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Impact of rHu-Epo supplementation on CRF induced neurobehavioral changes in rats: Studies on correlation with APP ratio, β amyloid and pTau expression

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Chronic renal failure (CRF) is a rapidly growing global health problem, with a prevalence of 15% in developed nations. Cognitive impairment has increasingly been recognized in CRF. Studies have shown impairment in executive function ranging from 23% - 38% and memory impairment ranging from 28% - 33% in patients with CRF. Anemia is an important risk factor for cognitive impairment in CRF and antianemic drug recombinant human erythropoietin (rHu-Epo) is a standard therapy for the management of anemia in CRF. Experimental studies have also shown that rHu-Epo exerts a remarkable neuroprotection in both cell cultures and in animal models of nervous system disorders. Studies show amyloid precursor protein (APP), β amyloid (A β) and hyperphosphorylated tau (pTau) protein expressions are useful biomarkers to detect cognitive dysfunction. In this study, we found that the impact of rHu-Epo supplementation on neurobehavioral changes caused by CRF induction in experimental animals and correlated the same with APP, A β and pTau expressions in brain regions such as cerebellum, cerebral cortex and hippocampus of CRF induced animals. Along with this, we also determined haematological parameters and brain creatine kinase activity. CRF was induced in rats by adenine mixed feed (0.75%, w/w) treatment for 4 weeks. Neurobehavioral changes such as learning, memory, reasoning and anxiety-related behaviors were recorded in CRF induced animals using rectangular and plus maze procedures. Haematological parameters and APP, A β , pTau expressions and creatine kinase activity in brain regions were altered in CRF induced animals. Supplementation of rHu-Epo (100 IU/ Kg bwt, thrice a week) in combination with adenine mixed diet treatment or post treatment of rHu-Epo (after 4 weeks of adenine mixed diet treatment), 12 days daily reversed the changes caused by CRF. In this study, the benefits of antianemic drug rHu-Epo against CRF induced neurotoxicity were seen.

Biography

P Venkataraman has completed his MPhil degree from Department of Endocrinology, University of Madras, Chennai, India and was awarded PhD degree at the age of 32 years from the same department. At present he is working as an Assistant Professor in Department of Medical Research, SRM Medical College Hospital and Research Centre, SRM University, Chennai, India. He has published his research works in 30 international peer reviewed journals especially Journal of Nutritional Biochemistry, Endocrine Research, Neurotoxicology, International Journal of Developmental Neuroscience and Neuroscience Research. He is the reviewer of reputed journals especially Comparative Clinical Pathology, Reproductive Sciences, Oxidants and Antioxidants in Medical Sciences. He is also the Editorial Board Member of Journal of Experimental and Integrative Medicine. He has participated and presented research papers in international and national conferences in the field of reproductive and comparative endocrinology and environmental toxicology. He served as a resource person in two national workshops (DST, DBT, ICMR and CSIR sponsored) entitled, "Techniques in molecular and cellular endocrinology", organized by Department of Endocrinology, University of Madras in 2010 & 2013. He got PhD research guide ship from SRM University and now supervising more than 5 PhD students.

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