

# Sharks Do Get Cancer: Few Surprises in Cartilage Research

As is the case for many alternative remedies, dozens of shark cartilage products for a variety of medical conditions are already on the market despite a lack of strong clinical evidence to support their effectiveness.

Although some laboratory studies have shown that shark cartilage may have antiangiogenic properties, it remains unclear whether future research will ultimately clarify troubling questions created by early human trials, some of which included a mixture of scientific conjecture and product promotion.

Folk remedies often carry the weight of convincing anecdotal experience, but the public interest in shark cartilage has been driven more by marketing than science, said Gary K. Ostrander, Ph.D., vice chancellor for research and graduate education at the University of Hawaii at Mānoa. “People want to believe this stuff. They’re desperate. They have limited time, limited resources,” he said. For some, that belief came from a book published in 1992. In *Sharks Don’t Get Cancer*, author William Lane, Ph.D., argued that the nearly nonexistent occurrence of solid tumors in sharks was because of cancer-fighting elements in their cartilage.

“This is all based on the idea that sharks don’t get cancer. Well, it turns out that sharks do get cancer,” said Ostrander. He and his colleagues cataloged findings of solid tumors in sharks in a review article, published in the Dec. 1, 2004, issue of *Cancer Research*, that also expounded on the dangers of pseudoscientific explanations for medical treatments.

Once Lane’s ideas came into the public, scientists began raising questions about the results of clinical studies he had conducted on cancer patients in Mexico and Cuba. “None of the work was ever published in a peer-reviewed research journal, and he was just playing with the artifacts,” said Ostrander. It also later came to light that the shark cartilage product that Lane was studying,

Benefin, was manufactured by Lane Labs, a company run by his son. In 1999, the U.S. Food and Drug Administration pursued an injunction against the company for illegally promoting the product as a cancer treatment.

And when Benefin was tested in a placebo-controlled trial, no benefit was



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found. “It wasn’t well tolerated, there wasn’t any suggestion of benefit in terms of quality of life, there wasn’t any suggestion of benefit in terms of survival,” said Charles L. Loprinzi, M.D., a cancer researcher at the Mayo Clinic in Rochester, Minn., who published the results of this study in the July 1 issue of the journal *Cancer*.

“When we set out to do this as a placebo-controlled evaluation . . . I would have loved to carry the banner of a positive study,” said Loprinzi. But after his study’s disappointing results, he is ready to move on. “We’re not planning to look further at it, and I wouldn’t recommend anyone look further at the product we looked at,” he said.

Benefin is just one of many shark cartilage products already on the market. However, some of these are being developed more like pharmaceuticals. For example, AE-941, or Neovastat, a standardized extract of shark cartilage, is currently being studied in a National Cancer Institute–sponsored phase III clinical trial for the treatment of non-small-cell lung cancer. Neovastat’s manufacturer plans to seek U.S. Food and Drug Administration approval for the drug.

But comparing Neovastat and Benefin is like comparing apples and oranges, said Charles Lu, M.D., assistant

professor at the University of Texas M. D. Anderson Cancer Center in Houston and principal investigator for the NCI study. “The company has never made any money off of Neovastat,” said Lu. “It is being treated as if it were an experimental drug.”

Federal law allows natural products such as Neovastat and Benefin to be marketed as dietary supplements, although the companies cannot make specific disease claims for those products. Lane Labs, like many other companies, has taken advantage of that loophole to sell their remedies without clinical studies.

Loprinzi said it is important to conduct clinical trials on these products so that the public can know the truth about whether they work. “It’s appropriate for us to look at things that have a high profile that may not have as much scientific basis, but . . . a lot of interest among the public,” he said.

There is another reason to study popular remedies—sometimes they really do



**Charles L. Loprinzi**

work, said Catherine Ulbricht, Pharm.D. “There might be something to public opinion that suggests something is helping or working,” said Ulbricht, chief editor at

Natural Standard, an international research collaborative that aggregates and synthesizes data on complementary and alternative therapies.

But when Natural Standard assessed the clinical data that had so far been collected on shark cartilage treatments, they gave these therapies a grade of C for “unclear or conflicting scientific evidence” for use in cancer and in every other application studied.

“I wouldn’t take it or recommend anyone take it,” said Ulbricht, who also

serves as the senior attending pharmacist at Massachusetts General Hospital in Boston. “I would need well-designed, hard-core randomized controlled trials. And once those were established, if they were positive or negative, I would need more to confirm those,” she said.

However, other people may need less convincing, she said. “If I had a life-threatening disease, my take on it might be a little more liberal.”

The results of Loprinzi’s study were not available when Natural Standard conducted their analysis, but his results aren’t likely to improve shark cartilage’s grade. Although there are other shark cartilage studies being planned, the evidence is already definitive enough for some people.

“Do we need to do more [shark cartilage] clinical trials in people? I think the data is pretty clear that we don’t,” said Ostrander, who cites the findings of overseas studies in reaching that conclusion. “Everything that I have seen and read suggests that there’s never going to be an effective therapy using shark cartilage,” he said. Ulbricht also noted that there were almost no data on the absorption and bioavailability of shark cartilage products in humans.

Although shark cartilage may lack support from clinical studies for use in oncology, some researchers still believe that laboratory studies of shark cartilage’s antiangiogenic properties may point to potential cancer-fighting compounds in cartilage.

“There is some rationale for why a shark cartilage product might work, and that is that in the cartilage there are not blood vessels,” said Loprinzi. “It is possible that there is some substance in one of the shark cartilage preparations that might have some benefit,” he said.

It’s also possible that media attention and public pressure have played a role in motivating clinical research into shark cartilage, but that doesn’t mean these products have nothing to offer, said Ulbricht. “Only time will tell,” she said. “There is new research being published every day in this area trying to elucidate the answer.”

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However, sharks don't get cancer very often, which is still interesting. Scientists have studied this phenomenon, and there's a couple different reasons. First, sharks, as mentioned above, don't have bones; their body structure instead comes from cartilage, the same stiff material that gives our nose and ears their shapes. Our bones serve as the factories where immune cells are created, but there's a lag time as the immune cells mature before being released into the bloodstream. However, this is very different from just eating cartilage in vain belief that any active ingredient will make its way to the tumor! If you had a bad sunburn, would you just eat a bunch of aloe? If you cut your finger, are you going to swallow a few Band-Aids? Save the Sharks (From Humans, Not Cancer). Read about shark cartilage and its role in cancer research. That sharks can and do get cancer makes it clear that ingesting their cartilage in a health-food supplement won't cure the disease in humans. To verify this, researchers have undertaken specific studies on the effects of shark cartilage in cancer patients. Studies on mice and on humans in 1998 and 2005 found that taking an oral shark-cartilage supplement had no effect on cancerous tumors. Results indicated that it didn't prevent the spread of cancer to other organs either. The study also found that taking the supplements led to some gastrointestinal side effects like diarrhea, nausea Sharks Do Get Cancer. From the WebMD Archives. April 5, 2000 (Atlanta) -- Sharks have captured people's imagination, for better or worse, since men drew sea serpents and dragons on maps. Until recently, little has been known about them -- an open invitation to myth. Now, science seems to be shattering one legend about the fabled fish: that they never get cancer -- a notion that has prompted thousands of cancer patients to ingest shark-cartilage supplements. "Early studies in the '80s showed properties of the shark, in cartilage, that prevent blood vessels from growing. [C]learly tumors need this, but it's just a big leap from that to shark cartilage [supplements]." Finkelstein JB: Sharks do get cancer: few surprises in cartilage research. J Natl Cancer Inst 97 (21): 1562-3, 2005. [PUBMED Abstract]. Schlumberger HG, Lucke B: Tumors of fishes, amphibians, and reptiles. Cancer Res 8 (12): 657-754, 1948. Wellings SR: Neoplasia and primitive vertebrate phylogeny: echinoderms, prevertebrates, and fishes--A review. Natl Cancer Inst Monogr 31: 59-128, 1969. Evaluation of shark cartilage in patients with advanced cancer: a North Central Cancer Treatment Group trial. Cancer 104 (1): 176-82, 2005. [PUBMED Abstract]. Folkman J: The role of angiogenesis in tumor growth. Semin Cancer Biol 3 (2): 65-71, 1992. [PUBMED Abstract]. Sipos EP, Tamargo RJ, Weingart JD, et al.