**Methods and Materials S1. Confirmation of *P. acnes* fermentation by NMR analysis.**

To validate the fermentation of *P. acnes*, bacteria (105 CFU/ml) were incubated in (10 ml) rich media with (20 g/l) 13C3-glycerol (Cambridge Isotope Laboratories, Andover, MA, USA) under anaerobic conditions using Gas-Pak (BD, Sparks, MD, USA) at 30°C. After seventeen-incubation, *P. acnes* was discarded by centrifugation at 5,000 g for 30 min. Supernatants were then passed through 0.2-μm-pore-size filters and mixed with 10% D2O for NMR analysis. The 1-D NMR and 2-D 1H-13C HSQC NMR spectra were obtained according to methods as described in Materials and Methods. The previously published NMR spectra of 13C-glycerol fermentation by *Propionibacterium* species were used to assist in identifying the intermediates or final products resulting from 13C3-glycerol fermentation by *P. acnes* [53].

**Histological analysis of USA300-infected skin**

The USA300-infected skins pre-treated with propionic acid and its controls were cross-sectioned, stained with H&E (Sigma, St. Louis, MO, USA), and viewed on a Bx51 research microscope (Olympus, Melville, NY, USA).

**The effect of glycerol on the growth of *P. acnes***

*P. acnes*(105 CFU/ml) was incubated in rich medium (100 µl/well) in the absence and presence of 20 g/l glycerol on a 96-well microplate under anaerobic conditions using Gas-Pak (BD, Sparks, MD, USA) at 30°C. Reading 96-well microplates at OD600 was used to determine growth of *P. acnes*.