Development of a wheat allergen chip (WAMA) for analysis of wheat allergen-specific IgE, IgA, IgG, IgG_1, and IgG_4 antibody responses

A. Krisai[1,2], L.-M. Call[1], H.-J. Huang[2], T. Schlederer[2], M. Tulaev[2], M. Focke-Tejkl[3], B. Linhart[2], R. Valenta[2,3,4,5,6], H. Grausgruber[1]

[1]BOKU University, Department of Agricultural Sciences, Institute of Plant Breeding, Tulln an der Donau, Austria, [2]Medical University of Vienna, Center of Pathophysiology, Infectiology and Immunology, Department of Pathophysiology and Allergy Research, Division of Immunopathology, Vienna, Austria, [3]Karl Landsteiner University of Health Sciences, Center of Molecular Allergology, Krems, Austria, [4]NRC Institute of Immunology, Moscow, Russian Federation, [5]Sechenov First Moscow State Medical University, Laboratory for Immunopathology, Department of Clinical Immunology and Allergy, Moscow, Russian Federation, [6]Life Improvement by Future Technology (LIFT) Center, Moscow, Russian Federation

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Abstract text

Text: **Background:** Wheat is an important allergen source for patients suffering from food allergy and respiratory allergy to wheat flour and may cause celiac disease. Currently 28 allergens from wheat have been characterized and listed in the International Union of Immunological Societies (IUIS) allergen nomenclature data base. Aim of this study was to produce a chip containing a comprehensive panel of wheat allergen molecules for the measurement of allergen-specific IgE, IgA and IgG subclass antibody responses.

Methods: Fourteen purified recombinant wheat allergens and 20 wheat allergen-derived synthetic peptides were prepared and spotted on pre-activated glass-slides using a sciFLEXARRAYER SX (Scienion, Berlin, Germany). In a first series of pilot experiments, sera from wheat allergic patients and non-allergic individuals were used to establish the measurement of allergen-specific IgE, IgA, IgG, IgG_1, and IgG_4 antibody responses. For calibration purposes, fluorescence units obtained by chip measurements were related to the corresponding ImmunoCAP values. IgG_1 measurements were calibrated using monoclonal IgG_1 specific for TNF alpha.

Results: A wheat allergen chip was produced based on micro-array technology containing a comprehensive collection of wheat allergens and wheat allergen-derived peptides. In initial experiments using sera from wheat allergic and non-allergic individuals we determined allergen-specific IgE, IgA, IgG, IgG_1, and IgG_4 antibody responses to wheat allergens. Antibody reactivity to multiple allergens, microspotted in triplicate, could be measured using less than 30 microliters of serum (IgE: 30 microliter; IgG, IgA, IgG_1, IgG_4: 1-2 microliters).

Conclusion: The wheat allergen chip will be a useful tool to study allergen-specific antibody levels in patients, in particular children from whom only small amounts of serum can be obtained, suffering from different wheat induced hypersensitivity diseases as well as in healthy subjects for the investigation of normal antibody responses in relation to different forms of diet.

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Conflict of Interest statement

Do you have any conflict of interest to declare?: No

Affirmation

1. Consent to participate and present onsite: Yes

2. Consent to publication publication: Yes

3. Consent on treatment of contact details saved in this system: Yes