

Immunological partial identity between – insect and mite allergens

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Present investigations of partial identity/»cross-reactivity» between related allergen sources can be considered to take place from two different points of view:

1. A basic scientific approach, where it is investigated, a) whether the same component(s) in related allergen sources carry the major allergen activity and b) to what extent partial identical allergens are recognized by reference human or experimental animal antibodies of various Ig-classes. Degrees of identity obtained using well-defined single allergens are generally in good accordance with the taxonomical position of the allergen sources.

2. A clinical approach, where the consequences of the selection of specific extract/allergen mixture is examined, regarding a) false positives and false negatives in diagnostic testing and b) sufficient and specific immunostimulation by hyposensitization therapy.

I. INSECT VENOMS

The venoms of honey bee and wasps (subfamily *Vespinae*, including yellow jackets and new/old world hornets) show very little partial identity towards human IgE and IgG. Bee venom phospholipase A has been found immunochemically distinct from wasp venom phospholipase (9). Few cases have, however, been described, where patients react to bee venom after sensitization to wasp. This is probably explained by the existence in bee venom of a minor allergen, partial identical to major/inter-

mediate allergen in wasp venom. *The opposite pattern was demonstrated, too (11).*

The risk of obtaining a false positive reaction to bee or wasp by testing with the »cross-reacting» preparation must be considered very low. Negligible cross-protection will take place by immunotherapy.

Between the different genera and species of wasps (*Vespinae*) a high degree of immunological identity exists between the common major allergen, and large degrees of correlations are found, when patients' RASTs to the different venoms are compared. Certain species appear, however, as exceptions (7, 10, 13).

In Scandinavia, the commonest occurring wasps all belong to the closely interrelated group *Vespula s.s.* (yellow jackets), while the impressive *V. crabro* (european hornet) occurs more sporadically.

If the aim of diagnosis is to verify a wasp-allergy in the broad sense, there appears to be little risk of false negatives by using test material from other species than the actually sensitising one.

The level of cross-protection obtained after immunotherapy with wasp venoms has not been directly investigated, but is presumably high.

II. MITES

House dust mites (fam.: *Pyroglyphidae*) are related to two other mite groups of allergenic importance: The storage mites (families: *Acaridae*, *Glycyphagidae*, and others) and the scabies mites (Fam.: *Sar-*

coptidae). Partial identity at the family level is significant within the storage mite group, as judged by skin-test reactions (14). Low levels of partial identity exist between the house dust mites and the other groups (6, 14). A minor allergen of *D. pteronyssinus* has been demonstrated in several storage mite species (3), and a minor allergen in *D. farinae* is present in extracts of the human scabies mite (2).

Weak false positive reactions may thus take place, when patients, sensitized to species of one of these groups, are tested with house dust mite extracts or vice versa.

The house dust mite family is divided as two subfamilies, *Pyroglyphinae* and *Dermatophagoidinae*. *Euroglyphus maynei* is the only commonly occurring species of the first group. It occurs frequently in the humid, atlantic climates in the western parts of Europe, but has been reported from several places elsewhere (1). Little is known about the degree of allergenic identity with the *Dermatophagoides* species. A comparatively large correlation between skin test reactions to species of the two subfamilies has been found (8, 12).

Within the *Dermatophagoides* genus, distinction is usually made between *D. pteronyssinus* and the *D. farinae* group (often just referred to as *D. farinae*, but actually comprising the two sibling species, *D. farinae* and *D. microceras*). The species contain the same 2 major and 2 intermediate allergens (3). At least one of the major allergens is, however, only partially identical between species (5). A minor allergen of *D. pteronyssinus* (Dp-37) is, furthermore, absent in the *D. farinae* group.

Human IgE-antibodies cross-react significantly between the two groups, as shown e.g. by the large correlation coefficients obtained in RAST and skin prick test comparisons (4, 12). Generally, only limited quantitative differences are observed between results of tests with the actually sensitizing species and with the »cross-reacting» species. Such differences may, however, appear significant around the cut-off

point for positive vs. negative skin-test reactions and at the lower border of RAST class 2.

Rare cases of patients without detectable reaction on the »cross-reacting» extract is often referred to in discussions of the need to diagnose with both species. Such cases are theoretically possible and should be expected to occur with a certain (low) frequency.

The actual choice of mite species to be included in the diagnostic tests, should be decided on the basis of prevalence data for the different species in the given area.

The level of cross-protection between *D. pteronyssinus* and *D. farinae* (s.e.) in immunotherapy has not yet been directly investigated. However, as quite considerable titers of species-specific IgE is detected by cross-absorption studies (4, 5), it is fair to assume, that treatment with the actually sensitizing species (or species mixture) may give optimal clinical results, and should be preferred against casual choice of species.

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