

Value of recombinant allergens in diagnostics and therapy

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Water soluble extracts of biologically defined allergenic source material are a basis of the *in vitro* diagnostic of IgE-mediated allergies of the immediate type (type-I-allergy). Common allergenic extracts used in conventional diagnostics of type-I-allergy contain a lot of unrelated proteins and glycoproteins. Only a small part of these components are allergens. In routinely used *in vitro* assays the binding of patients IgE to allergen extracts is quantified. In skin-prick tests the mediator (histamine) release is measured via erythema and wheal formation caused by contact of the allergen extract with cytotropic IgE of mast cells. The fact that allergen extracts contain single allergenic components has up till now not been routinely used to improve the diagnostics. With the advent of recombinant allergens the measurement of IgE reactivities to single allergenic components becomes possible. The question whether a mixture of recombinant allergens would be superior to conventional extracts is a current controversy between scientists. Since pollen or house dust mite allergy is not a problem of diagnosis the potential use of recombinant allergens in diagnostics focuses on applications where ill defined extracts are in use. These problematic extracts are applied in the diagnosis of food and mould allergy. A positive example for the use of recombinant allergens are the *Aspergillus fumigatus* allergens Asp f 4 and

Asp f 6 [1]. These allergens make it possible to diagnose with high specificity and sensitivity an allergic bronchopulmonary aspergillosis (ABPA). Apart from that a convincing practical usage of recombinant allergens in allergy diagnosis is still awaited.

In principle recombinant allergens are producible in large quantities and in high purity. This enables us to develop improved therapeutics. Conventional approaches of using recombinant allergens in therapy are guided by immunotherapy with allergenic extracts. There are three suggested ways of improving the extracts:

- to add recombinant allergens to the extract, to regulate, to standardize and optimize conventional extracts;
- to mimic natural allergens of an extract by recombinant once;
- to combine the recombinant allergens patients tailored.

In realizing the latter the problem arises whether the reactions to single allergenic components are reliable indicators for designing the patients tailored recombinant allergen mixture. A further problem is to predict the clinical outcome of the immunotherapy. Here monitoring of IgE- and IgG-subclass-reactivity to the respective allergens may help to solve this problem.

A further improvement of the immunotherapeutic agents would be the reduction of the danger of inducing anaphylactic reactions. One idea is to use T-cell reactive peptides to avoid adverse side reactions. Our approach is to reduce the IgE-reactive epitopes of recombinant allergens (Phl p 5b) by genetic engineering. This is described more in detail by Schramm et al. in their abstract "Variants of timothy grass pollen allergen Phl p 5b: new concept of more efficient immunotherapy".

In conclusion the application of recombinant allergens has a great impact in improving diagnostics and therapy but must not be indiscriminately used.

REFERENCES

1. Hemmann S., Nikolaizik W.H., Schoni M.H., Blaser K., Cramer R.
– Differential IgE recognition of recombinant *Aspergillus fumigatus* allergens by cystic fibrosis patients with allergic bronchopulmonary aspergillosis or *Aspergillus* allergy. *Eur. J. Immunol.*, 1998, 28, 1155-1160.

