The Straight Scoop on Curly Hair

New proteomic studies further elucidate the differences between straight and curly hair.

WITH FRASER BELL, PHD

>> The differences between curly and straight hair long have been attributed to the positioning of keratin proteins in the follicles. Fraser Bell, PhD, Science Insights Leader for hair care brand Nexxus, says that the company's own studies had shown that the structure of hair on the inside and outside of curls was different. However, Dr. Bell and colleagues wanted to determine whether the protein composition of different hair types was the same. "We wanted to understand if this was really the case, and proteomic studies, using advanced mass spectrometry methods, were the only way to know for sure," Dr. Bell says. "It was using our proteomic methods that identified the subtle but important differences in the protein composition of curly hair and straight hair."

Their findings, published in a white paper in *Journal of Cosmetic Science*, demonstrate that there are differences in the protein composition of curly and straight hair types. The findings have also led the company to develop a line of products specifically for curly hair. Dr. Bell discussed the findings with *Practical Dermatology*®.

What is the significance of what you found in terms of protein differences?

Dr. Bell: First, we found that the protein composition of the curly and straight hair types was different. We found that in curly hair, some proteins were found at increased levels of up to six times greater than those found in straight hair. Other proteins were found at much lower levels in curly hair than in straight hair. We were able to identify around 20 proteins that were present either in much greater or significantly lower amounts in each of the hair types.

Does the difference in proteins account for differences in hair curliness and texture seen across different ethnic and cultural groups? Do differences in proteins affect other hair characteristics?

Dr. Bell: The proteins that are expressed and form the hair fibers certainly give rise to the shape characteristics, and it's the shape characteristics that determine the look and feel and have a big role to play in many other physical properties, including strength.

We've focused on understanding the drivers of hair shape more so than the links between ethnicity and protein composition as it's hair type, it's characteristics and condition that determine the consumer's hair care needs more so than ethnicity. We then optimize our hair care products to deliver against the needs of specific hair types and conditions.

How does the existence of different proteins in the hair affect the cleansing and conditioning needs of the hair?

Dr. Bell: Curly hairs don't just have a different shape along their length when compared to straight hair. The cross-sectional shape is different too. Curly hairs have quite an elliptical, or even ribbon-like cross-sectional shape, and straight hair a rounder cross-section. The shape characteristics of curly fibers, and how they interact and align with each other, can make this hair type feel inherently rougher and more dry than straighter hair, even when in a healthy condition. Because curly hair can be less aligned than straight, it can be more difficult to detangle and style and, thus, is often subject to higher forces and fatigue during grooming and styling.

Both fiber shape factors and the susceptibility of curls to higher grooming forces often means curly hair needs more conditioning than straight to make it feel manageable.

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Findings published in a white paper in *Journal of Cosmetic Science* demonstrate that there are differences in the protein composition of curly and straight hair types. The shape characteristics of curly fibers, and how they interact and align with each other, can make this hair type feel inherently rougher and more dry than straighter hair, even when in a healthy condition, influencing the hair care needs and habits of individuals.

the**bottom**line

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In-shower products for curls generally provide more wet and dry conditioning than products designed for straight hair, and many curly consumers regularly boost conditioning levels with a variety of leave-in treatments.

The cleansing habits of consumers with different hair types are quite different too, and curly consumers tend to adopt more complex wash regimens but wash less frequently. This means that cleansers for curls often need to remove more sebum and product residue than cleansers for straight hair, but must also be mild and caring for the hair and scalp.

Does the identification of these protein signatures suggest potential new approaches to modifying one's hairstyle cosmetically?

Dr. Bell: An in-depth understanding of the chemistry and the physics of all hair types is key to designing products that are optimized for each. There is no one-size-fits-all solution in hair care. When we understand the factors that give rise to specific hair types and conditions, we can select specific ingredients and product formats that are most appropriate for each. ■

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Based on their research, formulators at Nexxus selected specific proteins that can help fortify curly hair and optimize levels of conditioning ingredients to improve manageability in the Nexxus Curl Define range. The novel pre-wash format, Nexxus Curl Define Ultra-8 Pre-Wash Treatment, is intended to help detangle curly hair and provide care before the wash begins.