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M.Z. Lisiecka
National Medical Institute of the Ministry of the Interior and Administration, Warsaw, Poland

Development of allergy to LTP in children and adults

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Abstract. ***Background.*** *The importance of issue is the rising incidence of allergies to volatile organic compounds, particularly in children and adults. This necessitates understanding the causes, risk factors, and methods for prevention and treatment. The purpose of the study was to clarify the relationship between the development of allergy to lipid transfer proteins (LTP) and various environmental influences, nutrition and the immune state of the body.* ***Materials and methods.*** *To achieve goal, the following research methods were used: content analysis of the database of medical organizations, the method of a representative sample and quantitative examination. In the practical part of the study, we used the Immuno Solid-phase Allergen Chip test.* ***Results.*** *The study results demonstrated adverse reactions in both children and adults with LTP allergies. Peach (Prunus persica) was identified as an allergenic product. It was found that childhood is a particularly sensitive period for the development of allergic reactions to LTP due to incomplete immune development. Additionally, the peculiarities of food allergy were investigated, taking into account its connection with antibodies and cause-and-effect relationships.* ***Conclusions.*** *Sensitization to lipid transfer proteins occurs in various groups, including children and adults, and depends on the sources of exposure.*

Keywords: *protein; sensitization; age categories; immune reaction; symptoms*

Introduction

The relevance of the article on the development of allergy to lipid transfer proteins (LTP) in children and adults is due to the growing prevalence of allergic diseases among the population. Modern science confirms an increase in cases of allergic reactions to plant proteins, in particular LTP, which requires a deep understanding of their clinical manifestations, diagnosis and proper treatment. Lipid transfer proteins are an important component of plant foods such as vegetables, fruits, nuts, and grains. These proteins play a key role in the transfer and storage of lipids in plant cells. Their presence helps ensure an optimal balance of lipids in plant organisms, which is important for the proper function and development of plants [1].

L. Cala et al. [2] also indicate that lipid transfer proteins constitute an important class of proteins involved in various processes such as cuticular wax synthesis, lipid metabolism and adaptation to environmental changes and stress conditions. The authors also note that the differential expression of LTP genes occurs as a strategy for inducing the tolerance mechanism in plants in both biotic and abiotic stress conditions. Meanwhile, K. Buczylko [3] in his research determined that some types of LTP are crucial for brain function, as they help transport lipids necessary for the construction of nerve cell membranes and for the synthesis of myelin, which isolates nerve fibres.

A special feature of lipid transfer proteins is their extreme resistance to heat and the effects of enzymes involved in digestion. This stability results in the preservation of the structure and function of these proteins during processing and cooking. However, this aspect causes serious concern among scientists, since the influence of lipid transfer proteins on the human body is of increasing importance [4]. According to M.I.T. Silva et al. [5], allergy to lipid transfer proteins can have very serious consequences. Firstly, it can provoke cross-hypersensitivity, when the body perceives these proteins as a threat and reacts to them with allergic reactions. In addition, there is a potential threat of direct life risk. The authors note that sometimes an allergic reaction to these proteins can be so severe that it causes anaphylactic shock, an extremely dangerous condition that can lead to death if emergency medical care is not provided.

Allergy to lipid transfer proteins can manifest itself in various symptoms that vary from mild to serious. Typical symptoms include itching, swelling of the face, lips, and eyelids. Respiratory symptoms of LTP allergy may include rhinitis, sneezing, and coughing. In some cases, allergy to LTP can cause gastrointestinal symptoms such as hyperaemia of

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For correspondence: M.Z. Lisiecka, PhD in Medicine, Assistant at the Department of Allergology, National Medical Institute of the Ministry of the Interior and Administration, 02-507, 137 Woloska st., Warsaw, Poland; e-mail: mariazofialisiecka@gmail.com
Full list of author's information is available at the end of the article.

the oral cavity, stomach cramps, abdominal pain, vomiting, or diarrhoea [6]. A. Wawrzenczyk et al. [7] determined that allergy to LTP can develop at any age, including childhood and adulthood. In some children, the allergy to LTP may disappear with age, and in others it may remain throughout life. In turn, in own research on the effect of allergy to LTP in children, A. Cieluch et al. [8] state that the child's body may be particularly prone to allergic reactions due to the incompleteness of the immune system. Children may show symptoms of allergy to LTP such as itching, red patches on the skin, swelling, tearing, and swelling of the face.

K. Wlodarczyk et al. [9] determined in his work that in adults, allergy to LTP can also develop, even if it was not observed before. People who have already had other types of allergic reactions may be more prone to developing allergy to LTP. The authors indicate that symptoms may be similar to those in children, but may also include cough, difficulty breathing, and other signs of an allergic reaction. In connection with the above, a study was conducted comparing the development of allergies to volatile and pollen allergens (LTP) in children and adults. This allows for a better understanding of the mechanisms for the development of special reactions to LTP and the use of ways to prevent and treat these diseases.

The study sought to elucidate how the development of allergy to LTP is influenced by various environmental factors, dietary habits, and the immune status of an individual's body.

Materials and methods

To solve the tasks and obtain the necessary data for the analysis of the development of allergy to LTP in children and adults, a number of appropriate methods were used. The work uses the method of content analysis of the database of medical organizations, the method of representative sampling and the method of quantitative examination. One of the key components was the chosen method of general content analysis of the international database of medical organizations, including the World Health Organization (WHO) and Global Health 50/50. Using this method, all available published materials on the topic of interest were searched and analysed. The results of studies conducted in large centres, hospitals, and universities were also included in the analysis. Statistical observational data were obtained, which were used to assess the dimensions of the problem and analyse situations in different regions of the world.

The study was conducted at the Department of Allergology, Clinical Immunology and Internal Medicine at the University of Wroclaw (Poland) in 2023. Two hundred and eighty-four participants of different age groups (3–14 years— 126 participants, 22–55 years — 158 participants) were selected. They had aerogenous allergy diagnosed on the basis of anamnesis and positive skin prick tests and developed adverse symptoms after eating food. Gender diversity was described as follows: 145 women and 139 men from different regions of Poland. The authors of the study used the method of quantitative examination, which made it possible to carefully study the aspects of food allergy. It was investigated how antibodies interact with LTPs, in particular, taking into account their specificity and response to external factors. Specific antibodies that can interact with LTPs and the nature of this interaction are presented. In addition, the method helps generalize the cause-and-effect relationships associated with antibodies and the development of food allergies. This information can help reveal how antibodies affect the development of allergic reactions, better understand the mechanisms of food allergy and the possibilities of influencing this process for future research and treatment.

For each study participant, venous blood was drawn from the ulnar vein using a closed BD Vacutainer K3E system into an anticoagulant-free tube. The obtained tubes of blood samples were centrifuged at 3500 rpm for 15 minutes at room temperature using an Eppendorf model 5424 centrifuge. The obtained serum was distributed into Eppendorf tubes and stored at –15 °C for further analyses. Immune test was used for semiquantitative determination of immunoglobulin E (IgE) levels in Immuno Solid-phase Allergen Chip (ISAC). The solid phase of this test was provided by the surface of the plate on which 112 components (43 native and 69 recombinant) arranged in triplets were adsorbed. The ISAC test was performed according to the manufacturer's instructions.

Before testing, the stored serum was thawed. Using a pipette, 20 µl of serum was applied to one of the four test fields available on the chip. After incubation for 120 minutes at room temperature in a humid chamber, the chip with serum was washed with a washing solution for 10 minutes, then with demineralized water for 5 minutes and dried. A solution containing fluorescently labelled secondary antibodies to human IgE was applied to the test field of the chip. After incubation for 60 minutes in a humid chamber, the chip was prepared for reading by washing with solution A and demineralized water and then completely dried. The surface components of the allergen interacted with specific antibodies present in the serum sample. Specific IgE antibodies bound to the support surface were demonstrated by adding fluorescently labelled human IgE antibodies. The level of fluorescence was quantified using GenePix 4100A Microarray Scanner (Molecular Devices LLC). The scanner was calibrated according to the ISAC test procedures.

Scanner parameters were determined in the test plate measurement procedure. The obtained values of antibody levels were expressed in standardized units of ISU-E (standardized unit of ISAC for specific IgE). The measured values ranged from 0.3 to 100 ISU-E, where values ≥ 0.3 ISU-E were considered as positive results. The method of representative random sampling was used to form a group of people with specific and not random characteristics. It involves defining a group of participants and their subsequent selection from the general population. This approach allows studying a certain subgroup of the population, provides an opportunity to obtain valuable data and the necessary information about the impact of allergy to LTP on the general condition of the respondents. It also allows revealing the relationship between the development of allergy to LTP and various environmental factors, nutrition, genetic features and the state of the body's immune system. Within the framework of this study, a mass survey of a representative sample of people in Poland was conducted using a carefully developed approach

to sample formation and a questionnaire created in advance. The survey was conducted using the Internet service SurveyPlanet. An important aspect of this study was ensuring the confidentiality and anonymity of the participants, which facilitated open and honest responses. All research was conducted in accordance with ethical standards, data from persons under 18 years of age was collected with the permission and help of parents.

Results

According to the WHO, food allergy to LTP occurs in 1.5–10.8 % of the world's population, and this indicator is growing rapidly. In most cases, food allergies are diagnosed in childhood, but about 28 % are first diagnosed in adulthood. Identifying cases of food allergy can be difficult due to confusion with food intolerance, which often causes less severe gastrointestinal reactions to certain foods. The process of diagnosing food allergies varies from country to country. In addition to individual reactions to cow's milk and egg, which are among the most common manifestations of food allergy in children regardless of geographic location, the variability of food allergy patterns in the United States, Europe, and Asia shows differences, reflecting the diversity of food consumption in different countries. The occurrence of reactions to fruits due to cross-sensitization with allergies to inhaled allergens is a common phenomenon in Europe.

In cases of food allergy caused by cross-reactions with plant pollens, initial sensitization to wood pollen allergens leads to a chronological interaction with homologous allergenic structures present in fruits. In Northern Thailand, shrimp, cow's milk, fish, eggs, and ant eggs were found to be among the five most common foods that often trigger food preferences among children, with shrimp being the most common food allergen. On the other hand, in India, food allergy is more associated with a comfort reaction to peas, reflecting the type of South Asian diet that includes many legumes. Food triggers that initiate a significant effective response in Asia have been reported to be due to both common and specific components of the Asian diet, including fish, shellfish, buckwheat, bird's nest, and mother's milk.

About 35 million people in the United States suffer from food allergies, and each year approximately 300 thousand people seek emergency medical care for allergic reactions to food. Food allergies are particularly high among young adults, with approximately one in 13 children in the United States experiencing this problem, and more than 40 % of children with food allergies are allergic to more than one food. According to the Global Health 50/50, the UK, Denmark, Norway, and Australia are countries with a high prevalence of childhood food allergies. Australia has the highest number of children under 5 years of age with a confirmed food allergy, with more than 12 % of children aged 12 months and approximately 5 % of children aged 4 years experiencing this phenomenon. The prevalence of specific types of allergies also varies. For example, peanut allergy spread among children at different periods of life: at the age of 12 months, it was 3.5 %, after four years, this indicator decreased to 2 %. Egg allergy was also common, with a value of 9 % at 12 months and a decrease to 1.5 % at four years. Sesame allergy selection was less extensive, with a rate of 1.8 % at 12 months and 1.4 % at four years.

These data indicate additional need and research into strategies to develop effective prevention and management of food allergies in early childhood. Parents, medical specialists and society need to maintain attention to this issue regarding children's health, taking into account their individual needs. For a more detailed analysis of necessary reactions to the LTPs in children and adults, an additional study was conducted among 284 people with allergies (126 children and 158 adults) living in Poland. The research approach included a survey aimed at identifying specific signs and symptoms of allergy to LTPs. It included analysing various aspects of the reactions to these proteins such as skin manifestations, respiratory and gastrointestinal symptoms. This approach will help increase the volume of information and gain a deeper understanding of the prevalence of these reactions. Based on the data of the first survey, adverse reactions were found in children and adults allergic to LTP (Table 1).

According to the results of the first survey, most research participants primarily indicated clinical manifestations such as itching and rash (25 cases in children, 31 cases among adults), diarrhoea (25 children and 29 adults) and respiratory complications (19 cases in children and 33 among

Table 1. Adverse reactions in subjects allergic to LTP

Symptoms of allergy to LTP	Children	Adults
Itching and crusting	25	31
Angioneurotic syndrome	17	19
Respiratory symptoms	21	22
Vomiting	14	19
Muscle spasms	7	8
Heartburn	18	23
Complicated breathing	19	33
Hyperaemia of the oral cavity	12	17
Stomach spasms	22	26
Diarrhoea	25	29

adults). On the other hand, less common adverse reactions were muscle spasms (7 cases among children and 8 among adults), hyperaemia of the oral cavity (12 children and 17 adults) and vomiting (14 children and 19 adults). It is worth noting that 42 % of surveyed children and 43 % of adults reported the presence of more than one undesirable symptom, which indicates the multiplicity of manifestations in allergy to LTP. Based on the data of the second survey, products were identified that provoke certain adverse reactions in children and adults allergic to LTP (Table 2).

The analysis of the second stage of the survey demonstrated that adverse reactions were most often detected after the consumption of peaches (specifically, 21 cases among children and 27 cases in adults), nuts (20 children and 23 adults) and oranges (19 cases in children and 25 in adults). Manifestations of an allergic reaction were most rarely observed after consumption of peas (11 children and 15 adults), corn (13 cases in children and 16 in adults) and tomatoes (12 children and 16 adults). Additionally, 28 % of children and 27 % of adults reported more than one allergic reaction to different foods. The authors used a methodological approach based on a detailed study of specific aspects of food allergy. It involved the interrelationships between antibodies and the causal relationships underlying this pathological process. In particular, the analysis of the interaction of antibodies with LTPs was carried out, taking into account their specificity and reaction to various external factors.

The results of the study are shown in Table 3, where specific antibodies that showed the ability to interact with LTPs are presented. It contains information about the nature of the interaction, possible places of communication and other important parameters characterizing this interaction.

The results of the conducted clinical diagnosis showed that the investigated components of LTPs have a noticeable variation in their sizes and the number of bends. Also, specific components such as Tri a 14 and Ara h 9 are distinguished by a significant number of deflections — 14 and 9, respectively. Analysis of average indicators for children and adults showed significant differences between them. For example, in case of the Ole e 7 component, the average score for adults is 8.4, which corresponds to a relatively low average score for children of 5.2. Standard deviations showed considerable scatter in the data, particularly evident in the adult Jug r 3 and Art v 3 components. Some components also show significant differences in mean scores between children and adults. For example, the difference in mean Cor a 8 is 0.7 for children and 1.7 for adults. Moreover, several components have an extreme value — Tri a 14 has the highest number of deflections (14) and Ole e 7 shows the lowest average value (0.7) among

Table 2. Number of subjects allergic to LTP who reported adverse reactions to specific products

Products	Children	Adults
Tomatoes	12	16
Apples	17	21
Apricots	18	22
Corn	13	16
Grape	17	22
Plums	14	15
Peaches	21	27
Oranges	19	25
Nuts	20	23
Pea	11	15

Table 3. Descriptive statistics for the levels of specific IgE related to LTP

Components of LTP	Number of patients		Average indicator		Standard deviation		Minimum		Maximum	
	Children	Adults	Children	Adults	Children	Adults	Children	Adults	Children	Adults
Pair j 2	8	12	7.2	8.3	5.6	5.3	0.6	0.7	14.5	15.9
Pla a 3	15	20	5.1	5.7	6.2	5.5	1.5	1.3	23.5	23.2
Jug r 3	4	7	2.8	6.1	6.8	7.1	3.1	0.5	31.7	16.3
Pru p 3	11	10	1.5	7.2	7.7	4.9	0.9	0.3	23.4	19.3
Art v 3	11	12	4.1	7.2	9.2	9.3	0.3	0.2	16.3	24.4
Ole e 7	5	8	5.2	8.4	0.7	0.4	0.7	0.5	14.3	33.6
Cor a 8	6	10	6.5	7.2	7.3	6.8	2.1	2.3	18.3	21.5
Ara h 9	9	14	6.1	5.5	9.1	8.2	1.6	2.6	21.9	23.9
Tri a 14	11	15	8.1	8.3	0.3	0.4	0.4	1.5	24.1	26.4

children. The results of this study emphasize the importance of taking into account variational aspects and age characteristics when analysing the necessary reactions to LTPs. These achievements can have a significant impact on the further study of the mechanisms of free reactions and the development of appropriate clinical approaches to their diagnosis and treatment.

The cause-and-effect relationships of antibodies and the development of food allergy display a mosaic of the influence of antibodies on the pathogenesis of a given allergic reaction, in particular, highlighting key elements that can contribute to the development or suppression of allergic responses. From this point, the authors selected 80 children and 108 adults as participants of the general study, which became the object of an in-depth clinical analysis. The suitability of the age categories of the participants in the selection was based on their vulnerability to the development of food allergies and the importance of obtaining representative data for further analysis.

Summarizing the obtained results, it can be noted that sensitization to LTP is manifested in different groups, including children and adults, and depends on the sources of interaction. The number of sensitized persons changes, in particular, due to the nature of contact with LTP. In the context of age dynamics, a difference between children and adults appears. The number of sensitized adults may exceed the number of sensitized children, especially when LTP is inhaled or inhaled and ingested with food (Table 4). The obtained data can also be significant in assessing the risk of comfort reactions among a group of persons who frequently contact allergens, for example, in everyday life or in professional fields. The obtained data can be used to compare the reactions of children and adults to different sources of LTP. The comparison may help detect variations in responses depending on age groups, which may be relevant for further research.

Table 4. LTP-sensitizing sources

A type of sensitizing LTP	Children	Adults
LTP inhalation + food	42	51
LTP inhalation	24	34
LTP food	14	23

Discussion

The consequence of insufficient research is the limited availability of data on the development of new food allergies in patients allergic to LTP. The report by E. Albert et al. [10] stands out as the only study aimed at evaluating the manifestation of this phenomenon. The scientific work of the authors also reveals this problem, finding out that 28 % of the studied patients develop new allergies to plant food. These results are synchronized with data from I.J. Skypala et al. [11], where 33 % of patients (21/66) were found to be allergic. It is a contribution that emphasizes the importance of highlighting this aspect in relevant studies and provides a broader understanding of the relationship between allergic reactions and allergy to LTP.

S. Scheurer et al. [12] investigated whether LTP allergy manifests clinically as severe anaphylactic reactions or less severe such as oral allergy syndrome (OAS). In patients with asymptomatic IgE reactivity to LTP, skin symptoms are most common (79 %), followed by OAS (69 %), respiratory problems (44.8 %) and gastrointestinal symptoms (22.1 %). An anaphylactic reaction occurred in 25 % of patients allergic to LTP. Similar results can be seen in the conclusions of E. Munoz-Osores et al. [13]. In their study, LTP allergy presented with the following symptoms: OAS in 81.2 % of participants, urticaria in 59.9 %, gastrointestinal symptoms in 48.6 %, and anaphylaxis in 72.1 %.

In turn, A. Anagnostou [14] showed that the results of IgE testing indicated a prevalence of sensitization of 22.4 % of patients to Ara h 9, 21.2 % to Art v 3, and 33.6 % to Pla a 3. Frequent co-sensitization and corresponding IgE reactivity were also observed. Of the 32 patients with LTP-related allergy, 9 reported symptoms after consumption of celery stalks, which mainly manifested as OAS. Extensive IgE cross-reactivity was observed between Ara h 9, Art v 3 and Pla a 3 with varying degrees of inhibition by individual patient sera. Modelling LTP monosensitization in a mouse model indicated the development of more congruent antibody specificities between Ara h 9 and Art v 3. It is worth noting that the biologically relevant cross-reactivity of mouse IgE was limited to the latter and differed from epitopes Pla a 3. Analysis of endolysosomal LTP processing showed the generation of similar clusters, which probably represent T-cell peptides. These results are quite accurately confirmed by the study cited above [15].

I.J. Skypala et al. [16] and J.B. Lopes et al. [17] in conclusions of their research stated that flowering fruits and nuts are the foods that most commonly cause allergic reactions in the context of LTP, even in cases of emerging types of plant food allergy. This trend may indicate the evolution of the pathology in these patients. According to the authors, this problem is relevant, because clinicians should approach the selected diet to avoid allergy to LTP individually. It is important to note that it is not necessary to limit the consumption of all LTP-allergic foods to the same extent, but instead to recommend choosing the foods most frequently consumed by the patient when creating a diet to prevent LTP-allergic reactions. Additional dietary restrictions should be considered based on patient risk stratification, as severity or response to a new plant-based food cannot be predicted. With this in mind, for those patients who already have a systemic reaction to peach skin, but who tolerate other parts of the peach (including the flesh) well, it may be sufficient to avoid peach skin and use epinephrine autoinjection as needed. However, when travelling to mountains, rural areas, or other remote locations, these patients should strictly avoid consuming foods that cause an allergic reaction to nonspecific lipid transfer protein and be careful with nonsteroidal anti-inflammatory drugs and other cofactors. This is important because there may be a situation where access to emergency medical care will be limited and patients' quality of life will deteriorate.

Peach is the most common cause of allergy associated with LTP. In the above study, individuals allergic to LTP most often reported adverse reactions after eating peach,

apple, or tree nuts. Research conducted by B. Olivieri et al. [18] confirmed the same situation with the five foods that most frequently caused symptoms in LTP allergy patients, and these results are consistent with those obtained in the study. In the work of R. Asero et al. [19], the most common sensitizing foods were peach (98 %), walnut (55 %), apple (49 %), hazelnut (45.3 %) and peanut (38.1 %). Such a close affinity of the data indicates the objectivity of both studies. Q.J. Gomes et al. [20] and F. Yatribi et al. [21] revealed that the management of patients with LTP allergy is a complex task that presents a serious challenge both to allergists and to the allergic population itself. The crux of the problem is that LTP is a panallergen, in other words, a universal protein that is widely found in plant products and has a wide spectrum of cross-reactivity, as well as very diverse clinical manifestations [22]. This often causes life-threatening allergic reactions. A complicating factor is that patients who are sensitized to homologous LTPs in other plant products may eventually develop severe or even fatal allergic reactions from simple sensitization (without manifesting clinical symptoms) [23, 24]. This situation has significant implications for dietary recommendations given to patients with LTP allergy. Such data are fully confirmed by the study cited above.

Research by R. Asero et al. [19] proves that LTPs have a key role in food allergy in the Central European population, causing severe allergic symptoms. Patients from central and northern parts of Europe, where first sensitization to Bet v 1 usually occurs through the respiratory tract, often show only mild symptoms after consumption of plant foods. In these cases, food allergy of plant origin is a consequence of interaction with proteins related to Bet v 1, causing allergic cross-reactions due to the high level of sequence homology with Bet v 1. In contrast, allergic reactions to plant-based foods in Southern Europe are usually accompanied by systemic reactions due to primary sensitization to LTP. These proteins are very potent allergens and often cause severe reactions. Thus, two main approaches to plant food reactions can be identified depending on geographic location: one associated with mild allergic symptoms and cross-reactions due to protein homology, and the other associated with severe systemic reactions due to exposure to potent LTP allergens [25, 26]. This is confirmed by research conducted at the Department of Allergology, Clinical Immunology and Internal Medicine at the University of Wroclaw. Given the increasing prevalence of allergic reactions to plant foods and the difficulty of clinical management of such conditions, the findings of the authors and colleagues emphasize the need for further research aimed at revealing the molecular mechanisms underlying these allergic reactions, as well as the development of more accurate methods of diagnosis and effective treatment strategies.

Conclusions

In a study of 284 people with allergies (126 children and 158 adults) in Poland, a certain variation was found in the sizes and number of probes of the studied components of LTPs. Specific components such as Tri a 14 and Ara h 9 were distinguished by numerous deviations: 14 and 9, respectively. A comparative analysis of average indicators for children and adults shows significant differences between them. For example, for the Ole e 7 component, the average score for adults was 8.4, while the score for children was significantly lower, at 5.2. For the use of standard deviations, the scatter in the data was noticeable, with the Jug r 3 and Art v 3 components for adults being particularly prominent. The study also showed that adverse reactions after consumption of various foods containing components of LTPs were quite extensive. Most cases occurred after the consumption of peaches (21 cases among children and 27 in adults), nuts (20 children and 23 adults), and oranges (19 cases in children and 25 among adults).

These results testify to the importance of considering variational aspects and age-specific features when analysing reactions to LTPs. They can influence the understanding of the development of necessary reactions and contribute to the further improvement of clinical approaches to the diagnosis and treatment of food allergy. In conclusion, the study provides a rationale for an individualized approach to the diagnosis and treatment of allergies to LTPs. The practical significance of this study is realized in the development of more effective strategies for the diagnosis and treatment of LTP food allergy. These data can be used to develop individualized approaches to the treatment of a person with common clinical symptoms and manifestations of individual reactions. In addition, the research indicates the need for further study of the interaction between additional components of LTPs and their role in the emergence of necessary reactions.

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Information about author
M.Z. Lisiecka, PhD in Medicine, Assistant at the Department of Allergology, National Medical Institute of the Ministry of the Interior and Administration, 02-507, 137 Woloska Str., Warsaw, Poland; e-mail: mariazofialisiecka@gmail.com; https://orcid.org/0009-0003-9543-509X

Lisiecka M.Z.
National Medical Institute of the Ministry of the Interior and Administration, Warsaw, Poland

Розвиток алергії на ліпід-транспортуючий білок у дітей і дорослих

Резюме. Актуальність. Важливість питання полягає в зростанні випадків алергії на леткі органічні сполуки, особливо в дітей і дорослих. Це вимагає розуміння причин, факторів ризику, методів профілактики та лікування. **Мета:** вивчити зв'язок між розвитком алергії на ліпід-транспортуючий білок (ЛТБ) та різними впливами навколишнього середовища, харчуванням та імунним станом організму. **Матеріали та методи.** Для досягнення поставленої мети використані методи дослідження, у тому числі контент-аналіз бази даних медичних організацій, метод репрезентативної вибірки та кількісний аналіз. У практичній частині дослідження застосовували тест Immuno Solid-phase Allergen Chip. **Результати.** Результати дослідження демонструють побічні реакції як у дітей, так і у дорослих з алергією на ЛТБ. Персик (*Prunus persica*) визначено як алергенний продукт. Встановлено, що дитинство є особливо чутливим періодом щодо алергічних реакцій на ЛТБ через незавершений імунний розвиток. Додатково досліджено особливості харчової алергії з урахуванням її зв'язку з антитілами та причинно-наслідкових зв'язків. **Висновки.** Сенсибілізація до ліпід-транспортуючих білків виникає в різних групах, включаючи дітей і дорослих, і залежить від джерела впливу.

Ключові слова: білок; сенсибілізація; вікові категорії; імунна реакція; симптоми