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STAPHYLOCOCCUS EPIDERMIDIS BIOFILM-DETACHED CELLS: DIFFERENTIAL GENE EXPRESSION AND ANTIBIOTIC RESISTANCE

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Staphylococcus epidermidis has emerged over the last 3 decades as a leading cause of nosocomial infections due to its ability to form biofilms, particularly, on the surface of indwelling medical devices. The detachment of cells from the biofilm by both active and passive mechanisms is believed to be crucial for the dissemination of infection, often leading to serious complications such as embolic events, endocarditis, sepsis and pneumonia. Hence, a better characterization of biofilm-detached cells may help to employ more effective strategies against biofilm-related infections. In order to characterize the phenotype of *S. epidermidis* biofilm-detached cells, we assessed cell properties by measuring growth curves, expression profiles of key genes involved in initial adhesion, biofilm regulation, detachment and immune evasion (*atlE*, *agrB*, psmβ*1, rsbU* and *icaA*), and the susceptibility to vancomycin, a cell wall synthesis inhibitor, and tetracycline, a protein synthesis inhibitor, comparing planktonic, biofilm-detached and biofilm-derived cell populations. Despite their planktonic state, biofilm-detached cells had some specific features of biofilm cells, including low expression levels of *agrB* and higher expression of *rsbU* and *ica* transcripts. In contrast, the biofilm-detached cells had higher expression of *psm*β*1* transcripts, a class of surfactant peptides that

has been related to dispersal mechanisms, with the biofilm-detached cells resembling the *psmβ1* expression profile of planktonic cells. Similar to biofilm-derived cells, the antibiotic susceptibility properties of the biofilm-detached cells showed more resistance to tetracycline than stationary planktonic cultures. For vancomycin susceptibility, no differences were found among the 3 populations. Finally, biofilm-detached cells mostly followed the growth kinetics of planktonic cells with only small differences found, and had a higher growth rate compared to biofilm cells during the first 5 h of culture. The results suggest that biofilm-detached *S. epidermidis* cells may constitute a distinct phenotype, presenting some features of biofilm-derived cells and other features associated with the planktonic cell phenotype. Targeting the properties of the biofilm-detached cells could present opportunities to more effectively treat these infections and prevent the pathologic events associated with dissemination of cells from a biofilm to more distant sites.

Final Program and Abstracts

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