

Chronological Changes in Allergic Sensitization Patterns

Division Allergy and Immunology, Department of Internal Medicine,
Institute of Allergy, Yonsei University College of Medicine, Seoul, Korea

Jae-Hyun Lee

To discuss about chronological changes in allergic sensitization patterns (ASPs), it is necessary to decide from what criteria and viewpoints to look at this subject. From the most one-dimensional point of view, it relates to what allergens the individual or patient has been exposure throughout the personal life and which has some specific ASPs. The difference in ASPs can be made depending on the individual's lifestyle, the location on the earth with specific climate or environmental conditions. In addition, since the childhood environment differs depending on the patient's age even if they live in the same area, it is possible to easily predict that the ASPs are different depending on their age. However, because we live on the earth, changes in the global environment and changes in favorite food will be important factors in changes in ASPs. Therefore, although temporal changes in ASPs are very hard to research, it is necessary for allergists who treat the global allergic patient in global era should be aware of the trend on ASPs. In this lecture, I would like to address temporal changes in allergy sensitization patterns from several restrictive viewpoints.

ASP is something individual. It is widely known that when born with atopic constitution and looking at the individual's life longitudinally, it is possible to observe changes in ASPs in terms of 'allergic march'. In infancy, food allergens such as egg and milk are sensitized and develop atopic dermatitis. In pre-school to school age, inhalant allergens are sensitized, and asthma occurs, and food allergy has outgrown gradually. It becomes sensitized to many other inhalant allergens, causing allergic rhino-conjunctivitis, and asthma will be sustained in adult age. Although it is known that genetic factors have a very large effect on ASPs, in a study using a twin cohort, Identical twins have shown that the ASPs are displayed quite differently. This means allergen exposure is also important, however, it is thought that random development of each individual's immune system is also an important factor.

ASP is something historical. Some food allergies have been increased according to increasing consumption of food with modern people's preference about food. The opposite is also possible. Similarly, there are large cultural

differences in pet ownership, A study conducted in Finland show that the proportion of atopy decreases in older asthmatics, and mammalian allergic sensitization such as dog, cat and horse have been increased in younger asthmatics. Recently, there has been a claim that pet ownership have protective role for the development of asthma, but this is also considered to be a factor that can influence the pattern of sensitization rates among generations.

ASP is something global. In recent years, changes in the distribution of animals and plants on the earth due to global warming gradually appear, and the flowering time of allergic plants in the tropical region has become earlier, and there are researches discuss the amount of allergen content in the pollen is increased than before. Therefore, it is necessary to recognize that the aspect the allergen itself causing the allergic disease is chronologically changing.

ASP is something regional. Although the term ‘regional’ can be easily agreed even if we do not explain the differences in the regional flora, species of plant and animal, the industrialization rate of each country also can affect the ASP. Particulate matter, ozone, and other air pollutants are considered importantly. In Asia, *Dermatophagoides pteronyssinus* and *D. farinae* are important inhalant allergen in temperate regions, However *Blomia tropicalis* is relatively more important in tropical regions of Asia. Although there are differences in macroscopic areas like this, there are also differences among dominant species in one country. Among the Republic of Korea, which extends from 33 to 38 north latitude, there are also research results that there are differences in dominant species of house dust mite.

Until now, we have discussed the temporal (chronological) changes in the ASP. In conclusion, the global, but regional ASPs are not expressed to all individuals as same manner, because ASP is also very personal. Thus, allergist should do comprehensive judgement with all of these and apply precision medicine to the individual patient through his/her entire life.

References

1. Shin JH, Lee DH. How does the pattern of aeroallergen sensitization change over time across all ages? Int Forum Allergy Rhinol. 2017;7:652–9.
2. Tovey ER, Sluyter R, Duffy DL, Britton WJ. Immunoblotting analysis of twin sera provides evidence for limited genetic control of specific IgE to house dust mite allergens. J Allergy Clin Immunol. 1998;101:491–7.
3. Toppila-Salmi S, Luukkainen A, Lemmetyinen R, et al. Birth decade affects the sensitization pattern and asthma risk in Finnish adult population. Allergy. 2017;72:1791–5.
4. Park HJ, Lim HS, Park KH, et al. Changes in allergen sensitization over the last 30 years in Korea respiratory allergic patients: a single-center. Allergy Asthma Immunol Res. 2014;6:434–43.
5. Davies JM. Grass pollen allergens globally: the contribution of subtropical grasses to burden of allergic respiratory diseases. Clin Exp Allergy. 2014;44:790–801.
6. Ziska L, Knowlton K, Rogers C, et al. Recent warming by latitude associated with increased length of

ragweed pollen season in central North America. *Proc Natl Acad Sci U S A*. 2011;108:4248–51.

7. Ma S, Nie L, Li H, Wang R, et al. Component-Resolved Diagnosis of Peanut Allergy and Its Possible Origins of Sensitization in China. *Int Arch Allergy Immunol*. 2016;169:241–8.
8. Röckmann H, van Geel MJ, Knulst AC, et al. Food allergen sensitization pattern in adults in relation to severity of atopic dermatitis. *Clin Transl Allergy*. 2014;4:9.