

i208 rApi m 1

rApi m 1, Phospholipase A2 from honey bee (*Apis mellifera*)

Clinical Utility

Api m 1 is a specific marker for primary sensitization to honey bee venom. ImmunoCAP® Allergen component i208, rApi m 1 is a valuable diagnostic tool to identify whether or not the culprit insect is a honey bee when assessing allergic reactions in stung patients.

This is of particular clinical value when venom immunotherapy is being considered.

Allergen Description

Api m 1 is a 16-20 kDa glycoprotein phospholipase A2 (PLA2) from honey bee venom. Api m 1 is recognized as a major allergen and represents approximately 10% of the protein content of honey bee venom (1-4).

The IgE-binding capacity of both natural and recombinant purified protein showed very close correlation when studied in honey bee-allergic patients and controls (1, 5-7).

Natural Api m 1 contains carbohydrate determinants (CCDs) that will bind to any CCD-specific IgE present in patient samples irrespective of the original CCD sensitizer, which in many cases is grass pollen proteins.

Recombinant Api m 1 protein lacks CCDs which gives increased test specificity since only IgE antibodies truly specific to the honey bee venom PLA2 protein will bind to rApi m 1 (6-8).

Cross-Reactivity

Available data suggest that the structure of Api m 1 from different honey bees worldwide is largely identical (9,10). It has also been shown that PLA2 from bumblebees shows 53% structural identity with PLA2, Api m 1 from honey bees (11, 12). Both bumblebees and honey bees belong to the *Apidae* family.

Clinical Experience

The most common reactions to different *Hymenoptera* stings are large local reactions and systemic anaphylactic reactions, the latter most often IgE-mediated (13). Self-reported systemic anaphylactic reactions are in the range 0.3% to 7.5% (13). Among beekeepers, the figures are higher, between 14 and 43% (14, 15). Reported prevalence figures in children are lower, only 0.15 to 0.3% (16-18).

Identifying the culprit insect is usually a problem. People seeking care as a result of a sting do not usually know which insect stung them. Furthermore, double-positivity in diagnostic procedures is a frequent cause of problems. Up to 50% of patients with allergic reactions to honey bee or *Vespula* are positive to both venoms in diagnostic tests (19, 20). This may be explained by true double-sensitization to both honey bee and wasps, or by cross-reactivity between homologous allergen proteins from the two venoms, e.g. hyaluronidase, but can also be due to IgE antibody binding to the CCDs present mainly on the honey bee PLA2 (Api m 1) (19-21).



In one study, Muller *et al.* showed that 97% of true bee venom allergic patients with specific IgE to the whole bee venom were also positive to recombinant Api m 1 (19). The presence of specific IgE antibodies to recombinant Api m 1 indicates a primary sensitization to honey bee and this information is particularly valuable when venom immunotherapy is being considered.

Venom immunotherapy has been shown to be effective for the majority of patients allergic to honey bees; 80-90% of treated patients are completely protected from developing generalized allergic symptoms during sting-provocation testing (22-24).

Thus, access to rApi m 1, as well as other venom-specific allergen markers, will aid in selecting patients for appropriate venom immunotherapy.

Furthermore, access to species-specific venom markers allows monitoring the patient's specific IgE reactivity during the treatment period (21).

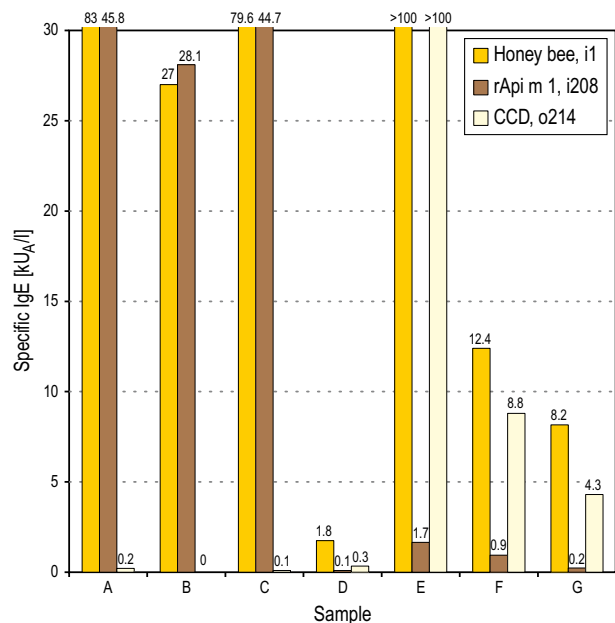


Figure 1. ImmunoCAP® Specific IgE concentrations in seven different patients, all sensitized to honey bee and with a positive clinical history. For the three first patients (A, B and C) a primary sensitization to honey bee is confirmed. The three last patients (E, F and G) show a high cross-reactivity to CCD.

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