TITLE: ANTIMICROBIAL ACTIVITY OF MOLECULES SECRETED BY *Staphylococcus aureus* ON *Staphylococcus pseudintermedius*

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ABSTRACT:

Staphylococcus aureus is considered an important human pathogen, mainly due to its ability to produce a wide repertoire of virulence factors. Despite causing several clinical manifestations, this species is also able to colonize the nasal region of about 30% of individuals asymptomatically. *Staphylococcus pseudintermedius* is found colonizing the skin and mucosa of about 90% of dogs and has often been isolated from veterinary infections. Due to the indiscriminate use of antibiotics and the consequent appearance of multiresistant strains, the treatment of such infections has become difficult. Although dogs are in constant contact with humans, cases of *S. pseudintermedius* infection in humans are not frequent and the reasons behind this are currently unknown. One hypothesis to be explored is the production of antimicrobial molecules by species that colonize these individuals, such as *S. aureus*. Thus, this study aimed to investigate the production of molecules secreted by *S. aureus* human isolates and their antimicrobial activity against veterinary *S. pseudintermedius* isolates. Competition assays combining different *S. aureus* and *S. pseudintermedius* isolates were performed and demonstrated that one *S. aureus* isolate (74) inhibited the growth of all *S. pseudintermedius* tested. To verify if *S. aureus* 74 could produce antimicrobial molecules the cell free conditioned media (CFCMs) was obtained for all *S. aureus* isolates and their effect on *S. pseudintermedius* growth was analyzed. *S. aureus* 74 CFCM was the only one able to inhibit the growth of all strains of *S. pseudintermedius* tested, exhibiting minimum inhibitory concentration with the CFCM concentrated 8x. Preliminary characterization of *S. aureus* CFCM with antimicrobial activity demonstrated that active molecules are only sensitive to sodium metaperiodate, but not to heat or proteases, indicating a possible polysaccharidic nature. It was also observed that this polysaccharide has no sulfate in its structure. During purification of the polysaccharide present in the CFCM, it was found that it is composed of hexoses and uronic acid, neutral and negatively charged sugars, respectively. In addition, high performance liquid chromatography analysis revealed that the polysaccharide with antimicrobial activity could be found between fractions 30 and 39. These results may help to understand the relationship between microbiota members and pathogens, aiding in the search for new therapies

Keywords: *S. aureus*, *S. pseudintermedius*, growth, antimicrobial, polysaccharide

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