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BIOFILM FORMATION BY PSEUDOMONAS AERUGINOSA ON SKIN WOUNDS: AN IN VIVO MODEL

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Aim: Although Pseudomonas aeruginosa biofilm on the nonbiological surface caused critical problems are well known, biofilm on wounds is still not understood. The aim of this study was to observe whether biofilm formation occurs on skin wounds.

Methods: Full or partial thickness wounds were created on the backs of SD rats. Suspensions of P. aeruginosa (PAO1 carrying the gene encoding the green fluorescent protein) was applied on the wounded area. Wounds were harvested at 8h,1,3days postwounding, processed for histology and immunohistochemistry. The presence of biofilm were indicated fluorescein isothiocyanate-conjugated concanavalin A.

Results: At 8 hour postwounding, we can observed biofilm on skin wounds in both groups, thereafter at 1, 3day, biofilm mass developed as the time proceeds. And naturally, fixed area of bacteria on wounds accorded with biofilm formation. As a result of detailed investigation about biofilm component, biofilm consist of bacteria and extracellular matrix.

In group of full thickness wounds, it was hard to make ulcer region clear. While in group of partial thickness wounds, it was simple to clear ulcer region and possible to change depth of wounds as to aim of study.

Conclusions: We confirmed biofilm formation by P. aeruginosa on skin wounds can observe in this experimental model, and partial thickness wounds were proper for to observe biofilm formation. Potential further developments of the model are discussed.

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MULTIPLE ACTIONS OF A SILVER IMPREGNATED FOAM DRESSING* – A NEW ANTIMICROBIAL WOUND DRESSING

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Aim: The activity of a new silver-containing dressing* on wound bacteria, bacterial proteinases and tissue proteolysis was studied in various in vitro and ex vivo models, as well as in vivo.

Methods: Growth assays using Pseudomonas aeruginosa and Staphylococcus aureus were employed for the study of antibacterial effects of released silver from a silver impregnated foam dressing* in presence of bacterial media as well as human serum. A comparison with seven other benchmark dressings was performed. SDS-PAGE and zymographic analysis was utilized for the study of a silver impregnated foam dressing* effects on protein degradation and proteinases during infection ex vivo. Release of biologically active silver from the dressing was studied. In a patient, wound size and dressing bacterial content was analysed.

Results: The silver impregnated foam dressing* demonstrated a significant antibacterial effect in relevant physiological environments when compared with benchmarks. The dressing was active against 19 chronic ulcer-derived P. aeruginosa isolates, as well as S. aureus bacteria. The silver impregnated foam dressing* blocked bacterial infection in presence of serum and human skin, and abolished release of bacterial enzymes, thus protecting from P. aeruginosa-mediated tissue degradation. In a case study a significant reduction of both wound size and dressing-derived bacteria was found after the silver impregnated foam dressing* treatment.

Conclusions: The new silver impregnated foam dressing* has a significant and sustainable action on relevant wound bacteria. Concomitant actions involve, in addition to its inherent and established capacity for exudate control, blocking of proteinase release and tissue degradation ex vivo.

*Mepilex Ag