The Hunt for the Holy Grail of Healthy Aging

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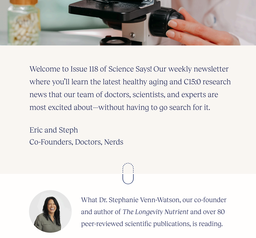

Welcome to Issue 118 of Science Says! Our weekly newsletter where you'll learn the latest healthy aging and C15O research news that our team of doctors, scientists, and experts are most excited about—without having to go search for it.

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

Ever Wonder How Longevity-Enhancers Are Discovered?

The countdown is on until Simon & Schuster's March 25th release of *The Longevity Nutrient*. This book tracks our 20-year scientific journey - starting with an unexpected discovery of C15O's health benefits while helping dolphins - which has culminated in a movement to improve global health. And dare we say, humanity?

In this series of *Science Says!*, we provide a behind-the-scenes science peek relevant to each of the book's chapters - from surprising dolphin discoveries to longevity molecule must-haves, from how essential fatty acids are discovered to the many ways C15O works, from how a newly found nutritional deficiency accelerates aging to how fixing and optimizing our C15O levels can slow aging to help us live healthier, longer.

This week, let's talk about the hunt for the holy grail of healthy aging and exactly how longevity-enhancing molecules are discovered.

The rub of longevity research in humans: time.

Here's the best way to find molecules that truly help us to live healthier and longer: Follow a large population of people who all share the same environment, eat the same routine diet, have the same social and economic status, share the same health care program, and follow the same physical activity routine from birth until death.

One could then understand, absent variations in these many underlying protective and risk factors, which genes and small molecules (aka longevity molecules) in our body help us to live healthier and longer.

The problem here is that this study would take nearly a century to complete. And, this type of shared lifestyle doesn't exist - even for us as individuals, right? Throughout our own lives, we change our environments, our diets, our financial states, our health care, and our physical activities.

That means our gold standard for discovering longevity molecules can't really happen.

Enter mice, worms and flies.

This is why almost all longevity-molecule searches involve short-lived species. Holtze et al. share how studies with mice, worms, and flies allow scientists to:

- Control environments, including housing, diets, and daily routines.
- Understand health and longevity throughout entire lifetimes (since worms live less than a month, flies fly up to 100 days, and mice live up to 4 years).
- Identify which genes and natural molecules enable health and longevity.
- Test various molecules to see which ones extend longevity.

Which makes sense, given our limitations in humans. These studies can be helpful because there are a good number of genes and biological pathways that are shared between humans, mice, worms, and flies.

As described by Capri et al., the elephant in the room is that these short-lived species are missing a critical piece. That's the ability to live to 50 or 100 years, like elephants (and humans). So, this explains why thousands of molecules studied in short-lived species haven't yet effectively translated into longer-lived humans.

An unexpected fountain of longevity-enabling discoveries.

Last week, we talked about how humans and dolphins age similarly, naturally, and over decades. Specifically, how some dolphins and humans age healthily throughout most of their lives, and others develop high cholesterol, chronic inflammation, fatty liver disease, and Alzheimer's disease.

Here's what makes these shared aging conditions between humans and dolphins so fascinating: while humans have lots of variable risk factors throughout their lives, dolphins (including Navy dolphins) have pretty simple lives:

- They live in the open ocean.
- They eat fish.
- They swim.
- They socialize.

This means that some dolphins can and do develop aging-associated conditions without trans-fats, ultraprocessed foods, sedentary lifestyles, cigarettes, and alcohol.

Understanding this about Navy dolphins, paired with four dozen clinical measurements and thousands of archived serum samples routinely collected as part of their routine healthcare throughout their 30 to 50 year lives, the Navy had unintentionally established the gold standard approach for discovering longevity molecules.

It is the outstanding care of this amazing population that has gifted the world with an opportunity to not only understand how long-lived mammals live longer than short-lived mammals... but how to leverage these evolutionary adaptations to help long-lived individuals (dolphins and humans) live even healthier and longer.

The first big discovery from this population? Well, C15O of course. As an odd-chain essential saturated fatty acid, C15O physically strengthens cell membranes to protect them against lipid peroxidation, and us against age-related breakdown. Resulting in healthier and longer lives.

Thank you, dolphins.

The Longevity Nutrient: The Cell Membrane Pacemaker Theory of Aging

In the upcoming book, *The Longevity Nutrient*, Chapter 2 covers the 7 must-haves of a longevity molecule and how well the leading contenders (aka rapamycin and metformin) currently stack up.

We also cover how C15O's role in physically strengthening cells aligns picture-perfectly with A.J. Hulbert's Cell Membrane Pacemaker Theory of Aging. Back in 2005, Hulbert demonstrated how the stability of fatty acids in cell membranes directly dictated species' longevity.

Simply, the stronger the fatty acids in cell membranes, the lower their lipid peroxidation levels, and the longer a species lived. We just needed the dolphins to show us which stable fatty acid was the most essential to longevity.

Next week, we'll cover the behind-the-scenes science on how C15O was studied (and continues to be studied) to help determine its role as The Longevity Nutrient.

In the meantime, have a wonderful week, everyone!

Dive deeper into the science

READ THESE STUDIES

- Holze et al. Alternative animal models of aging research.
- Capri et al. Aging and longevity in animal models and humans.
- Venn-Watson et al. Physiology of aging among healthy, older bottlenose dolphins (Tursiops truncatus): comparisons with aging humans.
- Gunn-Moore et al. Alzheimer's disease in humans and other animals: a consequence of postproductive life span and longevity rather than aging.
- Venn-Watson et al. Raising dietary and circulating C15:0 levels independently predicts improved health in dolphins.
- Venn-Watson et al. Efficacy of dietary odd-chain saturated fatty acid pentadecanoic acid parallels broad associated health benefits in humans: could it be essential?
- Venn-Watson & Schork. Pentadecanoic Acid (C15:0), an Essential Fatty Acid, Shares Clinically Relevant Cell-Based Activities with Leading Longevity-Enhancing Compounds.
- AJ Hulbert. On the importance of fatty acid composition of membranes for aging.
- Nerd out on all the C15:0 science at DiscoverC15.com