Title: Panax notoginsenoside saponins Rb1 regulates the expressions of Akt/ mTOR/PTEN signals in the hippocampus after focal cerebral ischemia in rats

Authors: Yi-Tian Yan, Shu-De Li, Chen Li, Yun-Xia Xiong, Xue-Hai Lu, Xin-Fu Zhou, Liu-Qing Yang, Li-Jin Pu, Hai-Yun Luo

PII: S0166-4328(17)32077-6
DOI: https://doi.org/10.1016/j.bbr.2018.02.037
Reference: BBR 11312

To appear in: *Behavioural Brain Research*

Received date: 1-1-2018
Revised date: 23-2-2018
Accepted date: 26-2-2018

Please cite this article as: Yan Y-T, Li S-D, Li C, Xiong Y-X, Lu X-H, Zhou X-F, Yang L-Q, Pu L-J, Luo H-Y, Panax notoginsenoside saponins Rb1 regulates the expressions of Akt/ mTOR/PTEN signals in the hippocampus after focal cerebral ischemia in rats, *Behavioural Brain Research* (2010), https://doi.org/10.1016/j.bbr.2018.02.037

Panax notoginsenoside saponins Rb1 regulates the expressions of Akt/ mTOR/PTEN signals in the hippocampus after focal cerebral ischemia in rats

Yi-Tian Yan[1], Shu-De Li[2#],Chen Li[1#], Yun-Xia Xiong[1], Xue-Hai Lu[1], Xin-Fu Zhou[3], Liu-Qing YANG[4] ， Li-Jin Pu[5**], Hai-Yun Luo[1*]

[1] Department of Pharmacology, College of Basic Medicine, Kunming medical university, Kunming, Yunnan, P. R. China

[2] Department of Biochemistry, College of Basic Medicine, Kunming medical university, Kunming, Yunnan, P. R. China

[3]School of Pharmacy and Medical Sciences, Sansom Institute, University of South Australia, Adelaide, Australia

[4]Cardiovascular Division and Lillehei Heart Institute, University of Minnesota, Minnesota, USA

[5] Department of Cardiology, First affiliated hospital of Kunming medical university, Kunming, Yunnan, P. R. China

# These authors contributed equally to this work.

* Correspondence

** Co-correspondence

Information for correspondence:

E-mail: luohaiyun12@163.com(Hy L),plj330@126.com(Lj P)

Abstract

Panax notoginsenoside saponins Rb1 (PNS-Rb1) is an important active ingredient of panax notoginseng for effective treatment of cerebrovascular diseases. However, the mechanism underlying its actions in the state of cerebral ischemia is still unclear. We asked whether the potential neuroprotection of PNS-Rb1 on the brain is due to, at least partially, its modulation of AkT/mTOR/PTEN signalling pathway along with down-regulation of caspase-3 in rats subjected to photothrombic stroke. To test this hypothesis, rats with induced photothrombotic stroke were treated with PNS-Rb1 (applied in three different doses, 25mg/kg, 50mg/kg, 100mg/kg, respectively) or saline, while sham operated rats injected with saline were used as the control. Our results indicate that PNS-Rb1 significantly alleviated the morphological lesion concomitant with improvement of cognitive and sensorimotor deficits induced by ischemic stroke. Moreover, immunohistochemistry and Western blot analyses showed that PNS Rb1 in a dose dependent manner increased the expressions of P-Akt, P-mTOR and reduced P-PTEN and caspase-3. The present study suggests that the improvement of cognitive and sensorimotor deficits by PNS-Rb1 is made, at least partially, by the modulation of the Akt/mTOR/PTEN signalling pathway.

Keywords: Focal cerebral ischemia; Hippocampus; Panax notoginsenoside Rb1; Akt/mTOR/PTEN

1. Introduction

Panax Notoginseng Saponins, an effective component extracted from panax notoginseng, belong to panax genus under the Araliaceae family. The most contents of panax notoginseng are panax notoginsenoside saponins Rb1(PNS-Rb1) and panax notoginsenoside saponins Rg1(PNS-Rg1). Increasing evidence have suggested that PNS-Rb1, a widely used Chinese traditional medicine for the treatment of cardiovascular and cerebral diseases, is effective for both ischemia and reperfusion injury[1， 2]; PNS-Rb1 can also reduce the damage of