TITLE: *CUTIBACTERIUM ACNES* SECRETES MOLECULES WITH ACTIVITY AGAINST *STAPHYLOCOCCUS LUGDUNENSIS* BIOFILM FORMATION.

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Staphylococcus spp. and *Cutibacterium acnes* are members of the human skin microbiome. However, studies have shown that both species can act as opportunistic pathogens, being isolated from human infections. Recently, *C. acnes* and coagulase negative *Staphylococcus*, such as *S. lugdunensis*, have been co-isolated from infections associated with medical devices, indicating a close relationship between these bacteria in these infections. Both microorganisms have their ability to form biofilms on surfaces as one of their main virulence factors, which allow the establishment and persistence of infection in the host. Biofilms also lead to increased bacterial resistance to antimicrobials, which poses additional challenges for the treatment of such infections. Given the problems associated with biofilm formation by these species and their close interaction during mixed infections, this study aimed to identify molecules present during these interactions with potential activity against biofilms. For this, we first sought to evaluate the impact of molecules secreted by *C. acnes* on *Staphylococcus* spp. biofilm production. To obtain a cell-free supernatant, we grew *C. acnes* for 72 h at 37 ºC under anaerobiosis, centrifuged to collect the supernatant, filtered and concentrated it. We then tested its impact on *Staphylococcus* spp. aerobic biofilm formation using a microplate assay. Given the results, we initiated the characterization of the active molecules present in the supernatant by submitting it to heat, boiling, and treatments with proteinase K, trypsin and sodium metaperiodate. We then tested the activity of the supernatants after each treatment on *S. lugdunensis* biofilm formation. Our results showed that among the staphylococci species tested, *S. lugdunensis* showed the greatest reduction in biofilm formation in the presence of *C. acnes* supernatant, but there was also a reduction on *S. aureus* and *S. epidermidis* biofilm. This effect was lost only when the supernatant was subjected to treatment with sodium metaperiodate, indicating a polysaccharidic nature of the molecule. Future experiments will focus on better characterizing the bioactive molecules, which could have therapeutical potential. Understanding the interactions between different microorganisms in mixed biofilms could shed light on new compounds with possible applications to help treating and preventing bacterial infections.

Keywords: biofilm, *Propionibacterium acnes*, *Staphylococcus lugdunensis*, microbial interactions.

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