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**Cognitive Enhancement Effects of Bacopa monnieri (Brahmi) on Novel Object Recognition and VGLUT1 Density in the Prefrontal Cortex, Striatum, and Hippocampus of Sub-Chronic Phencyclidine Rat Model of Schizophrenia**

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**Abstract**

**Background:** Decreased vesicular glutamate transporter type 1 (VGLUT1) in schizophrenic brain indicates the deficit of glutamatergic function, which may produce cognitive impairment in the patients. Brahmi might be a novel therapeutic agent for the cognitive deficit treatment in schizophrenia by changing cerebral VGLUT1 density.

**Objective:** To study effects of Brahmi on attenuation at cognitive deficit and cerebral VGLUT1 density in sub-chronic phencyclidine (PCP) rat model of schizophrenia.

**Material and Method:** Rats were administered PCP or vehicle. Half of the PCP-group was treated with Brahmi. Discrimination ratio (DR) representing cognitive ability was obtained from novel object recognition test. VGLUT1 density was measured in prefrontal cortex, striatum, cornu ammonis fields 1 (CA1) and 2/3 (CA2/3) of hippocampus and dentate gyrus (DG) using western blot and immunohistochemistry.

**Results:** DR in PCP-group was significantly decreased compared with control. This occurred alongside reduced VGLUT1 in prefrontal cortex, striatum, CA1 and CA2/3. PCP with Brahmi showed a significant increase in DR score compared with PCP alone. This occurred alongside significant increase in VGLUT1 in CA1 and CA2/3.

**Conclusion:** Cognitive deficit observed in PCP-administered rats was mediated by VGLUT1 reduction in prefrontal cortex, striatum, CA1 and CA2/3. Interestingly, Brahmi could recover this cognitive deficit by increasing VGLUT1 in CA1 and CA2/3 to normal.

**Keywords:** Brahmi, Schizophrenia, Animal model, Novel object recognition, VGLUT1

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