Gene expression level of toll-like receptor 4 and insulin receptor substrate 1 in type II diabetic Malay patients and their first-degree relatives

ABSTRACT

Background: Type II diabetes mellitus (T2DM) is a polygenic disorder that can be prevented or delayed in case of the adoption of proper interventions. The identification of susceptible genes and novel biomarkers of T2DM could be of great help in the early detection of high-risk individuals. First-degree relatives of T2DM patients have a high risk of this disease, even when they have no major abnormalities in glucose metabolism. The present study was conducted to examine the status of the expression of two genes, namely toll-like receptor 4 (TLR4) and insulin receptor substrate (IRS1), involved in glucose metabolism in peripheral blood, in individuals genetically predisposed to T2DM development. Methods: Blood samples were collected from 54 participants in three research groups, including Malay subjects with T2DM, first-degree relatives of T2DM patients, and healthy controls. The measurement of gene expression was accomplished using a quantitative real-time polymerase chain reaction. Result: The results were indicative of the significant upregulation and downregulation of TLR4 in patients with T2DM and their first-degree relatives, respectively ($P<0.05$). With regard to IRS1, the data revealed a decreased expression in T2DM patients as compared to that in the healthy controls ($p<0.05$). Conclusion: The results indicated that TLR4 and IRS1 might be involved in the pathogenesis of T2DM. Moreover,the altered expression of TLR4 in the first-degree relatives of diabetic patients is an important marker showing a genetic predisposition to T2DM. Therefore, the two investigated genes could be used as a diagnostic tool for the prediction of T2DM in this population.

Keyword: Type 2 diabetes mellitus; Gene expression; TLR4; IRS1; First-degree relative