I. Background

Measurement of IgE antibody to hazelnut components can aid in the prediction of allergic responses to the food. The relationship between patient demographics (age, location) and rates of sensitization to hazelnut allergen components among subjects across the USA with suspected hazelnut allergy were evaluated. The degree of correlation between hazelnut sensitization with sensitization to other tree nuts, peanuts and their components was also analyzed.

II. Methods

Sera from 10,503 individuals with hazelnut extract-specific IgE (sIgE) ≥0.35 kUA/L were analyzed for IgE antibodies to Cor a 1, 8, 9 and 14 by ImmunoCAP. A subset of these patients were analyzed for IgE antibodies to peanut, walnut and cashew nut IgE along with associated components.

Among this population of hazelnut sensitized individuals, 89.6% and 23.1% of children (< 3 yrs) were sensitized to Cor a 9 and Cor a 14 respectively. The percentage of tested patients that were positive for these two storage proteins dropped gradually with increasing age. Conversely, Cor a 1-specific IgE sensitization increased from 4.7% in the 0-3 year old cohort to 82.5% for the 30-40 year old cohort. The proportion of patients sensitized to Cor a 1 was markedly higher in the Northeastern USA relative to other regions of the country. Cor a 8 sensitization was relatively constant (near 10%) across all ages. We observed a high rate of cosensitization to hazelnut with other tree nuts as well as peanuts, especially in adolescents. In extract co-sensitized individuals, there was a strong correlation between the Bet v 1 homologs Cor a 1 and Ara h 8 and between the nsLTPs Cor a 8 with Jug r 3 and Ara h 9, respectively. There was also a strong correlation between the 2S albumins Cor a 14 with Jug r 1 and, to a lesser extent, Ana o 3. Weak correlations were observed between Cor a 9 with Jug r 1 and with Ana o 3. Correlations between hazelnut and peanut seed storage protein levels were relatively low, compared to those for Bet v 1 homologs and nsLTPs.

III. Results

Among this population of hazelnut sensitized individuals, 89.6% and 23.1% of children (< 3 yrs) were sensitized to Cor a 9 and Cor a 14 respectively. The percentage of tested patients that were positive for these two storage proteins dropped gradually with increasing age. Conversely, Cor a 1-specific IgE sensitization increased from 4.7% in the 0-3 year old cohort to 82.5% for the 30-40 year old cohort. The proportion of patients sensitized to Cor a 1 was markedly higher in the Northeastern USA relative to other regions of the country. Cor a 8 sensitization was relatively constant (near 10%) across all ages. We observed a high rate of cosensitization to hazelnut with other tree nuts as well as peanuts, especially in adolescents. In extract co-sensitized individuals, there was a strong correlation between the Bet v 1 homologs Cor a 1 and Ara h 8 and between the nsLTPs Cor a 8 with Jug r 3 and Ara h 9, respectively. There was also a strong correlation between the 2S albumins Cor a 14 with Jug r 1 and, to a lesser extent, Ana o 3. Weak correlations were observed between Cor a 9 with Jug r 1 and with Ana o 3. Correlations between hazelnut and peanut seed storage protein levels were relatively low, compared to those for Bet v 1 homologs and nsLTPs.

IV. Conclusions

The authors conclude that sensitization to individual hazelnut components is highly dependent on age and/or geographic location. Component correlations suggest that cosensitization to hazelnut and walnut may be caused either by their PR-10 allergens, nsLTPs or seed storage proteins whereas hazelnut/peanut cosensitization is more caused by cross-reactivity of PR-10 (Cor a 1 and Ara h 8) and nsLTPs (Cor a 8 and Ara h 9).