The relevance of tick bites to the production of IgE antibodies to the mammalian oligosaccharide galactose-α-1,3-galactose

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Abstract

Background
In 2009, we reported a novel form of delayed anaphylaxis to red meat, which is related to serum IgE antibodies to the oligosaccharide galactose-alpha-1,3-galactose (alpha-gal). Most of these patients had tolerated meat for many years previously. The implication is that some exposure in adult life had stimulated the production of these IgE antibodies.

Objectives
To investigate possible causes of this IgE antibody response, focusing on evidence related to tick bites, which are common in the region where these reactions occur.

Methods
Serum assays were carried out using biotinylated proteins and extracts bound to a streptavidin ImmunoCAP.

Results
Prospective studies on IgE antibodies in three subjects following tick bites showed an increase in IgE to alpha-gal of twenty-fold or greater. Other evidence included i) a strong correlation between histories of tick bites and IgE to alpha-gal (χ²=26.8, p<0.001), ii) evidence that these IgE antibodies are common in areas where the tick Amblyomma americanum is common, and iii) a significant correlation between IgE antibodies to alpha-gal and IgE antibodies to proteins derived from A. americanum (rs=0.75, p<0.001).

Conclusion
The results presented here provide evidence that tick bites are a cause, or possibly the only cause, of IgE specific for alpha-gal in this area of the United States. Both the number of subjects becoming sensitized and the titer of IgE antibodies to alpha-gal are striking. Here we report the first example of a response to an ectoparasite giving rise to an important form of food allergy.


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