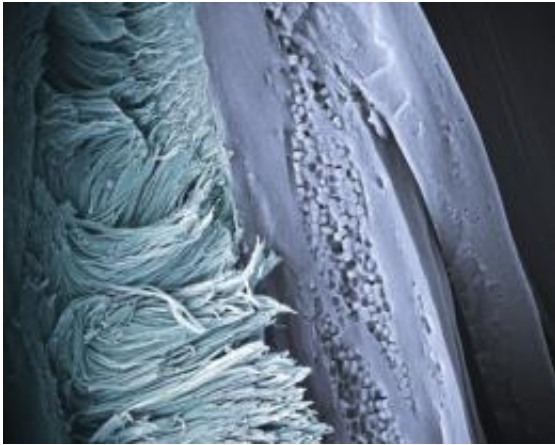


Researchers solve color mystery of blue-feathered penguins

February 10 2011



False-colored scanning electron micrograph of arrays of β -keratin nanofibers found in barbs of blue penguin feathers. The fibers produce a non-iridescent structural blue color by coherent light scattering and constitute a novel morphology for feathers. Photo by Liliana D'Alba

(PhysOrg.com) -- Researchers from The University of Akron and their colleagues have made an out-of-the-blue discovery.

They reveal that the blue color of the wing and back [feathers](#) of some penguin species results from the side-by-side arrangement of their nano-sized fibers. The neat, organized alignment and nano scale of the fibers cause light scattering in such a way that creates a blue hue.

This finding by biologist Dr. Liliana D'Alba, UA postdoctoral

researcher; Dr. Matthew Shawkey, UA assistant professor of biology and integrated bioscience; and their research team colleagues Drs. Vinodkumar Saranathan, Richard Prum and Jakob Vinther, Yale University; and Dr. Julia Clarke, University of Texas at Austin, shows — for the first time ever — a new way blue is created in feathers. The researchers' finding is published in the Feb. 9, 2011, issue of the Royal Society journal, *Biology Letters*.

Research could benefit various fields

The discovery could lead to new ways of growing nanofibers and open possibilities for new applications, according to Shawkey, who describes nanofibers' diverse applications, such as in flexible electronics and biomedical uses including wound dressings and drug-delivery systems.

The researchers used light and electron microscopes to examine wing and back penguin feathers and found they contained massive numbers of fibers, nanometers in diameter and parallel-aligned.

"Optical analyses of these [fibers](#) through Fourier analysis and small-angle X-ray scattering told us that their size and arrangement cause them to scatter light in a manner that creates the blue color," Shawkey says.

"For 30 years it has been thought that blue colors in feathers are only produced by cells of feather barbs in spongy layers, or matrices of keratin with nanometer-scaled pores in them. These results show that we should never stop looking just because we 'know' how something is made," Shawkey adds.

While the light scattering of nanofibers is responsible for the blue color of the skin of some birds and other animals such as mandrills, this is the first time it has been found as the source of the color blue in feathers.

More information: [rsbl.royalsocietypublishing.or ...
010.1163.short?rss=1](https://rsbl.royalsocietypublishing.org/doi/10.1163/short?rss=1)

Provided by University of Akron

Citation: Researchers solve color mystery of blue-feathered penguins (2011, February 10)
retrieved 18 April 2024 from
<https://phys.org/news/2011-02-mystery-blue-feathered-penguins.html>

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