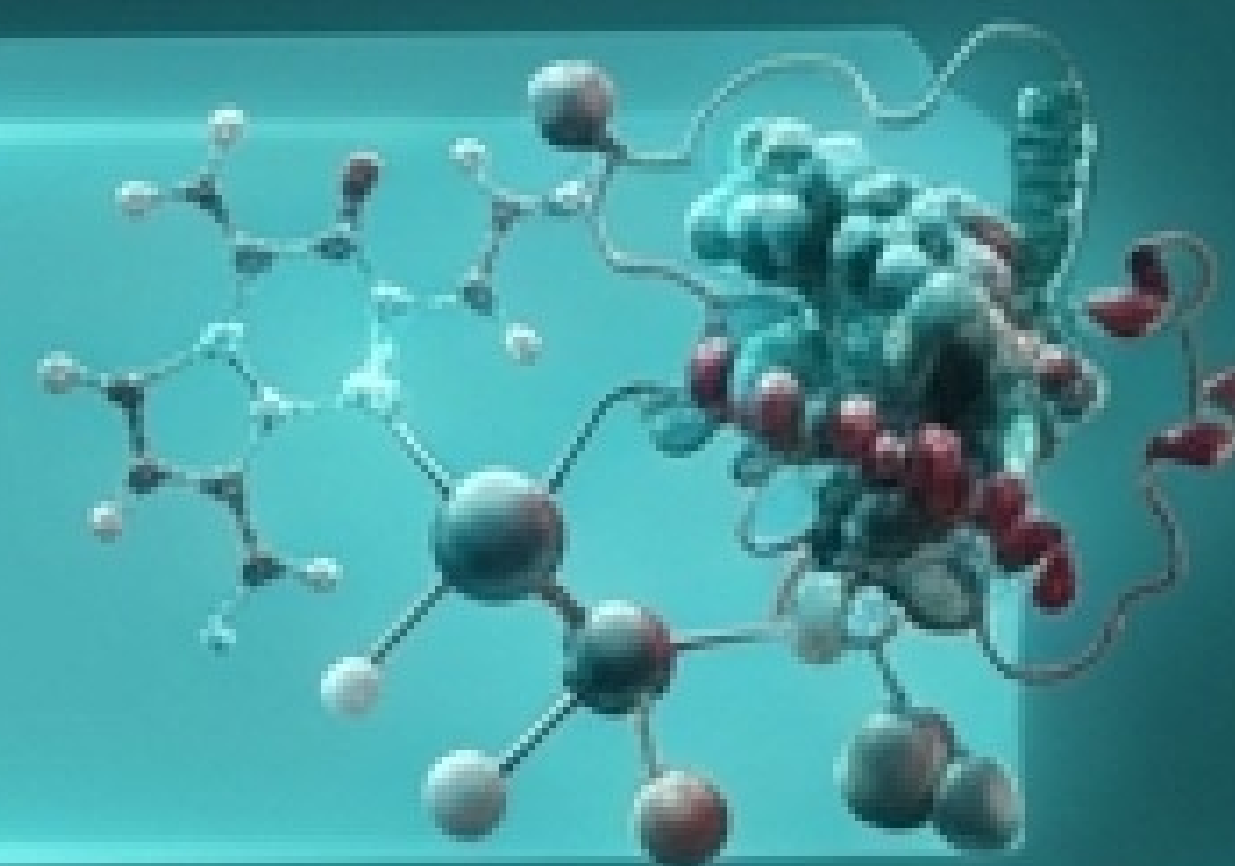
**“Understanding the science is the first step.
Working with a team that understands it
deeply is the second.”**

The Zvia Difference

- generic wellness advice



- **Science-forward education**



- scale-weight focus



- **Body composition focus**



- one-size-fits-all recommendations



- **Provider-guided strategy**



- trend-driven advice



- **Evidence-based approach**



Ready to Take the Next Step?

You've learned the science. Let's talk about what this looks like for your specific biology, your goals, and your life stage.

Schedule your consultation with the Zvia team.

Zvia Weight Loss & Medspa

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