Genetic association of miR-149 polymorphism with asthma

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Background and objectives

Regulation of inflammatory responses in human diseases is mediated by coordinated control of inflammatory gene expression, which is also modulated by miRNAs. MiRNA binds to the 3'UTR of target genes, regulating their expression at the post-transcriptional level. The aim of the study was to investigate the genetic effect of miR-149 polymorphism on asthma.

MATERIALS AND METHODS

- One hundred- eighty six patients with asthma and 170 normal healthy controls (NC) were enrolled.
- Rs2292832 in *miR-149* was genotyped by TaqMan allelic discrimination assay.
- Expression of miR-149 was evaluated by real time PCR using mirVana™ miRNA isolation kit and miRNeasy Serum/Plasma Kit, respectively

RESULTS

Table 1. Clinical characteristics of study subjects

	Asthma (n=186)	NC (n=170)	P value
Age (years)†	41.51±15.00	29.07±9.38	<0.001
Sex (Female/total) ‡	102/189(53.97%)	69/159(43.40%)	0.049
Atopy (presence/total) ‡	104/172(60.47%)	50/133(37.6%)	<0.001
Total IgE (IU/L) †	500.79±1022.63	123.72±224.97	<0.001
Baseline FEV_1(% Pred) †	88.37±21.77/165	NA	NA
PC_{20} (mg/mL) †	9.58±15.31/153	NA	NA
IgE D1 (KU/L) †	9.48±19.84/169	4.4±15.68/19	0.005
IgE D2 (KU/L)†	12.92±26.03/170	6.62±22.8/19	0.003
Sputum eosinophil count (%) †	24.59±33.03/107	NA	NA
Sputum neutrophil count (%) †	61.17±33.44/115	NA	NA
Total eosinophil count (%) †	491.3±1320.47/193	NA	NA

† Data presented as **mean ± SD**. *P-values* were obtained using ***Student's T test***
‡ Data presented as **prevalence (%)**. *P-values* were obtained using ***Fisher's test***.

Table 2. Genotype frequencies of *miR-149* gene polymorphism distributed in asthma and NC groups

	Genotype	Asthma (n=186)	NC (n=170)	*P* value
miR-149 T>C rs2292832	TT	149(80.1%)	116(68.2%)	0.090
	CT	24(12.9%)	41(24.1%)	0.727
	CC	13(7%)	13(7.6%)	**0.035**

*Each *P-value* was calculated using the co-dominant, dominant and recessive models. Logistic regression analysis was applied to control age and sex as covariates.

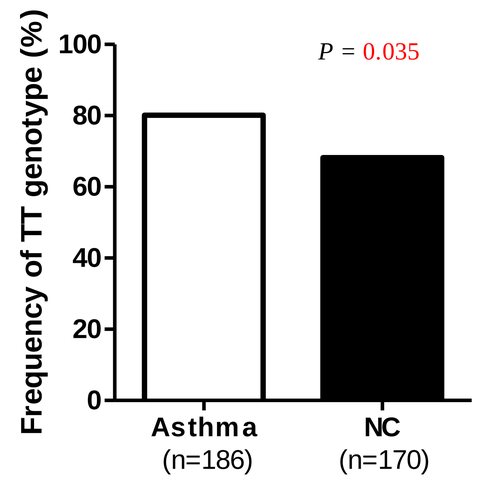

Figure 1. **The frequency of TT genotype between Asthma and NC groups**

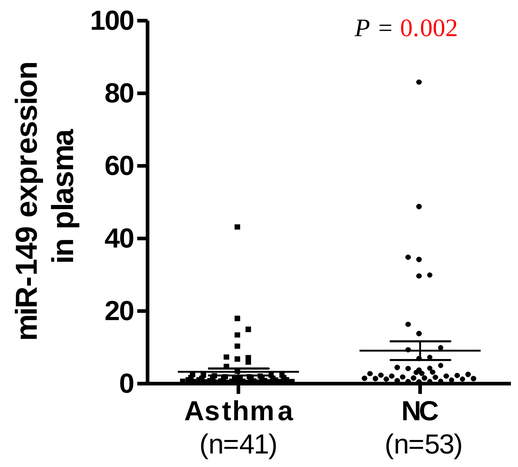

Figure 2. **miR-149 expression level between Asthma and NC groups**

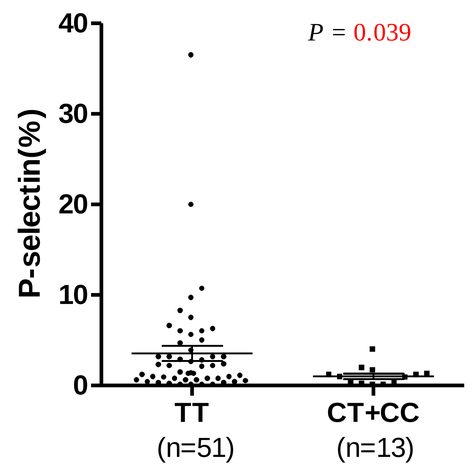

Figure 3. **Association of *miR-149* TT genotype with P-selectin expression level on platelet**

**P* values in figure 1-3 were calculated by the Mann-Whitney U test.

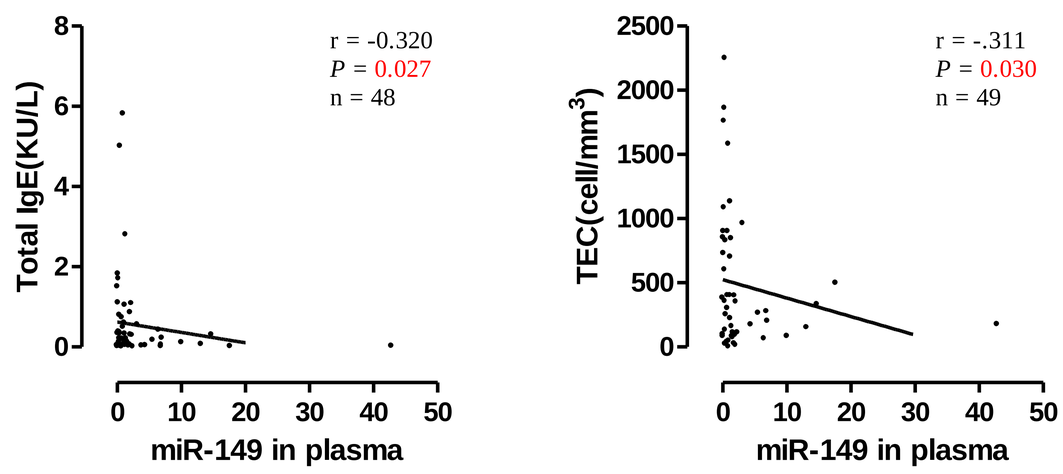

Figure 4. **Correlation of clinical parameters and expression of miR-149 in plasma**

SUMMARY

- Asthmatic patients showed significantly higher frequency of rs2292832 T allele at miR-149 and lower expression of plasma miR-149 compared to those of NCs (*P* = 0.035, *P* = 0.004, respectively).
- Those carrying the miR-149 T allele showed significantly higher level of p-selectin expression on platelets compared to non-carriers (*P* = 0.039).
- The level of plasma miR-149 showed negative correlations with total IgE (*P* = 0.027) and total eosinophil count (*P* = 0.030).

FUNDING SOURCE

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CONCLUSION

The present study suggests an inhibitory role of miR-149 on eosinophilic inflammation in asthmatics. Further study is required to investigate the role of miR-149 in the pathogenic mechanism of asthma.