

Plasma and PBMC miRNA Profile in Sexually HIV-1 Exposed Seronegative Individuals

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Background: MicroRNAs (miRNAs) are small 20- to 24-nt non-coding RNAs involved in the post-transcriptional regulation of gene expression which play important defensive roles in several viral infections. Global expression profiles of cellular miRNAs have identified alterations of specific miRNAs post-HIV-1 infection both in vitro and in different patient cohorts suggesting potential roles for miRNA in pathogenesis and disease progression. We therefore decided to verify if natural resistance to HIV-1 infection observed in seronegative individuals repeatedly exposed to HIV-1 (HESN) through unprotected sexual intercourse could be secondary to a different expression of their miRNA profile.

Methods: Expression levels of 25 miRNAs selected according to their proven anti-HIV-1 properties were analyzed in plasma, basal PBMC and in in vitro HIV-1 infected macrophages isolated from 30 HESN, 30 HIV seropositive subjects (HIV +) and 30 healthy controls (HC).

Results: In plasma the expression of mir-155, mir-382, mir-28 and mir-198 was significantly augmented in both HIV + and HESN compared to HC probably as a consequence of viral exposure. Conversely the expression of mir-223 and mir-150 in plasma was significantly increased only in HESN and this result was also confirmed in basal PBMC suggesting a protective effect for these miRNAs in resistance to HIV-1 infection. Furthermore, the expression of mir-150 was significantly increased in HESN macrophages following HIV-1 infection.

Conclusions: mir-223 and mir-150 can target the 3'UTR of HIV-1 transcripts, and they have already been identified as anti-HIV-1 miRNAs. The higher expression of these miRNA in HESN samples could therefore represent a key protection mechanism against HIV infection.