Oral Tolerance, Skin Inflammation and Physicochemical Characteristics of Wheat-Derived Products Influence Cutaneous Sensitisation to Wheat

Introduction
The safety of cosmetics containing hydrolysed wheat proteins has been questioned, due to reports of food allergy to wheat hydrolysates and breakage of oral tolerance to wheat after cosmetic usage.

Rationale
Skin sensitising capacity of 5 commercial wheat products with different physicochemical characteristics were evaluated on skin with various barrier-defects and inflammatory conditions, in either wheat tolerant or naïve rats. We hypothesised that several factors influence the skin sensitising capacity of wheat products.

Methods
Brown Norway rats bred on a wheat-free diet (naïve rats), or a conventional chow (wheat-tolerant rats), were sensitised by skin-application of unmodified wheat, enzyme hydrolysed or, one of three acid hydrolysed wheat products on either intact, slightly damaged, or skin with experimental irritant dermatitis or atopic dermatitis. Sensitising capacity of wheat products was evaluated by specific IgE and in vivo elicitation tests.

Results
Sensitising capacity of the 5 wheat products was dependent on the product’s physicochemical characteristics, both in naïve and tolerant rats. Whereas all 5 products could sensitise naïve animals only the acid hydrolysed products could sensitise wheat-tolerant rats. Thus, acid hydrolysed wheat could break oral tolerance. The skin condition heavily influenced the sensitising capacity of the products, which was enhanced by skin damage and inflammation.

Conclusions
This study demonstrate that skin sensitisation can be driven by commercially available wheat-derived products, and is dependent on the specific physicochemical features of the product and the physical and inflammatory condition of the exposed skin. Addition of food-derived proteins to cosmetics should be carefully evaluated due to the risk of sensitisation.

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