Impact of oxLDL and LPS on C-type Natriuretic Peptide System is Different between THP-1 Cells and Human Peripheral Blood Monocytic Cells.

Abstract:
Background: The C-type natriuretic peptide (CNP) has anti-inflammatory, anti-proliferative, and anti-migratory properties. The purpose of this study was to investigate the occurrence of CNP and its receptors (NPR2 and NPR3) in a human monocytic cell line (THP-1 cells) as well as in peripheral blood monocytic cells (PBMC). Impact of both, LPS and human oxLDL on expression pattern of CNP and its receptors shall be studied. Methods: Cells were cultured in standard medium with or without LPS or oxLDL. Expression levels of CNP, NPR2, NPR3, TNF-?, IL-1?, IL-6, CD14 and CD68 were measured at baseline, 24h, and 48h. Results: Baseline expression of all analysed genes was significantly higher in PBMC compared to THP-1 cells (all p<0.05). Expression levels of CNP, IL-1?, IL-6, and CD14 were significantly increased in PBMC following stimulation with LPS. In contrast, in THP-1 cells stimulated by LPS, significant increase in expression was found only for IL-6 (p=0.007). In THP-1 cells, oxLDL increased the expression levels of NPR3, TNF-?, IL-1?, IL-6, CD14, and CD68 significantly. In contrast, expression level of NPR2 was diminished by oxLDL (p=0.007). In PBMC NPR3 was significantly down-regulated (p=0.002). Treatment with oxLDL for 48h increased NPR2/3-ratio significantly in PBMC (22.5 vs. 4.8, p=0.010). In contrast, in THP-1 cells, NPR2/3-ratio was lowered significantly by oxLDL (0.31 vs. 17.0, p=0.008).
Conclusion: Treatment with LPS or oxLDL leads to diverging changes in gene expression PBMC and THP-1 cells. With respect to CNP and its receptors, data gained from THP-1 cells should be further validated using naive human peripheral blood monocytes. However, THP-1 cells can serve as a negative control for e.g. future signalling pathway studies related to oxLDL effect on CNP system in monocytes/macrophages.