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INTERACTIONS OF ASTHMA SEVERITY AND RESPONSE TO TREATMENT WITH β2-ADRENERGIC POLYMORPHISMS IN SAMPLE OF IRAQI CHILDREN

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ABSTRACT : Beta-2 adrenergic receptor (ADRBS) changes can influence the severity of asthma and how well it responds to the medication. As a result, we aimed to investigate the *ADRB2* gene polymorphism at codons 16 and 27 that affects asthma severity and treatment response in children with asthma. The case-control study was conducted on 60 children (30 patients and 30 controls); the range of ages was (5-17) years. The sequencing for DNA fragment of the *ADRB2* gene on exon region used for detection Arg16gly and Gln27Glu by Sanger's sequencing, the obtained results were analyzed using SPSS, and Linkage disequilibrium analysis was performed using Haploview. The allele frequency in Arg16gly found no significant difference between the patients' group and controls group, the mutant GG genotype (33.3% *vs* 43.3, OR=0.65, 95% C.I. (0.22-1.86), P=0.42).Gln27Glu observed no significant difference among the studied groups, the mutant GG genotype (6.7% *vs* 6.7%, OR=1.0, 95% C.I. (0.13-7.60), P=1.00). In conclusion, there was no correlation observed between asthma severity and treatment response in asthmatic children with polymorphisms of Arg16gly and Gln27Glu on ADRB2 gene.

Key words : ADRB2 gene, asthma, polymorphisms.

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INTRODUCTION

Asthma is a chronic airway inflammatory disease that affects ~334 million people of all ages worldwide and this number is expected to rise by another 100 million by 2025 (GINA, 2014; Behera and Sehgal, 2015). The occurrence of milder asthma cases may have caused the rise in asthma prevalence (Chen *et al*, 2018). Because asthma is not a curable disease, the main objective of asthma treatment is to alleviate the symptoms, minimize the development of the disease and improve quality of life (GINA, 2018). Many researchers have looked into the correlation between asthma severity and genetic variants. Numerous genes have been identified as asthma-susceptible genes, the most widely -studied of the â-2 adrenergic receptor (ADRB2) (Barnes, 2010; Meyers, 2010; Zhang *et al*, 2012). The β2 adrenergic receptor (ADRB2) is highly expressed in lung tissue and plays a significant role in pulmonary function regulation. Changes in ADRB2 can influence the severity of asthma and the response to therapy, which can be highly complicated and difficult to predict (Van Veen *et al*, 2006). The ADRB2 gene, which is found on chromosome 5q31-q32 and encodes a G-protein-coupled receptor expressed in airway smooth muscle and causes bronchial relaxation, is located on chromosome 5q31-q32 (Hawkins *et al*, 2008). Variations in treatment responses and intermediate phenotypes of asthma have been linked to polymorphisms in the ADRB2 gene. The correlation between ADRB2 variants and inhaled b2-agonist reaction has been controversial, with varying findings published Carroll *et al*, 2009; Finkelstein *et al*, 2009). According to some studies, the Arg/Arg genotype at position 16 is related to a good response to SABA, while the Arg/Gly and Gly/Gly genotypes are linked to weak response (Cho *et al*, 2005; Carroll *et al*, 2009). Other reports, on the other hand, found the opposite results or failed to find any positive correlation (Palmer *et al*, 2006; Rebordosa *et al*, 2011). When polymorphisms at position 27 of the ADRB2