In advanced cases of alveolar bone atrophy, non-resorbable polytetrafluoroethylene (PTFE) membranes for guided bone regeneration (GBR) are used as effective treatment, demonstrating a good regenerative outcome. However, the concept has been challenged by the risk of exposure and subsequent infections. Given the excellent regenerative results, it is of clinical relevance to both evaluate the bacterial biofilm formation and optimize the tissue response to different types of PTFE membranes.

This study aims to evaluate the biofilm formation of Streptococcus oralis and fibroblast cytocompatibility on PTFE membranes with different structure (dense vs. expanded).

Methods and Materials

- Dense PTFE membrane (C) (Cytoplast®, Osseogenics, USA) was compared to 3 different expanded PTFE surfaces with varying degree of expansion (T1, T2, T3) (NeoGen®, NEOSS Ltd, UK).
- Streptococcus oralis ATCC 35037 (10<sup>5</sup> CFU/ml) was inoculated onto 10 mm Ø membranes (duplicates) and incubated statically for 2 h, 24 h, and 48 h. Bacterial colonization, viability and penetration were evaluated by colony forming unit (CFU) counting, confocal scanning laser microscopy (CLSM) and scanning electron microscopy (SEM).
- Human gingival fibroblasts HGF-1 (16000 cells/well) were cultured on membranes (triplicates) for 24 h and transferred to new wells for additional 2 h, 24 h, and 48 h. Cell proliferation and viability were analysed by cell counting (Nucleocounter), lactate dehydrogenase activity (LDH) and SEM.
- Experiments were repeated 3 times (n=3).