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Nanofibers with probiotics combination for treatment of periodontal disease

Nina K. Grilc¹, Julijana Kristl¹, Tomaž Rijavec², Aleš Lapanje², Špela Zupančič¹

¹ University of Ljubljana, Faculty of Pharmacy, Ljubljana, Slovenia

² Jožef Stefan Institute, Department of Environmental Sciences, Ljubljana, Slovenia



Dysbiosis in the periodontal pocket represents the most detrimental factor in the development of periodontal disease [1]. Local administration of probiotic bacterial strains, especially autochthonous oral strains, into the periodontal region has shown to be a promising treatment option. Currently, there is a lack of appropriate systems for precise local delivery of probiotics into the periodontal pocket and thus, nanofibers present an excellent candidate [2,3]. Our work aims to develop nanofibers as a delivery system for a combination of two autochthonous oral bacterial strains.

We developed electrospun polyethylene oxide (PEO) and PEO-alginate nanofibers with incorporated individual probiotic strains and their combination. The probiotic *Bacillus* strains were isolated from a healthy oral cavity. Preservation of bacterial viability is crucial and was addressed by induction of bacterial sporulation prior to nanofiber fabrication. This strategy enabled high spore loading (> 7 logCFU/mg) with no significant decrease of bacterial viability. The resulting nanofiber mats released viable spores in a sustained manner and PEO-alginate nanofibers exhibited a markedly slower release profile than PEO nanofibers.

The developed nanofibers with a combination of two potential probiotics showed the promising characteristics and will be further characterized based on their potential to inhibit the growth of pathogenic bacteria and elucidate the potential synergistic action of the two strains in combination.

References

1. Zidar et al. Expert Opin. Drug Deliv. 18(9), 1229-1244
2. Zupančič et al. Biomacromolecules. 19(11), 4299-430658 (2018)
3. Costalonga et al. Immunol. Lett. 162 (2): 22–38 (2014)