Role of phosphoinositide 3-kinase in ischemic postconditioning-induced attenuation of cerebral ischemia-evoked behavioral deficits in mice

Ashish K. Rehni, Nirmal Singh

Department of Pharmaceutical Sciences and Drug Research, Punjabi University, Patiala-147002, India

Correspondence: Nirmal Singh, e-mail: nirmal_puru@yahoo.com, ashishrehni@yahoo.co.in

Abstract:
The present study has been designed to pharmacologically investigate the role of phosphoinositide 3-kinase in ischemic postconditioning-induced reversal of global cerebral ischemia and reperfusion-induced behavioral dysfunction in mice. Bilateral carotid artery occlusion for 10 min followed by reperfusion for 24 h was employed in the present study to produce ischemia and reperfusion-induced cerebral injury in mice. Short-term memory was evaluated using the elevated plus maze test. The inclined beam walking test was employed to assess motor incoordination. Bilateral carotid artery occlusion followed by reperfusion produced impaired short-term memory, motor co-ordination and lateral push response. Three episodes of carotid artery occlusion for a period of 10 s and reperfusion of 10 s (ischemic postconditioning) significantly prevented ischemia-reperfusion-induced behavioral deficit measured in terms of loss of short-term memory, motor coordination and lateral push response. Wortmannin (2 mg/kg, iv), a phosphoinositide 3-kinase inhibitor given 10 min before ischemia attenuated the beneficial effects of ischemic postconditioning. It may be concluded that beneficial effects of ischemic postconditioning on global cerebral ischemia and reperfusion-induced behavioral deficits may involve activation of phosphoinositide 3-kinase-linked pathway.

Key words:
ischemic postconditioning, cerebral ischemia, phosphoinositide 3-kinase, wortmannin