Boosting Longevity with AMPK

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Welcome to Issue 46 of Science Says! Our weekly newsletter where you'll learn the latest healthy aging and C15:0 research news that our team of doctors, scientists, and experts are most excited about—without having to go search for it.

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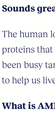

What Dr. Stephanie Venn-Watson, our co-founder and author of over 80 peer-reviewed scientific publications, is reading.

HEALTHY AGING

AMPK puts the "amp" back into your cells

The ability to reverse aging is no longer science fiction. Sounds too good to be true? In this series, we are talking about the latest peer-reviewed science on how slowing, and even reversing aging is becoming a reality.

This week, let's talk about the heart of the longevity pathway: AMPK.

Sounds great! What is the longevity pathway?

The human longevity pathway is a map of genes and proteins that determine how long we live. Scientists have been busy targeting various parts of the longevity pathway to help us live longer - and healthier.

What is AMPK?

AMP-activated protein kinase (aka AMPK) is an enzyme that serves as our ultimate cell and body balancer. AMPK sits at the heart of the human longevity pathway, and numerous studies in relevant models have shown that activation of AMPK results in extended longevity. As described by Ge et al., here are just a few of the things that AMPK does to support long and healthy lives:

- **Balances metabolism.** AMPK ramps up cellular metabolism, lowers blood glucose, and blocks abnormal glucose production. Due to these metabolic benefits, AMPK activators have been used to successfully manage and treat type 2 diabetes.
- **Supports vascular health.** AMPK helps to calm inflammation in blood vessels, lower unhealthy lipids, and reduce vessel injury, resulting in improved cardiovascular health.
- **Protects brain health.** AMPK is considered neuroprotective due to its anti-inflammatory and cell-protective effects in the brain.

These broad and beneficial activities of AMPK explain why the hunt for the holy grail of healthy aging includes AMPK activators.

I'm in. What amps up AMPK?

As we get older, AMPK is less activated, resulting in... well, feeling older. Due to AMPK's key role in supporting long and healthy lives, Tarasiuk et al. review how different molecules may help to keep this critical longevity pathway up and running.

- **Some molecules turn *down* mitochondrial energy (aka ATP) to turn up AMPK.** While this may seem counterintuitive, turning down mitochondria triggers a warning: 'Cell energy is down, get to work turning it back up!' This is how metformin *indirectly* ramps up AMPK.
- **Other molecules *directly* activate AMPK.** Direct AMPK activators are promising because they don't have to turn mitochondrial energy down. While aspirin is a direct AMPK activator, it has a bucket of side effects when used long term.
- **Lastly, there are molecules disguised as AMP or ADP.** For example, cordycepin mimics AMP to effectively turn up AMPK. This molecule originates from the Cordyceps militaris fungus that takes over insects' bodies to turn them into zombies. So, there's that.

In summary, there are many exciting advancements being made around AMPK activators that may help to extend our healthspan, and possibly our lifespan, too. The goal? To find an AMPK activator that does not have to turn down our mitochondrial ATP, is orally bioavailable, super safe, and effective.

C15:0 activates AMPK (with all that other good stuff, too)

The fact that a nutrient naturally activates AMPK makes a lot of sense, right? AMPK is a powerful sensor that tells our cells to ramp up metabolism, which should be triggered when we eat certain nutrients.

As a healthy fat, C15:0 (aka pentadecanoic acid) not only helps to *boost* ATP-energy production by our mitochondria, Fu et al. demonstrated that C15:0 also helps to directly activate AMPK. Here are the key takeaways from their peer-reviewed article in *Food Nutrition Research:*

- **C15:0 directly activates AMPK** by phosphorylation of this key enzyme. No down-activation of mitochondria needed.
- **C15:0 improves glucose uptake by cells.** By activating AMPK, Fu et al. showed that C15:0 significantly improves healthy glucose uptake by cells. This helps to support healthier glucose blood levels.
- **C15:0 enhances response to insulin.** C15:0 has an insulin-sensitizing effect on cells, reversing a key driver of imbalanced metabolism.
- **C15:0 supports healthy metabolism.** Demonstrated AMPK-activating effects of C15:0 on glucose metabolism and insulin sensitivity explain why people with higher C15:0 levels have healthier long-term metabolism.

These AMPK boosting benefits add up to supporting our overall health. Importantly, as a nutrient, C15:0 is both orally bioavailable and safe. Stay tuned as the science world learns more about C15:0's role as an AMPK activator and supporter of longer, healthier lives.

Have a wonderful week, everyone!

Dive deeper into the science

READ THESE STUDIES

- Ge et al. Role of AMPK in healthy aging
- Tarasiuk et al. AMPK-activating molecules
- C15:0 has remarkable ATP-generating capabilities
- C15:0 repairs mitochondrial function
- Fu et al. C15:0 activates AMPK
- Check out all the C15:0 science at www.DiscoverC15.com