Neurocognitive correlates of miRNA expression in the CNS of HIV positive subjects with a history of methamphetamine abuse

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Background

1. A growing body of evidence indicates that microRNAs are important regulators of neuronal and brain function.
2. There may be links between changes in microRNA expression and neuronal function.
3. Long-term infection with HIV leads to neurocognitive changes and associated cellular and gene expression changes in the central nervous system.
4. Methamphetamine abuse among HIV-positive individuals represents a "double epidemic" affecting neurobehavioral outcomes.

Aims

1. To assess differential expression of microRNAs in the Frontal Cortex of HIV-positive individuals with a history of Methamphetamine Abuse.
2. Hypothesize that a set of microRNAs are differentially regulated and whose expression correlates to neurocognitive domains and clinical parameters.

Methods

Features of the Study Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean Age (SD)</th>
<th>Mean PM hr (SD)</th>
<th>NCD4 (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>53.5 (6.8)</td>
<td>120.7 (19.8)</td>
<td>3.0 (2.2)</td>
</tr>
<tr>
<td>HIV</td>
<td>55.1 (11.9)</td>
<td>152.1 (17.8)</td>
<td>3.0 (2.2)</td>
</tr>
<tr>
<td>METH</td>
<td>56.1 (11.9)</td>
<td>145.6 (19.7)</td>
<td>3.0 (2.2)</td>
</tr>
</tbody>
</table>

Table 1. Features of the Study Groups

Neurocognitive and Clinical Correlates to miRNA expression

<table>
<thead>
<tr>
<th>miRNA</th>
<th>CDS</th>
<th>LEARN</th>
<th>MEMORY</th>
<th>EXEC</th>
<th>WRKMEM</th>
<th>MOTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>miR-210</td>
<td>0.7694</td>
<td>0.7109</td>
<td>0.7149</td>
<td>0.6376</td>
<td>0.7683</td>
<td>0.7694</td>
</tr>
<tr>
<td>miR-541</td>
<td>0.8697</td>
<td>0.7005</td>
<td>0.7149</td>
<td>0.6376</td>
<td>0.7683</td>
<td>0.7694</td>
</tr>
<tr>
<td>miR-886-3p</td>
<td>0.7927</td>
<td>0.7109</td>
<td>0.7149</td>
<td>0.6376</td>
<td>0.7683</td>
<td>0.7694</td>
</tr>
</tbody>
</table>

Table 2. Neurocognitive and Clinical Correlates to miRNA expression

Conclusions

1. Learning, Memory, Working Memory, and Executive Functioning Deficits correlate with miRNA expression in the CNS of HIV-infected individuals.
2. mir-210 and mir-541 may be potential molecular mediators of neuronal dysfunction in long-term HIV-infection. mir-210 and mir-424 may be indicators of immune function.

References