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6th International Conference on

Structural Biology

August 22-23, 2016 New Orleans, USA

The molecular effects of processing on the peanut allergens

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Food allergy is on the rise and the prevalence of peanut allergy has more than tripled in the U.S. in the last 20 years. Meanwhile, little is known about why certain proteins in foods are allergenic and others are not. Also, it is important to know what happens to the allergenicity of food products after processing. To assess processing-induced changes, the major allergens were purified from raw (R), and roasted (Ro) peanuts and the structure and IgE binding were compared with various ELISA and immunoblots with allergic sera, circular dichroism, mass spectroscopy and enzymatic digestion. While the structure of the allergens purified following roasting did not show significant changes compared to the raw, the IgE binding and SPT to the roasted samples peanuts were higher. Although allergen structure was found to be more important than linear sequence, it is likely that the roasting-induced chemical modifications are more important for enhanced IgE binding and immunogenicity than the structural changes to the major peanut allergens. Mass spectroscopic analysis was utilized to identify specific processing-induced chemical modifications of the peanut allergens that may contribute to the observed effects. Thermally processed peanut proteins are chemically modified, covalently cross-linked, less soluble, more resistant to digestive enzymes, bind higher levels of IgE and cause higher skin prick test (SPT) reactivity than raw peanut proteins. This knowledge may be useful in the development of more specific and improved diagnostic, therapeutic and detection tools and potentially lead to development of processes that can result in reduced allergenicity of a food.

Biography

Soheila J Maleki is an expert in food allergy research and has worked in this field for over 18 years. She has received her PhD from the University of Arkansas for Medical Sciences, USA. She has served on the Scientific Advisory Committee to the FDA, the National Peanut Board and NIH's Guidelines of the Diagnosis and Management of Food Allergy and as Expert Reviewer for the Canadian AllerGen project. She is a Fellow of the AAAAI and has edited a book and authored over 90 publications and has had a significant number of invited national and international speaking and reviewer engagements.

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