**Activation of α7 nicotinic acetylcholine receptor improves blood-brain barrier integrity**

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Stroke is an important risk factor and one of the most devastating complications of bone fracture. We showed previously that bone fracture at the acute stage of ischemic stroke worsens, and activation of α7 nicotinic acetylcholine receptor (α7 nAChR) improves stroke recovery through attenuation of inflammation. We hypothesized that activation of α7 nAChR also reduce astrocyte oxidative stress and improves blood-brain barrier integrity. Stroke model was created by permanent occlusion of the distal middle cerebral artery (pMCAO). Tibia fracture was perform 1 day after pMCAO. Mice were treated intra-peritoneally with 0.8 mg/kg PHA 568487 (PHA, α7 nAChR-specific agonist), 6 mg/kg methyllycaconitine (MLA, α7 nAChR antagonist), or saline 1 and 2 days after pMCAO. Brain water content was assessed by measuring the wet and dry weight 3 days after pMCAO. The expression of monoamine oxidase B (MAO-B) in astrocytes and tight junction proteins were quantified. We found tibia fracture increased water content in the ischemic stroke brain (p<0.001) and MAO-B positive astrocytes, and decreased tight junction protein expression. Compared to saline treatment, PHA treatment reduced and MLA increased water content, and MAO-B positive astrocytes in pMCAO and pMCAO plus tibia fracture mice. PHA treatment also increased and MLA decreased tight junction protein expression. Therefore, in addition to inhibiting inflammation, activation of α7 nAChR also reduces astrocyte oxidative stress and improves blood-brain barrier integrity. Thus, the α7 nAChR-specific agonist can be developed into a new therapy for improving recovery of patients with stroke or stroke plus bone fracture.

**Biography**

Hua Su has received different levels of trainings at the Nanjing Medical University, Xian Jiaotong University and Beijing Medical University. She joined the faculty at University of California, San Francisco in 1996. Currently, she is a Professor and the Associate Director for Basic Science Research at the Center for Cerebrovascular Research, Department of Anesthesia and Perioperative Care. She has published more than 80 papers in reputed journals and has been serving as an Editorial Board Member of many scientific journals.

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