

Impact of lifestyle on the development of allergy

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The incidence of allergic diseases has increased dramatically over the last 50 years, particularly in developed countries. The rise in prevalence occurred in such a short period frame that genetics alone cannot explain it. Several hypotheses have been suggested such as hygiene hypothesis and DOHaD (Developmental Origin of Health and Diseases) hypothesis. The hygiene hypothesis is based on epidemiological data showing a direct link between the decrease of infectious or microbial burden and the rising incidence of allergic diseases. DOHaD theory is early life is a critical time of risk but also a critical time of opportunity for promotion of health and prevention of future disease, such as allergic diseases. All modern diseases are associated with modern lifestyle changes, suggesting common risk factors for many non-communicable diseases (NCDs). These risks include unhealthy dietary patterns, reduced physical activity, altered patterns of microbial exposure, tobacco smoking, and other environmental pollutants.

Diet might influence susceptibility to allergic diseases, as it contributes to the education and regulation of the immune system. Allergic diseases usually start early in life. Indeed, through maternal metabolism, diet could have an impact on our health even before birth and some interventional studies have reported immunomodulatory effects of specific nutrients on the neonate and a reduction of early sensitization to allergens. Many epidemiological cohort studies have investigated association between maternal diet during pregnancy and allergic diseases in the offspring. Although most of these studies failed to report consistent associations, some dietary patterns more likely to be associated with less risk for allergic disease include Mediterranean dietary patterns, diets rich in fruits and vegetables, fish and vitamin D. Food patterns associated with higher risk for atopy included vegetable oils and margarine, and fast food.

The role of early life vitamin D exposure in the development of childhood allergic diseases also remains controversial. Vitamin D has been the focus of many studies examining its relationship with allergic disease. Because vitamin D exposure exerts immunomodulatory effects in utero as early as the first trimester, prenatal vitamin D exposure should be considered when examining the potential effects of early life vitamin D.

Some epidemiologic studies suggest a protective effect of higher vitamin D exposure in early life, while other results point to increased odds of childhood allergic diseases or no associations with vitamin D exposure. Differences in exposure assessment, outcome definitions, study population, and study design account for many of these disparate results. Overall, vitamin D seems to be a pleiotropic regulator of immune function that might exert different effects depending on the timing exposure (prenatal vs. postnatal) and the dose, and possibly also on genetic variability, which can influence individual susceptibility.

While it is clear that the lifestyle factors, such as diet, vitamin D exposure, and stress, significantly influences host immune maturation and immune activity, the molecular basis for these immunomodulatory mechanisms is only beginning to be elucidated. To improve the understanding of how the lifestyle factor affects the allergic diseases in humans, further data from key target periods, such as pregnancy and early infancy, and interventions during various disease status should be combined to provide a map of co-occurrence.

References

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