

Immune modulation and COVID 19 in the Asia-Pacific region

Allergic disease has become recognized as a global epidemic. The prevalence of pollen allergies is very high, with a prevalence in Europe reaching 40%.¹ Bet v 1 is the major allergen in birch and birch-related tree pollen allergies.² In their study, Wisgrill and colleagues³ aimed to characterize the immune response to the Bet v 1 allergen in the peripheral blood of 24 birch-pollen allergic patients compared to 47 non-birch-allergic patients. Allergic and non-allergic peripheral blood mononuclear cell (PBMC) samples were isolated and stimulated with Bet v 1 allergen, this was followed by performing microarray and transcriptomics, as well as fluorescence activated cell sorting (FACS) analysis.

The study found that Bet v 1 allergen induced innate immune networks only in birch-allergic patients. Following the separation of cell types by FACS, analysis showed macrophages and dendritic

cells were found to be involved in the initial innate immune response against the allergen. This led to an in-depth analysis of the pathways involved, which revealed the activation of antiviral immune response pathways upon allergen stimulation. The study highlights the importance of exploring gene networks focusing on dendritic cells and macrophages' involvement in birch allergy. The identified networks revealed interesting targets to study further and explore their role in allergy sensitization and disease progression (Figure 1).³ These findings can potentially reveal new approaches for the treatment and prevention of pollen allergies.

Japanese cedar pollinosis (JCP) is seasonal allergic rhinitis caused by the Japanese cedar (JC), and it is the most common allergic disease in Japan. The prevalence of JCP in Japan has been rising dramatically and has increased from 16% in 2008 to more than 38%

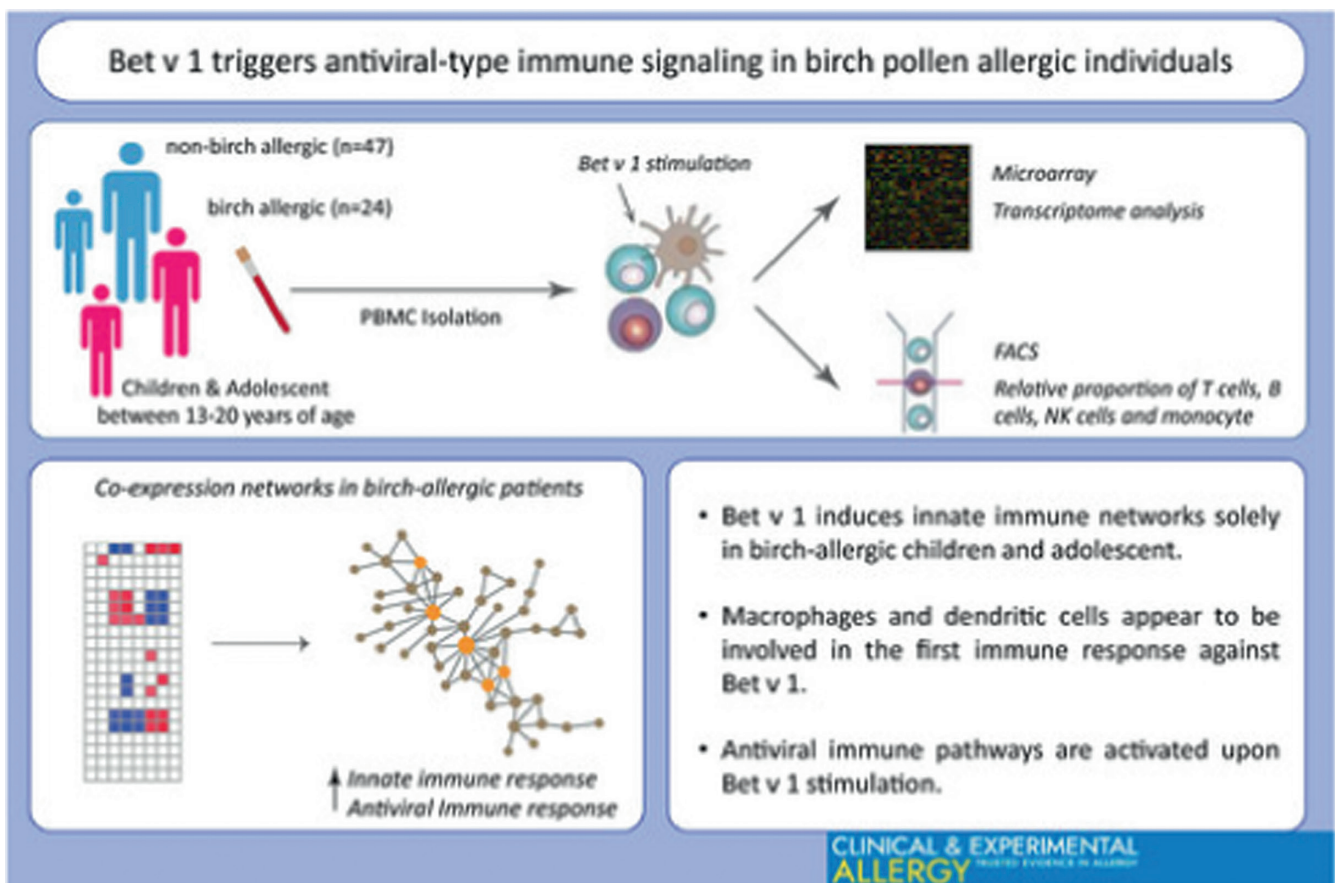


FIGURE 1 Systems immunology study to characterize the impact of bet v 1 stimulation of peripheral blood mononuclear cells (PBMC) of birch-allergic and non-birch-allergic children and adolescent. Utilizing transcriptomics and FACS analysis, co-expression networks revealed innate and antiviral immune networks, as well as associated immune cells in birch-allergic patients. Bet v 1, major birch allergen; PBMC, peripheral blood mononuclear cells, FACS, fluorescence activated cell sorting.

in 2019.^{4,5} The current study assessed the effects of sublingual immunotherapy (SLIT) treatment using JC pollen extracts on PBMCs derived from JCP patients. The study included 8 healthy controls, 16 JCP patients that are not treated with SLIT, and 30 JCP patients that are treated with SLIT.⁵

The authors showed that SLIT significantly reduced the proportion of memory T-helper 2 (Th2) cells as well as T follicular helper 2 (Tfh2) cells in SLIT-responders. The study also looked at the effect of Fas ligand (FasL) on memory CD4+ T cells, which was found to induce apoptosis, possibly by the increased FasL-expressing B regulatory 1 (BR1) cells. FasL was previously shown to induce apoptosis in neutrophils and eosinophils,⁶ however, the present study is the first to show it in memory CD4+ T cells.⁵ Additionally, it was shown that the prevalence of memory Th2 and memory Tfh2 cells was decreased following SLIT. The outcomes presented in this study can be beneficial in developing a diagnostic tool for predicting the efficacy of SLIT for allergic patients.

In March 2020, the World Health Organization (WHO) declared the Coronavirus Disease 2019 (COVID-19), caused by the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), as a pandemic.⁷ There has now been over 257 million confirmed cases worldwide, with a 2.2% global mortality rate.⁸ A follow-up survey was conducted in the Asia-Pacific region in order to compare the changes in epidemiology, clinical profile, therapeutics and public health measure 3 years following the start of the pandemic. The study was commissioned by the Asia Pacific Association of Allergy Asthma and Clinical Immunology (APAAACI) and comprised of a questionnaire-based survey with 32 questions sent out to all 15 member countries of APAAACI via a single point-of-contact representative from each country.⁹

The study found that anaphylaxis from COVID-19 mRNA vaccines was not as high as initially expected in this region. Additionally, neutralizing antibodies and antiviral treatment for mild-moderate disease was shown to complement established therapeutics for severe disease. The study concluded that the APAAACI member countries made good progress over the first 2 years of the pandemic to minimize the morbidity and mortality related to COVID-19 disease. According to the survey, this progress was evident through the successful COVID-19 vaccine programme in the region, as well as access to internationally recommended standards of care.⁹

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