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MicroRNA-210 is involved in early cognitive impairment induced by chronic cerebral hypoperfusion in rats through regulation of snap25

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Vascular dementia (VD) is the most common form of dementia in the elderly. However, little is understood about the roles of microRNAs (miRNAs) in cognitive impairment in early VD. Here, rats with 4 weeks chronic ischemia showed early impaired acquisition of spatial learning in Morris water maze test. We further investigated the roles of miRNAs in cognitive impairment. The miRNA expression microarrays on RNA extracted from the hippocampus of rats with 4 weeks chronic ischemia and control rats were used. Real-time reverse transcription PCR was conducted to verify the candidate miRNAs discovered by microarray analysis. The data showed that miR-210 was increased significantly in the hippocampus of rats with 4 weeks chronic ischemia, which were concomitant with that rats displayed a significant synaptic loss and cognitive deficits. Bioinformatic analysis predicted that snap25 mRNA is targeted by miR-210. Overexpression of miR-210 lowers the levels of snap25 and synaptic proteins expression in PC12 cells damage induced by serum-free. In contrast, suppression of miR-210 by miR-210 inhibitor significantly results in higher levels of snap25 and synaptic proteins expression. Taken together, miR-210 is involved in cognitive impairment in rats with chronic ischemia-induced vascular dementia through regulation of snap25.

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