

Is the application of cosmetics containing protein-derived products safe?

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Key words: contact urticaria; cosmetics; food allergy; hydrolyzed wheat protein.

Plant, mainly wheat, proteins hydrolyzed or not, are common substitutes for animal proteins in cosmetics for safety reasons. Contact urticaria induced by cosmetics is not common. The conjunction of contact urticaria and oral allergy to the same plant proteins is even less frequent. Gluten is the major group of proteins in wheat and other cereal grains. We describe here a case of urticaria to hydrolyzed wheat proteins in cosmetics associated with generalized urticaria induced by preserved foods containing wheat proteins.

Case Report

A 46-year-old atopic woman was investigated for urticaria. About 3 months before the investigation, she had developed contact urticaria upon applying an eyelid cream and a body moisturizer, manufactured by two different companies. She had using these creams daily for 10 months without any problems. Within the last 2 months, she had experienced two attacks of generalized urticaria, 30 min after eating preserved foods: sausages with lentils and a French cassoulet. She could eat cereal-based products like breads and pastries without any problems.

Open application tests were carried out and then, if negative, prick tests on the volar aspect of forearms and on the back, with food extracts (Stallergènes Laboratory, Antony, France), the 2 preserved foods, the 2 creams and the individual ingredients of these products provided by the

manufacturers, diluted if necessary in saline. Codeine phosphate (9%) and saline were, respectively, positive and negative controls. Strong positive responses were obtained with the preserved foods, and the wheat gluten contained in them as an ingredient, the 2 creams and the hydrolyzed wheat proteins used for their manufacture. The strongest reaction was to these last ingredients, positive down to a dilution of 1/1000. Similar reactions were obtained with pure gliadins and gluten component, extracted from wheat flour. These tests were all negative in 5 control patients. Investigations showed that the hydrolyzed wheat proteins in the creams were from the same manufacturer as the gluten in the preserved foods. Detection of specific IgE using the CAP system (Pharmacia-Upjohn,) showed class 3 levels, with 16.4 kU_A/L for wheat flour and 16.2 kU_A/L for gluten.

We have since observed 2 other cases, which are still under investigation. The first case involved hydrolyzed wheat proteins in cosmetics as well as gluten-containing foods. The second concerned a patient with anaphylaxis to gluten in foods and positive tests to hydrolyzed wheat proteins.

Discussion

There have been previous reports of immediate reactions to hydrolyzed protein, mainly in hair conditioner, as well as more recently in a cosmetic cream (1–4). In recent reports, 3 cases of allergy to hydrolyzed wheat protein were described, 1 with contact urticaria (cosmetic cream), and 2 others with contact dermatitis (hair conditioner and cosmetic cream) (5, 6). The authors did not note any associated food allergy even on eating gluten. We have previously reported 2 patients with contact urticaria induced by sesame oil in cosmetics, associated with anaphylactic reactions when eating sesame oil or seeds in foods (7). In the present case, gluten-derived products were responsible for immediate hypersensitivity on both cutaneous and oral contact. Although the primary route of sensitization is uncertain, the chronology of reactions is in favour of cutaneous sensitization (the patient

had used the same cosmetics for a long time while eating food-containing gluten without any reaction). Penetration of proteins through the skin is well-known in animals and in humans. For some authors, the skin may be one of the major routes of sensitization in natural latex allergy or in atopsies (8, 9).

Even if immediate allergy to proteins in cosmetics is rare, their use is increasing. Physicians should therefore be aware of their potential allergenicity. Further studies needed to ensure their safe use.

References

1. Kousa M, Strand R, Mäkinen-Kiljunen S, Hannuksela M. Contact urticaria from hair conditioner. *Contact Dermatitis* 1990; 23: 279.
2. Freeman S, Lee M S. Contact urticaria to hair conditioner. *Contact Dermatitis* 1996; 35: 195–196.
3. Pasche-Koo F, Claves M, Hauser C. Contact urticaria with systemic symptoms caused by bovine collagen in a hair conditioner. *Am J Contact Dermatitis* 1996; 7: 56–58.
4. Niinimäki A, Niinimäki M, Mäkinen-Kiljunen S, Hannuksela M. Contact urticaria from protein hydrolysates in hair conditioners. *Allergy* 1998; 53: 1078–1082.
5. Varjonen E, Petman L, Mäkinen-Kiljunen S. Immediate contact allergy from hydrolyzed wheat in a cosmetic cream. *Allergy* 2000; 55: 294–296.
6. Sanchez-Perez J, Sanz T, Garcia-Diez A. Allergic contact dermatitis from hydrolyzed wheat protein in cosmetic cream. *Contact Dermatitis* 2000; 42: 360.
7. Pecquet C, Leynadier F, Saïag P. Immediate hypersensitivity to sesame in foods and cosmetics. *Contact Dermatitis* 1998; 39: 313.
8. Hayes B B, Afshari A, Millicchia L, Willard P A, Povoski S P, Meade B J. Evaluation of percutaneous penetration of natural rubber latex proteins. *Toxicol Sci* 2000; 262–270.
9. Beck L A, Leung D Y. Allergen sensitization through the skin induces systemic allergic responses. *J Allergy Clin Immunol* 2000; 106: S258–S263.

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