**Clinical Utility**

rVes v 5 is a marker for primary sensitization to *Vespidae* venom, and particularly to *Vespinae* (wasp and hornet). ImmunoCAP® Allergen component i209, rVes v 5 is a valuable diagnostic tool to identify whether or not the culprit insect is a wasp when assessing allergic reactions in stung patients. This is of particular clinical value when immunotherapy is considered.

**Allergen Description**

Ves v 5, known as antigen 5, is a 23 kDa protein from the species *Vespula vulgaris*. Its biological function is as yet unknown. Antigen 5 is recognized as the major and most potent allergen in venoms of the *Vespidae* family, i.e. Common wasp, European hornet and Paper wasp (1-4). It is not found in honeybee venom (5-6).

**Cross-Reactivity**

Homologues of antigen 5 from different wasps, hornets and paper wasps are known (4-5, 7-8). A sequence similarity of approximately 98% occurs within species of the same genus, such as between *V. germanica* and *V. vulgaris*. This figure falls, however, when antigen 5 is compared between different genera (3-4, 9-10). Ves v 5 displays 69% and 60% sequence identity with the homologue proteins of *Dolichovespula maculata* and *Polistes annularis* respectively, for example. All have a degree of immunological cross-reactivity (4, 8). Note that structural similarity between proteins suggests but does not guarantee clinical cross-reactivity for all patients.

Antigen 5 has also been found in venoms from different ants, and great variation in protein sequence similarity to homologue proteins of different *Vespidae* species has been demonstrated (6, 11-12).

**Clinical Experience**

The most common reactions to different *Vespula* stings are large local reactions and systemic anaphylactic reactions, the latter most often IgE-mediated. Self-reported systemic reactions range from 0.3% to 7.5% (13).

When people stung by bees or wasps experience severe reactions, identifying the culprit insect is very important. This is particularly true if a patient is considered for venom immunotherapy (VIT). Some patients are allergic to more than one stinging insect, whereas others are only allergic to one species. In many cases, this is difficult to establish correctly since patients have difficulty recognising the different species, and also because double-reactivity is a quite frequent problem when testing for IgE antibodies to honeybees and different wasps (13-15).

Double-reactivity is caused by:
- true double-sensitization to honeybee and wasps,
- sensitization to cross-reacting allergen proteins present in venoms of different species,
- sensitization to CCD (carbohydrate determinants) present in venoms of different species.

In one study, double-positivity in tests for specific IgE to both honeybee and *Vespula* was found in 59% of patients with allergic reactions to either species (15). The patients were analysed with SPT and serum-specific IgE to bee venom, *Vespula* venom, species-specific rVes v 5 and rApi m 1 (species-specific marker for honeybee) and CCD. It was concluded that double-positivity of specific IgE to honeybee and *Vespula* venom was often caused by cross-reactions (CCD in particular) and that serum IgE to both rVes v 5 and rApi m 1 indicates true double-sensitization. Immunotherapy to both venoms would thus be required in the latter cases.

In the Mediterranean region, multiple positivity to IgE tests for specific IgE to *Vespula* and *Polistes* is a significant problem (16).

One study from Italy investigated the degree of cross-reactivity between *Vespula* and *Polistes* venoms. By using inhibition studies, the authors concluded that a double sensitization to the venoms was likely a result of cross-reactivity in 31 of 45 patients. All 45 had been prescribed VIT to both *Vespula* and *Polistes*, and this study showed that immunotherapy with only one venom extract would have been sufficient for 31 of them (16).

Access to rVes v 5 and other venom-specific allergen markers will thus aid in selecting patients for VIT. Furthermore, it will allow monitoring of the patients’ specific IgE reactivity during the treatment period (17).

**Figure 1.** Classification and common names of *Vespidae* (wasps). Figure adapted from Fernandez J, 2004 (18) and Bilo BM et al, 2005 (13).
References


For further reading, see: www.immunocapinvitrosight.com