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Neuroprotective effect of betulinic acid against bilateral common carotid artery occlusion induced vascular dementia and neuronal damage in rats: Possible neurotransmitters and neuroinflammatory mechanism

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Betulinic acid (BA), a pentacyclic triterpene has been reported to exhibit anti-inflammatory, immunomodulatory and neuroprotective properties. BA is also reported as a selective inhibitor of phosphodiesterase 4 enzymes which is also involved in the normal neuronal blood flow. However role of BA in bilateral common carotid artery occlusion (BCCAO) induce vascular dementia and its effect on the neurotransmitters and neuroinflammaoty mediators has not been investigated so far. So, we have investigated the therapeutic potential of BA in BCCAO induced vascular dementia in rats. BCCAO was done by exposing carotid arteries. BA was administered (5, 10 and 15 mg/kg/day p.o.) 7 days after BCCAO surgery upto 40 days. Morris Water Maze (MWM), locomotor activity and object recognition task (ORT) were used to assess behavioral changes in rats. On 41st day, animals were sacrificed and hippocampus was isolated for biochemical (AChE, LPO, GSH, nitrite), neuroinflamatory (TNF-α, IL-1β, and IL-6), neurotransmitters (NTs) (dopamine, norepinephrine, serotonin) and their metabolites (DOPAC, HVA, 5-HIAA) analysis. BCCAO significantly impaired memory as observed in MWM and ORT, increased oxidative stress, increased pro-inflammatory cytokine's level and altered NTs and their metabolites level. BA dose dependently (5, 10 and 15 mg/kg) significantly restore BCCAO induced behavioral, biochemical and NTs abnormalities in rat brain. The findings of the present study suggest that BA act through multiple mechanisms and would be used to curb cognitive decline associated with neurodegenerative disorders such as vascular dementia.

Biography

Madhu Kaundal is pursuing her PhD from Jamia Hamdard, New Delhi as SRF under UGC Rajiv Gandhi National Fellowship Scheme at Pharmacology Division, Faculty of Pharmacy, Jamia Hamdard, New Delhi (August 2016 – present). Currently she is exploring the similar therapeutic approaches for sporadic dementia Vascular Dementia. Her future plans are to explore the underlying mechanisms involve in the pathology of neurodegenerative diseases. She is awarded with Travel Award to attend the ISN-ESN Meeting in Paris from 20-24 August 2017, Best Poster Presentation Award in the "Fifth National Conference of Pharmacogenomics and Outcomes Research" held at DIPSAR, New Delhi on 3rd and 4th March 2017 and awarded with IBRO-APRC-ISN Travel Grants award to attend Australian Neuroscience Society (ANS) meeting held during August 23-28, 2015 in Cairns.

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