Transcriptomic characterization of human IL-22-producing T cells by next generation RNA sequencing

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Among all T helper cells subsets, IL-22-producing T cells are characterized to a lesser extent as compared to other cells. Because of the unique role of IL-22 in the regulation of epithelial cells, the characterization of IL-22-producing T cells was performed in human palatine tonsils where T cells are in the close proximity to epithelial cells.
Co-expression analysis of IL-17, IL-10, IL-4, IL-13 and IFN-γ by IL-22-producing $CD4^+$ T cells revealed that most of IL-22-producing cells either co-express IL-4 only or co-express IL-17 only or produce IL-22 alone. Further, T cells stimulated with TLR3L in the presence of IL-7 and IL-23 produced high levels of IL-22. Next, viable IL-22-producing T cells were sorted with in-house developed anti-IL-22 secretion assay and next generation sequencing analysis of IL-22-producing and IL-22-non-producing T cells has been carried out. Differential gene expression analysis shows that signature genes characterizing IL-22-producing T cells may be subdivided into 3 main groups: cytokines and chemokines, G protein-coupled receptors (GPCRs) and transcription factors (TFs). Among cytokines, IL-22-producing T cells express higher levels of IL-22, IL-17A, IL-17F, IL-1A, IL-9, IL-21, IL-26 and CCL1, CCL2, CCL20. At the same time IL-22-producing T cells differentially express CCR5, CXCR4 and CXCR6. Finally, transcription factors upregulated in IL-22-producing T are MAF, EPAS1, MSC, CITED, PPARG and downregulated are Fox, EGR1, EGR4, and ZXDA.
In summary, the present study for the first time shows the next generation sequencing analysis of human IL-22-producing T cells and proposes the genes that are describing in detail human IL-22-producing T cells. Further investigation of biological function of those molecules in IL-22 secreting T cells is required.