CONFOCAL MICROSCOPY OF EXPRESSION OF NLRP3 INFLAMMASOME AND TIGHT JUNCTION PROTEIN OCCLUDIN IN THE LINING EPITHELIA OF INFLAMED GINGIVA

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Background and objectives: The lesion of chronic periodontitis is characterized by perturbation of the epithelial attachment to the tooth with subsequent migration of the lining epithelium and formation of a cleft or pocket as a favourable habitat for a complex anaerobic microflora. The inflammasome comprises an intracellular network of regulatory and effector molecules mediating responses to receptors of innate immunity. Among those inflammasomes, NLRP3 has been well studied. To evaluate the role of NLRP3 in mediating this response in periodontitis patients, the expression of NLRP3 inflammasome and tight junction protein occludin in the lining epithelia of inflamed gingival tissues was visualised with confocal microscopy.

Materials and Methods: Immunofluorescence staining and confocal laser scanning microscopy were used to analyse patterns of expression of NLRP3 inflammasome and occludin in paired sections containing chronic periodontitis or minimally inflamed gingival epithelia.

Results: NLRP3 component was detected in the cytoplasm. In the minimally inflamed gingiva, NLRP3 was observed as moderate staining in external oral epithelium, to moderate-strong staining in gingival crest and sulcus, and moderate staining in gingival attachment. In contrast, periodontitis gingiva showed weak-moderate staining in the oral epithelium and negative-weak staining in the pocket epithelium. Occludin strongly expressed at cell contacts in the minimally inflamed gingiva, with scattered and uneven staining in the pocket epithelium.

Conclusions: Findings of expression of occludin indicate the failure of barrier function in periodontal disease while expression of NLRP3 inflammasome suggests the importance in maintaining resistance to periodontal infection. The data obtained provides a new focus on therapies targeting the epithelial microbial biofilm.