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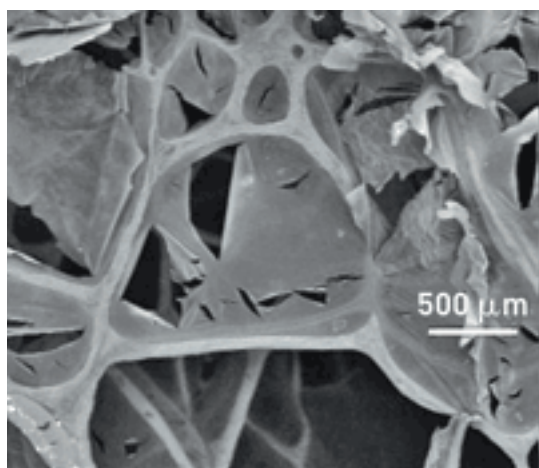
CRITTER CHEMISTRY

The Toucan Beak, Inside And Out

Tough exterior and rigid foam interior make toucan beak both strong and light

[Sophie Rovner](#)

What makes the colorful beak of a toucan both strong and light? To find out, University of California, San Diego, materials scientist and engineer [Marc A. Meyers](#) and his colleagues studied the structure and mechanical properties of the toucan's beak, which measures one-third the length of the bird but accounts for a mere one twentieth of its weight (*Acta Mater.* **2005**, 53, 5281).



COURTESY OF MARK MEYERS/UCSD

Using electron microscopy, the researchers found that the exterior of the beak is made up of overlapping tiles of keratin, the sulfur-containing fibrous protein that makes up hair, fingernails, and horn. The interior of the beak is constructed of a rigid foam (shown) made of a network of calcium-rich bony fibers connected by membranes. The membranes are similar in composition to keratin.

Meyers was surprised by the beak's ability to absorb high-energy impacts. Its structure could serve as the inspiration for automotive panels that could protect passengers in crashes and could also be used for ultralight aircraft components, according to the researchers.

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