

Correlations Between Alder Specific IgE and Alder-related Tree Pollen Specific IgE by RAST Method

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ABSTRACT

Background: Wild birch trees grow in limited areas in Japan and are not a common aero-allergen. However, many patients who do not live in the area show positive birch pollen Radioallergosorbent Test (RAST). Therefore, being sensitized by another tree pollen which is closely related to birch may result in showing a specific IgE antibody to birch. Alder is one of these trees and in the past it grew widely in Japan. However, there is no available RAST data as to the correlations between alder and alder-related trees.

Methods: We measured the alder specific IgE (CAP-RAST, Phadea) in stored sera which was positive in birch RAST (228 samples), beech RAST (36 samples), oak RAST (152 samples) and cedar RAST (411 samples) and examined correlations between the RAST of alder and other trees.

Results: The correlation coefficient value of birch was very high (0.971). The other coefficient values of beech and oak were high (0.884 in beech and 0.895 in oak) but were slightly lower than that of the birch. This means that in terms of allergenicities, birch pollen is almost the same as alder and beech and oak are partly different from the alder.

Conclusions: The Japanese respond to alder pollen just same as they do to birch pollen in forming specific IgE antibody. In clinical practice, positive alder RAST has the same meaning as positive birch RAST.

KEY WORDS

alder, allergenicity, beech, birch, oak, RAST

INTRODUCTION

Birch pollen is known as a causative allergen of pollinosis and induces oral allergy syndrome (OAS).¹⁻⁷ In Japan, wild birch trees grow in limited areas such as Hokkaido and Nagano prefecture which are far from metropolitan areas. In metropolitan areas birch pollen is hardly found.⁸ However, some pollinosis patients who live in metropolitan areas show a positive birch RAST. Some studies of antigen analysis show that birch and alder pollens are similar to each other.^{7,9-12} The alder and alder-related trees grow widely in the metropolitan neighboring areas. Therefore, being sensitized by the alder pollen may result in showing a positive birch RAST.¹³ However, no RAST data was found regarding the correlations between alder and the other alder-related tree pollens.^{2,13} We investigated the correlation between alder and the alder-

related trees pollens, namely birch, beech and oak.

METHODS

We measured specific IgE in stored sera of our allergic patients. The sera, which consists of 228 samples of positive birch (common silver birch, *Betula verrucosa*) RAST, 36 of positive beech (American beech, *Fagus grandifolia*) RAST and 152 of positive oak (*Quercus alba*) RAST, were taken from allergic patients from Kanagawa prefecture or in the neighboring areas, which constituted the metropolitan areas. Another 411 samples of positive cedar (*Libocedrus deccurrens*) RAST which is far from the alder in terms of plant classification, were investigated as a reference. The specific IgE antibody was measured by Phadea CAP-RAST kit. We converted the RAST value into logarithmic numerals and calculated a correlation coefficient. We used SPSS software for statistical analysis.

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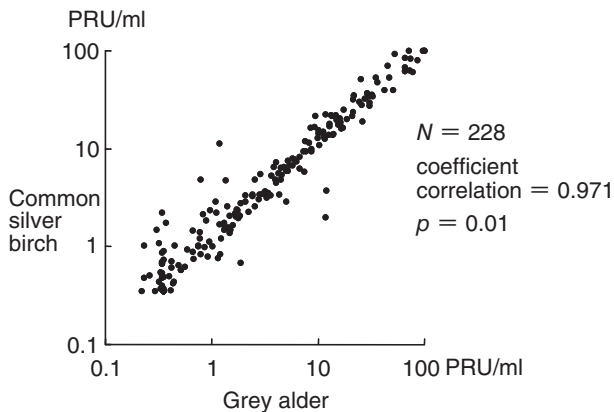


Fig. 1 Correlation of alder with birch pollen in RAST. The correlation coefficient value was high. This means that the allergenicity of alder and that of birch are almost the same.

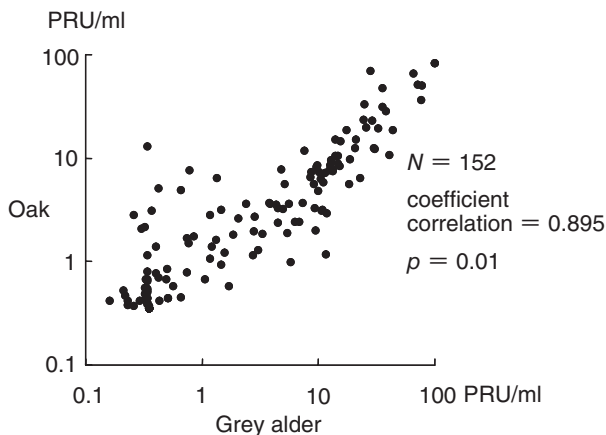


Fig. 2 Correlation of alder with oak pollen in RAST. The correlation coefficient was not higher than that of birch. This means that the allergenicity of oak is different from that of both alder and birch.

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RESULTS

An extremely high correlation coefficient was found between the alder (Grey alder) and the birch RAST (Fig. 1). The correlation value was 0.971 and was significant ($p = 0.001$). This data suggests that the allergenicities of both pollens are almost the same. Not only in beech (Fig. 2) but also in oak RAST (Fig. 3), high correlation coefficients were found between these pollens and the alder pollen. However, those correlation values, 0.884 in beech and 0.895 in oak, were lower than that of the birch. The low correlation values mean that the allergenicities of both pollens are partly different from alder. In contrast to the above pollens, the cedar RAST showed a very low correlation value (Fig. 4).

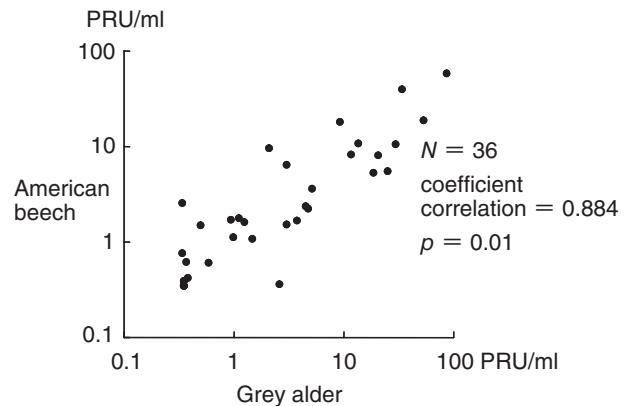


Fig. 3 Correlation of alder with beech pollen in RAST. The correlation coefficient was not higher than that of birch. This means that the allergenicity of beech is different from that of both alder and birch.

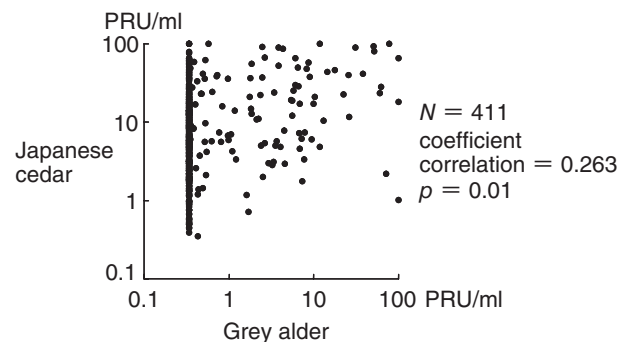


Fig. 4 Correlation of alder with Cedar pollen in RAST. The correlation coefficient was low. This means that the allergenicity of cedar is considerably different from that of both alder and birch.

DISCUSSION

It is well known that some patients with birch pollinosis have the OAS. Birch pollen has allergenic components inducing the OAS. Therefore, birch pollen has attracted clinical attention.¹⁴

Geographically, Japan is a long archipelago, extending from north to south. For this reason, the vegetation is greatly different in the northern part and the southern part. In Japan, the wild Siberian silver birch (*Betula platyphylla* var. *japonica*) grows only in cold districts: such as Hokkaido and in restricted areas of Honshuu, especially in the Nagano prefecture. We have encountered many OAS patients not only in Hokkaido but also in metropolitan areas. It led us to think that in the metropolitan area positive birch RAST does not indicate birch sensitization and may suggest other birch-related pollen sensitization. Wild alder (*Alnus japonica*), Japanese beech (*Fagus crenata*) Japanese oak (*Quercus serrata*) grow widely in

Japan. In comparison with cedar, these pollens scatter in very small quantities. Therefore we paid no attention to the alder and alder-related trees.

Our data showed that the Japanese are sensitized by alder and birch pollen almost in the same manner. The beech and the oak trees are more distant from the alder than the birch in terms of a plant classification and have a slightly different allergenicity. In summary, the Japanese respond to alder pollen just as they do to birch in forming specific IgE antibody. In clinical practice positive RAST to alder has the same meaning as positive RAST to birch.

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