Association between suppressors of cytokine signalling, T-helper type 1/T-helper type 2 balance and allergic sensitization in children.

BACKGROUND: Suppressors of cytokine signalling (SOCS) family members have been shown to play an important role in the balance of cytokines that determine the onset of T-helper type 1 (Th1)- and Th2-mediated immune responses. In particular, for cytokine-induced Src-homology 2 protein (CIS), SOCS1, SOCS3 and SOCS5, a role in the regulation of T cell differentiation has been discussed. However, only few data exist so far in the human system. OBJECTIVES: The aim of the present study was to analyse the relationship between these suppressors and Th1/Th2 regulation as well as allergic sensitizations within a population-based study. METHODS: Within the Lifestyle-Immune system-Allergy plus cohort study, mRNA was prepared from blood samples of 6-year-old children for the analysis of cytokines, transcription factors for T cell regulation and SOCS molecule expression by quantitative real-time polymerase chain reaction. In addition, total and specific IgE concentrations have been measured by the Pharmacia CAP System. A complete data set from 248 children was available. Results Among the SOCS molecules investigated, only SOCS1 showed a strong positive correlation to allergic sensitizations. In addition, an up-regulated SOCS1 expression correlated with
down-regulated T-box expressed in T cells (Tbet) and higher expression levels of GATA-binding protein 3 (GATA-3) and IL-4. No association between SOCS1 and forkhead box P3 (FOXP3) was observed. For SOCS3, SOCS5 and CIS, a contradictory picture was found. The expression of these SOCS molecules was positively correlated with Tbet and FOXP3 and (with the exception of CIS) negatively with IL-4. CONCLUSIONS: Our data suggest that SOCS3, SOCS5 and CIS, which correlate with an up-regulated Th1 and regulatory T cell activity, are without relevance for the allergic status. In contrast, SOCS1 might be involved in the development of a Th2-skewed immune response and subsequent allergic sensitizations.