Abstract of Presentation

Presentation Title(Should be no more than 20 words):

Production of hypoallergenic wheat flour for clinical use

Abstract :

Food allergy has long been emerging a very important public health problem. It is well known that eggs, cow's milk, peanuts and wheat flour often cause allergy. However, complete removal of these foods from daily food consumption is very difficult to accomplish, because many processed foods contain varying amounts of these foods. Because of this, food-allergic patients have strongly desired the development of hypoallergenic foods. With such a situation, we have developed a process for producing a hypoallergenic wheat flour.

1. IgE-binding epitope of wheat gluten

An allergenic peptide responsible for atopic dermatitis was isolated from the chymotryptic hydrolysate of gluten. The primary structure of the peptide was determined as (Ser-Gln-Gln-Gln-(Gln-)Pro-Pro-Phe)4. The N-terminal glutamine and the two proline residues were essential for epitopic function.

2. Enzymatic treatment of wheat flour to produce hypoallergenic wheat flour (HWF)

Based on this epitope structure, a practical method is proposed to produce hypoallergenic flour using food-processing enzyme. Soft flour was mixed with water dissolving actinase and then incubated at 40 C for 1 hr. The product was determined to be negative allergenicity by ELISA *in vitro*. Hypoallergenic wheat products in the form of cupcake and bread were fabricated.

3. Clinical evaluation of the hypoallergenic flour

We tried to clarify the safety and usefulness of a hypoallergenic cupcake in patients with atopic dermatitis and wheat allergy. All patients had a history of severe urticaria when cereal-based products were ingested. Among them, 87% of the patients showed no adverse reaction after consuming the hypoallergenic cupcake. Therefore the hypoallergenic cupcake is safe for most patients with wheat allergy. Moreover, by taking the hypoallergenic cupcakes over a long period (more than 6 months), some patients were hyposensitized and became able to eat normal wheat products. This suggests that HWF can act as an anti-allergenic via allergen-specific immunotolerance. Thus, we next investigated the preventive and suppressive effects of HWF.

4. Suppressive effects of HWF on wheat allergy

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In gluten-induced allergic asthma models, rat receiving HWF exhibited a significantly lower number of total cells and eosinophils in bronchoalveolar lavage fluid (BALF) than those in the control diet group. In addition, the serum wheat-specific antibody levels in HWF diet group were significantly lower than those in the control diet group. These results strongly suggest that HWF actively suppresses allergic reactions, probably by induction of oral tolerance.