COGNITIVE ENHANCEMENT EFFECT OF BACOPA MONNIERI ON VESICULAR GLUTAMATE TRANSPORTER 2, VGLUT2, IN THE PREFRONTAL CORTEX, STRIATUM AND HIPPOCAMPUS OF SCHIZOPHRENIA RAT MODEL

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Background: Decreased vesicular glutamate transporter type 2 (VGLUT2) in schizophrenic brain indicates the deficit of glutamatergic function which may produce cognitive impairment in the patients. *Bacopa monnieri* (Brahmi), a traditional Indian Ayurvedic medicinal plant and popularly known as a cognitive enhancer might be a novel therapeutic agent for the cognitive deficit treatment in schizophrenia by changing cerebral VGLUT2 density.

Objective: To study effects of Brahmi on attenuation at cognitive deficit and cerebral VGLUT2 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. VGLUT2 immunodensity was measured in the prefrontal cortex, striatum, cornu ammonis 1 (CA1) and cornu ammonis 2/3 (CA2/3) of hippocampus using immunohistochemistry.

Results: DR in PCP-group was significantly decreased compared with control. This occurred alongside reduced VGLUT2 density in the prefrontal cortex, but not in 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 VGLUT2 density in the prefrontal cortex.

Conclusion: Cognitive deficit observed in PCP-administered rats was mediated by VGLUT2 reduction in the prefrontal cortex. Interestingly, Brahmi could recover this cognitive deficit by increasing VGLUT2 in the prefrontal cortex to normal. Conclusively, Brahmi could be a new frontier of cognitive deficit treatment in schizophrenia.

Keywords: Brahmi, Schizophrenia, Animal model, Novel object recognition, VGLUT2