

Neurotoxins in shark fins: A human health concern

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In a new study by University of Miami marine biologist Neil Hammerschlag and Deborah Mash, M.D., uncover an alarming accumulation of BMAA neurotoxins in shark fins, which may pose a serious threat to shark fin consumers.

<http://www.mdpi.com/1660-3397/10/2/509/> Credit: Eric Cheng

Sharks are among the most threatened of marine species worldwide due to unsustainable overfishing. Sharks are primarily killed for their fins alone, to fuel the growing demand for shark fin soup, which is an Asia delicacy. A new study by University of Miami (UM) scientists in the journal *Marine Drugs* has discovered high concentrations of BMAA in shark fins, a neurotoxin linked to neurodegenerative diseases in humans including Alzheimer's and Lou Gehrig Disease (ALS). The study suggests that consumption of shark fin soup and cartilage pills may pose a significant health risk for degenerative brain diseases.

"Shark fins are primarily derived through finning, a practice where by shark fins are removed at sea and the rest of the mutilated animal is thrown back in the water to die," said co-author Dr. Neil Hammerschlag, research assistant professor of Marine Affairs & Policy and director of the RJ Dunlap Marine Conservation Program (RJD) at UM. "Estimates suggest that fins from as many as 70 million sharks end up in soup. As a result, many shark species are on the road to extinction. Because sharks play important roles in maintaining balance in the oceans, not only is shark fin soup injurious to the marine environment, but our study suggests that it is likely harmful to the people who are consuming them."

Seven species of shark were tested for this study: blacknose, blacktip, bonnethead, bull, great hammerhead, lemon, and nurse [sharks](#). Samples were collected from live animals in waters throughout South Florida.

"The concentrations of BMAA in the samples are a cause for concern, not only in [shark fin](#) soup, but also in dietary supplements and other forms ingested by humans, " says study co-author Prof. Deborah Mash, Director of the University of Miami Brain Endowment Bank. The Bank supports basic and clinical research and holds one of the world's largest collection of postmortem human brains encompassing a wide range of neurological disorders. In 2009, Prof. Mash and her co-authors published a study in the journal *Acta Neurological Scandinavica*, demonstrating that patients dying with diagnoses of Alzheimer's Disease and ALS had unusually high levels of BMAA in their brains up to 256 ng/mg, whereas normal healthy aged people had no BMAA, or only trace quantities of the toxin present. "BMAA was first linked to neurodegenerative diseases in Guam, which resulted in the progressive loss of structure and function of neurons."

The shark study found a similar range and even higher BMAA in the fins tested. The new study found levels of between 144 and 1836 ng/mg of BMAA, which overlapped the levels we measured in the brains of

Alzheimer's and ALS victims. Surprisingly, this level fits with the BMAA levels in fruit bats examined by Paul Cox, animals which concentrate BMAA from their diet of cycad seeds. He linked ingestion of fruit bats to the severe ALS/Parkinsonism dementia that afflicted many people in Guam.

"Not only does this work provide important information on one probable route of human exposure to BMAA, it may lead to a lowering of the demand for [shark fin soup](#) and consumption of shark products, which will aid ocean conservation efforts," added Hammerschlag.

Provided by University of Miami

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