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Development of recombinant antibodies for a reliable and sensitive food allergen detection

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Around 4% of the populations suffer from IgE-mediated food allergies and the number of food-allergenic people is increasing. Individuals with certain pollen allergies may also suffer from a sensitization to proteins in the foods. As an example a person sensitized to the major birch pollen allergen, Bet v 1, is often sensitized to its homologues, such as the major allergens of apple, Mal d 1, and celery, Api g 1, as well. Development of diagnostic tools for the reliable, sensitive and quick detection of allergens present in various food products are essential for allergic persons to prevent the consumption of substances causing mild and even life-threatening immune responses. The use of monoclonal antibodies would ensure the specific detection of the harmful food content. The production of functional antibody fragments and their efficient display on the filamentous phage have made it possible to construct large and diverse antibody phage display libraries for the isolation of recombinant antibodies. We have constructed mouse IgG antibody libraries from immunized mice and selected them for Mal d 1 and Api g 1-specific recombinant antibodies by phage display. The isolated allergen-specific Fab fragments exhibit high affinity towards the target recombinant as well as native allergens from natural sources. Interestingly, isolated Mal d 1-specific antibody bound also to Bet v 1, the main allergen eliciting the cross-reactivity syndrome between the birch pollen and apple. With further development, these antibodies can be utilised as diagnostic tools for the specific and reliable detection of allergens from different consumable products.

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Recent advances of DNA-based methods for tracing the botanical origin of food products

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The recent developments in the food industry, the global trade, the food scarce and the recent food scandals have raised the interest in methods for species identification, traceability and adulteration detection. Furthermore, the increased interest in plant based high added value products has raised concerns about adulteration. Thus, accurate, fast and reliable methods able to protect all the components in the production chain from the producer, the company and the customer are needed. Fresh food products and especially those based on plants could be suitable for many types of analytical or molecular analyses, yet most of food samples are processed to some extent. During process DNA is usually altered and fragmented into small fragments. However, extensive research has been performed and DNA based methods able to identify even small fragments are becoming the methods of choicefor food authenticity. Here DNA based methods like PCR and High Resolution Melting analysis have been successfully employed for species identification and authenticity in foods as well as for quantitation purposes.

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