

# Toward phage therapy for acne vulgaris: Topical application in a mouse model

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**Background:** *Cutibacterium acnes* (*C. acnes*) plays a significant role in the pathogenesis of acne vulgaris, most patients are between the age 12-19. Recently, the prevalence of antibiotic-resistant *C. acnes* strains has been rising around the world. One promising alternative treatment against antibiotic-resistant bacteria is bacteriophage (phage) therapy. Phages are viruses that specifically lyse bacteria without infecting eukaryotic cells.

**Aim:** Explore feasibility of topical *C. acnes* phage therapy in an acne mouse model.

**Materials and Methods:** We tested in vitro susceptibility of 36 clinical isolates of *C. acnes* to commonly used antibiotics. then, we assessed their susceptibility to eight new isolates of *C. acnes* phages. An acne mouse model was induced by intradermal injection of *C. acnes* combined with topical application of artificial sebum. Mice were assigned into two groups; each group was treated topically for five days with a vehicle gel, with or without *C. acnes* phages. The presence of bacteria and inflammatory lesions at the site of *C. acnes* injection was evaluated.

**Results:** Full coverage of *C. acnes* strains was achieved by combination of phages and antibiotics. The treated mice had significantly superior inflammatory clinical scores over the placebo group and showed a significant reduction in neutrophil percentage compared to the control group.

**Conclusions:** These results demonstrate that topically applied lytic phages on *C. acnes*-inflammatory induced lesions lead to clinical improvement and a reduction of neutrophil migration, an essential part of acne vulgaris pathogenesis, thus having therapeutic potential.