

Dietary essential oil components in the prevention of hypoperfusion/reperfusion-induced tissue damage in the rat cerebral cortex

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To extend our previous observations on the beneficial effect of dietary *Pistacia lentiscus* L. essential oil during cerebral bilateral common carotid artery occlusion-induced injury, we evaluated the activity of one of its major components, beta-caryophyllene (BCP), already known to possess peculiar biological activities, in Wistar rat cerebral cortex.

Cerebral hypoperfusion was produced by a 30 min bilateral common carotid artery occlusion followed by 60 min reperfusion (BCCAO/R). Animals were starved for 12 hours before surgery and, 6 hours prior to hypoperfusion, BCP (40 mg/kg/0, 45 ml of sunflower oil as vehicle) was administered via gavage. Biological samples of brain tissue, plasma and cerebrospinal fluid (CSF) were examined by HPLC, western blot, gel zymography and immunohistochemistry and analyzed for fatty acids, expression of the enzyme cicloxygenase-2 (COX-2), CB receptors for endocannabinoids (eCBs), and peroxisome proliferator-activated receptor (PPAR)-alpha and enzymatic activity of matrix-metalloprotease-9 (MMP9).

Data obtained indicate that BCP appears to influence the outcome of BCCAO/R cerebral injury by modulating changes in levels of polyunsaturated fatty acids, biosynthesis of eCBs and eCB congeners, expression of CB1 and CB2 receptors, COX-2 protein levels and enzymatic activity of MMP9.

Brain tissue response to the hypoperfusion/reperfusion-induced cerebral insult is modulated by dietary administration of BCP, suggesting the possible use of this molecule as nutritional treatment in neuroprevention.

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