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HEALTH

The Solution for Skin Ailments Could Be Right Under Your Nose

By FERRIS JABR JUNE 26, 2017

Your skin is a tapestry of ecosystems roughly the size of three bath towels. Complex societies of bacteria, viruses and fungi live in these diverse habitats — from the oil fields of the face and back, to the damp caverns of the nose, to the parched and hairless palms.

For decades researchers have argued that some of the skin's microscopic residents are partly to blame for certain disorders, such as acne and eczema. Now, it seems, bacteria may be part of the treatment, too.

Dr. Richard Gallo, a dermatologist and biologist at the University of California, San Diego, and his colleagues recently concocted an innovative microbial treatment for eczema, a disorder characterized by red, itchy, inflamed skin. The recipe was relatively simple.

Dr. Gallo had discovered that Staphylococcus hominis and Staphylococcus epidermidis, typically friendly members of the human skin microbiome, can kill Staphylococcus aureus, which is known to play a role in eczema. So the team swabbed S. hominis and S. epidermidis from the skin of a few volunteers with eczema, grew the bacteria in the lab, and incorporated the microbes into Cetaphil lotion.

Next they applied the experimental balm to the volunteers' forearms, drastically increasing the numbers of their own helpful skin bacteria. Within 24

hours, the probiotic lotion nearly eliminated S. aureus from their skin. The researchers were also able to identify some of the compounds that the beneficial bacteria use to deter S. aureus.

Dr. Gallo and his collaborators published their results earlier this year in Science Translational Medicine.

"It's the first time anything like this has been shown," said Elizabeth Grice, a research dermatologist and microbiologist at the University of Pennsylvania who was not involved in the experiment. "What remains to be seen is whether this kind of treatment can reduce the severity of skin disease over the long term."

Only in the last few years have scientists seriously studied how to therapeutically modify the skin's native colonies of microbes. Understanding this unique microbiome may yield new ideas for treating various dermatologic conditions.

Some studies suggest, for example, that people prone to acne carry more of the microbe Propionibacterium acnes on their skin. A disturbance in typical bacterial populations leads to conflict between P. acnes and neighboring species, the theory goes, which in turn triggers an inflammatory response in the skin.

In another study published late last year, Dr. Gallo and his colleagues injected a beneficial strain of Staphylococcus epidermidis, along with some food that only it could digest, into the ears of mice. The combination treatment, known as a synbiotic, encouraged the growth of S. epidermidis, which in turn reduced both the number of P. acnes and level of inflammation in the mice.

Other scientists have been reporting similar findings. In 2014, a team in South Korea and the United States showed that an extract from Helicobacter pylori — a common resident of the human stomach — also can inhibit P. acnes and decrease skin inflammation in mice.

Scientists in Canada have demonstrated that people who take both probiotics and antibiotics have significantly fewer acne lesions after 12 weeks, compared with people who take only one or the other.

Several private companies are racing to capitalize on a growing consumer appetite for probiotic cosmetics, toiletries and topical treatments. The biotech

company AOBiome offers a “live probiotic spray,” for instance, that is meant to replenish populations of beneficial skin bacteria.

Many microbiologists worry, however, that the science is nowhere near advanced enough to justify the proliferation of these products. Scientists still have a lot to learn about what microbial ecosystems look like on healthy skin, how they change during illness, and how to safely interfere.

Topical probiotics can easily rub off and be transferred to other parts of the body or other people, Dr. Grice pointed out. Just because a microbe kills one species of pathogen does not mean it is unwaveringly “good” or peaceful.

And what if the bacteria in a lotion or spray were to infiltrate the body via a cut or scratch?

Dr. Grice agreed, however, that the idea is intriguing. Whereas typical antibiotics and antiseptics indiscriminately kill all kinds of bacteria throughout the body and drive the evolution of highly dangerous microbes impervious to existing drugs, probiotics may be much more selective.

And probiotics that successfully colonize the body have the unique ability to evolve in concert with a surrounding ecosystem. After all, genuine microbe-based therapies are not just cocktails of molecules; they contain living organisms that persist and adapt. Dr. Gallo calls his experimental lotion an “evolutionarily honed” treatment.

“There are so many new potent medicines right under our nose,” he said.

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