Distinct Immunological Signatures in CRS Phenotypes and Allergic Rhinitis: Unraveling the Role of B Cells.

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Type selection

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Abstract text

Text: Chronic rhinosinusitis (CRS) is a persistent inflammatory condition affecting the nasal and paranasal sinus mucosa. It is classified into two phenotypes: CRS with nasal polyps (CRSwNP) and without nasal polyps (CRSsNP). CRS often coexists with asthma, non-steroidal anti-inflammatory drug (NSAID)-exacerbated respiratory disease (N-ERD), and respiratory allergies. This study investigates the immune cell phenotypes in peripheral blood mononuclear cells (PBMC) of CRS patients stratified also by presence or absence of allergic rhinitis using mass cytometry.

Samples were collected from CRS biobanks of the Department of Otorhinolaryngology, Medical University of Vienna. The cohort comprises controls, CRSsNP, CRSwNP, and N-ERD patients (n=6/group), with half of each group having allergic rhinitis. Cytokine levels in nasal secretions and sera were measured using a 33-plex assay. Immune cell abundance and phenotypic markers in PBMCs were assessed using mass cytometry and clustering methods, applying the MaxPAR Direct Immunoprofiling Assay with 38 markers.

N-ERD patients exhibited increased type 2 nasal cytokine levels. Mass cytometry and cluster analysis in PBMC revealed a higher number of activated naive B cells (CD27-CD38+IgD+) in the blood of CRSwNP and N-ERD. Additionally, these activated naive B cells showed reduced expression of the chemokine receptor CXCR5 in CRSwNP and N-ERD compared to the other cohorts. In contrast, the CRSsNP cohort had a B cell population dominated by resting naive B cells (CD27-CD38-IgD+). None of these cells or markers were significantly altered when patients were clustered by allergy; however, Th2a cell levels were significantly higher in allergic subjects regardless of CRS phenotype.

In conclusion, distinct immunological features characterize CRS phenotypes and respiratory allergies. CRSsNP is marked by higher resting naive B cells, while CRSwNP and N-ERD exhibit increased activated naive B cells. Th2a cell levels are elevated in allergic subjects.

Conflict of Interest statement

Do you have any conflict of interest to declare?: No

Affirmation

1. Consent to participate and present onsite: Yes

2. Consent to publication publication: Yes

3. Consent on treatment of contact details saved in this system: Yes