Dolphins are awesome. (here's why)

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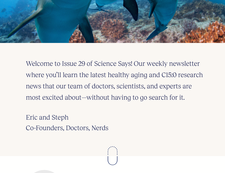

Welcome to Issue 29 of Science Says! Our weekly newsletter where you'll learn the latest healthy aging and C15© research news that our team of doctors, scientists, and experts are most excited about -without having to go search for it.

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

Dolphins & humans share the same healthy aging secrets

While mice, worms and flies are often used to try and decode aging, we here at fatty15 think about aging differently. Namely, we are looking for answers to the following two questions:

How did humans, dolphins, elephants and other long-lived mammals evolve to live longer than mice, worms, and flies in the first place? And could nature's secrets to longevity be leveraged to help us live even longer and healthier?

This series of Science Says covers our fellow long-lived mammals, including how improving their long-term health may just help us, too. This week, as our last Science Says of 2022, let's (of course) talk about our favorite big-brained mammal: bottlenose dolphins.

I love dolphins! But do they really age similarly to people?

Yes! Dolphins are long-lived, large-brained mammals that develop aging-associated conditions just like us, including:

- **Chronic inflammation.** As dolphins get older, they are more likely to develop mild, systemic inflammation. This chronic inflammatory state is also a primary contributor to the process of aging in humans.
- **Metabolic syndrome.** Older dolphins can develop metabolic syndrome, which is a cluster of conditions, such as elevated insulin, elevated glucose, and elevated cholesterol. 1 in 3 humans also has metabolic syndrome, which increases our risk of developing type 2 diabetes, heart disease and stroke.
- **Nonalcoholic fatty liver disease (NAFLD).** About 1 in 3 humans has NAFLD, which is a metabolic liver condition that is becoming the leading cause of liver cancer and liver transplants globally. When NAFLD was first identified in dolphins, this was a bit of a shocker to physicians, who had originally hypothesized that NAFLD was driven by dietary sugars. Since dolphins don't imbibe in carbohydrates, the question was - what causes NAFLD in dolphins?
- **Alzheimer's disease.** When studying the brains of wild dolphins that had stranded and died along the shores, the University of Oxford discovered that some older dolphins had tissue changes in their brains that matched the pattern of Alzheimer's disease in humans. It ends up, Alzheimer's disease in older dolphins may be just as common as in humans.

Can you dive a little deeper into why older dolphins and humans have so many parallels? Pun intended.

Glad you asked. Dolphins are part of the artiodactyla clade that evolved alongside cows, camels, and hippos. Their ancestors were land-dwelling mammals that decided to move back into the water about 53 million years ago. Despite these evolutionary differences from humans, there are several important and surprising similarities that help explain why older dolphins and humans age similarly, too.

- **We share large brains.** When using the encephalization quotient (or EQ), which is the ratio of brain size to body size, humans get top billing. Of ALL other mammals - including primates - guess which species gets second place? That's right... bottlenose dolphins.
- **We have super efficient glucose transport systems.** It was once believed that only us primates had red blood cells that could rapidly transport glucose throughout our bodies, especially to our brains. Until it was discovered that cetaceans, including bottlenose dolphins, could do the same. Have a big brain? You'll need a way to get glucose to support all those deep thoughts.
- **We have twin chromosomes.** Of our 23 chromosomes, Chromosome 1 is the largest. It includes genes that are relevant to our overall health and longevity. Among all mammals, there are very (very) few mammals that share not only the same genes within human Chromosome 1, but also the same order of genes: great apes, the 2-toed sloth, and bottlenose dolphins. Humans and dolphins also have remarkably similar microRNA, too.

These unexpected parallels between humans and dolphins explain why we age alike. Shared big brains, shared glucose metabolism, shared chromosomes and more all tally up to common drivers of our health, our aging, and our longevity.

Got it, we're practically dolphins. But how can knowing that actually help dolphins and humans live healthier & longer?

Well, science. Fancy science! Since dolphins tend to be much more consistent with their health regimen (they go swimming every day, eat only fish, and have incredible social lives), helping older Navy dolphins live healthier is providing important insights for us, too. Here's where the science comes in:

- **Step 1: Find healthy aging molecules.** Despite their healthy habits, some dolphins still age better than other dolphins. Using archived serum samples, we use metabolomics to study thousands of small molecules present in both humans and dolphins to understand which molecules are associated with the healthiest aging dolphins.
- **Step 2: Screen molecules for healthy-aging activities.** We then use human cell-based systems that mimic aging-related conditions to test these molecules for safety and direct activities, including lowering pro-inflammatory cytokines, decreasing proliferation of harmful cells, and repairing mitochondrial function. We also test these molecules' ability to activate receptors that are known to support healthy aging.
- **Step 3: Develop products that replenish our healthy-aging molecules and support our long-term health.** While we are discovering new essential nutrients that support our overall health and wellness, we are also finding molecules that may specifically prevent and treat chronic inflammation, metabolic syndrome, NASH, and Alzheimer's disease. For humans... and dolphins. 📢❤️

Dolphins' first healthy aging secret: C15©.

Here's an example of what happened when we put our discovery method to work:

Step 1. We discovered that odd-chain saturated fats were healthy. When we compared healthy aging dolphins with less healthy aging dolphins, we noticed that the healthiest dolphins had the highest levels of odd-chain saturated fatty acids - both in their serum and their fish diets. When less healthy aging dolphins were provided a fish-based diet higher in odd-chain fatty acids (like C15© and C17©), they became healthy aging dolphins.

Step 2. We learned which odd fat was best (and how it worked). With our discovery, we tested different odd-chain saturated fatty acids, including C13©, C15©, and C17© for direct healthy aging activities at the cellular level. Here, we found that C15© stands out as the most effective and safe odd-chain fat. Specifically, C15© effectively lowers numerous pro-inflammatory cytokines, decreases proliferation of harmful cells, and repairs mitochondrial function. C15© also activates receptors called PPAR-alpha and delta, which are the ultimate metabolic and immune balancers. Dang, that's a lot of healthy goodness.

Step 3. We found a way to deliver fatty15 to your doorstep! A bunch of science and a few years later, helping dolphins age healthier resulted in C15© being the first essential fatty acid to be discovered since omega-3, which was over 90 years ago. After that discovery, we then spent a few more years leveraging nature to make C15© even better. How? By developing a >99% pure, readily bioavailable, vegan-friendly, award-winning, patented, and science-backed C15© powder in fatty15.

Perhaps the best part? We're now developing fatty15 for the Navy's dolphins, too.

Well, that's a wrap for 2022. Thanks for being part of our fatty15 journey. Spoiler alert: 2023 comes with more exciting news (yes, the science continues...)

When we return, in addition to sharing lots of new C15© science, we'll talk about ever-graceful elephants - and how helping them live healthier longer may help us, too. Have a wonderful holiday season, everyone!

Dive deeper into the science

READ THESE STUDIES

- Similarities in aging between humans and dolphins
- Metabolic syndrome in dolphins
- NAFLD in dolphins
- Alzheimer's disease in dolphins
- Dolphin and human encephalization quotients
- Dolphin and human glucose transport systems
- Dolphin and human chromosome synteny
- C15:0 as an essential fatty acid