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Virus and Host Encoded microRNAs – A Major Role in Controlling HIV Infection?

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Background and methods

MicroRNAs (MIRs) are emerging as important regulators of gene expression through posttranscriptional control. We have developed powerful bioinformatic and biologic tools for detecting new MIRs in the whole human genome (Nature Genetics in press). These tools, were applied to the study of MIRs in several viral species including HIV.

Results

Comparing infected and non-infected cells we have revealed differential expression of several host MIRs, as well as the increased expression of some predicted viral MIRs. Several of the upregulated host MIRs have binding sites on 3' UTRs of mRNAs that play a central role in HIV infection and its life cycle. Experiments are underway to determine the role of these MIRs in the regulation of the predicted target genes and thus their involvement in viral infection. Some of the virally encoded MIRs are associated with genes known to play a central role in viral replication and latency, and are therefore under intense study.

Conclusion

1) HIV infection is associated with upregulation of several host MIRs and appearance of viral encoded MIRs. 2) At least some of the host and of the viral encoded MIRs may have a direct effect on viral replication and latency. 3) Control of MIR expression or its modulation offers a novel approach for therapy of HIV infection. 4) The changed expression of host MIRs with HIV infection, may also lend itself to new therapies affecting the host response and susceptibility to HIV infection.