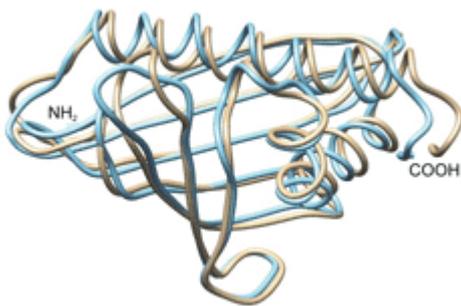


Molecular allergy diagnosis & characterization of allergens

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Although the majority of clinically important allergens in Western countries have been identified, the allergenic properties of isoforms and likewise allergenic structures from spreading allergenic sources are not fully characterized. The objective of our ongoing studies is to improve in vitro allergy diagnosis using purified allergens. We hypothesize that recombinant allergens rather than allergen extracts will improve the correlation between in vitro test results and the clinical outcome, and utilize recombinant allergens to increase the diagnostic sensitivity.



The birch pollen-food syndrome is based on structural homology and IgE cross-reactivity between the major birch pollen allergen Bet v 1 (brown) and homologous food allergens, e.g. the major cherry allergen Pru av 1 (blue).

Source: *Kay Fötisch / PEI*

In this context, respiratory and ingestive allergens will be identified (e.g. from peach, peanut, chickpea, and celery) and genetically engineered using *E. coli*, *B. subtilis*, and *K. pastoris* expression systems. Purification strategies are continuously optimized in terms of allergen yield and potency, as well as process- and protein-related impurities. Subsequently, allergens are characterized in terms of identity, structural- integrity and modification, stability, IgE-reactivity, allergenic potency, and IgE-cross-reactivity. In addition, potential intrinsic adjuvant properties and immunogenicity of allergens are investigated.

Well-defined and standardized allergens are applied to component-resolved diagnosis (CRD) to increase the diagnostic sensitivity and to determine the sensitization profile of patients in order to assess the potential risk of clinical reactivity and cross-reactivity. Depending on the project, geographical differences in the sensitization pattern, the time course of sensitization, and species-specific allergenicity will be considered.

Finally, the generated recombinant allergens serve as models to investigate the pathomechanism of allergic diseases also considering intrinsic adjuvant properties of allergens, and are utilized for the development of recombinant allergen therapeutics.