Clinical Allergy Tips
Edited by Rodrigo Rodrigues Alves, MD – Regional Associate Editor, WAO Web Editorial Board

From the Editor: Shellfish allergy is a relatively common entity and its accurate diagnosis is essential to improve the quality of life of these patients. In this Clinical Allergy Tip, Dr. Joaquín Sastre provides practical information on how to explore mite-seafood cross-reactivity.

Mite-Seafood Cross-Reactivity: Not Only Tropomyosin
Joaquín Sastre, MD, PhD
Allergy Dept Fundación Jiménez Díaz and CIBER de Enfermedades Respiratorias (CIBERES) Madrid, Spain (Institute Carlos III, Ministry of Economy and Competitiveness)
September 2014

Shellfish allergy, including allergy to crustaceans and mollusks, is a relatively common and long-lasting disorder that may cause allergic reactions. Allergic symptoms may range from mild (e.g., oral allergy syndrome) to severe (e.g., anaphylaxis). The efficiency of skin prick or specific IgE determination with seafood extract is far from good and only half of the patients with positive determinations to seafood extracts have a positive oral challenge test.

The first major allergen identified in crustaceans was the muscle protein tropomyosin, a 37-kDa protein associated with the actin filament of muscle cells as well as other non-contractile cells. Additional crustacean allergens have been characterized: arginine kinase, sarcoplasmic calcium-binding protein, myosin light chain, troponin C, triosephosphate isomerase and recently α-actinin, β-actin, fructose biphosphate aldolase and ubiquitin. A complete list of shrimp allergens is available at allergen databases including http://www.allergen.org and http://www.allergome.com.

Nevertheless, tropomyosin is considered the major allergen in shellfish allergy since sensitization to this allergen has been found in about 80% of patients tested in different populations. Of note, determination of specific IgE levels by ImmunoCAP® to rPen a 1 (recombinant tropomyosin from Penaeus aztecus shrimp) provided additional value to the diagnosis of clinical allergy to shrimp. Tropomyosin has been also considered to be responsible for cross-reactivity between other arthropods such as dust mites, nematodes or cockroach. This can be explained because tropomyosins from dust mites and other arthropods have a sequence homology of 75–80%. Arginine...
kinase is another allergen shared by mites and shellfish that may explain cross-reactivity between both. Recently, other allergens have been described to explain this phenomenon, ubiquitin and α-actinin. The importance of each allergen in the cross-reactivity seems depend on which is the primary sensitizer. Tropomyosin and ubiquitin are responsible for mite-seafood cross reactivity from different climates (dry or humid); but α-actinin is involved in areas of dry climate (primary sensitizer is seafood) and arginine kinase is implicated in humid climate populations, in which the primary sensitization is due to mites.

Conclusions & Clinical Relevance:

Together with a clinical history, the presence of positive sIgE to shrimp tropomyosin alone or together with arginine kinase strongly correlates with clinical allergy to seafood, which could provide added diagnostic value to the methods currently available. Additionally, the origin of the studied population is very important for the outcome of a study on major allergens and to explain cross-reactivity phenomenon. To confirm a true mite sensitization in patients with positive skin prick test to seafood and mites determination of specific IgE to major mites allergens, such Der p1, Der p 2, Lep d 1 (Lepidoglyphus destructor in Atlantic coasts) or Blo t 5 (Blomia tropicalis in tropical/subtropical areas) could also be useful.

REFERENCES:

