

Endocannabinoid system and periodontal diseases: a histological preliminary study

Stefano Milani^{1,2}, Marilisa Toma^{1,2}, Daniela Carmagnola¹, Anna Colombo^{1,2}, Michele Giammattei^{1,2} and Claudia Dellavia¹

¹ Dipartimento di Scienze Biomediche, Chirurgiche e Odontoiatriche, Università degli Studi di Milano, Milan, Italy

² Dipartimento di Scienze Biomediche per la Salute, Università degli Studi di Milano, Milan, Italy

Periodontal disease is a chronic condition characterized by an opportunistic infection of the periodontal tissues by Gram- anaerobic bacteria (1). Tissue destruction can be limited by the production of anti-inflammatory substances and its final entity depends on the equilibrium between pro- and anti-inflammatory mechanisms. The endocannabinoid system (EC) is supposed to have an anti-inflammatory action. The two most extensively studied molecules of the EC are anandamide and 2-AG with their specific receptors, CB1 and CB2. Nakajima et al (2) showed the presence of CB1 and CB2 receptors in human gingival fibroblasts from healthy patients and subjects affected by periodontal inflammation and found that AEA significantly reduced the production of cytokines (IL-6, IL-8 and MCP-1) by gingival fibroblasts after bacteria stimulation, through CB1 and CB2 receptors. The aim of this project was to quantitatively and qualitatively evaluate the presence of CB1 and CB2 receptors in the gingival tissue from patients affected by periodontitis compared to healthy subjects. Ten patients were recruited, six healthy subjects (H) and four with chronic periodontitis (P). In each patient, a gingival biopsy was harvested during periodontal treatment and processed for immunohistochemistry to reveal CB1 and CB2 expression. Every sample was mapped at 200X total magnification and the presence of CB1 and CB2 was quantified using a standardized method with Adobe Photoshop PS5. The percentage of marked tissue in the connective tissue and in the epithelium was calculated. In P the mean CB1 percentage on the connective tissue (CB1-c) was 2.27% + 0.14% and CB2 (CB2-c) was 2.12% + 0.43%, while in H the values were 0.13% + 0.31% and 0.06% + 0.11% respectively. In P the mean CB1 value on the epithelium (CB1-e) was 5.08 + 2.27% and CB2 (CB2-e) was 4.07% + 1.64%, while in H the corresponding values were respectively 0.16% + 0.36% and 0.03% + 0.02%. CB1 and CB2 expression resulted significantly higher in P than in H samples in both epithelial and connective tissue (Wilcoxon sum rank test, $p < 0.01$). Such data confirm that EC are involved in periodontal disease.

References

- [1] Kim J & Amar S. *Odontology*. 2006;94:10-21.
- [2] Nakajima Y et al. *FEBS Lett*. 2006;580(2):613-9.

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