

TITLE: BIOFILM ASSOCIATION BETWEEN *Staphylococcus lugdunensis* AND *Propionibacterium acnes* ISOLATED FROM PROSTHETIC DEVICES

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ABSTRACT:

Propionibacterium acnes and *Staphylococcus* spp. are Gram-positive bacteria commonly found in the human skin microbiota, and frequently associated with opportunistic infections. This is due to a number of virulence factors, such as biofilm formation. Recent studies co-isolated *P. acnes* with other species of bacteria, including *Staphylococcus aureus* and coagulase-negative *Staphylococcus* (CoNS). Bacterial biofilm contributes to prosthetic joint infections, causing complications that may require surgical intervention and aggressive antimicrobial treatment. Considering that biofilm formation is an important medical problem in patients with orthopedic implants and those commensal bacteria are often related to such infections and isolated together, the aim of this study was to analyze the relationship between CoNS and *P. acnes* during biofilm formation. CoNS and *P. acnes* isolated from patients had their identification confirmed by standard biochemical assays and MALDI-TOF. Biofilm formation was analyzed for CoNS and *P. acnes* clinical isolates separately and together under aerobic and anaerobic conditions. We observed that among the different CoNS strains isolated from medical devices analyzed, mixed cultures of *P. acnes* and *S. lugdunensis* had a synergic effect on biofilm formation under aerobic and anaerobic conditions. This phenotype was stronger under anaerobiosis. Growth of *P. acnes* with different *S. lugdunensis* clinical isolates also promoted a stronger biofilm formation, indicating that the phenotype was not isolate-specific. Biofilm production of *S. lugdunensis* grown in the presence of cell-free media after *P. acnes* growth was also analyzed and *S. lugdunensis* did not exhibit the same increased biofilm formation, indicating that the phenotype is not due to *P. acnes* secreted molecules. In conclusion, co-culture of these microorganisms influences total biofilm formation by mechanisms still to be determined. The increased biofilm production might explain the co-isolation of these bacteria in infections associated with medical prosthetics.

Keywords: biofilm, *Propionibacterium acnes*, *Staphylococcus lugdunensis*, prosthetics devices.

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