

# Targeted light-based therapy for acne

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🌐 VU Reference:  
 VU15096

## VU Lead Inventors

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## Summary

Acne is the most common skin condition, with direct treatment costs totaling over \$3 billion each year. Vanderbilt researchers have developed a photodynamic therapy (PDT) for effectively and specifically treating *Propionibacterium acnes* infections, enabling improved clinical support for patients.

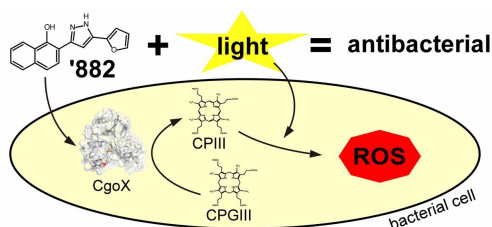
## Addressed Need

More than 90% of the global population suffer from acne during their lifetime, leading to billions of dollars in clinical costs and immeasurable emotional and psychological distress. This technology provides a powerful new therapy for treating this common condition, as well as infections caused by other Gram-positive bacteria, including methicillin-resistant *Staphylococcus aureus* (MRSA) and *Bacillus anthracis* (anthrax).

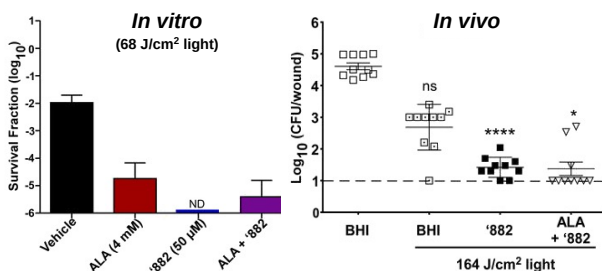
## TECHNOLOGY DESCRIPTION

While light is now commonly used to treat acne and cancer, this technology improves the effectiveness of PDT by co-administering a small molecule therapeutic. This therapeutic activates the overproduction of growth-essential photosensitizers specifically in Gram-positive bacteria like *P. acnes*. Blue light directed at the infection site then excites these photosensitizers, producing reactive oxygen species that destroy the pathogens from the inside.

**Top:** The small molecule developed by VU researchers improves the potency of acne PDT treatment by increasing production of intracellular photosensitizers.



**Bottom:** *in vitro* and *in vivo* data demonstrate that a therapy of '882 and blue light effectively reduces the bacterial burden of *P. acnes* when compared to controls (Vehicle, BHI) and ALA, another FDA-approved photosensitizer.



## Competitive Advantages

Preliminary data demonstrate that this technology can effectively kill *P. acnes*, with **toxicity improved by orders of magnitude** when compared to light alone or to light with aminolevulinic acid (ALA), a commonly used PDT prodrug that broadly produces photosensitizers in other bacteria and humans as well. This approach is also **targeted and specific**, attacking only the pathogens at the infection site to preserve skin cells and avoid negative off-target effects. The combination therapy and growth-essential nature of the photosensitizer also **reduce susceptibility to resistance**.

## Intellectual Property Status:

Patent: [US20160213780A1](#)  
 Publication: [PNAS, 2017](#)

## Stage of Development:

This technology has been validated *in vitro* and *in vivo*. We are seeking commercial partners to further develop it for clinical applications.