Hyperlipidemia induces a hyperinflammatory response in T-cells

Bram van Os¹, Claudia van Tiel¹, Kikkie Poels¹, Tom Seijkens^{1,2} and Esther Lutgens^{1,2}

¹ Department of Medical Biochemistry, Academic Medical Center, University of Amsterdam, Amsterdam, The Netherlands

² Institute for Cardiovascular Prevention (IPEK), Ludwig Maximilians University, Munich, Germany

Introduction

Hyperlipidemia is one of the main risk factors in the development of atherosclerosis. How hyperlipidemia affects immune cell activation is still unclear. Here, we determined the transcriptomic profiles of CD4⁺ T cells under standard and hyperlipidemic conditions.

Conclusion

Hyperlipidemia results in an enhanced activation of T cells and skews them towards a Th1 and Th17 phenotype. Furthermore, an increase in pro-atherogenic cytokines, such as Interferon- γ , IL-15 and IL-21, is seen.

Methods

Results

Comparing gene expression in CD4⁺ T cells between high cholesterol diet (HCD) fed and chow fed C57BL6 LDLR^{-/-} mice revealed a significant upregulation of pro-atherogenic T helper 1 (Th1) and T helper 17 (Th17) associated genes such as CXCR3, Stat1 and IL21 (Fig 1A and B). This was confirmed by a pathways analysis, showing an enrichment in Th1 and Th17 associated pathways and an increased T cell activation

Figure 1A: Volcano plot comparing RNA expression profiles between normal fed (chow) mice and high cholesterol diet (HCD) fed mice. **B:** Top upregulated genes in HCD compared to chow fed mice **C:** Top differentially regulated pathways in HCD fed mice