1606 | Nasal biomarker-profiles to distinguish between high- and low-symptomatic, non-allergic and allergic subjects in a natural pollen exposure study

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Background: Pollen exposure induces local and systemic allergic immune responses in sensitized individuals, but also non-sensitized individuals are exposed to pollen. The kinetics of symptom expression under natural pollen exposure has never been systematically studied, especially including non-allergic subjects.

We monitored the humoral immune response under natural pollen exposure to potentially uncover nasal biomarkers for in-season symptom severity and to identify protective factors.

Method: We compared humoral immune response kinetics in a panel study on seasonal allergic rhinitis (SAR) and non-allergic (NA) subjects, and tested for cross-sectional and inter-seasonal differences in levels of serum and nasal, total and Bet v 1-specific immunoglobulin (Ig) isotypes, Ig free light chains, cytokines and chemokines. Non-supervised principal component analysis (PCA) was performed for all nasal immune variables and single immune variables were correlated with in-season symptom severity by Spearman test.

Results: Symptoms followed airborne pollen concentrations in SAR subjects with a time lag between 0 and 13 days, depending on the pollen type. Out of 7 NA subjects, 4 also exhibited in-season symptoms whereas 3 did not. Cumulative symptoms in NA were lower than in SAR but followed the pollen exposure with similar kinetics. Nasal Eotaxin-2, MDC and MCP-1 levels were higher in SAR, IL-8 higher in NA subjects. PCA and Spearman correlations identified nasal IL-8, IL-33, and Bet v 1-specific IgG_4 ($sIgG_4$) and sIgE antibodies as predictive for seasonal symptom severity.

Conclusion: Nasal pollen-specific IgA and IgG isotypes are potentially protective within the humoral compartment. Nasal IL-8, IL-33, $sIgG_4$ and sIgE could be predictive biomarkers for pollen-specific symptom expression, irrespective of atopy.