

System may offer new hope for personalized treatment of eczema

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Pharmaceutical researchers at Oregon State University have developed a new approach to treat eczema and other inflammatory skin disorders that would use individual tests and advanced science to create personalized treatments based on each person's lipid deficiencies.

A patent has been applied for on this system, which could revolutionize the treatment of eczema if it works as scientists believe it will.

By identifying the specific problems each person has, moisturizers, skin protectants or other products or therapies could be created to address those specific problems.

Aside from powerful steroid treatments that have a wide range of unwanted side effects, the primary existing treatments for eczema are "one size fits all" moisturizing or protective products, with little basis for understanding whether or not that's what an individual needs. Sometimes such products help, and often they are inadequate.

In 2012 in the United States, about 15 million Americans struggled with eczema, or atopic dermatitis, accounting for about \$1 billion in health care costs and 10-20 percent of all visits to a dermatologist.

Eczema and some other [skin disorders](#) can be caused by a deficiency in lipids, which are various types of fat in the skin such as ceramides, cholesterol and [free fatty acids](#), according to Arup Indra, an associate professor in the OSU College of Pharmacy and an expert on

inflammatory skin disease.

"Lipids in our skin help retain moisture, they act like a blanket that protects against irritation and infection," Indra said. "You could think of [skin cells](#) as the bricks of a wall, but lipids are the mortar that prevent things from getting through the cracks. When they are deficient, problems can develop."

Part of what makes eczema so difficult to treat, however, is that there are hundreds of lipids, serving various functions as a skin protector, barrier or antimicrobial agent - and every individual has a slightly different lipid composition. Most of the moisturizers now available are just random compositions of lipids that may or may not help address what is missing in a given individual.

The new system created at OSU starts with surprising simplicity. A piece of tape is stuck to the skin and then pulled off, removing with it some skin cells. The painless procedure is totally noninvasive and could be used on anyone from infants to the elderly.

Those skin and lipid samples are then analyzed with sophisticated mass spectrometry in a process created at OSU that literally produces a "lipid fingerprint" - a measurement of that person's skin and lipid profile. This profile can then be compared against those of healthy individuals, to help identify missing or deficient lipids that may be an underlying cause of the skin disorder.

From that, various products or other therapies can be developed that would help replace or increase the lipids that are deficient in a person. They could be used topically like conventional moisturizers.

OSU's research, the first of its type, has already shown that the lipid profiles of people with healthy skin often differ markedly from those

with eczema or other inflammatory skin disorders. This offers further evidence that altered [lipid](#) composition in the skin of [eczema](#) patients may be a determinant of disease onset, progression and severity, the researchers said.

"We believe it's likely that supplementation with the lipids a person specifically needs will help address their skin problems and improve epidermal barrier function, and we plan to test that in continued research," Indra said.

Findings in this area could also be used in veterinary medicine, the researchers said, since many pets such as cats and dogs also have [skin](#) disorders.

Further collaboration and support from private industry is being sought by OSU to help bring these systems more rapidly to availability, through its Office for Commercialization and Corporate Development.

Provided by Oregon State University

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