Dogs & Healthy Aging: Where C15:0 Comes In

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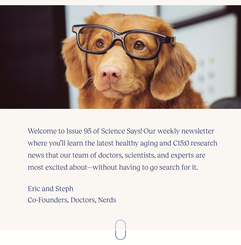

Welcome to Issue 95 of Science Says! Our weekly newsletter where you'll learn the latest healthy aging and C15:0 research news that our team of doctors, scientists, and experts are most excited about—without having to go search for it.

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

Emerging role of C15:0 to support health & longevity in dogs

While we usually talk about healthy aging in humans here at *Science Says!*, last week and this week we're covering how we can apply the science behind healthy aging and C15:0 to our most faithful furry friends. This one's for Rover.

Advancing science to help dogs live healthier, longer.

There have been some exciting advances on the science front to extend longevity in our dogs. Important clues have been coming from the company Loyal, as well as The Aging Dog Project, which have been evaluating drugs that tap into the mammalian longevity regulating pathway.

Sounds great! What is the mammalian longevity regulating pathway?

This complex pathway includes a series of mechanisms shown to extend longevity in mammals (a link to this nerdy KEGG map is provided below). Mapped roads to longevity are based on caloric restriction, which has reliably lengthened lives in multiple mammals, including dogs.

In their 20-year study, Lawler et al. showed that a 25% reduction of daily food intake resulted in an extra 1.8 years of life for labrador retrievers compared to the control group. Yes, please.

This longevity benefit was attributed to the restricted diet's effects, including maintained metabolic health with age, balanced glucose and insulin handling, and delayed onset of chronic aging-associated diseases, including arthritis and lost muscle mass.

The highest risk factors for earlier death in dogs? High body fat and development of insulin resistance. So, dietary restriction (without losing key nutrients) was good for both health *and* longevity. This is why molecules that mimic the longevity-mapped benefits of caloric restriction have been top contenders to extend both our and our dogs' lifespans.

What are the leading longevity-enhancing candidates for dogs?

Four molecules have received the most attention to give us more precious years with our pups:

- LOY-001 & LOY-003 inhibit GH1/IGF-1 and support insulin sensitivity. These candidates are intended to help large-breed dogs live longer. Anticipated release date: 2026.
- LOY-002 improves metabolic fitness and is intended to extend longevity among older dogs of all sizes. Anticipated release date: 2025.
- Rapamycin inhibits mTOR and has been shown to extend longevity in multiple species. Still being studied.

Additionally, Schmid et al. from the Aging Dog Project just published a study showing that aging dogs develop inflammaging, just like us. Inflammaging is a chronic, low lying form of inflammation that accelerates age-related breakdown, and just like humans, the primary instigators are the pro-inflammatory cytokines IL-6 and TNFα. Thus, molecules that target these cytokines may also support healthy aging.

It is important to note that all of the candidates above are prescription drugs.

So, where does C15:0 come in?

Well, right about here. As we published in the journal *Nutrients*, C15:0 has more clinically relevant cellular benefits compared to leading longevity-enhancing molecules, including rapamycin. Unlike these drug candidates, however, C15:0 is a safe, natural, and essential nutrient that all mammals get from birth (aka milk).

Lifespan-lengthening benefits of C15:0 include the following:

- Activating AMPK in the mammalian longevity pathway, which supports healthy glucose and insulin handling.
- Inhibiting mTOR in the mammalian longevity pathway to help remove senescent "zombie" cells.
- Lowering 18- proinflammatory cytokines, including IL-6 and TNFα.

In summary, by supporting healthy metabolism and calming overactive immune responses, C15:0 is emerging as an essential longevity-enhancing nutrient not just for humans, but for dogs, too.

Is there evidence of a C15:0 deficiency syndrome in dogs that is relevant to their health and longevity?

Good question! As we recently published in *Metabolites*, humans (and dolphins) can develop a nutritional C15:0 deficiency syndrome, called Cellular Fragility Syndrome that may be affecting as many as 1 in 3 people. This condition involves low C15:0 levels in our diet and cell membranes that result in fragile cells, abnormal iron handling, and a new type of cell death called ferroptosis. In turn, ferroptosis accelerates aging and impairs metabolic, heart, and liver health.

So, could nutritional C15:0 deficiencies similarly accelerate aging in dogs? While we don't yet know the answer to this question, we do know the following:

- As shown by Maldonado et al., **humans and dogs share the same C15:0 blood levels.** Given the known essential and functional benefits of C15:0 in mammals, this supports that dogs require the same healthy levels of C15:0 in their diet and bodies as humans.
- Dogs' wild ancestors (wolves) eat meat and fat, which naturally contain C15:0. When evaluating five different types of puppy chow, Dzima et al. showed that **three of these puppy chows had no detectable C15:0.** This means that dogs may not be getting the dietary C15:0 their bodies need.
- Understanding that C15:0 deficiencies cause ferroptosis, Zhang et al. found that this new form of cell death **may play an important role in the progression of arthritis in dogs.** Ensuring that dogs have adequate dietary C15:0 may help protect against age-related arthritis.
- Higueras et al. showed that **dogs with higher levels of C15:0 in their gut have higher muscle condition scores and lower inflammatory bowel disease scores**.

These studies indicate that getting adequate dietary C15:0 may not only support key longevity pathways for dogs, but that it may help support healthy joints, healthy muscle mass, and gut health, too. Good C15:0.

Fatty15 ingredient gains GRAS status for dogs.

We're excited to share that our pure C15:0 ingredient (fatty15) has gained Generally Recognized as Safe (GRAS) status for dogs 🐶❤️. We have long had GRAS status for fatty15 and humans, including all people older than 4 years old, pregnant women and nursing moms. Now, we're working with fellow do-gooders to support the long-term health and wellness of dogs, too.

Stay tuned for more news on this front over the coming months. In the meantime, have a great week, everyone!

Dive deeper into the science

READ THESE STUDIES

- Loyal: The STAY study.
- Dog Aging Project: Research publications.
- KEGG Pathways: The Mammalian Longevity Regulating Pathway.
- Lawler et al. Diet restriction and aging in the dog: major observations over two decades.
- Schmid et al. The companion dog as a model for inflammaging: a cross-sectional pilot study.
- Venn-Watson et al. C15:0, an essential fatty acid, shares clinically relevant cell-based activities with leading longevity-enhancing compounds.
- Venn-Watson S. The Cellular Stability Hypothesis: Evidence of Ferroptosis and Accelerated Aging-Associated Diseases as Newly Identified Nutritional Pentadecanoic Acid (C15:0) Deficiency Syndrome.
- Maldonado et al. Lipid and fatty acid composition of canine lipoproteins.
- Dzima et al. Fatty acid profile of commercial dry puppies' food.
- Zhang et al. The role played by ferroptosis in osteoarthritis: evidence based on iron dyshomeostasis and lipid peroxidation.
- Higueras et al. Faecal short-chain, long-chain, and branched-chain fatty acids as markers of different chronic inflammatory enteropathies in dogs.

- Nerd out on all the C15:0 science at Discoverc15.com.