

Immunological partial identity between pollen and food allergens

LIISA HALMEPURO & FRED BJÖRKSTÉN

From the Hospital for Allergic Diseases, Helsinki University Central Hospital, Meilahdentie 2, SF-00250 Helsinki 25, Finland

The association between pollen allergy and hypersensitivity to nuts, fruits and vegetables has been verified by many clinical and immunological observations. In particular, patients allergic to birch pollen often get symptoms if they ingest or handle plant materials such as parsnips, apples, potatoes, carrots, celeries, hazelnuts, cherries, peaches, almonds, walnuts, pears, plums, brazil nuts or peanuts (Hannuksela & Lahti, 1977; Eriksson et al., 1982). Patients allergic to timothy and mugwort pollen may also exhibit excessive sensitivity to foodstuffs. The frequent co-occurrence of ragweed allergy and hypersensitivity to melon and banana has been described (Andersson et al., 1970). This clustering of allergies could be due to common chemical structures in the allergens concerned, and various immunochemical techniques have been used to investigate the relationships.

Celery and parsley have been reported to cause severe allergic reactions in patients with mugwort pollen allergy, and the reactions appeared to be IgE-mediated as reactivity was transferable in the Prausnitz-Küstner test (Kauppinen et al., 1980). Also apple, carrot, hazelnut and potato reactivity from a birch-pollen allergic patient was similarly transferable (Dreborg & Foucard, 1983).

Partial immunological identity between birch-pollen and hazelnut allergens has been demonstrated by immunodiffusion and passive hemagglutination inhibition (Belin,

1972) and by crossed line immunoelectrophoresis (Andersen & Löwenstein, 1978).

Common structures in birch-pollen and some fruit and vegetable allergens have been demonstrated using RAST inhibition technique. All the allergenic determinants in apple, orange, carrot and celery could be shown to be present in birch pollen, as birch-pollen extract could inhibit completely the binding of apple-, orange-, carrot- and celery-specific IgE to these allergens on RAST discs (Björkstén et al., 1980; Halmeपुरo et al., 1984). On the other hand, all birch pollen determinants were not present in the fruits and vegetables studied. Grass pollen may also contain food-related allergens, as binding of IgE to timothy-pollen allergens on RAST discs can be inhibited with apple and potato preparations (Löwenstein & Eriksson, 1983). In one study IgE antibodies which appeared to cross-react with grass pollen, vegetable foods and *Hymenoptera* venom have been described (Aalberse et al., 1981).

Using crossed line immunoelectrophoresis we have found that structures related to those present in pollen antigens (birch, timothy, mugwort) can be found in apple, carrot and celery (Halmeपुरo & Löwenstein, unpublished results). One each of the birch-pollen antigens and timothy-pollen antigens had previously been characterized as minor allergens. Crossed radio immunoelectrophoresis showed that an allergen present in celery

was related to one in birch pollen (Halmepuro, unpublished results).

In our opinion there now exists considerable evidence which indicates that clustering of hypersensitivities to plant materials may generally be due to the presense of IgE-antibodies that cross-react with several allergens. The allergens do not come from any definable plant taxonomic group or type of tissue.

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