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V10 Assessing the Th2 sensitizing potential of birch pollen: A cell-culture-based approach based on nasal epithelial cells

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Background: Birch pollen are a major cause of seasonal allergic rhinitis. Allergic immune responses to birch pollen are characterized by a T helper cell type 2 (Th2) and IgE dominated immune response directed against Bet v 1, the major birch pollen allergen. However, purified Bet v 1 alone does not initiate Th2 responses in mouse models and both, sensitizer(s) and Th2-driver(s) remain elusive. **Aim of study:** Identification and characterization of the sensitization and Th2-driving factor(s) within the birch pollen matrix using a cell culture assay with human nasal epithelial cells, the first cells to get into contact with birch pollen-derived substances. **Methods:** Human nasal epithelial cells were isolated from nasal brushes and tissue from nasal conchotomic surgery, expanded and cultivated at the air liquid interface. The cells were fully differentiated after 4 weeks, which was evidenced by the movement of cilia and by mucus production. Two different concentrations of an aqueous birch pollen extract (BPE) as well as three fractions from the BPE and the corresponding naturally occurring LPS concentrations (nLPS) were used for stimulation of HNECs of 5 male and 5 female, non-atopic donors. **Results:** Significant differences between cells derived from male and female donors were found in the alarmin (IL-25) and proinflammatory cytokine response (IL-8, IL-6, IL-1b, and TNF-a). Whereas male donors'

cells hardly showed any proinflammatory cytokine response to birch pollen stimulation, female donors' cells responded with a strong proinflammatory cytokine response. BPE was more potent in inducing cytokines than nLPS, except for IL-25, which was stronger induced by nLPS than by BPE. Next, the cells were stimulated with BPE fractions which had proven more or less potent in inducing allergic sensitization to birch pollen in mice. Fraction F1 led to a comparable release of cytokines than the whole BPE. Outlook: By combined in vivo and in vitro screenings, the active fraction F1 will be analyzed further, until the active substance(s) are identified.