C15:0 Depletion May Help Explain Declining Coral Health

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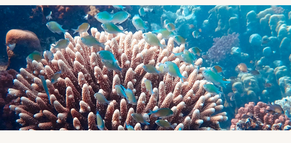

Welcome to Issue 116 of Science Says! Our weekly newsletter where you'll learn the latest healthy aging and C15:0 research news that our team of doctors, scientists, and experts are most excited about—without having to go search for it.

Eric and Steph
Co-Founders, Doctors, Nerds

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

HEALTHY AGING

Not Just For Us. C15:0 May Help Protect Coral Health, Too

Happy New Year, everyone!

We are kicking off our first *Science Says!* of 2025 with an interesting study recently published in *Marine Biology*. Here, a team of biologists in India evaluated fatty acids in the protective mucus layer of coral, to see if there were any differences between healthy and diseased animals. Let's dive in to see what they found.

What's up with coral health, and (no offense) does that have any relevance to human health?

No offense taken! Here are a few fast facts on why the world is paying attention to coral health:

- Throughout the world, coral reefs have been devastated by different diseases, such as bleaching, black band disease, pink spot disease, and pink line syndrome. These diseases have been attributed to higher stress and lowered resilience of coral globally, making them more susceptible to chronic diseases. Sound familiar?
- As described by Kortschak et al., corals are animals with a surprising number of ancient **human genes**, especially related to metabolism, that are not present in *Drosophila* flies and *C. elegans* worms. This shocking study blew a big hole in the prior belief that certain health-driving genes were limited to vertebrates.
- Additionally, Rathinam et al. review how corals have complex innate immune systems, and Voolstra et al. have shown how microbiomes determine their health and disease status. So, that's two more parallels with human health.
- Corals also have a protective mucus layer which serves a role similar to our own cell membranes, as described by Bhagwat et al. Specifically, to help keep the good stuff in and the bad stuff out.

As such, lessons learned to improve coral health may provide insights into how we can improve human health. Plus, we all want a world of beautiful, happy, and healthy coral.

I'm in. What are the details of this most recent coral health study, and what did they find?

In their study, Bhagwat et al. studied fatty acids in the mucus of healthy versus diseased corals. Specifically, they looked at *Acropora* and *Porites* corals with and without bleaching, pink spot disease, and pink line syndrome.

They found that - compared to healthy coral - some of the fatty acids in the mucus layer were higher in diseased coral, while others were depleted in diseased coral.

In both types of coral, C15:0 mucus levels were depleted in the diseased compared to the healthy animals.

Other depleted fatty acids in the diseased coral included the other two essential fatty acids, linoleic acid and alpha linolenic acid. The authors conclude that the same essential fatty acids can be important for both invertebrates (like coral) and vertebrates (like humans).

How could C15:0 be helping to keep healthy coral, healthy?

While more studies are needed, a key protective role of C15:0 for coral may be its antimicrobial properties.

This is because when coral are stressed, they are more susceptible to infections. Multiple studies have shown that C15:0 has antimicrobial activities specific to bad pathogens, including Galdiero et al. and Ricciardellia et al's demonstrated abilities for C15:0 to stop the growth of bacterial and fungal pathogens. Further, Villamor et al. showed that people infected with Dengue virus were less likely to develop advanced infections if they had higher C15:0 levels. Note that this last study was just about association, not proven causation.

Of course, C15:0's demonstrated ability to strengthen cells, reduce oxidative stress and support health metabolism and immunity likely helps, too.

Great study... from where does the C15:0 in coral come?

The good C15:0 in coral mucus may be made by a healthy coral's bacterial microbiome. We have shared prior studies, such as those from Wei et al., demonstrating that healthy microbes in the gut can make C15:0. In turn, C15:0 supports overall health - including our metabolic and liver health.

While human gut microbes don't make enough C15:0 to support essential levels, healthy bacteria may be a primary C15:0 source for coral.

C15:0 Ocean Discovery Origins

For those of us at fatty15, it is promising to see the potential for C15:0 to help our fellow ocean mates. As most of you know, our initial discovery of C15:0's healthy aging benefits occurred while caring for older Navy dolphins. A decade later, this discovery is not only helping to improve the long-term health of dolphins and humans, but may be a clue to help protect the world's corals, too. Now, that's pretty darn awesome.

Have a wonderful week, everyone!

Dive deeper into the science

READ THESE STUDIES

- Bhagwat et al. Characterization of fatty acid composition of healthy and diseased coral mucus released from host and/or endosymbiont for their possible role in coral health.
- Kortschak et al. Analysis of corals reveals similarities to human genes not present in Drosophila or C. elegans.
- Rathinam et al. The immune system of marine invertebrates: Earliest adaptation of animals.
- Voolstra et al. The coral microbiome in sickness, in health and in a changing world.
- Bhagwat et al. Beneficial properties of mucus in coral adaptations and ecological interactions.
- Galdiero et al. Pentadecanoic acid against Candida albicans-Klebsiella pneumoniae biofilm: towards the development of an anti-biofilm coating to prevent polymicrobial infections.
- Ricciardelli et al. Pentadecanal and pentadecanoic acid coatings reduce biofilm formation of Staphylococcus epidermidis on PDMS.
- Villamor et al. Serum fatty acids and progression from dengue fever to dengue hemorrhagic fever / dengue shock syndrome.
- Wei et al. Parabacteroides distasonis uses dietary inulin to suppress NASH via its metabolite pentadecanoic acid.
- Venn-Watson et al. Raising dietary and circulating C15:0 levels independently predicts improved health in dolphins.

- Nerd out on all the C15:0 science at Discover15.com.