

Advances in Neonatal and Pediatric Nutrition & 14th International Congress on Advances in Natural Medicines, Nutraceuticals & Neurocognition

July 19-21, 2018 | London, UK

Estrogen receptor β mediated neuroprotective efficacy of *cicer microphyllum* seed extract in global hypoxia

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In recent years the high altitude medicinal plant has become a subject of interest owing to the presence of high concentration of secondary metabolite and bioactive compounds in their fruits, seed, leaves, stem and roots to endure the environmental stress. *Cicer microphyllum* Benth, commonly called wild gram, is abundant in the high altitude Himalayan regions and is reported to be a natural reservoir of phytoestrogens. Recent studies suggest several pharmacological properties of the plant that include anti-oxidant, anti-inflammatory, anti-diabetic, anti-convulsant, anti-cancer, immunomodulatory and anti-diarrhoeal activity. Hypoxia induced oxidative stress and neurodegeneration in the hippocampus has been implicated for memory impairment in conditions like stroke, ischemia and hypobaric hypoxia. The present study, aimed at investigating the potential of ethanolic extract of *Cicer microphyllum* seeds (CSE) CSE supplementation considerably reduced neurodegeneration and dendritic atrophy in CA1 neurons This effect of CSE was partly attributed to its antioxidant activity resulting in reduction of lipid peroxidation, protein oxidation and DNA damage during exposure to chronic hypoxia. CSE also promoted dendritic arborization through activation of Estrogen Receptor beta (ER β) and phosphorylation of extracellular signal regulated kinase (ERK1/2) which was independent of Brain Derived Neurotrophic Factor (BDNF) mediated signalling mechanisms. Extra nuclear activation of ERK1/2 by ER β resulted in phosphorylation of cyclic AMP response element binding protein (CREB) leading to increased expression of PSD-95. Our findings not only suggest the neuroprotective potential of CSE in hypoxia but also provide evidence for involvement of estrogen receptor and pCREB mediated nootropic effect of the extract.

Biography

Deepti is pursuing her PhD for the past 4 yrs at Defence Institute of High Altitude Research, Leh-Ladakh (DRDO) under the guidance of Dr Sunil Kumar Hota. Her area of work was to understand the *behavioral, physiological, biochemical and molecular mechanisms* associated with hypoxia induced neurodegeneration and with the objective to develop suitable prophylactic for ameliorating high altitude induced memory impairment neurodegeneration and cognitive dysfunction. She has published 2 research paper in reputed journal.

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