

"Long before it's in the papers"



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Dolphins' "remarkable" healing abilities spur investigation

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Courtesy of Georgetown University Medical Center
and World Science staff

A doctor has launched an investigation into what he calls the "remarkable" ability of dolphins to heal from atrocious wounds, saying humans may benefit from the research.

With no apparent medical care, the finned mammals seemingly shrug off—and totally recover from—shark bites that look shockingly bad to a person, according to the physician, Michael Zasloff. "Comparable injuries in humans would be fatal," said Zasloff, of Georgetown University Medical Center in Washington, D.C., adding that dolphins show little sign of pain from the wounds.

"Much about the dolphin's healing process remains unreported and poorly documented," he went on. "How does the dolphin not bleed to death after a shark bite? How is it that dolphins appear not to suffer significant pain? What prevents infection of a significant injury? And how can a deep, gaping wound heal in such a way that the animal's body contour is restored?"

Zasloff, who has previously identified antimicrobial compounds in the skin of frogs and in the dogfish shark, reported his recent research in a letter published in the July 21 issue of the *Journal of Investigative Dermatology*. He interviewed dolphin handlers and marine biologists from around the world and reviewed the limited literature available about dolphin healing.

Zasloff proposes that dolphins may limit blood loss by diving deep after an injury, which diverts blood away from outer areas of the body and toward the center. As for the apparent indifference to pain, it "clearly represents an adaptation favorable for survival," he wrote in the letter, but how the feat is managed is unknown.

How the animal keeps infection at bay may be less of a mystery, he said, proposing that the animal's blubber holds the key. Blubber and its makeup have been studied extensively because it accumulates many man-made pollutants, Zasloff said. It's thus well documented that blubber also contains natural antibiotics called organohalogenes. Probably "the dolphin stores its own antimicrobial compound," Zasloff predicts. "This action could control and prevent microbial infection while at the same time preventing decomposition around the animal's injury."

Zasloff also explored the ability of the dolphin's wound to heal in a way that restores the body contour. He said the dolphin's healing ability is less like human healing and more like regeneration. "The repair of a gaping wound to an appearance that is near normal requires the ability of the injured animal to knit newly formed tissues with the existing fabric of adipocytes [fat cells], collagen and elastic fibers," he wrote. "The dolphin's healing is similar to how mammalian fetuses are able to heal in the womb."

Brent Whitaker, deputy executive director for biological programs at the National Aquarium in Bal-

timore, called Zasloff's letter "thought provoking." Zasloff consulted with Whitaker as part of his research.

"It makes sense that the dermal tissues of the dolphins would evolve mechanisms to protect them from the microbes ever present in the water in which these animals live," Whitaker said. "Other aquatic animals have developed protective strategies that allow them to cope with water-borne microflora," or pathogens. Zasloff's letter "suggests a unique and intriguing hypothesis which may begin to explain how dolphins, and perhaps other cetaceans, survive significant soft-tissue wounds in the wild without the aid of antibiotics or clinical care," he added.

"It is very clear from working with marine mammals that the ability to heal is 'enhanced' from what we see with terrestrial mammals," said Leigh Ann Clayton, director of the Department of Animal Health at the National Aquarium, who also advised Zasloff. "Zasloff proposes some fascinating mechanisms of action in healing. It is exciting to begin exploring these mechanisms more completely."

In his letter, Zasloff presents the case histories of two shark-bitten dolphins, Nari and Echo, at the Tangalooma Wild Dolphin Resort in Moreton Island, Australia. The reports document the healing process of the dolphins with photos to eloquently demonstrate how and how quickly two dolphins heal from severe shark injuries.

"The Tangalooma dolphin care team is continuously astounded at the remarkable natural ability of the dolphins that visit us, in overcoming severe shark bite injuries with what seems to be indifference," said Trevor Hassard, director of Tangalooma. "We learn so much from the lives of other animals. Perhaps Zasloff's contribution will bring the dolphin's remarkable healing capacities to the attention of the medical research community."

"My hope is this work will stimulate research that will benefit humans," said Zasloff. "I feel reasonably certain that within this animal's healing wounds we will find novel antimicrobial agents as well as potent analgesic compounds."