Biofilm prevention and killing of Gram-positive bacterial pathogens involved PJI by antibiotic-loaded calcium sulfate beads (ALCSB) *in-vitro*

Robert Howlin¹, Devendra H. Dusane², Casey Peters², Craig Delury⁴, Sean Aiken⁵, Phillip Laycock⁵, Paul Stoodley²,³,⁴

1 Centre for Biological Sciences, Faculty of Natural and Environmental Sciences and Institute for Life Sciences, Building 85, University of Southampton, Highfield, Southampton, SO17 1BJ, UK
2 Department of Microbial Infection and Immunity, The Ohio State University, Columbus, OH 43210, USA
3 Department of Orthopaedics, The Ohio State University, Columbus, OH 43210
4 National Centre for Advanced Tribology, Mechanical Engineering, University of Southampton, Southampton, SO17 1BJ, UK
5 Biocomposites Ltd, Keele Science Park, Keele, Staffordshire, ST5 5NL, UK

**Aims:**
Periprosthetic Joint Infection (PJI) causes significant morbidity and mortality in fixation and joint arthroplasty and has been extensively linked to the formation of biofilms. A common approach in PJI management is the adjunctive use of local and systemic antibiotics. In this study we evaluated the *in-vitro* efficacy of ALCSB* to inhibit biofilm formation and kill pre-existing biofilms of a number of key Gram-positive pathogens including Epidemic methicillin-resistant *Staphylococcus aureus* (EMRSA-16) and *Staphylococcus epidermidis*.

**Method:**
To assess biofilm prevention, microorganisms were treated with ALCSB containing vancomycin (1000mg/10cc pack), gentamicin (240mg/10cc pack) or combinations of both antibiotics. Media was removed and challenged with fresh bacteria for 14 daily challenges. CFU counts were taken after 1, 2, 3, 7 and 14-days. For killing of pre-existing biofilms, ALCSB were added to 3-day biofilms. CFU counts were recorded at 1, 3 and 7-days.

**Results:**
ALCSB are capable of preventing surface colonisation and biofilm formation in the presence of repeat bacterial challenges

**Conclusions:**
These *in-vitro* studies highlight the potential *in vivo* benefit of antibiotic-loaded calcium sulfate beads in the prevention of bacterial colonisation and biofilm formation in prosthetic infection management.

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