The combination of increased healthcare access, universal aging, and infallible therapy demands, synergistically drive the need for the development of biomaterial technologies that mitigate the challenge of biomaterial-associated infections (BAI)" Juhlin et al (2017).

Abstract:

The combination of increased healthcare access, universal aging, and infallible therapy demands, synergistically drive the need for the development of biomaterial technologies that mitigate the challenge of biomaterial-associated infections (BAI). Staphylococcus epidermidis and Staphylococcus aureus account for the majority of BAI due to their ability to accumulate in adherent multilayered biofilm.

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This investigation details the development of gene expression assays to evaluate the genetic processes of attachment, accumulation, maturation, and dispersal phases on biomaterials in vitro, while abiding by the Minimum Information for Publication of Quantitative Real-Time PCR Experiments (MIQE) guidelines. The biofilm formation of S. epidermidis on polyurethane central venous catheters (PU CVCs) and S. aureus on machined titanium (Ti) was examined in terms of gene expression at early and late time points. The results provided insight into how each stage of biofilm formation is orchestrated over time on these biomaterials in vitro. Furthermore, the results suggested that mechanical RNA extraction, organic solvents, elimination of genomic DNA, and preamplification are advisable strategies to implement for biofilm gene expression analysis. It is concluded that this method can be employed for the assessment of biofilm-biomaterial interactions at the molecular level.

Reference:

Juhlin, A., Svensson, S., Thomsen, P. and Trobos, M. (2017) Staphylococcal biofilm gene expression on biomaterials – a methodological study. Journal of Biomedical Materials Research. August 7th. .

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