

LETTER TO THE EDITOR

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# Analysis of $\text{G}\gamma$ -158(C→T) polymorphism in hemoglobin E/ $\beta$ -thalassemia major in Southern China

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## Abstract

**Background:** The  $\text{G}\gamma$ -158(C→T) polymorphism plays important function in the clinical variability of HbE/ $\beta$ -thalassemia. There is little known about  $\text{G}\gamma$ -158(C→T) polymorphism in HbE/ $\beta$ -thalassemia major in Southern China. This study aimed to explore the association between HbE/ $\beta$ -thalassemia major and this polymorphism in Southern China.

**Methods and Results:** The frequency of the  $\text{G}\gamma$ -158(C→T) polymorphism has been evaluated in 32 patients with HbE/ $\beta$ -thalassemia major from Southern China. Further analysis of the  $\text{G}\gamma$ -158(C→T) polymorphism revealed the prominent frequency of this polymorphic pattern among HbE/ $\beta$ -thalassemia major patients (65.63%). The presence of this polymorphism was strongly correlated with the increase of HbF synthesis.

**Conclusions:** The frequency of the  $\text{G}\gamma$ -158(C→T) polymorphism was relatively high in Southern Chinese patients with HbE/ $\beta$ -thalassemia major, often accompanying with high production of HbF. This feature appears to be different with reports in other races and regions.

## To the Editor

Hemoglobin E/ $\beta$ -thalassemia(HbE/ $\beta$ -thalassemia) is a common form of severe thalassemia syndromes in the Southern Chinese provinces [1]. Clinical manifestations of these patients range from nearly asymptomatic to severe  $\beta$ -thalassemia disease. The  $\text{G}\gamma$ -158(C→T) polymorphism (-158 Xmn I  $\text{G}\gamma$ -globin polymorphism) has been shown to be associated with the increased production of HbF and can strongly influence this heterogeneity of HbE/ $\beta$ -thalassemia [1-6]. The condition of the -158 Xmn I  $\text{G}\gamma$ -globin polymorphism has been rarely reported in HbE/ $\beta$ -thalassemia majors from Southern China. The present study was to investigate the frequency of the -158 Xmn I  $\text{G}\gamma$ -globin polymorphism and its association with high HbF level in HbE/ $\beta$ -thalassemia major patients of the Southern Chinese.

The clinical data were collected from 32 patients with HbE/ $\beta$ -thalassemia major who were seen at the First Affiliated Hospital, GuangXi Medical University. We also collected data from and compared with 30 unrelated

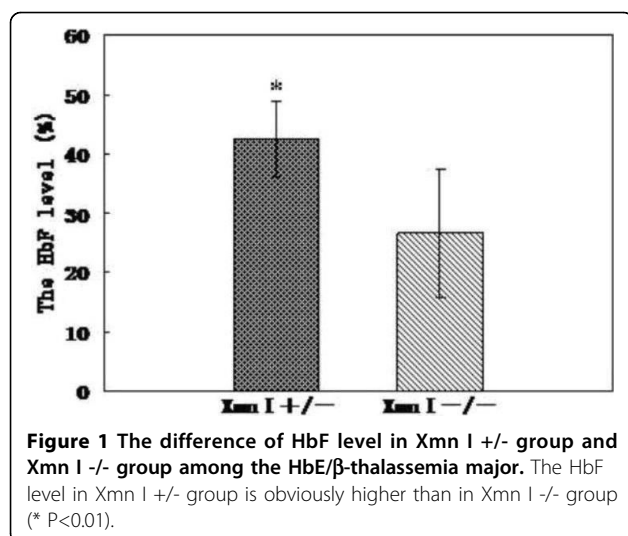
healthy individuals. Table 1 shows the existence of the -158 Xmn I  $\text{G}\gamma$ -globin polymorphism among HbE/ $\beta$ -thalassemia major and healthy controls. The frequency of polymorphism in HbE/ $\beta$ -thalassemia major (65.63%) was significantly higher than those in healthy controls ( $P < 0.00$ ). In these patients, there were 6  $\beta$ -thalassemia mutations detected in trans to the  $\beta$ E-thalassemia mutation. None of  $\alpha$ -thalassemia and homozygote of the -158 Xmn I  $\text{G}\gamma$ -globin polymorphism were found in all samples. Fig 1. displays the association between the -158 Xmn I  $\text{G}\gamma$ -globin polymorphism and HbF level among the HbE/ $\beta$ -thalassemia major. The HbF level in Xmn I +/- group was more than that in Xmn

**Table 1 Existence of the -158 Xmn I  $\text{G}\gamma$ -globin polymorphism among 32 HbE/ $\beta$ -thalassemia major and 30 healthy controls**

Polymorphism	Controls (%)	HbE/ $\beta$ -thalassaemia (%)
-158 Xmn I $\text{G}\gamma$ -globin	1 (3.33)	21 (65.63)
Xmn I +/+	0 (0)	0 (0)
Xmn I +/-	1 (3.33)	21 (65.63)
Xmn I -/-	29 (96.67)	11 (34.37)

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**Figure 1** The difference of HbF level in Xmn I +/- group and Xmn I -/- group among the HbE/ $\beta$ -thalassemia major. The HbF level in Xmn I +/- group is obviously higher than in Xmn I -/- group (\*  $P < 0.01$ ).

I -/- group, confirming the significant difference between these two groups. The analysis by Spearman correlation indicated that the -158 Xmn I  $G_{\gamma}$ -globin polymorphism was associated with increased HbF synthesis ( $r_p = 0.588$ ).

In HbE/ $\beta$ -thalassemia, particularly in the major cases, during hematopoietic stress, point mutation at G-gamma promoter (the -158 Xmn I  $G_{\gamma}$ -globin polymorphism) can induce high gamma chain production rate [7]. The heavy hematopoietic stress from severe anemia may thus lead to the high frequency of this polymorphism in Southern Chinese patients with HbE/ $\beta$ -thalassemia major. This is the first report of the frequency of the -158 Xmn I  $G_{\gamma}$ -globin polymorphism in patients with HbE/ $\beta$ -thalassemia major in Southern China. These data suggest that screening of the -158 Xmn I  $G_{\gamma}$ -globin polymorphism and HbF level in early childhood may help on the management of HbE/ $\beta$ -thalassemia major patients and possibly prevent severe complications in Southern China.

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