European Respiratory Society
Annual Congress 2012

Abstract Number: 1679

Publication Number: P1786

Abstract Group: 5.1. Airway Pharmacology and Treatment

Keyword 1: Asthma - mechanism **Keyword 2:** Allergy **Keyword 3:** Airway smooth muscle

Title: The effect of single-nucleotide polymorphism in IL-13 on airway hyperresponsiveness in asthmatics

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Body: Background: Single-nucleotide polymorphism (SNP: rs20541) of IL-13 has been recognized as a risk factor of asthma. We recently demonstrated that FEV1 in asthmatics with the Q110 variant IL-13 declined faster (Allergol Int 2011). However, the effects of the variant IL-13 on airway hyperresponsiveness (AHR) have never been elucidated. Objectives: To evaluate the effects of SNP (rs20541) in IL-13 on AHR in asthmatics, we analyzed the relationship between SNP and AHR. Methods: We recruited 182 asthmatics to the current study who visited the asthma out-patient clinic in Iwate Medical University Hospital from 2006 to 2011. Subjects were genotyped using rs20541 by 7500 Fast Real-Time PCR System, (Applied Biosystems USA). Therapeutic steps (GINA 2011), eosinophil counts in peripheral blood and serum IgE concentration in those asthmatics were also studied. AHR to methacholine was measured by Astograph; Jupitor 21 (Chest, Japan). AHR was expressed as Dmin (U) (average ± SE). Statistical analysis was performed by one way ANOVA. This study was approved by the ethics committee of Iwate Medical University. Results: Genotyping of rs20541 showed that 26 A/A, 77 A/G and 79 G/G. D min (U) of the 3 genotypes was 1.17±0.300 in A/A, 1.99±0.35 in A/G and 2.85±0.39 in G/G. D min in the 3 genotypes was proved to be significantly different by Kruskal-Wallis One Way Analysis of Variance (p=0.007). There was no significant difference in therapeutic steps, eosinophil counts or serum IgE concentration among the 3 genotypes of asthmatics. Conclusion: SNP (rs20541) in IL-13 was associated with AHR, suggesting that IL-13 was involved in the progress of AHR through its biological activity on airway smooth muscles.