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**Features of Molecular Sensitisation Profile in Infants with Risk of Allergic Diseases**

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***Background.*** *For now, there is little data on sensitivity features to specific allergen antigens in infants with initial allergy manifestations.* ***Objective. The aim of the study is to*** *determine the features of the primary molecular sensitisation profile in infants with risk of atopic disease according to their postnatal age.* ***Methods.*** *Full-term infants with burdened familial allergic history and/or skin/gastrointestinal allergy symptoms were examined: Group 1 — 50 children, age — 2.0 [1.0-3.0] months; Group 2 — 35 children, age — 9.0 [8.0-11.0] months.* ***Results.*** *The hereditary atopy risk was observed in 74% of cases (37/50) in Group 1 and in 71% of cases (25/35) in Group 2. 38% of children (19/50) in Group 1 were breastfed, in Group 2 — 60% of children (21/35). Supplemental feeding was implemented in 5.5 [5.0-6.0] months in both groups. Sensitisation was reported in 10% and 37% of cases respectively. Children of Group 1 were sensitised to food allergen antigens: cow's milk/meat (Bos d 6, Bos d 8), egg-white (Gal d 1, Gal d 2, Gal d 3), soybeans (Gly m 6), shrimps (Pen m 4); airborne allergens: house dust mite (Blo t 5, Der h 10), anisakidae (Ani s 3), cockroach (Bla g 7). Children of Group 2 were sensitised to food allergen antigens: cow's milk (Bos d 6), egg-white (Gal d 1, Gal d 2), soybeans (Gly m 6), peanut (Ara h 1, Ara h 2, Ara h 6), kiwi (Act d 1), corn (Tri a 19); airborne allergens: cat (Fel d 1, Fel d 4), birch pollen (Bet v 1). Polyvalent sensitisation was revealed in 4% and 6% of cases, respectively.* ***Conclusion.*** *Infants have much wider range of allergens to which they are sensitive than it is commonly believed. Beside obligate food allergens, sensitisation can be caused by airborne allergens: house dust mites, epidermal, birch pollen; cross-reactive component — tropomyosin.*

***Keywords:*** *infants, sIgE, food allergy, sensitisation, ImmunoCAP ISAC*

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**Table 1.** Characteristics of infants from the group with allergy risk

|  |  |  |  |
| --- | --- | --- | --- |
| **Indicator** | **Group 1**  ***Me* (25; 75)** | **Group 2**  ***Me* (25; 75)** | ***p*** |
| Children postnatal age at study entry, months | **2 (1; 3)** | **9 (8; 11)** | 0,0018 |
| **Maternal factors** | | | |
| Mother’s age, years | 30 (28; 34) | 29 (26; 35) | 0,3011 |
| Antibacterial therapy in pre- and during labour period, abs. (%) | 5 (10) | 8 (23) | 0,1886 |
| Caesarean section, abs. (%) | 23 (46) | 7 (20) | 0,0252 |
| **Infant’s factors** | | | |
| Gestational age, weeks | 39,5 (38; 40) | 39 (39; 40) | 0,2727 |
| Birth weight, g | 3515 (3100; 3750,0) | 3450 (3180; 3710) | 0,4079 |
| Body length, sm | 52 (50; 53) | 51 (50; 52) | 0,1439 |
| APGAR score, points:   * 1st min   5th min | 8 (7; 8)  9 (8; 9) | 8 (7; 8)  9 (8; 9) | 0,3463  0,1545 |
| NICU management, abs. (%) | 12 (24) | 8 (23) | 0,4805 |
| Antibacterial therapy after birth, abs. (%) | 9 (18) | 11 (31) | 0,2393 |
| Breastfeeding initiated in delivery room / on the first day of life, abs. (%) | 39 (78) | 35 (100) | 0,0514 |
| Feeding at study entry, abs. (%):   * breastfeeding * formula/mixed feeding | 19 (38)  31 (62) | 21 (60)  14 (40) | 0,0752  0,0752 |
| Supplemental feeding implemented, months | 0 (0) | 5,5 (5; 6) | – |
| **Allergic factors** | | | |
| Burdened familial allergic history, abs. (%) | 37 (74) | 25 (71) | 0,9884 |
| Skin manifestations, abs. (%):   * dry skin * skin hyperemia * papular rash * exudation symptoms | 28 (56)  21 (42)  42 (84)  10 (20) | 20 (57)  15 (43)  26 (74)  4 (11) | 0,9063  0,8853  0,4085  0,4524 |
| Gastrointestinal manifestations, abs. (%):   * colics * constipations * regurgitation * thin stool | 27 (54)  11 (22)  21 (42)  26 (52) | 8 (23)  7 (20)  8 (23)  7 (20) | 0,0081  0,9620  0,0509  0,0059 |

*Note.* NICU (ОРИТН) — neonatal intensive care unit.

**Table 2.** Molecular sensitisation profiles of infants of first 3 months of life with atopy risk

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Patient** | **IgE total, kU/L** | **Allergen** | **Antigen** | **Antigen** | **Level, ISU-E** |
| 1. K. | 50 | Cow's milk/meat | Bos d 6 | Serum albumin | 0,4 |
| 2. K. | 11,7 | Cow's milk | Bos d 8 | Casein | 2,0 |
| 3. L. | 21 | Egg-white | Gal d 2 | Ovalbumine | 0,3 |
| 4. I. | 19,8 | Egg-white | Gal d 2 | Ovalbumine | 1,2 |
| Soyabeans | Gly m 6 | Glycinin | 0,4 |
| House dust mite *B. tropicalis* | Blo t 5 | Mites group 5 | 0,3 |
| 5. Z. | 151,0 | Egg-white | Gal d 1 | Ovomucoid | 0,6 |
| Gal d 2 | Ovalbumine | 0,8 |
| Gal d 3 | Conalbumin / ovotransferrin | 1,2 |
| Shrimp | Pen m 4 | Sarcoplasmic Ca-binding protein | 0,4 |
| Cross-reactive components: tropomyosin | | | |
| Anisakidae | Ani s 3 | Tropomyosin | 3,0 |
| Cockroach | Bla g 7 | Tropomyosin | 2,6 |
| House dust mite *D. pteronyssinus* | Der h 10 | Tropomyosin | 2,6 |
| Shrimp | Pen m 1 | Tropomyosin | 8,4 |

*Note.* ISU-E — ISAC Standardised Units.

**Table 3.** Molecular sensitisation profiles of infants of 6-12 months of life with atopy risk

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Patient** | **IgE total, kU/L** | **Allergen** | **Antigen** | **Antigen** | **Level, ISU-E** |
| 1. F. | 20 | Cat | Fel d 1 | Uteroglobin | 0,37 |
| 1. G. | 20 | Corn | Tri a 19 | Omega-5-gliadine | 0,49 |
| 1. E. | 101 | Cow's milk/meat | Bos d 6 | Serum albumin | 0,4 |
| 1. E. | 76 | Cow's milk/meat | Bos d 6 | Serum albumin | 0,6 |
| 1. A. | 85,2 | Egg-white | Gal d 1 | Ovomucoid | 3,8 |
| 1. B | 38,5 | Egg-white | Gal d 1 | Ovomucoid | 0,4 |
| 1. U. | 93,7 | Egg-white | Gal d 1 | Ovomucoid | 1,0 |
| 1. K. | 27,8 | Egg-white | Gal d 2 | Ovalbumine | 1,0 |
| 1. Ts. | 239 | Peanut | Ara h 1 | Globulin 7S | 0,7 |
| Ara h 2 | Albumine 2S | 1,7 |
| Ara h 6 | Albumin e2s | 1,6 |
| Soyabeans | Gly m 6 | Glycinin | 0,6 |
| Kiwi | Act d 1 | Cysteine protease | 4,0 |
| Cat | Fel d 1 | Uteroglobin | 2,2 |
| Fel d 4 | Lipocalin | 0,9 |
| Egg-white | Gal d 1 | Ovomucoid | 6,2 |
| Gal d 2 | Ovalbumine | 0,6 |
| 1. E. | 7,6 | Birch pollen | Bet v 1 | Protein PR-10 | 6,0 |
| 1. P. | 219 | Cow's milk/meat | Bos d 6 | Serum albumin | 0,5 |
| 1. Sh. | 124 | Egg-white | Gal d 1 | Ovomucoid | 0,8 |
| Gal d 2 | Ovalbumine | 1,2 |
| 1. F. | 30,4 | Egg-white | Gal d 1 | Ovomucoid | 0,48 |
| Sesame | Ses i 1 | 2S albumine | 1,2 |

*Note.* ISU-E — ISAC Standardised Units.

**RESEARCH LIMITATIONS**

The limited sample size does not allow to extend the results on global population of infants with the risk of allergic diseases.

**FINANCING SOURCE**

Not specified.

**DISCLOSURE OF INTEREST**

**Irina A. Belyayeva** — lecturing for pharmaceutical companies Progress, Medela, Akrikhin, Nestle, HiPP Russ.

**Tatyana V. Turti** — lecturing for pharmaceutical companies Progress, Akrikhin.

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