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Gene Expression Changes in CD4+ T Cells Exposed to Endothelial Cells and Implications for HIV-1 Infection

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[Title]
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Abstract: Human immunodeficiency virus type 1 (HIV-1) is a devastating disease that affects millions of people worldwide. Highly effective treatments have been developed, but a cure remains elusive. HIV-1 infects and destroys human CD4+ (helper) T cells, which are an indispensable part of the immune system, and are crucial to survival. Thus, it is of the utmost importance that scientists understand the mechanisms of HIV-1 infection in order to develop better cures and preserve the lives of people across the world. Previous research has shown that exposure to endothelial cells, which line the blood vessels, can greatly enhance the infectious potential of HIV-1, though the mechanisms by which this happens are not well understood. In this study we aimed to elucidate the changes in T cell gene expression caused by exposure to endothelial cells, in an attempt to better understand this phenomenon. CD4+ T cells were obtained from four HIV-negative human subjects. Cells were grown both in monoculture and in co-culture with endothelial cells. RNA was extracted and sequenced, and an RNA-seq analysis pipeline was carried out to analyze differential gene expression. Several interesting changes were identified, including alterations to the JAK-STAT immune signaling pathway, increased expression of hypoxia-inducible factor 1α, and changes in expression of genes involved in T cell subtype differentiation. Each of these genes has the potential to impact the susceptibility of T cells to HIV infection, and further research on the specific pathways involved is warranted.

[Abstract]