Peptide Perspectives

BEYOND TRAINING

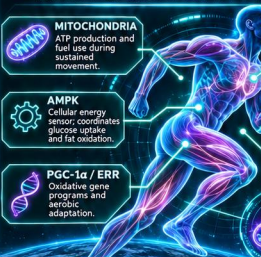
Can Peptides Influence Endurance, Stamina & Exercise Adaptation?

From mitochondrial signaling to experimental exercise mimetics, researchers are investigating what helps muscles sustain effort — while asking whether any pathway can truly reproduce the full benefits of training.

ENDURANCE IS AN ADAPTATION

- Endurance reflects coordinated changes in heart, lungs, blood vessels, muscle, nerves, and fuel use.
- Stamina is a broader term that includes fatigue tolerance and recovery.
- A single hormone or lab marker does not define performance.
- A treatment that mimics part of exercise biology is not the same as exercise itself.

HOW EXERCISE CAPACITY IMPROVES



MITOCHONDRIA
ATP production and fuel use during sustained movement.

AMPK
Cellular energy sensor; coordinates glucose uptake and fat oxidation.

PGC-1α / ERR
Oxidative gene programs and aerobic adaptation.

VO_2MAX & OXYGEN DELIVERY
Heart, lungs, circulation, and muscle use of oxygen.

GH / IGF-1 AXIS
Endocrine signaling linked to tissue biology, but different from classic exercise-mimetic pathways.

Exercise performance depends on whole-body physiology, not one molecule.

EIGHT COMPOUNDS RESEARCHERS ARE EXPLORING

EXERCISE-PATHWAY / MITOCHONDRIAL RESEARCH



1. MOTS-c
- Mitochondrial-derived peptide.
- Linked to AMPK-related metabolic adaptation.
- Endogenous levels rose after exercise in a small human study.
- Mouse studies suggest improved physical capacity.
- No proven administered-human endurance benefit.



2. SLU-PP-332
- Non-peptide ERR agonist.
- Mouse study reported ~70% longer running time and ~45% greater distance.
- No controlled human endurance trials.



3. AICAR
- Non-peptide AMPK-related research compound.
- Classic mouse study reported ~44% greater endurance.
- No validated human performance benefit.
- Banned in sport.



4. SS-31 (ELAMIPRETIDE)
- Cardiolipin-binding mitochondrial peptide.
- FDA accelerated approval for Barth syndrome only.
- Not established as a healthy-athlete endurance enhancer.

GH-RELATED / ENDOCRINE PATHWAYS



5. CJC-1295
- GHRH analogue.
- Raises GH and IGF-1 in small human studies.
- No demonstrated VO_2max or endurance improvement.



6. IPAMORELIN
- Ghrelin receptor peptide.
- Triggers GH release.
- No convincing human evidence for aerobic performance or recovery.



7. TESAMORELIN
- FDA-approved GHRH analogue for excess abdominal fat in HIV-associated lipodystrophy.
- Not approved for endurance or fitness enhancement.



8. MK-677
- Oral non-peptide ghrelin receptor agonist.
- Increased fat-free mass in older adults but did not improve strength or physical function.
- Glucose concerns.

WHAT THE EVIDENCE SHOWS

- Mouse treadmill results can be dramatic, but do not predict human outcomes.
- Endogenous exercise responses do not prove injected-compound benefits.
- Raising GH / IGF-1 does not automatically improve stamina or recovery.
- Human outcomes that matter include VO_2max, time to exhaustion, function, fatigue, and recovery.

WHERE THE SCIENCE IS HEADING

- Help people who cannot exercise normally.
- Match therapies to the right biological limitation.
- Measure real-world function, not biomarkers alone.
- Integrate training, recovery, sleep, and nutrition.

EVIDENCE TAKEAWAY

- Biological plausibility is not proven performance enhancement.
- Several highlighted compounds are investigational or non-peptides.
- Evidence levels vary widely from mouse studies to limited human data to narrow FDA approvals.
- Educational overview only; not medical advice.

Educational infographic based on the Peptide Perspectives article "Beyond Training: Can Peptides Influence Endurance, Stamina, and Exercise Adaptation?" Reviewed November 2026.