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Zinc affords protection against aluminium-induced altered lipid profile and membrane integrity

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We carried out investigations to understand whether zinc supplementation can provide protection to lipid profile and fluidity of cerebrum and cerebellum membranes of rats against possible alterations during exposure to aluminium. Male Sprague Dawley rats were segregated into four different treatment groups viz: Normal Control, aluminium treated, zinc treated and aluminium+zinc treated. Aluminium in the form of $AlCl_3$ was administered orally at a dose of 100mg/kg body weight/day in drinking water. Zinc as zinc sulphate was supplemented to rats at a dose of 227mg/l in drinking water. An appreciable decrease in the levels of total lipids, glycolipids, phospholipids, cholesterol, and gangliosides contents was observed in both the cerebrum and cerebellum following Al exposure, which interestingly was found to be significantly increased following Zn supplementation. On the contrary, Al treatment caused a significant augmentation in the synthesis of conjugated dienes, which were found to be reduced upon simultaneous Zn supplementation. Further, Al treatment significantly elevated the fluorescence polarization, anisotropy and order parameter, which however were normalized upon Zn co-administration. In conclusion, the present study underscores the potential of Zn in alleviating the changes caused by Al on membrane composition and fluidity in rat brain.

Biography

DK Dhawan is working as a Professor in the Department of Biophysics and has also worked as chairman department of Biophysics, Coordinator of Centre for Nuclear Medicine as well as Centre for Medical Physics at Panjab University, Chandigarh, India. Prior to his PhD, he worked in Radiation Medicine Centre of Bhabha Atomic Research Centre, Mumbai, India, and was awarded Post Graduate Diploma in Medical Radioisotopes Techniques. His research areas are radiation medicine, diabetes, neurodegeneration, and cancer. He has published 197 research articles and 158 are listed in Scopus for 33 years of his research career. He has supervised 37 PhD and 44 MSc theses of students. He is a Fellow of Union for International Cancer Control, Indian College of Nuclear Medicine and Indian Association of Biomedical Scientists. Recently, he was given Oration award by Indian Association of Biomedical Scientists at its 38th Annual conference held at Chennai.

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