



Imitation Shark Skin Could Prevent Infections

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While manatees can accumulate algae on their backs, and whales are often sporting barnacles, sharks always have clear skin: and that unique trait can save human lives.

“This is a property unique to all sharks,” microbiologist Ethan Mann says in a 2019 TEDx talk in Denver, Colorado. “The next time you watch Shark Week, you’ll notice each and every shark you see is pristine.”

Mann is the Vice President of Sharklet Technologies, Inc. By mimicking the texture of shark skin, Sharklet makes medical devices that inhibit bacteria growth without using harsh chemicals or antibiotics.

“Texture can greatly influence the way biological organisms see surfaces,” says Mann. The founder of Sharklet, Dr. Anthony Brennan, is a Professor of Materials Science and Engineering and Biomedical Engineering at the University of Florida who noticed that different dental materials would see different amounts of bacterial growth.

The Sharklet surface is an ordered series of raised bars, each with a width of only 16 microns (about a third of the width of a human hair). The bars are arranged in a series of interlocking diamonds, almost like argyle. Sharklet has proved that this surface structure is inhospitable to bacterial growth.

“What we’ve found is that you can not only prevent bacterial fouling on medical devices,” Mann says, “you can actually adapt how your own body heals around medical devices.”

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Mann has been with Sharklet since 2013, just after Sharklet received their second Phase II Small Business Innovation Research (SBIR) grant from the National Institute of Diabetes and Digestive and Kidney Diseases for a urinary catheter. Urinary tract infections (UTIs) associated with urinary catheters account for over 40% of infections in hospitals and nursing homes. But

(continued on back)



Sharklet Technologies

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Technology

Medical Device

Primary Institute

Diabetes, Digestive, and Kidney
(**NIDDK**)

Secondary Institute

Arthritis, Musculoskeletal, and
Skin (**NIAMS**)
Heart, Lung, and Blood (**NHLBI**)

Project Details from NIH RePORTER Sharklet Technologies

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Sharklet's urinary catheter, covered in their sharkskin-like surface, can greatly reduce the number of those infections. Patients have also reported significantly less pain from the Sharklet catheter than from a control catheter.

"There haven't been technologies that are able to inhibit this biofilm formation," Mann says. "So our results have been pretty exciting."

Sharklet has been developing products with SBIR grants since their founding in 2007. Besides the urinary catheter, Sharklet has used these grants to improve endotracheal tubes, wound dressings, and central venous catheters. The SBIR grants for these devices have come from the National Heart, Lung, and Blood Institute and the National Institute of Arthritis and Musculoskeletal and Skin Diseases.

"The SBIR program made delivering innovative technology more achievable and more attainable than it otherwise would have been," Mann says. "Really what the SBIR program brought to Sharklet was support for innovation at a time where no one else was really ready to take a leap on something so novel and paradigm shifting."

