

Interactions between programmed death 1 (PD-1) and cytotoxic T lymphocyte antigen 4 (CTLA-4) gene polymorphisms in type 1 diabetes

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Aim: To explore the contribution of the PD-1 gene polymorphisms involved in T1D as well as the relationship between the PD-1/CTLA-4 genes and soluble CTLA-4 concentrations. Patients and methods: 261 incident cases of T1D and 280 healthy children less 15 years old were included in this study. Haplotypes for polymorphisms of the PD-1 and CTLA-4 genes were determined by PCR and RFLP methods. Screening for soluble CTLA-4 was done using an ELISA assay. Statistical analysis was performed using the online SHESIS package. Results: Our results show that sCTLA-4 levels were higher in T1D than in controls (2.99 ± 1.7 ng/ml versus 1.43 ± 0.31 ng/ml, $p < 0.001$). The allele dosage of CTLA-4 on PD-1 haplotypes, showing a significant modified effect of G carriers over AA genotype on the sCTLA-4 concentrations (5.48 ± 2.09 ng/ml versus 3.27 ± 1.30 ng/ml, $p < 0.03$ in T-C haplotype) and (1.92 ± 0.79 ng/ml versus 3.41 ± 1.10 ng/ml, $p < 0.02$ in C-T haplotype). Conclusion: Consistent with the higher serum s