Expression of Human £]-defensin-3 in Gingival Epithelia

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Objectives: The human β-defensins (hBDs) are a group of small, broad-spectrum cationic antimicrobial peptides. We recently found that the expression levels of hBD-1 and -2 peptides were associated with periodontal conditions (Lu et al. 2004; J Periodont Res, in press). This study further investigated the expression patterns of the newly discovered hBD-3 (Jia et al. 2001; Gene, 263:211-8) in human gingiva. Methods: A total of 49 gingival biopsies were collected, including 33 samples from 21 patients with chronic periodontitis and 16 samples from 16 periodontally healthy subjects. The expression of hBD-3 was detected by immunohistochemistry and in situ hybridization. Double-staining was undertaken to further identify hBD-3 peptide-positive cells in gingival epithelia, including CD-1a and cytokeratin 20 as markers for Langerhans cells and Merkel cells, respectively. Results: hBD-3 peptide was detected in 88% of the samples, which was confined to the gingival epithelia. In healthy control tissues, it was more frequently detected in basal layer as compared to those from the patients (53% vs. 18%, $p<0.05$). While in the tissues from patients, hBD-3 expression was extended from the basal layer to the spinous layers, which was observed in 82% of the samples. The hBD-3 peptide was expressed not only in gingival keratinocytes, but also in Langerhans cells and Merkel cells. hBD-3 transcripts were detected in 90% of the samples and they were mainly observed in basal and spinous layers of gingival epithelia. No significant difference was observed in the expression patterns of hBD-3 mRNA between the healthy subjects and patients. Conclusions: This study showed that hBD-3 was frequently expressed in gingival epithelia. The appropriate expression of hBD-3 peptides might contribute to the maintenance of periodontal homeostasis, likely through its antimicrobial effect and promotion of adaptive immune responses. Supported by the Hong Kong Research Grants Council (RGC No. HKU 7310/00M).

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