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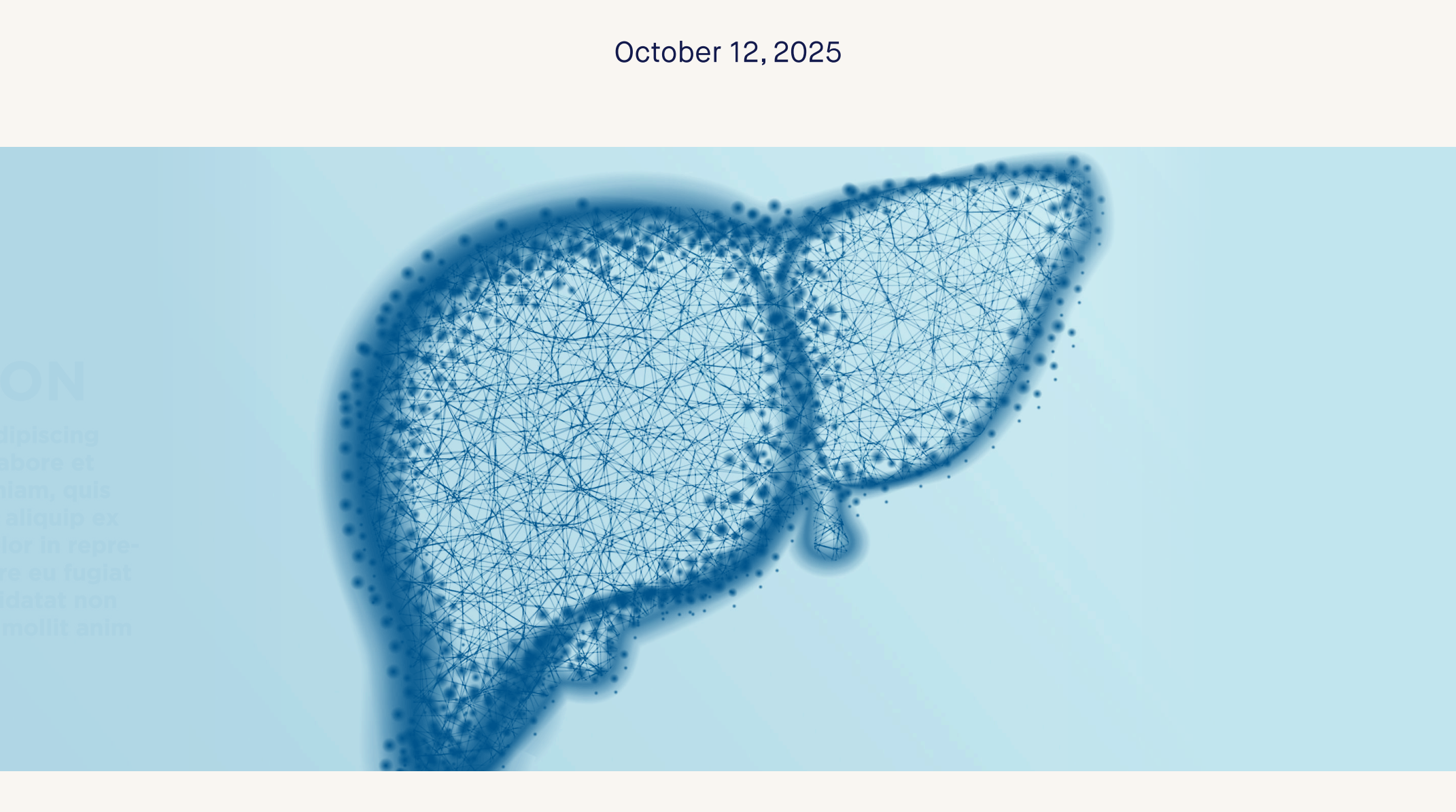
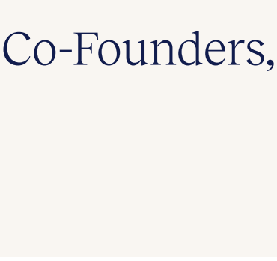
C15:0 Science Round-Up Series: How C15:0 Protects our Metabolic & Liver Health

October 12, 2025



Welcome to Issue 152 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

Let's Talk Glucose Metabolism & Liver Function

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 rescues our mitochondria. This week, we share how C15:0 activates receptors that support healthy glucose metabolism and liver function.

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, sleep, and mood health.

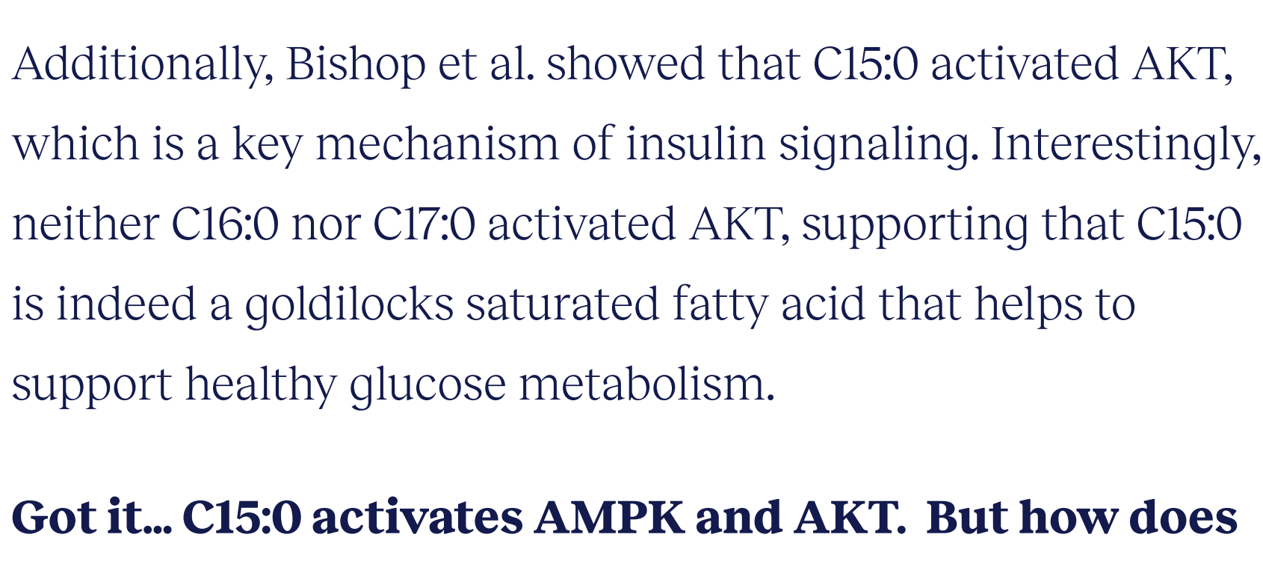
We're covering each of these mechanisms, with this week focusing on C15:0's ability to support our metabolic and liver health.

Okay, so how does C15:0 support healthy glucose metabolism?

Good question. In most cases, maintaining a healthy glucose balance depends on how well we store blood sugar when we don't need it.

Specifically, insulin helps us store glucose by moving sugar from our bloodstream into cells. The more sensitive our bodies are to insulin, the better we can keep our glucose levels balanced.

Fu et al. showed that C15:0 activates AMPK, and by doing so, C15:0 improved glucose uptake by cells. As shown below, C15:0 not only improved insulin sensitivity, it also mimicked insulin's glucose storing skills. Impressive, right?



Fu et al. 2020

Additionally, Bishop et al. showed that C15:0 activated AKT, which is a key mechanism of insulin signaling. Interestingly, neither C16:0 nor C17:0 activated AKT, supporting that C15:0 is indeed a goldilocks saturated fatty acid that helps to support healthy glucose metabolism.

Got it… C15:0 activates AMPK and AKT. But how does it support our liver health?

As it ends up, C15:0 helps our liver in many ways:

- ☑ Venn-Watson et al. demonstrated that C15:0 directly activates PPARα/δ, which helps to support both a healthy immune response and liver tissue function. Further, Bishop et al. showed that C15:0 lowered key proinflammatory cytokines, such as TNFα, in liver cells.
- ☑ C15:0 also strengthens cells against hepatic (aka liver) lipid peroxidation. Both Wei et al. and Aabis et al. showed that C15:0 supplementation lowered oxidative stress in the liver.
- ☑ Last week, we also covered how C15:0 stops and reverses ferroptosis, a new form of cell death. As a result, C15:0 has been shown by Venn-Watson et al. and Aabis et al. to balance iron metabolism and protect liver function.

That's a hearty 1-2-3 punch of liver health protection.

Translating Cellular Health to Metabolic & Liver Health

The studies above show how C15:0 works - by activating AMPK, AKT, and PPARα/δ - to support healthy glucose metabolism and liver function. This all-important ability to understand how C15:0 works, explains why Li et al. and Sawh et al. found that people with higher C15:0 levels have better long-term metabolic and liver health, respectively. And why Robinson et al. showed in their randomized clinical trial that people who supplemented with C15:0 and had raised C15:0 levels also had improved liver function. See how it's all coming together?

Next week, we'll cover how C15:0 inhibits receptors that result in supported immune, cognitive, sleep, and mood health. In the meantime, have a fantastic week, everyone!

Dive deeper into the science

READ THESE STUDIES AT DISCOVERC15.COM/RESOURCES

GLUCOSE CONTROL & LIVER PROTECTION MECHANISMS

- Fu et al. (2021) Food Nutr Res 65, 10.29219.
- Bishop et al. (2023) Nutrients 15, 2052.
- Venn-Watson et al. (2020) Scientific Reports 10, 8161.
- Wei et al. (2023) Nature Microbiology 8, 1534-1548.
- Aabis et al. (2025) Nauyn Schmied Arch Pharmacol doi:10.1007/s00210-025-04143-6.
- Li et al. (2022) Frontiers in Nutrition 9, 963471.
- Sawh et al. (2021) J Pediatr Gastroenterol Nutr 72:e90-e96.
- Robinson et al.(2024) J Nutr 154, 2763-2771.

MITOCHONDRIAL STUDIES

- Lopez-Otin et al. (2023) Cell 186, P243-278.
- Monroe et al. (2024) Aging Cell 24, e14367.
- Dixon et al. (2012) Cell 149, P1060-1072.
- Venn-Watson et al. (2020) Scientific Reports 10, 8161.
- Duan et al. (2025) J Nutr 155, 1298-1310.
- Pfeuffer et al. (2016) Adv Nutr 7, 730-734.

MECHANISM OF ACTION STUDIES

- Venn-Watson et al. (2020) PLOS ONE 15, e0230769.
- Garg, R. (2025) J Hematol All Sci 5, 115-124.
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POPULATION STUDIES

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- Zheng et al. (2017) BMC Med 15, 203.
- Chen et al. (2025) Lipids Health Dis 24, 219.
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- Kratz et al. (2014) Am J Clin Nutr 99:1385-1396.
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- Brydges et al. (2022) Brain Behav Immun 102, 42-52.
- Liu et al. (2023) Aging Cell 22, e13934.

CLINICAL TRIALS

- Stallings et al. (2013) Int J Clin Pharmacol Ther 51, 263-273.
- Mascarenhas et al. (2015) J Clin Pharmacol 55, 854-865.
- Robinson et al.(2024) J Nutr 154, 2763-2771.
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- Kaneko et al. (2023) Med Cons New-Remed 60, 459-470.
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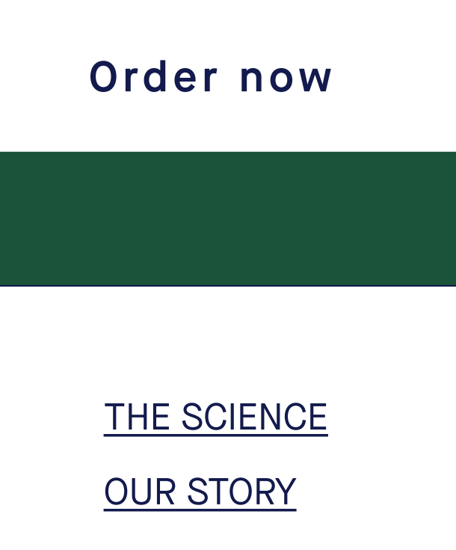
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Dr. Stephanie Venn-Watson, DVM, MPH

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