Distinct Salivary Biomarker Profile in Chronic Periodontitis

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Abstract

Background: Saliva has potential to diagnose chronic periodontitis (CP). Changes in tissue-expression of pattern-recognition-receptors (PRRs), which recognize periodontal-pathogens, correlate with CP. It follows that PRRs-expression in nucleated-cells (NCs) shed in saliva and soluble-PRRs may differentiate CP from health. Additionally, cytokines in gingival cervical fluid (GCF) correlate with worsening CP, which may be reflected in saliva. One significant test for biomarkers is changes in response to treatment.

Objectives: Comparison of CP salivary-biomarkers profile with health and to study treatment effects of scaling and root planning (SRP).

Methods: Unstimulated whole saliva (UWS) collection and recording of routine clinical periodontal parameters was done for two groups (n=16): healthy (H) (minimal clinical loss of attachment (CAL) and clinical inflammation) and CP (≥30% sites with ≥4mm CAL). UWS was collected at 3 different time points: before, 1-week and 6-weeks after SRP from the CP group. NCs and clarified saliva (CS) were separated from UWS. Messenger RNA was extracted from NCs and TLR-2 expression was quantitated through real-time-PCR. CS depleted of immunoglobulin and amylase to prevent large molecule interferences and diluted to 1 µg/ml of salivary-protein in PBS, normalize for variations in liquid volume, was used to quantify biomarkers through ELISA. Statistical significance between H- and CP-groups biomarkers was determined through Mann-Whitney ‘U' test and one tailed paired ‘t' test.

Results: Statistically significant differences were noted for clinical profiles of H- and CP-groups and for changes after SRP within CP-group. Salivary sTLR-2, IL-17 and IL-10, were significantly higher, and sCD14, IL-6, IL-4 and TLR-2 mRNA were significantly lower in H compared to CP. In CP, salivary sTLR-2 and IL10 increased significantly at 1- and 6-weeks after SRP, whilst IL-4 decreased significantly at 6-weeks.

Conclusions: Salivary biomarkers profiles are distinct between health and CP as well as before and after SRP treatment. sTLR-2, IL-10 and IL-4 may serve as short-term biomarkers for monitoring response to SRP. sCD14, TLR2-mRNA and other cytokines need exploration as long-term response biomarkers. Depletion of amylase and immunoglobulin, and normalization for total salivary protein may be important in biomarkers quantification.