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Association of peanut oleosins with severe allergic symptoms: new marker for clinical severity of peanut allergy?

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Aims: Allergic reactions to peanut are on the rise in Western countries. In vitro diagnostic tests applying aqueous extracts or water-soluble single allergens are investigated as an alternative to costly and potential life-threatening oral food challenges (OFC). However, their diagnostic accuracy to predict the degree of clinical severity is still inferior to OFCs which might be based on the absence of lipophilic allergens such as oleosins. Recently, sensitization to oleosins has been associated with more severe allergic symptoms in allergy to sesame and hazelnut. Hence, we sought to investigate oleosins as possible new candidates for routine diagnostic measurements in peanut allergy.

Methods: Oleosins from raw and in-shell roasted peanuts were isolated by flotation centrifugation and purified by preparative electrophoresis. Protein identification was carried out by N-terminal sequencing and mass spectrometry. Sensitization prevalence to oleosins from raw and in-shell roasted peanuts was investigated by western blot. The ability of oleosins to trigger type I hypersensitivity reactions was evaluated by basophil activation test (BAT).

Results: A number of eight oleosins were isolated and identified from peanut. So far, these molecules showed IgE binding exclusively to sera from patients suffering from severe peanut allergy. Moreover, IgE binding to oleosins obtained from in-shell roasted peanuts was increased compared to raw ones. Both, oleosins from raw and in-shell roasted peanuts were able to stimulate basophils from peanut-allergic individuals having severe symptoms.

Discussion: Oleosins are important lipophilic allergens that are able to trigger allergic reactions but have been overlooked so far due to their low solubility in aqueous buffers. Sensitization to these proteins seems to be solely associated with severe allergic symptoms.

Conclusion: Peanut oleosins are clinically relevant peanut allergens. As they are most likely associated with more severe allergic symptoms they might be new maker candidates for the clinical severity of peanut allergy. Furthermore, in-shell roasting increases the IgE binding potency of oleosins which is in line with previous results for other peanut allergens.