

unclear, but they emphasize the complexity of pollen extracts. The rapidity of extraction of such components would make them important in inducing clinical manifestations in pollen-sensitive patients by reacting with cell bound specific IgE, and allowing the release of mediators.

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Cross Reactions among Pollen Antigens

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The immunochemical relations between antigens originating from different allergenic sources are parameters of crucial importance for the biological characterization of allergenic extracts. Partial immunochemical identity between molecules which share common molecular parts, or complete immunochemical identity between molecules, is easily investigated directly by means of CLIE (7). The type of information obtained is similar to that obtained with the Ouchterlony technique. Four levels of information may be obtained: (1) any immunological identity at all between complex mixtures; (2) immunological identity between one molecule in one mixture and another molecule in another mixture; (3) immunological identity between parts of one molecule and parts of another molecule — the common molecular part comprising several immunological determinants, and (4) im-

munochemical identity between single determinants within the same or from two different molecules.

The information obtained through this technique is related to the probability of patients' allergic reactions to related allergen sources. A simpler immunochemical comparison between related allergenic extracts should include only the allergens but this is not a realistic possibility (1) because of the patients' unique IgE response to complex antigenic mixtures, and (2) because isolated allergens are not generally available. The limitation of this method is the degree of availability of antibodies against all potential allergens. Partial identity may also be determined by means of RAST inhibition, the limitation of which in a similar way is the availability of antibodies against all the potential allergens in the human serum pool used. Preferably the two methods should be used to complement each other. Absence of a

reaction of identity as measured by CLIE or by RAST inhibition indicates that it is unlikely that cross-reactivity will occur.

Allergenic extracts from different tree pollens have been compared by means of CLIE using rabbit antibodies against a birch pollen extract. Relative to birch pollen a high degree of identity was found to hazel, a somewhat lower to alder, and very little to

beech, oak, and elm (Table 1). A somewhat similar result was obtained by Bernstein et al. (1) using RAST.

Extracts of pollen from Compositae were investigated by means of the same methods on the basis of rabbit antibodies against pollen extract from mugwort and chrysanthemum. A high degree of identity was only found between, on the one hand, mugwort and, on the other, chrysanthemum and camomile. A somewhat

Table 1

A) Percent immunological partial identity between pollen antigens from composites and pollen antigens from mugwort and chrysanthemum estimated by means of CLIE

Extract of pollen from	Antibodies against	
	Artemisia v	Chrysanthemum l
Ambrosia c	33%	58%
Artemisia v	100%	75% incl. 2 all.
Aster t	55% incl. 1 all.	25% incl. 1 all.
Chrysanthemum l	55% incl. 2 all.	100%
Matricaria c	55% incl. 1 all.	58% incl. 1 all.
Solidago v	45%	75% incl. 2 all.
Taraxacum u	33%	50% incl. 2 all.

B) Percent immunological partial identity between pollen antigens from various common nordic trees and birch pollen estimated by means of CLIE

Extract of pollen from	
Alnus g	33% incl. 1 all.
Betula p	100%
Corylus a	89% incl. 1 all.
Fagus s	6%
Ulmus g	33%
Quercus r	33%

C) Percent immunological partial identity between pollen antigens from grasses estimated by means of CLIE

Extract of pollen from	Antibodies against pollen from			
	Avena c	Dactylis g	Lolium p	Phleum p
Agrostis	100	100	ND	100
Alopecurus p	100	100	ND	100
Anthoxanthum o	100	100	ND	100
Avena c	100	100	100	100
Dactylis g	100	100	100	100
Festuca p	100	100	ND	100
Holcus l	100	100	ND	100
Lolium p	100	100	100	100
Phragmites c	100	100	ND	100
Phleum p	100	100	100	100
Poa p	100	100	ND	100

lower degree of identity was found between mugwort and chrysanthemum to ragweed, sea startwort, goldenrod and camomile (Table 1). Using RAST inhibition Leiferman et al. (2) have obtained similar results.

No absence of the reaction of immunochemical identity or partial identity between any antigens extracted from different grass pollens and investigated by these methods was observed, but considerable quantitative variations occurred. Thus, antigens of whole pollen extract from the following grasses: red top, meadow foxtail, sweet vernal grass, false oat grass, orchard grass, meadow fescue, velvet grass, rye-grass, reed, timothy, blue grass, were all partially identical to antigens of false oat grass, orchard grass, rye-grass and timothy, as shown by CLIE. Extracts and antibodies against these last antigenic preparations were all prepared as described in (4). Similar results have been obtained by Tangen & Nilsson (6) and Leiferman and Gleich (3) using RAST inhibition.

In a recent study (5) crossed immunoelectrophoresis in various modifications has directly revealed the immunological partial identity between isolated major allergens of timothy pollen (antigens 19 and 25) and the corresponding pollen allergens of false oat, orchard and rye grass, using rabbit antibodies against all four grasses. The inhibitory effects of antigens 19 and 25 relative to those of whole pollen extracts have been determined by means of RAST, inhibiting serum pools from selected grass-pollen-allergic patients and using insolubilized whole pollen extracts from the four grasses as allergosorbents. The inhibitory effects of antigens 19 and 25 were determined to be 97, 91, 92 and 73% of those of whole extracts of timothy, false oat, orchard and rye grass, respectively.

These results are in general agreement with botanical knowledge of relationship between different plants and with clinical experience. The significance of such investigations is not only of academic interest but of practical value for the evaluation of test results. A high degree of partial identity means that only a few extracts should be necessary; a low degree (less than 90%) that several extracts are necessary to cover all patients' individual responses. If a patient reacts to say birch, hazel

and alder, it should preferably be checked if this is due to the same or different allergens before starting a desensitization. For this purpose CRIE or RAST inhibition could be used.

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Immunochemical Studies of Hymenoptera Venom Allergens

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The most common insect sting allergies in the United States are those caused by bees and vespids. The vespids include hornets, yellowjackets and wasps. Some reports claim that 0.4-0.8% of the population of the United

States is sensitive to these insects. In the past diagnosis and treatment of insect allergy have been commonly carried out with whole-body insect extracts. In recent years there has been a renewed interest in the use of

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