Latin American Journal of Pharmacy
(formerly *Acta Farmacéutica Bonaerense)*
Lat. Am. J. Pharm. **38** (3): 572-8 (2019)

Received: September 25, 2018
Accepted: December 30, 2018

Neuroprotective Activity of Farnesol against Bilateral Common Carotid Artery Occlusion Induced Cerebral Ischemia/Reperfusion Injury in Mice

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SUMMARY. **Oxidative stress and neuroinflammation are the two major pathological processes involved in the stroke related neurodegeneration. Farnesol (FS) is a sesquiterpene alcohol, generated endogenously in the cells and also found in the diet. This molecule is well reported for its beneficial effects against various oxidative and inflammatory markers in peripheral disorders. We investigate the beneficial effects of FS pretreatment against bilateral common carotid artery occlusion induced focal ischemia in mice. The twenty eight days pretreated animals with FS (100 and 200 mg/kg, b.wt.) were induced with cerebral ischemia on the 28th day. The neurobehavioural studies, biochemical markers of oxidative stress, neuroinflammation and mitochondrial dysfunction and brain histopathology were evaluated to assess the neuroprotective effect. FS pretreatment shown a dose dependent protection against focal ischemia induced changes in behaviour, biochemical markers (superoxide dismutase, catalase, reduced glutathione, TNF alpha, nitric oxide, myeloperoxidase, mitochondrial calcium and mitochondrial complex I activity) and histopathological changes in brain. The results, therefore, confirm the neuroprotective benefits of FS.**

RESUMEN. El estrés oxidativo y la neuroinflamación son los dos procesos patológicos principales involucrados en la neurodegeneración relacionada con el accidente cerebrovascular. El farnesol (FS) es un alcohol sesquiterpénico, generado de forma endógena en las células y también se encuentra en la dieta. Esta molécula posee efectos beneficiosos contra diversos marcadores oxidativos e inflamatorios en trastornos periféricos. Investigamos los efectos beneficiosos del tratamiento previo con FS contra la isquemia focal inducida por la oclusión de la arteria carótida común en ratones. Los veintiocho días de animales tratados previamente con FS (100 y 200 mg/kg de peso corporal) se indujeron con isquemia cerebral en el día 28. Se evaluaron los estudios neuroconductuales, los marcadores bioquímicos del estrés oxidativo, la neuroinflamación y la disfunción mitocondrial y la histopatología cerebral para evaluar el efecto neuroprotector. El tratamiento previo con FS mostró una protección dosis dependiente contra la isquemia focal inducida por cambios en el comportamiento, marcadores bioquímicos (superóxido dismutasa, catalasa, glutatión reducido, TNF alfa, óxido nítrico, mieloperoxidasa, calcio mitocondrial y actividad del complejo mitocondrial I) y cambios histopatológicos en el cerebro. Los resultados, por lo tanto, confirman los beneficios neuroprotectores de FS.

KEY WORDS: bilateral common carotid artery occlusion, cerebral ischemia, farnesol, inflammation, mitochondrial dysfunction, neuroprotection.

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ISSN 0326 2383 (printed ed.)
ISSN 2362-3853 (on line ed.)