

Unique Clinical Features of Hereditary Gingival Fibromatosis With elevated Expression of Human β -Defensin-2 and -3 in Gingival Epithelia

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Research

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Abstract

Background: Hereditary gingival fibromatosis (HGF), a rare benign oral condition, has several adverse consequences such as aesthetic changes, malocclusion, speech impediments, and abnormal dentition. However, relatively few studies have addressed the beneficial effects of thick gingival tissues on resisting external stimuli. Patients with HGF commonly manifest a 'healthy' gingiva, and the aetiology and pathogenesis of this condition remain unclear. Human β -defensins (hBDs) are known to play a pivotal role in the clearance and killing of various microbes and contribute to maintaining a harmonious oral environment, which is currently an emerging research focus. We previously performed an immunohistochemical analysis of gingival tissues from a multigenerational family with non-syndromic HGFs (NHGF). However, the expression pattern and localisation of hBD-2 and -3 in patients with NHGF has not been reported.

Methods: Gingival tissue was paraffin embedded, sectioned, and then the expression and localisation of hBD-2 and -3 in the gingival epithelium of patients with HGF and normal individuals were compared using immunohistochemistry (IHC) with descriptive and quantitative analysis.

Results: The immunohistochemical staining showed a statistically significant increase in hBD-2 and 3 in gingiva tissue derived from patients with HGF.

Conclusion: Our current findings provide evidence to support the novel hypothesis that certain gene mutations of the HGF lead to relatively elevated expression levels of hBDs, which may be beneficial in protecting oral tissue from external stimuli and promoting periodontal regeneration.

Full Text

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Figures

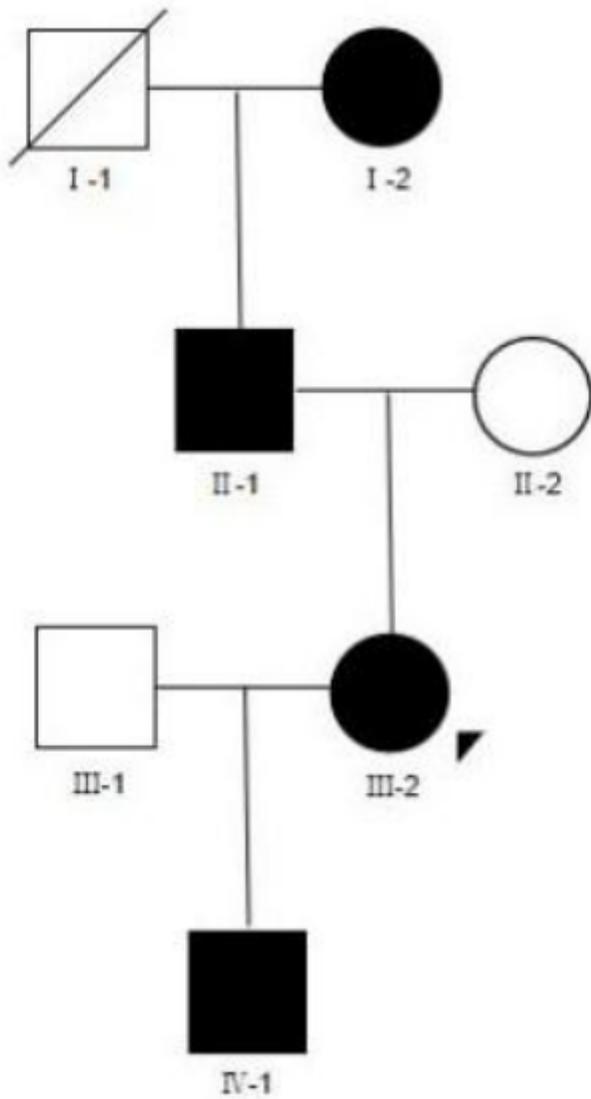


Figure 1

Pedigree of Chinese family with non-syndromic hereditary gingival fibromatosis (NHGF). Affected individuals are indicated by red symbols. Circles and squares denote female and male members and a slash through a symbol denotes a deceased individual. The proband is indicated by the arrow

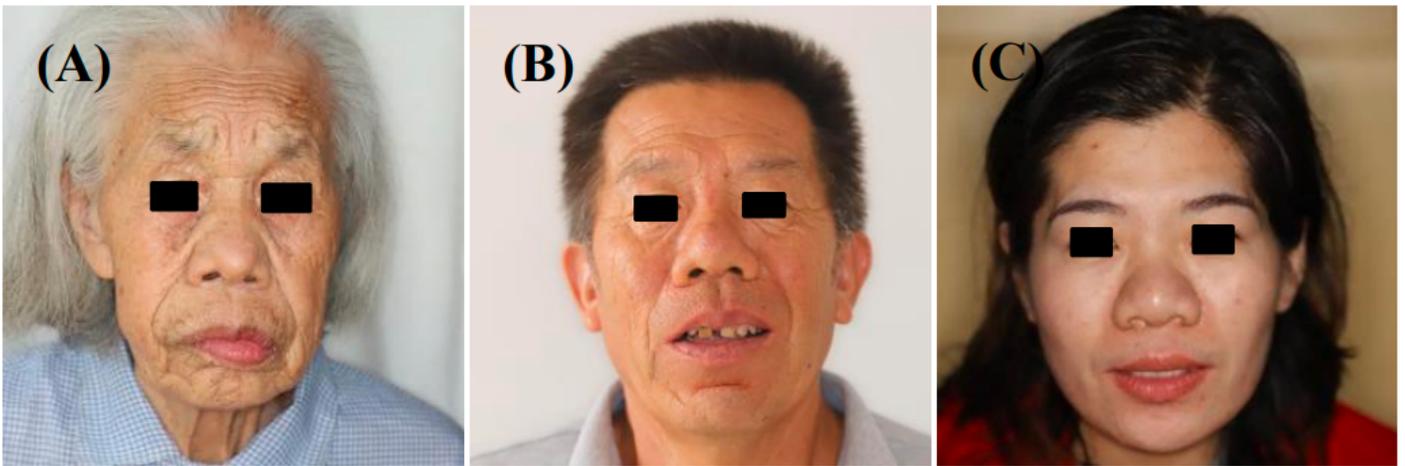


Figure 2

Extra-oral images of patients with non-syndromic hereditary gingival fibromatosis (NHGF). (A) I-2, 91 years old; (B) II-1, 63 years old; and (C) III-2, 35 years old.



Figure 3

Intra-oral images of patients with non-syndromic hereditary gingival fibromatosis (NHGF). (A) I-2, 91 years old; (B) II-1, 63 years old; (C) III-2, 35 years old; and (D) IV-1, 5 years old.

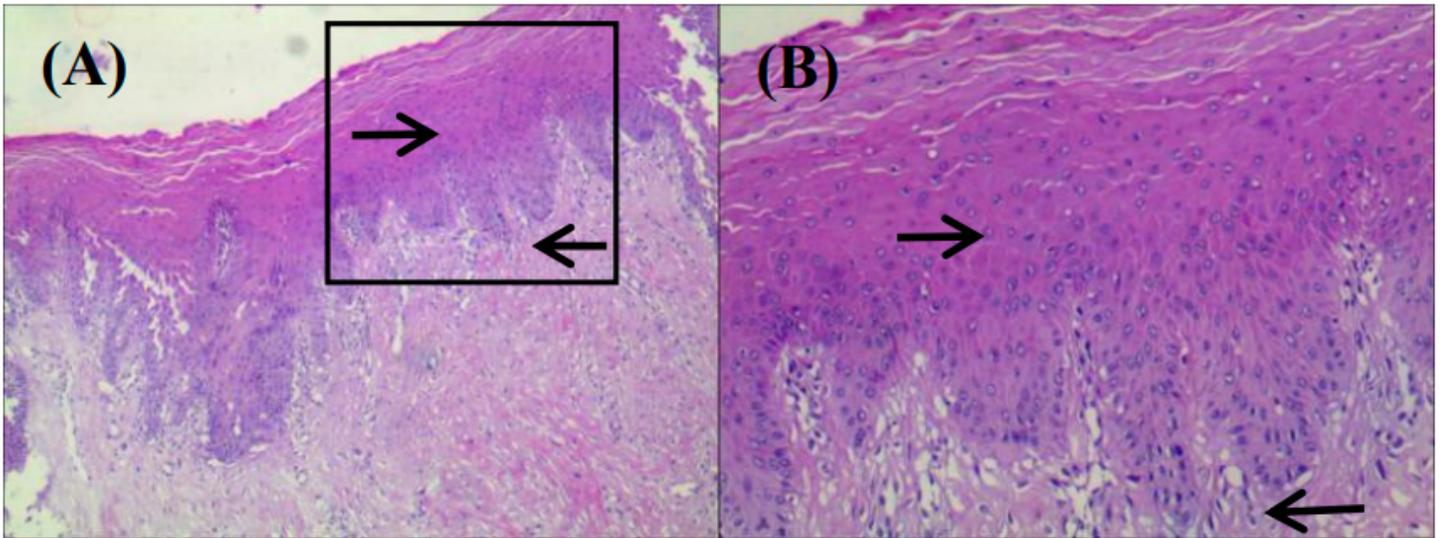


Figure 4

Representative photomicrographs of patients in the pedigree showing acanthotic thickened layer of epithelium. Furthermore, the rete ridges were broad, long, and extended deeply within the underlying connect tissue (black arrow). The encircled areas in (A) is $\times 40$ magnification and was amplified to $\times 200$ magnification in (B)

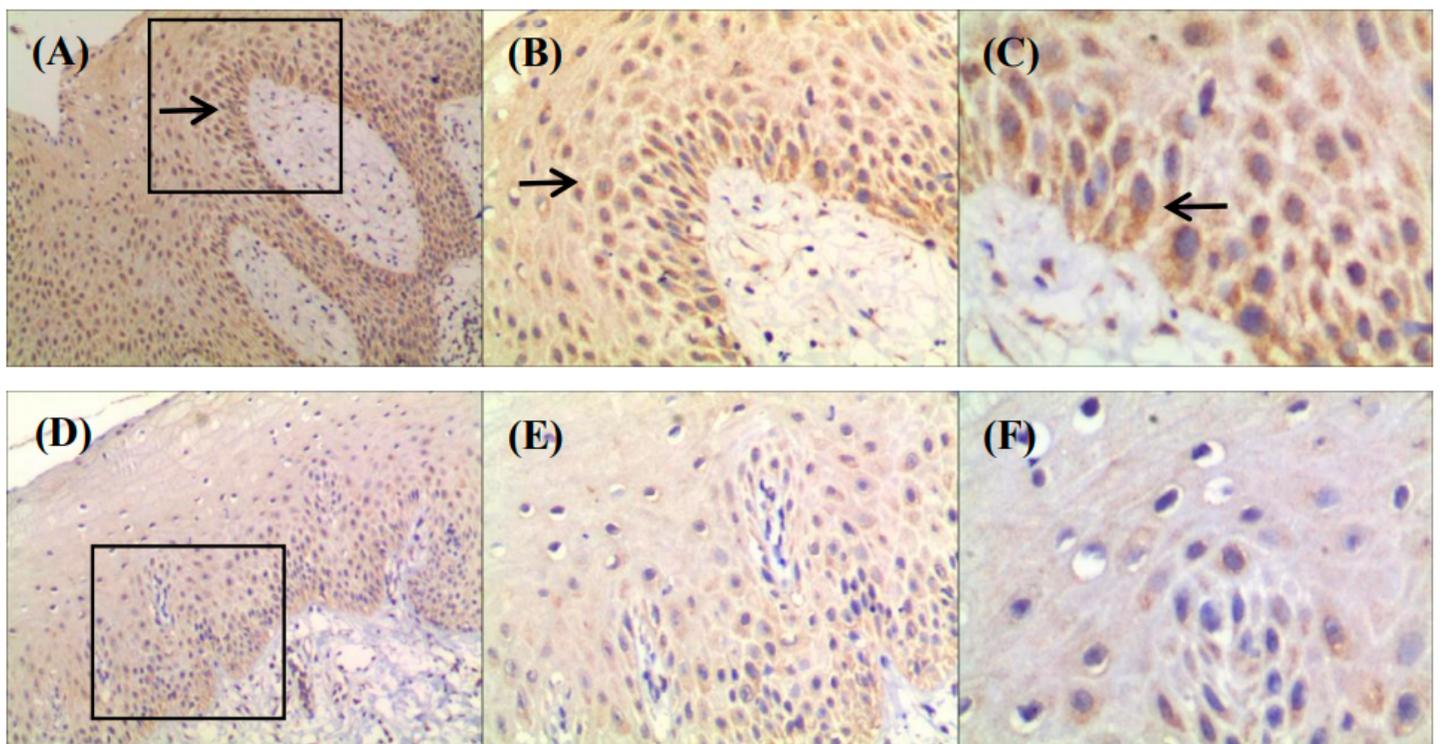


Figure 5

Representative images showing expression of human β -defensin (hBD)-2 in gingival tissue samples (original magnification $\times 100$, $\times 200$, $\times 400$). Gingival samples were stained with rabbit polyclonal IgG antibody to hBD-2 (1:300) using standard immunohistochemical (IHC) protocol. Circled areas in (A) and (D) were amplified in (B), (C), (E), and (F). (A), (B), and (C) were derived from patient with NHGF, and (D), (E), and (F) were 182 derived from a healthy control gingival biopsy. (C) hBD-2 were detected only in the cytoplasm. Arrows indicates positive staining.

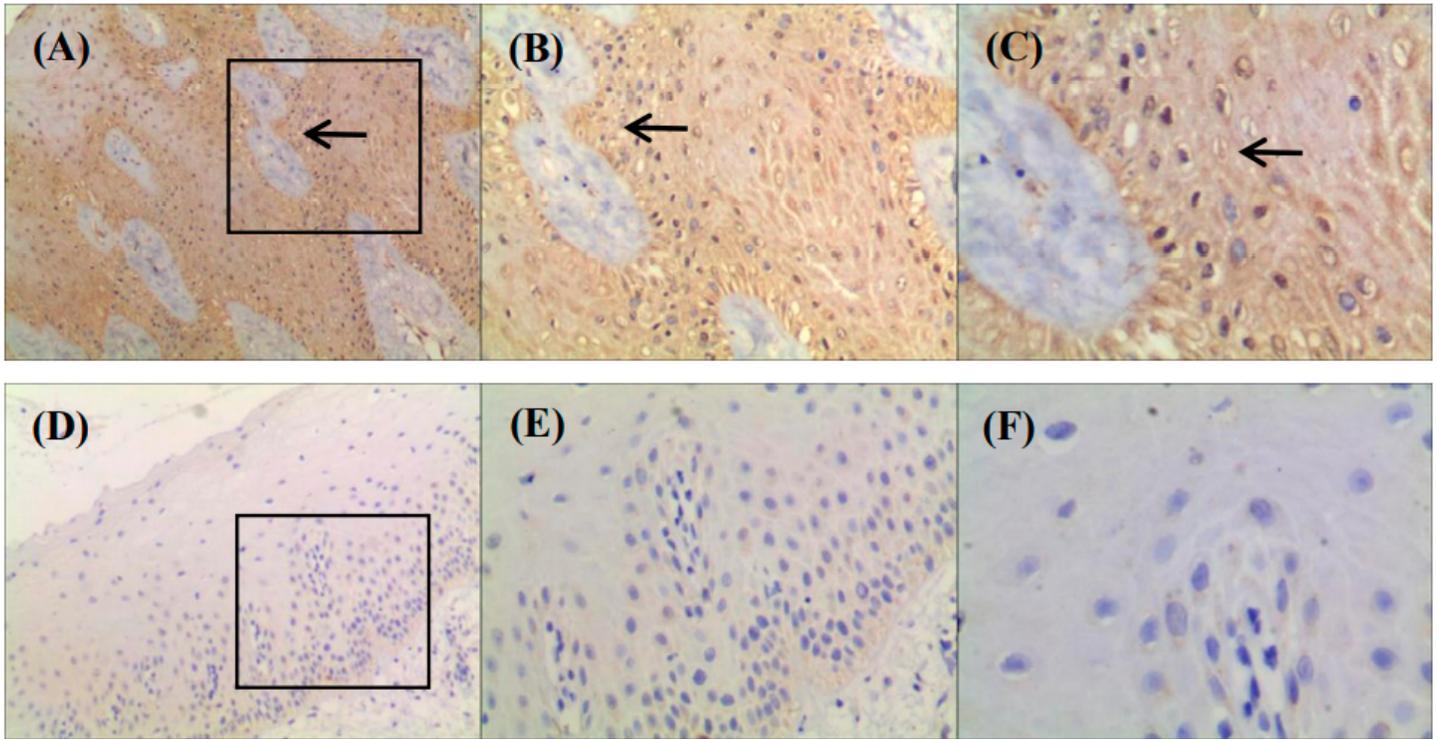


Figure 6

Representative images showing expression of human β -defensin (BD)-3 gingival tissue samples (original magnification $\times 100$, $\times 200$, $\times 400$). Gingival samples were processed with rabbit polyclonal IgG antibody to hBD-3 (1:400), using a standard immunohistochemical protocol. Encircled areas in (A) and (D) were amplified in (B), (C), (E), and (F). (A–C) were derived from patient with non-syndromic hereditary gingival fibromatosis (NHGF) and (D–F) were derived from healthy control gingival biopsies. (C) hBD-2 was detected in the nuclei and cytoplasm. Arrows indicate positive staining.

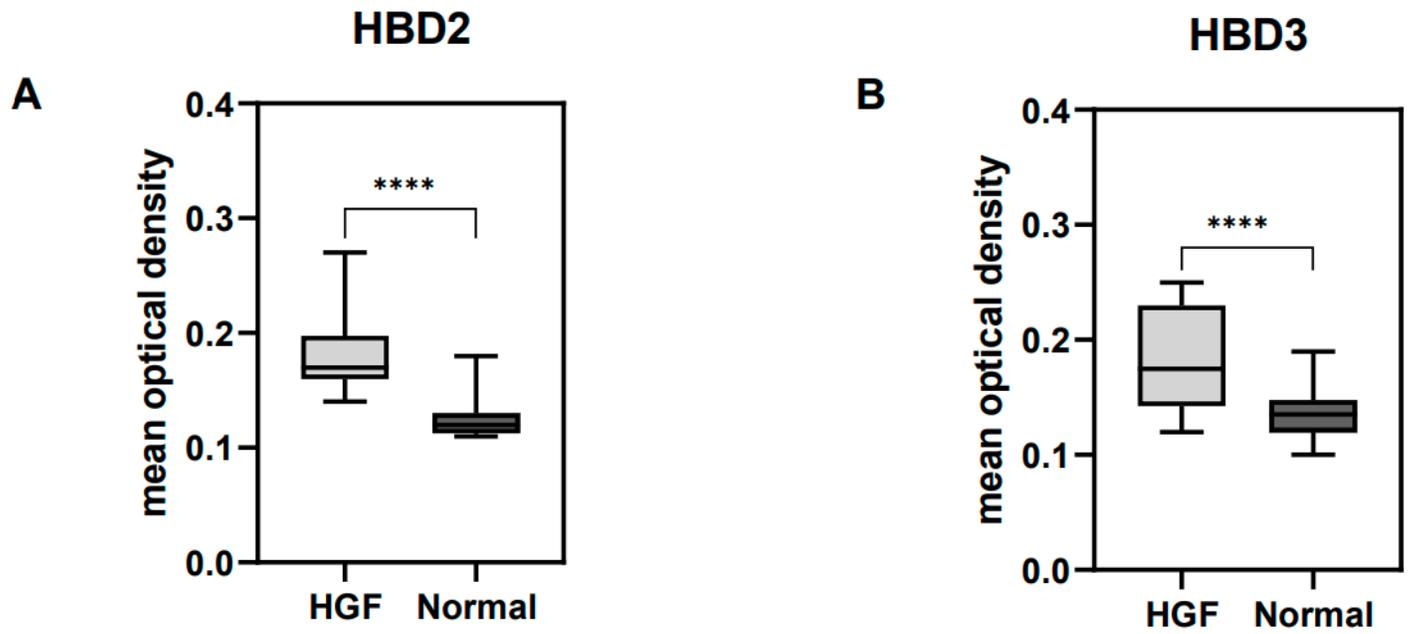


Figure 7

Human β -deferens (hBD)-2 and -3 staining and mean optical density. HGF, hereditary gingival fibromatosis.