Study of the Effect of Ciprofloxacin-Releasing Bioabsorbable Implant on *Staphylococcus Epidermidis* Attachment and Biofilm Formation in Vitro

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Background
Antibiotic coating systems have been successfully used to prevent bacterial attachment and biofilm formation. Our purpose was to evaluate whether bioabsorbable polylactide-co-glycolide (PLGA) 80/20 on its own, and PLGA together with ciprofloxacin (PLGA+AB) have any advantages over titanium in preventing *Staphylococcus epidermidis* attachment and biofilm formation in vitro.

Materials and methods
Cylindrical specimens of titanium, PLGA and PLGA+AB in triplicate were examined for *S. epidermidis* ATCC 35989 attachment and biofilm formation after incubation with a bacterial suspension of *ca.* 10^5 cfu/ml for 1, 3, 7, 14 and 21 days, using scanning electron microscopy. Growth inhibition properties of PLGA and PLGA + AB cylinders were tested on agar plates.

Results
On days 1, 3 and 21, no bacterial attachment was seen in 19.5%, 9.2% and 41.4% of the titanium specimens, in 18.4%, 28.7% and 34.5% of the PLGA specimens and in 57.5%, 62.1% and 57.5% of the PLGA + AB specimens, respectively. During the whole study period no biofilm was observed on 74%–93% of the titanium specimens, 58%–78% of the PLGA specimens and 93%–100% of the PLGA+AB specimens. PLGA + AB showed clear bacterial growth inhibition on agar plates while PLGA and titanium did not show any inhibition.

Conclusions
PLGA + AB bioabsorbable material was superior to titanium in preventing bacterial attachment and biofilm formation and may have clinical applicability, for example, in prevention of infection in trauma surgery or in the treatment of chronic osteomyelitis.

Keywords
Antibiotic, bioabsorbable, biofilm, ciprofloxacin, polylactide-co-glycolide

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