**Irina A. Belyayeva1, 2, 3, Tatyana V. Turti2, 3, 4, Leyla S. Namazova-Baranova2, 3, Elena P. Bombardirova2, Regina A. Shukenbaeva3, Elena A. Vishneva2, 3, Pavel E. Sadchikov2, 3**

1 Morozovskaya Children's City Hospital, Moscow, Russian Federation

2 Research Institute of Pediatrics and Children’s Health in Petrovsky National Research Centre of Surgery, Moscow, Russian Federation

3 Pirogov Russian National Research Medical University, Moscow, Russian Federation

4 Research Institute for Healthcare Organization and Medical Management, Moscow, Russian Federation

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

**Contact information:**

**Tatyana Vladimirovna Turti**, pediatrician of the highest qualification grade, doctor of medical science, professor of the faculty pediatrics department at the pediatric faculty of Pirogov Russian National Research Medical University, principal researcher in Research Institute of Pediatrics and Children’s Health in Petrovsky National Research Centre of Surgery

**Address:** 119333, Moscow, Fotieva Street 10, b. 1, e-mail: turtit@mail.ru

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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) | 0,34630,1545 |
| 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) | 0,07520,0752 |
| 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) | 0,90630,88530,40850,4524 |
| Gastrointestinal manifestations, abs. (%):* colics
* constipations
* regurgitation
* thin stool
 | 27 (54)11 (22)21 (42)26 (52) | 8 (23)7 (20)8 (23)7 (20) | 0,00810,96200,05090,0059 |

*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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