

Nanoparticles used to prevent inflammatory acne through slow-released nitric oxide

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GW researcher and dermatologist, Adam Friedman, M.D., and colleagues, find that the release of nitric oxide over time may be a new way to treat and prevent acne through nanotechnology. This research, published in the *Journal of Investigative Dermatology*, identified that the nanoparticles were effective at killing *Propionibacterium acnes*, the gram positive bacteria associated with acne, and even more importantly, they inhibited the damaging inflammation that result in the large, painful lesions associated with inflammatory acne.

"Our understanding of [acne](#) has changed dramatically in the last 15-20 years," said Friedman, associate professor of dermatology at the GW School of Medicine and Health Sciences and co-author of the study.

"Inflammation is really the driving force behind all types of acne. In this paper, we provide an effective a way to kill the bacterium that serves as a stimulus for Acne without using an antibiotic, and demonstrate the means by which nitric oxide inhibits newly recognized pathways central to the formation of a pimple, present in the skin even before you can see the acne."

While the body makes nitric oxide for many purposes, its impact, such as anti-inflammatory effects, are short lived. Because nitric oxide interacts with its environment so quickly and is active for only a few seconds, it was crucial to find a way to release nitric oxide over time to be used effectively. Utilizing an established nanotechnology capable of generating and releasing [nitric oxide](#) over time, Friedman and his research team at the Albert Einstein College of Medicine and University

of California Los Angeles explored the mechanisms by which the nanoparticles could be a new way to tackle Acne, one of the most common dermatologic diseases affecting between 40-50 million people each year.

Acne develops due to an inappropriate immune system response to various factors, including bacteria on the skin such as *P. acnes*. The focus of this study was on a new pathway that was recently highlighted by the team at UCLA, involving what is known as an inflammasome, responsible for the activation of the inflammatory process in Acne.

"Many current medications focus only on one or two part of this process," said Friedman. "By killing the bacterium and blocking multiple components of the inflammasome, this approach may lead to better treatment options for acne sufferers, and possibly treatments for other inflammatory skin conditions."

More information: Nitric Oxide Releasing Nanoparticles Prevent Propionibacterium acnes Induced Inflammation by both Clearing the Organism and Inhibiting Microbial Stimulation of the Innate Immune Response, *Journal of Investigative Dermatology* 14 July 2015; [DOI: 10.1038/jid.2015.277](https://doi.org/10.1038/jid.2015.277)

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