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Virus Could Be New Weapon Against Zits

Zits begone: It might be possible some day to apply a cream that contains a virus that kills acne-causing bacteria to ward off zits, a new study suggests.

The study, published Tuesday in the journal mBio, analyzed the genomes of viruses that attack the skin bacteria linked to acne problems from 11 volunteers.

Using over-the-counter pore cleaning strips, the researchers peeled off samples of phages - viruses that attack bacteria - from the noses of pimply and unblemished individuals.

The researchers were astounded to find that these viruses were remarkably similar genetically from patient to patient, said corresponding author Graham Hatfull, professor of biotechnology and biological sciences at the University of Pittsburgh. The fact that there was so little difference between these viruses from nose to nose suggests that their bacterial prey - in this case, the bacteria that lead to acne - are ill-equipped to defend themselves.

These findings "indicate the possibility of using these phages as a targeted approach to acne treatment," the study authors wrote.

Acne is the most common skin problem across the United States, according to the American Academy of Dermatology website. Acne affects 40 to 50 million Americans at any given time, and can lead to disfigurement and problems with self-esteem.

The increase in antibiotic-resistant strains of the skin bacteria linked to acne highlights the need for new and better acne treatments, the study authors wrote.

Dr. Doris Day, clinical assistant professor of dermatology at NYU Langone Medical Center and author of "100 Questions and Answers about Acne," explained how the common skin bacteria, Propionibacterium acnes - P. acnes for short - helps pimples develop.

"You have a follicle, which is a pore," said Day, who was not involved with the study. "For [some] reason, the skin cells that line it don't slough off as they're supposed to. Once the opening gets blocked, then the oil and skin cells behind it start to build up. That's your whitehead."

Day explained that when the opening to the pore is clogged, there is little to no oxygen - the perfect environment for bacteria like P. acnes to thrive.

"Everything it likes to eat is right there," she said.

The hope, Day said, is that dermatologists will be able to tailor treatments to attack and destroy P. acnes in a way that is currently not possible -- a viral smart bomb, if you will, against acne germs.

How could future anti-zit treatments work? There are two ways, said study author Hatfull.

One method would be to create a virus-containing cream that patients could someday slather on pimply areas to kill off P. acnes. Since this virus is harmless to humans and already lives on our skin, he said, there would be no worry of side effects.

Using viruses to wipe out bacteria is not as far-fetched as it sounds. A food safety product containing viruses to fight disease-causing bacteria – such as Listeria monocytogenes - has been approved by the Food and Drug Administration to prevent foodborne illness, the study authors said.
A second potential acne treatment is to use endolysins, a special enzyme produced by the virus that kills bacteria on contact, Hatfull said.

Endolysins have been shown to be safe and to work well in other types of infections, said Vince Fischetti, professor and head of the Laboratory of Bacterial Pathogenesis and Immunology at Rockefeller University in New York City, who was not involved with the study.

The pressure inside a bacterial cell is 10 to 20 times higher than atmospheric pressure, he said. Upon contact, endolysins drill holes in the cell wall that cause a bacterium to explode like a balloon. And Fischetti has the dramatic videos to prove it.
The effect of endolysins occurs in matter of minutes, he said, adding that antibiotics take hours to work since they have to enter the bacterial cell and interfere with its metabolism for the cell to die.

Future therapies for drug-resistant acne could include creams that contained these bacteria-melting endolysins, he said.

However, much more research and testing needs to be done before patients can expect a new zit-busting cream, study author Hatfull said.

While we wait for new and better treatments for zits, what should acne suffers do for relief in the meantime?

"One thing that people have to understand is that rubbing alcohol on your skin does not have any effect on P. acnes," Day said, "So don't do that."

Day also advised not to pick at lesions because the immune response to the injured skin could make it worse and make pimples more likely to scar and last longer.

Dr. Gary Goldenberg, assistant professor of dermatology and pathology at Mount Sinai School of Medicine in New York City, who was not involved with the study, gave the following advice, "If you have acne, get examined by a dermatologist to determine what kind of acne you have and what kind of treatment is right for you."