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Cross-talk between human mast cells and epithelial cells by IgE-mediated periostin production in eosinophilic nasal polyps

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Background: Periostin is involved in Th2 inflammation and a biomarker of allergic diseases. However, its role in chronic rhinosinusitis with nasal polyps (CRSwNP) remains unclear.

Objective: To investigate the cellular origin and the role of periostin in CRSwNP.

Methods: Expressions of periostin and its receptor, integrin αV, were investigated in nasal polyps (NP) by qRT-PCR, IHC and ELISA. Immunohistochemistry and immunocytochemistry were used to determine cellular sources of periostin in NP and a human mast cell line, LAD2. LAD2 cells were stimulated with IgE, IL-4, IL-13 or TNF-α and periostin measured in the culture supernatants. Normal human bronchial epithelial cells (NHBE) were stimulated with periostin, IL-4, IL-13, TNF-α, and dsRNA alone or in combination and thymic stromal lymphopoietin (TSLP) measured in the culture supernatants.

Results: Periostin was up-regulated and positively correlated with IL-5, CCL-11 and CT scores in eosinophilic NP (E-NP), but not in non-eosinophilic NP. Tryptase-positive cells were a main source of periostin in E-NP. Periostin levels were also correlated positively with total IgE in E-NP homogenate. Furthermore, IgE stimulation enhanced the mRNA and protein levels of periostin. Confocal microscopic examination of LAD2 cells showed that periostin was localized in the granules. Overexpression of integrin αV was observed in epithelial layers of E-NP and correlated positively with the levels of periostin in E-NP. Periostin and integrin αV expressions in the epithelia were positively associated with TSLP at mRNA and protein levels in E-NP. Treatment with periostin induced more TSLP production in NHBE than those without periostin, in combination with IL-13 or IL-4 and TNF-α or dsRNA.

Conclusion: These data suggest that periostin is upregulated in E-NP and correlates with Th2 markers. Human mast cells are a major source of NP-derived periostin, which may induce TSLP production from epithelial cells.

Biography

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