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C15:0 Science Round-Up Series: How C15:0 Protects our our MIC (that's mood, immunity, and cognitive) health

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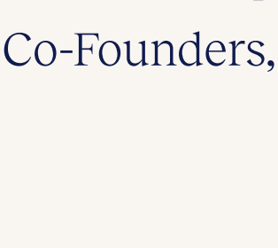
Welcome to Issue 153 of Science Says! Our weekly newsletter where you'll learn the latest healthy aging and C15:0 research news that our team of doctors, scientists, and experts are most excited about—without having to go search for it.

Eric and Steph
Co-Founders, Doctors, Nerds



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

HEALTHY AGING

Being Mindful About Your Health: Let's Talk Brains & Aging

It's back to school time, so we thought, what better time to do a Round-Up Series on what makes C15:0, well, so science-backed? In this series, we have been covering the following six key topics on C15:0:

- ☐ **Optimal Effective Levels & Daily Intake:** C15:0 bioavailability and amounts needed to achieve active levels
- ☑ **Mechanisms of Action:** How C15:0 works
- ☑ **Cell-Based Efficacy:** What C15:0 does at the cellular level
- ☑ **In Vivo Efficacy:** What C15:0 does at the whole-body level
- ☑ **Epidemiological Studies:** People who have higher levels of C15:0 have healthier ________ (we'll fill in the blanks)
- ☑ **Clinical Trials:** Randomized controlled clinical trials with C15:0

What makes the science behind C15:0 so robust is its consistency across all six topics above - including 100+ studies across numerous independent research teams throughout the world. We have also been sharing how C15:0 study outcomes - from its mechanisms of action to clinical trials - are intricately interlinked.

Last week, we covered how C15:0 activates receptors that support our glucose metabolism and liver function. This week, we share how C15:0 inhibits receptors that result in supported immune, cognitive, and mood health.

A quick review of how C15:0 works.

In the science world, "how" a molecule works is called its *mechanism of action*. Thanks to work from independent research teams throughout the world, we know that C15:0 has multiple mechanisms of action, including:

1. Strengthening cell membranes against age-related breakdown.
2. Repairing mitochondrial function.
3. Activating receptors that support healthy glucose metabolism and liver function.
4. **Inhibiting receptors that result in supported immune, cognitive, and mood health.**

We're covering each of these mechanisms, with this week focusing on C15:0's ability to soothe our brains (and therefore, our bodies).

How our brains age, biologically.

As we get older, our brains like to do a few things:

- **Overreact, at least immunologically.** Proinflammatory cytokines are increasingly present as we age, as explained by Tamatta et al., which leads to neuroinflammaging, a leaky blood-brain barrier, more proinflammatory cytokines, and declining neural function.
- **Get toxic, by oxidizing fragile lipids.** Cerasuolo et al. provide a detailed breakdown of how changing lipids in the brain, including increased fragile fatty acids, can lead to increased lipid peroxidation with age.
- **Hoard precious metals, as in iron.** In their review, Gao et al. discuss the burgeoning science around accumulating iron deposits in our brain over time. In turn, this iron begets over reactive immune responses and oxidative stress… which becomes a vicious cycle of all three drivers of brain aging.
- **Turn up the noise, including MAO-B.** As we get older, our brain levels of MAO-B increase, resulting in lower amounts of dopamine. The long-term negative impact of this phenomenon, including cognitive decline, is described by Oyovwi et al.

The result of these aging-related changes may sound familiar:

- **Slower cognition.** In their study, Umur et al. showed that iron deposition and oxidative stress each had their own independent roles in lowering cognitive function (as measured by a test called the Mini-Mental State Examination (MMSE)).
- **Offset mood.** Patrick et al. describe how aging can result in poorer emotion regulation and an offset mood. This can happen, in part, due to lower dopamine levels.

Okay, so how can C15:0 soothe our brains?

C15:0 has several mechanisms of action that support our MIC (that's mood, immune, and cognitive) health, primarily by inhibiting the instigators in aging brains:

- **Balanced immune response.** Our published studies have shown that C15:0 inhibits 18+ proinflammatory cytokines, including those involved in aging brains, in part by inhibiting JAK-STAT.
- **Lowering lipid peroxidation.** Given that C15:0 is a stable fatty acid that is resistant to lipid peroxidation, this antioxidant effect is expected not only in the body (as shown by Wei et al.), but our brains, too.
- **Balancing iron metabolism.** Aabis et al. demonstrated that C15:0 can reset healthy iron metabolism and stop unwanted iron deposition in tissues.
- **Inhibiting MAO-B.** We also recently showed that C15:0 has a dose-dependent effect of inhibiting MAO-B, a mechanism that is used to protect mood-soothing dopamine levels.

Combined, these mechanisms of action may explain why:

- Shen et al. found an association between higher C15:0 levels and better cognitive scores.
- People with higher C15:0 also had a better, balanced mood, according to research led by Brydges et al.

While there is still more research to be done on the brain health front as it relates to C15:0, the studies to date have been encouraging. Stay tuned here at *Science Says!* for new updates on this front.

Wrap-Up of C15:0 Mechanisms of Action

Over the past four weeks, we have covered the many demonstrated mechanisms of action of C15:0, including:

- Physically strengthening cell membranes against age-driving lipid peroxidation
- Repairing mitochondrial function and lowering reactive oxygen species (ROS)
- Activating receptors (like AMPK, AKT, and PPARs) that support healthy glucose metabolism and liver function
- Inhibiting pathways and enzymes (like JAK-STAT and MAO-B) that can result in supported immune, cognitive, and mood health

These mechanisms are important because they explain not only how C15:0 exerts its demonstrated health benefits across human cell lines, animal studies, and clinical trials… but how much C15:0 is needed to have these effects.

Next week, we'll cover how effective C15:0 doses are determined, given extensive bioavailability studies with C15:0 in humans. In the meantime, have a fantastic week, everyone!

Dive deeper into the science

READ THESE STUDIES AT
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AGING BRAINS & C15:0 PROTECTION MECHANISMS

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