

Research with dolphins provides hope for prevention of diabetes in humans

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For decades, the public has been told to avoid foods high in saturated fats and cholesterol. A new study led by the National Marine Mammal Foundation (NMMF) and published in *PLOS ONE* today discovered a saturated fat, called heptadecanoic acid, that may help reverse prediabetes in humans.

NMMF research discovered that bottlenose dolphins can readily switch in and out of diabetes-like states, and that dolphins - including those in the wild - can develop metabolic syndrome, a subclinical condition called prediabetes in humans. "To better understand what may be a driver for metabolic syndrome in dolphins, we started exploring their diet, which is primarily fish," said Dr. Stephanie Venn-Watson, Director of NMMF's Translational Medicine and Research Program and the study's lead author.

Because of the popularity of fish-based [omega-3 fatty acids](#) as a human health supplement, NMMF's team started by assessing fatty acid blood levels in 49 dolphins, as well as in their dietary fish. "We were surprised to find that among the 55 fatty acids studied, the [saturated fat](#) heptadecanoic acid appeared to have had the most beneficial impact on dolphin metabolism," said Venn-Watson. "Dolphins with higher levels of heptadecanoic acid in their blood had lower insulin and triglycerides." The study also showed that while some fish have high levels of heptadecanoic acid, other fish types had none.

Six dolphins with low heptadecanoic acid were then fed fish high in this

fatty acid. Within six months on the new diet, indicators of metabolic syndrome in dolphins, including elevated insulin, glucose, and triglycerides normalized. Key to this surprising outcome was reversal of high ferritin, an underlying precursor to metabolic syndrome. "We saw blood ferritin levels decrease in all six dolphins within three weeks on the new diet," said Venn-Watson.

Heptadecanoic acid, also called margaric acid or C17:0, is a saturated fat found in dairy fat, rye, and some fish. The NMMF study showed no detectable heptadecanoic acid in nonfat dairy product and some amount in low fat dairy products. The highest levels were found in whole fat milk, yogurt, and especially butter. The fish with the highest heptadecanoic acid content was mullet.

"We hypothesize that widespread movement away from whole fat dairy products in human populations may have created unanticipated heptadecanoic acid deficiencies," said Venn-Watson, "and, in turn, this dietary deficiency may be playing a role in the global diabetes pandemic." Today, the Centers for Disease Control and Prevention estimates that over 86 million people in the U.S. have metabolic syndrome—*one* in every three adults.

"This study is a good example of how improving dolphin health can have an added benefit to human health, too," said NMMF President Dr. Sam Ridgway.

NMMF is partnering with children's hospitals to see if children with [metabolic syndrome](#) and diabetes also have low heptadecanoic [acid](#) levels. The NMMF is also studying how changes in ocean prey due to climate change and other environmental impacts are affecting metabolism of wild [dolphins](#).

NMMF's discovery aligns well with growing scientific evidence

demonstrating that cholesterol and some fats may not be as bad as once thought. Earlier this year, the American Dietary Guidelines changed its recommendations related to [fat](#), including removing the need for most people to limit their dietary cholesterol intake (high cholesterol comes primarily from what our body produces, not what we eat).

Does this mean that we can now eat butter without guilt? Dr. Venn-Watson says, "Butter may have both good and bad saturated fats, but it's always best to check with your physician before making changes to your diet."

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