Session 2

Component resolved diagnostics (CRD) in allergology – descriptions of clinical cases

Małgorzata Bulanda & Ewa Czarnobilska

Department of Clinical and Environmental Allergology, Faculty of Medicine, Jagiellonian University, Śniadeckich 10, 31-531 Krakow, Poland

Introduction: Component resolved diagnosis (CRD) provides a major step in improving the accuracy of diagnosing IgE-mediated food allergy. An anaphylactic reaction to food is a severe, life-threatening allergic condition in which defining the exact cause has major impact on the future management, including avoidance or immune modulation.

Clinical cases: We present descriptions of the use of CRD in 3 patients with anaphylactic reaction to food:

– Patient 1: A 4 year old boy with atopic dermatitis and asthma and a history of anaphylactic shock in 7 months of life after cow's milk consumption. In additional studies: positive specific IgE for 17 different foods.
– Patient 2: A 35 year old woman with atopic dermatitis who has had anaphylactic shock three times: in June 2015, 2016, 2017 after consumption of dumpling with carmel, bun and the last time during physical exertion few hours after eating waffle. In additional studies: positive specific IgE for milk and egg.
– Patient 3: A 26 year old healthy man with the history of one-time loss of consciousness after eating mixed nuts and drinking beer. In additional studies: positive specific IgE for peanuts and several different fruits.

In all patients the diagnostics has been extended to determine allergens' components:

– Patient 1: Positive results were obtained for the main component of: milk allergens (alpha-lactoglobulin (Bos d 4): 85 ISU-E, beta-lactoglobulin (Bos d 5): 31 ISU-E, casein (Bos d 8): 48 ISU-E), walnut (7S globulin (Jug r 2, storage protein): 17 ISU-E) and soya (glycinin (Gly m 6, storage protein): 6,1 ISU-E).
– Patient 2: Positive components among food allergens were as follows: Bos d 8: 133,54 FIU/ml (casein); Gal d 1: 10,61 FIU/ml, Gal d 2: 13,52 FIU/ml (egg).
– Patient 3: Results of allergen-specific IgE serum testing was negative for all main peanut molecules (Ara h 1-NT, Ara h 2, Ara h 3, Ara h 6, Ara h 8, Ara h 9, Ara h Agglutinin); increased levels of specific IgE were measured against LTP molecules of: walnut (Jug r 3; 0,58 FIU/ml), peach (Pru p 3; 2,13 FIU/ml), hazelnut (Cor a 8; 4,33 FIU/ml), pomegranate (Pun g 1; 1,5 FIU/ml) and corn (Zea m 14; 1,17 FIU/ml).

Comment: The use of CRD influenced the management of our patients:

– Patient 1: The elimination diet was limited to milk, walnut and soya.
– Patient 2: Due to very high level of casein, desensitization to milk has not been carried out.
– Patient 3: Dietary recommendations have been specified (avoiding foods containing LTP).

Conclusions: CRD offers the possibility to conduct a detailed diagnostic evaluation of patients with a history of anaphylactic reaction.

The benefits and dangers of genetically engineered organisms in relation to the allergic reactions

Barbara Majkowska-Wojciechowska

Department of Immunology and Allergy, Medical University of Lodz, Pomorska 251, 92-213 Łódź, Poland

GMOs are organisms that possess a novel combination of genetic material obtained through the use of modern biotechnology. Most of the existing GMOs have been developed to increase biomass, improve taste and nutritional quality, resistance to viruses, pests, adverse conditions, insect tolerance, and so on. The benefits and dangers of GMOs are a subject of controversy. The available data suggest that researchers examining the safety of GMOs present various positions. Most of them indicate that GMOs are absolutely safe and allergies to natural products are more common. Second group claims that GMOs are dangerous for health and require more, long-term research. In fact, GMO modifications add proteins that weren't indigenous to the wild type of the plant, so they could be full of "surprises," even for the inventors themselves, and they also can increase the risk in allergic reactions. miRNA from GMOs absorbed by the human cells were able to change their gene expression.[1] Integrated proteomic, metabolomic, physiological level analysis of NK603 maize crops versus wild plants shows the significant difference between their nutritional quality and the metabolic imbalance of the GMO version.[2] Currently researchers try to develop new tools – epigenetic changes (*Epicrop*)[3] that can be used over multiple generations. According to WHO, it is not possible to make generalizations about any GMO products safety and this should be deeply assessed on a case-by-case basis.[4]

[1] Mlotshwa S, Pruss GJ, MacArthur JL, et al. A novel chemopreventive strategy based on therapeutic microRNAs produced in plants. Cell Research. 2015; 25, 521–524.

[2] Mesnage R, Agapito-Tenfen SZ, Vilperte V, at al. An integrated multi-omics analysis of the NK603 Roundup-tolerant GM maize reveals metabolism disturbances caused by the transformation proces. Sci Rep. 2016; 6: 37855.

[3] http://www.epicrop.com/

[4] Bradford KJ, Van Deynze A, Gutterson N, et al. Regulating transgenic crops sensibly: lessons from plant breeding, biotechnology and genomics. Nat Biotechnol 2005;23:439-44.