

Antibody, T cell and cytokine responses to cat albumin, Fel d 2, an important cross-reactive cat allergen

Z. Liu¹, D. Trifonova¹, P. Gattinger¹, B. Linhart¹, M. Focke-Tejkl^{1,2}, R. Kiss¹, R. Valetna^{1,2,3,4}

¹Medical University of Vienna, Institute of Pathophysiology and Allergy Research, Vienna, Austria, ²Karl Landsteiner University of Health Sciences, Laboratory for Molecular Allergology, Krems, Austria, ³Sechenov First Moscow State Medical University, Laboratory for Immunopathology, Department of Clinical Immunology and Allergology, Moscow, Russian Federation, ⁴Life Improvement by Future Technologies (LIFT) Center, Moscow, Russian Federation

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Abstract text

Text:

Serum albumins are highly conserved in mammals yet paradoxically serve as potent cross-reactive allergens in furry animals allergic patients.

To investigate IgE, IgG, T cell, and cytokine responses to cat albumin (Fel d 2) in cat-allergic patients and study albumin-specific antibody induction in a rabbit model of allergen-specific immunotherapy.

Sera and PBMCs were obtained from Fel d 2-allergic patients. Thirteen peptides (29-45 amino acids) spanning the Fel d 2-surface-exposed-areas were synthesized, purified, and structurally characterized via CD spectroscopy. IgE and IgG reactivity to folded Fel d 2, albumins from 14 animal species (including humans) and Fel d 2-derived peptides were tested. Fel d 2-specific CD4⁺ cell and CD8⁺ T cell proliferation was investigated by FACS-based CFSE dilution assays, secretion of cytokines in cultured PBMCs via Luminex technology and allergenic activity by basophil activation testing. Furthermore, rabbits were immunized with natural Fel d 2 and KLH-coupled Fel d 2 peptides and allergen-extract-based cat AIT vaccines.

Cat and dog albumin, were the most frequently recognized albumins by patients IgE inducing significant basophil activation, confirming their allergenicity. IgE and IgG were directed mainly to conformational but not to sequential peptide epitopes. Cat albumin induced minimal CD4⁺ T cell proliferation and cytokine responses (IL-2, IL-4, IL-5, IL-10, IL-12, IL-13, GM-CSF, IFN-gamma, TNF-alpha) compared to other cat allergens. Rabbit immunization with cat albumin, certain C-terminal Fel d 2-derived peptides and AIT vaccines containing Fel d 2-induced albumin-specific IgG responses correlating with sequence homology and triggered auto-reactivity to rabbit albumin.

Cat albumin, Fel d 2, is a key allergen recognized by 10–15% of cat-sensitized-patients. Predominantly containing conformational epitopes, it exhibits allergenic activity but elicits weak T cell and cytokine responses. In AIT, Fel d 2 can induce autoreactive antibodies, supporting the preference for molecular AIT vaccines lacking albumins over extract-based formulations for cat allergy treatment.

Conflict of Interest statement

Do you have any conflict of interest to declare?: Yes

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Affirmation

1. Consent to participate and present onsite: Yes

2. Consent to publication publication: Yes

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