

ORAL PRESENTATIONS

MICRORNAS IN VIRAL INFECTIONS: BIOMARKERS OF DISEASE PROGRESSION AND CLINICAL OUTCOMES

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MicroRNAs (miRNAs) are small non-coding RNAs involved in post-transcriptional regulation of gene expression and host responses to viral infections. Changes in their expression may reflect disease activity, tissue damage and progression of virus-associated complications. At the Research Institute of Virology of Uzbekistan, miRNAs have been investigated as potential molecular biomarkers in HIV infection, chronic viral hepatitis and HPV-associated cervical disease.

In HIV infection, miR-29a, miR-134 and miR-3665 were evaluated in 50 patients with neurocognitive disorders, including 31 patients with HIV-associated dementia and 19 without dementia. MiR-134 expression was markedly higher in patients with HIV-associated dementia (19.5 vs 3.64), while miR-3665 showed an approximately two-fold increase (3.64 vs 1.76). MiR-29a decreased to an undetectable level. These findings indicate that changes in selected miRNAs may accompany progression of HIV-associated neurocognitive impairment.

In chronic HBV, HCV and HBV/HDV infection, circulating miR-21, miR-122, miR-199a, miR-155 and miR-29a were studied in relation to the severity of liver injury. The most informative patterns were observed for miR-21, miR-122 and miR-199a. In HBV/HDV infection, miR-122 and miR-199a levels were increased 19- and 16-fold, respectively, compared with controls. MiR-21 increased already at the stage of chronic hepatitis without cirrhosis, whereas miR-122 progressively increased with advancing fibrosis. A two-component miR-122/miR-21 panel differentiated chronic hepatitis from liver cirrhosis with an AUC of 0.908, while a three-component miR-122/miR-199a/miR-21 panel differentiated compensated from decompensated cirrhosis with an AUC of 0.939.

The clinical applicability of miRNA-based diagnostics was also evaluated in HPV-associated cervical disease through pilot validation of the NOVAprep® miR-CERVIX (Belorus) assay on a reference panel of 48 clinical samples with previously established diagnoses, representing the spectrum from NILM and LSIL to HSIL, squamous cell carcinoma and adenocarcinoma. The assay demonstrated 100% concordance with the reference clinical classification and confirmed the diagnostic performance characteristics declared for the test system. The evaluation supported the subsequent introduction of the assay as an IVD diagnostic tool.

The studies conducted at the Research Institute of Virology demonstrate that miRNA expression patterns reflect different pathways of progression and complications of viral infections, including neurocognitive impairment, progressive liver fibrosis and virus-associated carcinogenesis. Specific miRNAs and their combinations therefore represent promising complementary biomarkers for assessing disease progression and clinical outcomes. Further standardization and validation in independent cohorts are required for their translation into routine clinical practice.