

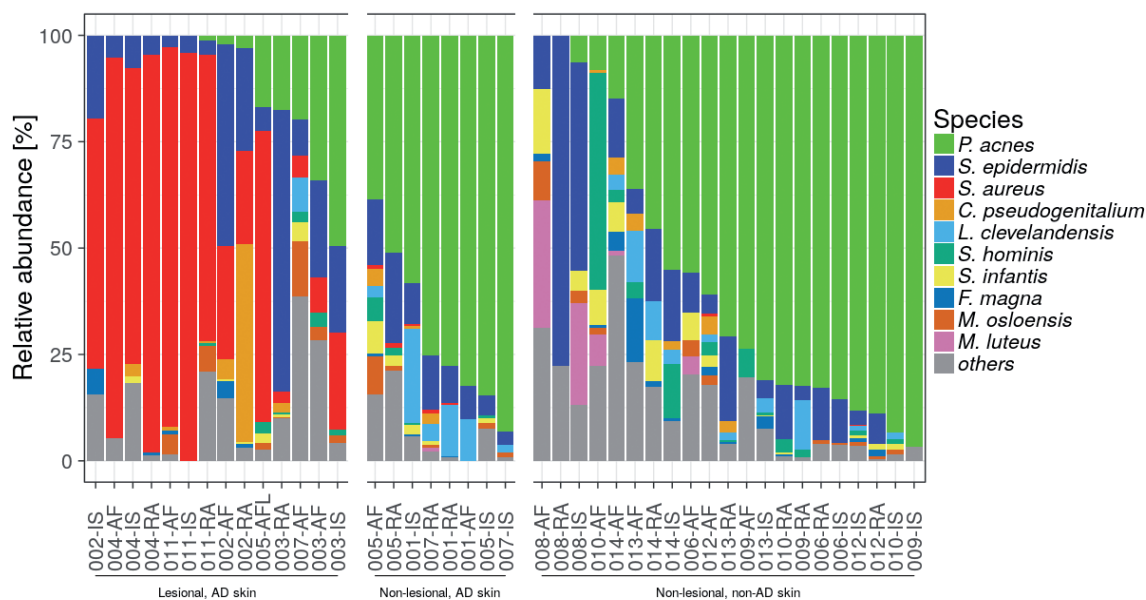


Fig. S1. Relative abundances of the 10 most abundant species sampled from 3 skin locations of 7 patients with atopic dermatitis (AD) and 7 healthy controls. Less abundant species were grouped together into "others" and included in the graph for completeness. The samples are coded as follows: patient number and sampling area. Sample 005-AFL and 005-AF were taken from locations close to each other (< 3 cm) and were from lesional and non-lesional skin, respectively. Samples were sorted according to the relative *P. acnes* abundance. AF: antecubital fossa; RA: retroauricular; IS: interscapular.

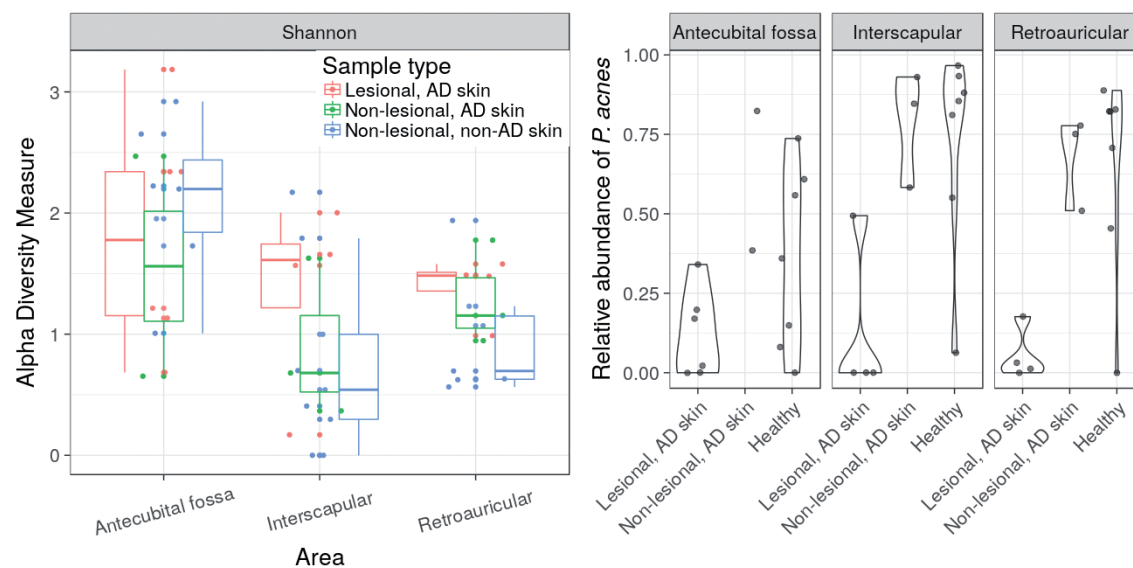


Fig. S2. The alpha diversity depends on core bacterial species. (a) Shannon Diversity Index of the samples in 3 anatomical areas. (b) Relative abundances of *Propionibacterium acnes* in 3 anatomical sites in lesional and non-lesional skin of atopic dermatitis patients, and healthy individuals.

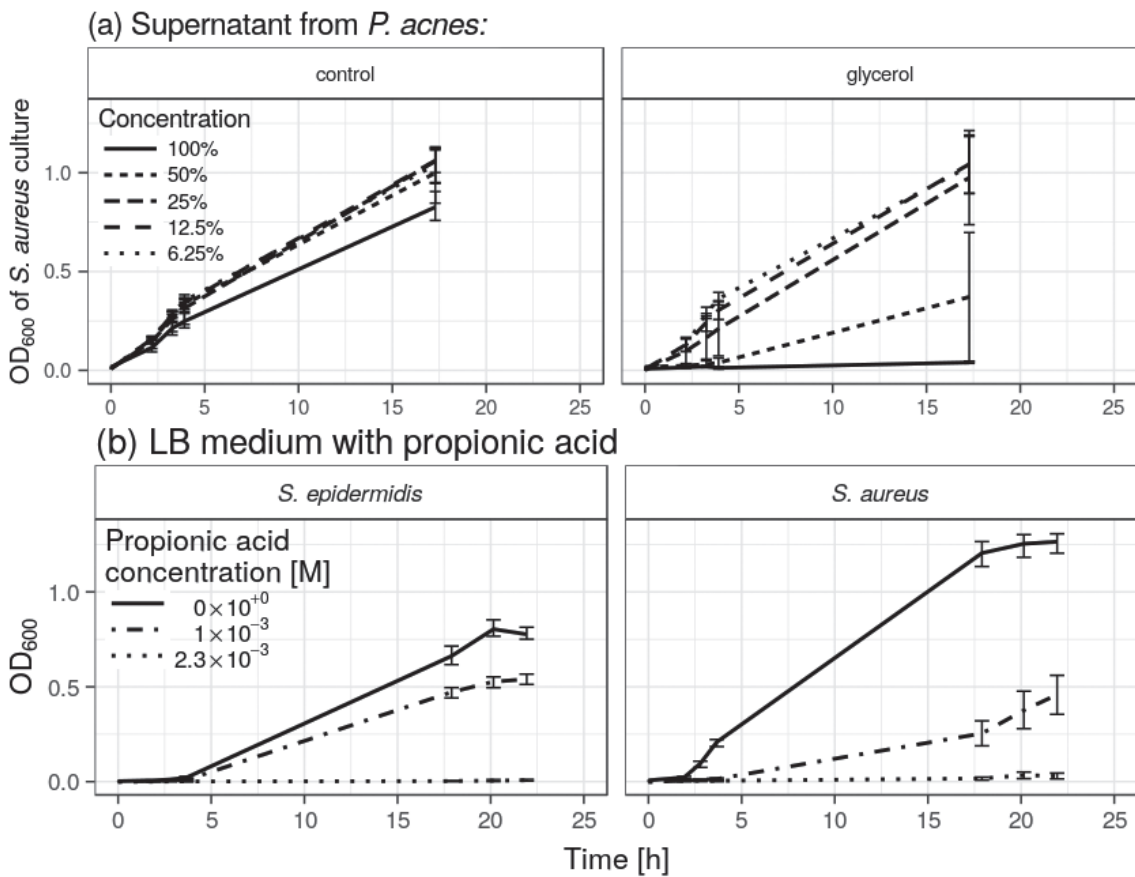


Fig. S3. (a) Growth of *S. aureus* in the supernatant from *P. acnes* cultures without (*left*) and with (*right*) addition of glycerol. (b) The inhibitory effect of propionic acid on the growth of *S. aureus* ($n=5$) and *S. epidermidis* ($n=5$) in increasing concentrations.

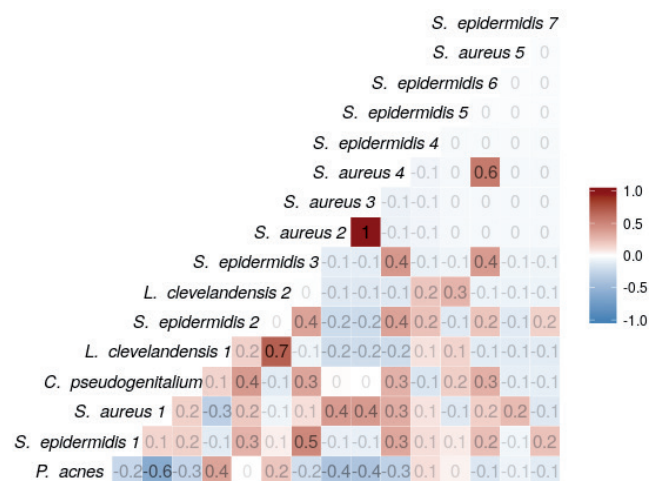


Fig. S4. Relative abundance correlation between ribosomal gene sequence variants of the 5 most abundant species. Blue (negative) and red (positive) colour intensity corresponds to Spearman's ρ values.