Connectivity patterns between multiple allergen specific IgE antibodies and their association with severe asthma

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Allergic sensitization is associated with severe asthma, but assessment of sensitization is not recommended by most guidelines.; We hypothesized that patterns of IgE responses to multiple allergenic proteins differ between sensitized participants with mild/moderate and severe asthma.; IgE to 112 allergenic molecules (components, c-sIgE) was measured using multiplex array among 509 adults and 140 school-age and 131 preschool children with asthma/wheeze from the Unbiased BIOmarkers for the PREDiction of respiratory diseases outcomes cohort, of whom 595 had severe disease. We applied clustering methods to identify co-occurrence patterns of components (component clusters) and patterns of sensitization among participants (sensitization clusters). Network analysis techniques explored the connectivity structure of c-sIgE, and differential network analysis looked for differences in c-sIgE interactions between severe and mild/moderate asthma.; Four sensitization clusters were identified, but with no difference between disease severity groups. Similarly, component clusters were not associated with asthma severity. None of the c-sIgE were identified as associates of severe asthma. The key difference between school children and adults with mild/moderate compared with those with severe asthma was in the network of connections between c-sIgE. Participants with severe asthma had higher connectivity among components, but these connections were weaker. The mild/moderate network had fewer connections, but the connections were stronger. Connectivity between components with no structural homology tended to co-occur among participants with severe asthma. Results were independent from the different sample sizes of mild/moderate and severe groups.; The patterns of interactions between IgE to multiple allergenic proteins are predictors of asthma severity among school children and adults with allergic asthma.
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