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Pharmacogenomic association between bronchodilating response to short-acting beta2-agonist and beta2-adrenoreceptor gene polymorphisms

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The beta2-adrenergic receptor (β_2 AR) agonists are the most widely used agents in the treatment of asthma, and β_2 AR polymorphisms have been associated with agonist-promoted downregulation in vitro studies. The aim of this study was to evaluate pharmacogenomic relationship between β_2 AR polymorphisms and bronchodilating response to inhaled β_2 AR agonist.

Two hundred and nine children revealed bronchial hyperresponsiveness to methacholine, and underwent bronchodilating response after inhalation of albuterol. One hundred and ninety-five of the 209 gave peripheral blood for genotyping of β_2 AR gene.

The bronchodilating response was significantly associated with polymorphism at codon 16, but not with at codon 27. Interestingly, this study demonstrated that the bronchodilating response was more significantly associated with β_2 AR haplotypes, with Arg-Gln/Arg-Gln and Arg-Gln/Gly-Glu haplotypes showing the highest bronchodilating responses, Arg-Gln/Gly-Gln and Gly-Gln/Gly-Glu intermediate responses, and Gly-Gln/Gly-Gln the lowest response .

The β_2 AR gene polymorphisms are associated with bronchodilating responses to beta agonists, and β_2 AR haplotypes are more informative than individual polymorphisms in predicting the bronchodilating response.