Comprehensive analysis of seven Toll-like receptor genes including 15 single-nucleotide polymorphisms with autoimmune thyroid disease in Korean children.

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Background: The Toll-like receptors (TLRs) are germline-encoded receptors that play an essential role in initiating the immune response against pathogens.

Objective and hypotheses: In this study, we assess the association of TLR polymorphism with autoimmune thyroid disease (AITD) in Korean children.

Method: Seven Toll-like receptor genes (TLR1, -2, -3, -4, -5, -6, -9) including 15 single-nucleotide polymorphisms were analyzed on 104 Korean children with AITD [Hashimoto’s disease (HD) = 40, Graves’ disease (GD) = 60] and 192 healthy individuals.

Table 1. Characteristics of 104 AITD patients

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Sex (F/M)</th>
<th>Age (years)</th>
<th>Age at diagnosis</th>
<th>HD</th>
<th>GD</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>11.3±3.2</td>
<td>15.2±3.5</td>
<td>72 (39.3%)</td>
<td>38 (63.3%)</td>
</tr>
</tbody>
</table>

Results:

1. In total AITD, the frequencies of these alleles had no statistical difference with controls (Table 3).

2. In HD, the frequencies of the TLR3 rs3775296 AA genotype (OR=3.45, P < 0.022) was higher, whereas the TLR3 rs3775296 C allele (OR=0.29, CP < 0.044) showed lower frequencies than in the healthy controls. In GD, the frequencies of the TLR4 rs1927911 CC genotype (OR=2.18, CP < 0.027) was higher, whereas the TLR4 rs1927911 CT genotype (OR=0.48, P < 0.018) and TLR4 rs1927911 T allele (OR=0.46, CP < 0.018) showed lower frequencies than in the healthy controls (Table 4).

Discussion:

1. In TAO, the frequencies of the TLR4 rs1927911 CC genotype was higher, whereas TLR4 rs1927911 T allele (OR=0.43, P < 0.029) showed lower frequencies than in the healthy control. Between TAO and non-TAO, the frequencies of the TLR9 rs187084 CC genotype in non-TAO (OR=5.52, P < 0.028) was higher, whereas TLR9 rs187084 T allele in non-TAO (OR=0.18, P < 0.028) was lower than TAO. However, the statistical significance was disappeared after correction.

Conclusion:

Our results suggest that TLR3 and -4 gene polymorphisms may contribute to the pathogenesis of HD and GD.