Molecular-Based Haplotype Analysis of the β2-Adrenergic Receptor Gene (ADRB2) in Japanese Asthmatic and Non-Asthmatic Subjects

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Background: The β2-adrenergic receptor gene (ADRB2) is a target molecule of β2-agonists. Single nucleotide polymorphisms (SNPs) in the ADRB2 are related to the effectiveness of β2-agonists. However, there are some discrepancies in the results of pharmacogenetic studies of ADRB2 among different ethnic groups. The aims of this study were to determine the ADRB2 haplotypes and diplotypes in Japanese asthmatic and non-asthmatic subjects and to examine their relation to asthma and to compare these results with previous studies done in other ethnic groups.

Methods: Complete sequences for 3 kb promoter and 1.2 kb structural regions of ADRB2 were analyzed in 48 Japanese asthmatics and 100 controls, and haplotypes and diplotypes of SNPs were analyzed.

Results: Fifteen SNPs including a novel one in -839 were observed. Allele frequencies for all SNPs were similar between asthmatics and controls. We also identified 42 haplotypes and 54 diplotypes of ADRB2 in a Japanese population. The frequencies were similar between the two groups. They were classified into 17 and 23 types, respectively, according to Drysdale's haplotype-organization system, and a significant ethnic difference was observed between the Japanese and Caucasian populations.

Conclusions: The frequencies of SNPs and ADBR2 haplotypes in Japanese are different from those in Caucasians and African Americans. These divergences might imply the need for independent pharmacogenetic studies for ADBR2 in each ethnic group.

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