

Study could explain why some people get zits and others don't

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The bacteria that cause acne live on everyone's skin, yet one in five people is lucky enough to develop only an occasional pimple over a lifetime. What's their secret?

In a boon for teenagers everywhere, a UCLA study conducted with researchers at Washington University in St. Louis and the Los Angeles Biomedical Research Institute has discovered that acne bacteria contain "bad" strains associated with pimples and "good" strains that may protect the skin.

The findings, published in the Feb. 28 edition of the [Journal of Investigative Dermatology](#), could lead to a myriad of new therapies to prevent and treat the disfiguring skin disorder.

"We learned that not all acne bacteria trigger pimples—one strain may help keep skin healthy," said principal investigator Huiying Li, an assistant professor of molecular and [medical pharmacology](#) at the David Geffen School of Medicine at UCLA. "We hope to apply our findings to develop new strategies that stop blemishes before they start, and enable dermatologists to customize treatment to each patient's unique cocktail of [skin bacteria](#)."

The scientists looked at a tiny microbe with a big name: *Propionibacterium acnes*, bacteria that thrive in the oily depths of our pores. When the bacteria aggravate the immune system, they cause the swollen, red bumps associated with acne.

Using over-the-counter pore-cleansing strips, LA BioMed and UCLA researchers lifted *P. acnes* bacteria from the noses of 49 pimply and 52 clear-skinned volunteers. After extracting the [microbial DNA](#) from the strips, Li's laboratory tracked a [genetic marker](#) to identify the [bacterial strains](#) in each volunteer's pores and recorded whether the person suffered from acne.

Next, Li's lab cultured the bacteria from the strips to isolate more than 1,000 strains. Washington University scientists sequenced the genomes of 66 of the *P. acnes* strains, enabling UCLA co-first author Shuta Tomida to zero in on genes unique to each strain.

"We were interested to learn that the bacterial strains looked very different when taken from diseased skin, compared to healthy skin," said co-author Dr. Noah Craft, a dermatologist and director of the Center for Immunotherapeutics Research at LA BioMed at Harbor–UCLA Medical Center. "Two unique strains of *P. acnes* appeared in one out of five volunteers with acne but rarely occurred in clear-skinned people."

The biggest discovery was still to come.

"We were extremely excited to uncover a third strain of *P. acnes* that's common in healthy skin yet rarely found when acne is present," said Li, who is also a member of UCLA's Crump Institute for Molecular Imaging. "We suspect that this strain contains a natural defense mechanism that enables it to recognize attackers and destroy them before they infect the bacterial cell."

Offering new hope to acne sufferers, the researchers believe that increasing the body's friendly strain of *P. acnes* through the use of a simple cream or lotion may help calm spotty complexions.

"This *P. acnes* strain may protect the skin, much like yogurt's live

bacteria help defend the gut from harmful bugs," Li said. "Our next step will be to investigate whether a probiotic cream can block bad bacteria from invading the skin and prevent pimples before they start."

Additional studies will focus on exploring new drugs that kill bad strains of *P. acnes* while preserving the good ones; the use of viruses to kill acne-related bacteria; and a simple [skin](#) test to predict whether a person will develop aggressive acne in the future.

"Our research underscores the importance of strain-level analysis of the world of human microbes to define the role of [bacteria](#) in health and disease," said George Weinstock, associate director of the Genome Institute and professor of genetics at Washington University in St. Louis. "This type of analysis has a much higher resolution than prior studies that relied on bacterial cultures or only made distinctions between bacterial species."

Acne affects 80 percent of Americans at some point in their lives, yet scientists know little about what causes the disorder and have made limited progress in developing new strategies for treating it.

Dermatologists' arsenal of anti-acne tools—benzoyl peroxide, antibiotics and Accutane (isotretinoin)—hasn't expanded in decades. Most severe cases of acne don't respond to antibiotics, and Accutane can produce serious side effects.

Provided by University of California, Los Angeles

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