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Squid sucker ring teeth material could aid reconstructive surgery, serve as eco-packaging

Date: July 2, 2014

Source: American Chemical Society

Summary: Squid tentacles are loaded with hundreds of suction cups, or suckers, and each sucker has a ring of razor-sharp 'teeth' that help these mighty predators latch onto and take down prey. Researchers report that the proteins in these teeth could form the basis for a new generation of strong, but malleable, materials that could someday be used for reconstructive surgery, eco-friendly packaging and many other applications.

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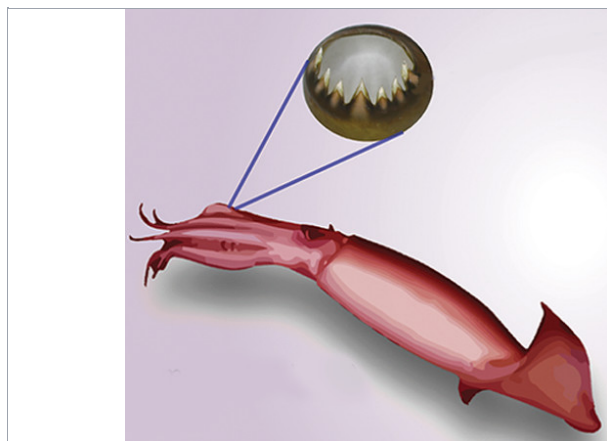
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Teeth on squid suckers are inspiring new materials for a wide range of applications from surgery to packaging.

Credit: ACS

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Squid tentacles are loaded with hundreds of suction cups, or suckers, and each sucker has a ring of razor-sharp "teeth" that help these mighty predators latch onto and take down prey. In a study published in the journal *ACS Nano*, researchers report that the proteins in these teeth could form the basis for a new generation of strong, but malleable, materials that could someday be used for reconstructive surgery, eco-friendly packaging and many other applications.

Ali Miserez and colleagues explain that in previous research, they discovered that sharp, tough squid sucker ring teeth (SRT) are made entirely of proteins. That makes SRT distinct from many other natural polymers and hard tissues (such as bones) that require the addition of minerals or other substances to perform the right activities, they say. The team already had identified one "suckerin" protein and deciphered its genetic code. They also found that this protein could be remolded into different shapes. But what about the other suckerins in SRT?

In the new study, they identified 37 additional SRT proteins from two squid species and a cuttlefish. The team also determined their architectures, including how their components formed what is known as "β-sheets." Spider silks also form these structures, which help make them strong. And just as silk is finding application in many areas, so too could SRT proteins, which could be easier to make in the lab and more eco-friendly to process into usable materials than silk. "We envision SRT-based materials as artificial ligaments, scaffolds to grow bone and as

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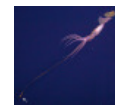
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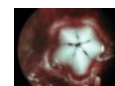
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▶ sustainable materials for packaging, substituting for today's products made with fossil fuels," says Miserez. "There is no shortage of ideas, though we are just beginning to work on these proteins."

Story Source:

The above story is based on materials provided by [American Chemical Society](#).
Note: Materials may be edited for content and length.

Journal Reference:

1. Paul A. Guerette, Shawn Hoon, Dawei Ding, Shahrouz Amini, Admir Masic, Vydzianathan Ravi, Byrappa Venkatesh, James C. Weaver, Ali Miserez. **Nanoconfined β -Sheets Mechanically Reinforce the Supra-Biomolecular Network of Robust Squid Sucker Ring Teeth.** *ACS Nano*, 2014; 140613151440007 DOI: [10.1021/nn502149u](#)

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American Chemical Society. "Squid sucker ring teeth material could aid reconstructive surgery, serve as eco-packaging." ScienceDaily. ScienceDaily, 2 July 2014. <[www.sciencedaily.com/releases/2014/07/140702111007.htm](#)>.

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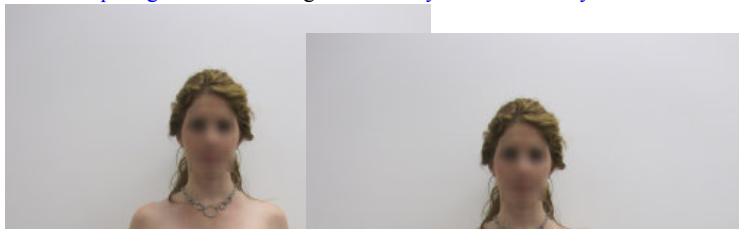
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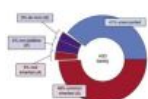


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