Maternal HIV type 1 infection suppresses MMP-1 expression in endothelial cells of uninfected newborns: Nonviral vertical transmission of HIV type 1-related effects

Abstract:
HIV-1 infection is associated with vascular alterations. This is accompanied by an increased risk of cardiovascular diseases and Kaposi’s sarcoma, an endothelial cell-derived tumor. We investigated the impact of maternal HIV-1 infection on phenotype and gene expression of endothelial cells in newborns. For this reason endothelial precursor cells and differentiated endothelial cells were isolated from cord blood as well as from umbilical veins and arteries of noninfected infants born to HIV-1-infected (H-group) and noninfected (N-group) mothers. No apparent differences in proliferation, capillary formation, and expression of endothelial cell markers were detected in these cells. Interestingly, the expression of matrix metalloproteinase was repressed significantly (chi(2) analysis, p< 0.002) and consistently at the RNA, the protein, and the secretory levels in the H-group as compared to the N-group. Neither treatment with zidovudine (AZT), mutations in the matrix metalloproteinase-1 (MMP-1) promoter, nor epigenetic changes in the promoter methylation pattern were responsible for the repression of MMP-1 expression in H-group endothelial cells. The reduced MMP-1 expression may contribute to the impaired cardiac function that has been observed in children of
HIV-1-infected women. Most interestingly, our findings indicate that HIV-1-related effects can be transferred from mother to child in the absence of HIV-1 transmission.