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Nanocapsulated curcumin in combating cerebral ischemia induced mitochondrial oxidative damage in rats

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Toxic reactive oxidative species (ROS) evoked by the induction of oxidative stress in the episode of cerebral ischemia reperfusion (CIR) play the key role in neurodegeneration. As it is the prime source point of ROS, neuronal mitochondria, the cellular energy metabolic centre suffer severe damage in response to cerebral ischemic oxidative thrust. In aging, CIR accelerates the process of mitochondrial dysfunction. From therapeutic point, the application of chemical antioxidants is almost ineffective as the blood-brain barrier (BBB) limits the passage of molecules from the circulation into the cerebral region. Formulation of curcumin loaded polylactide nanocapsules was made and applied orally to explore the possibility of this nanocapsulated curcumin (NC) against CIR induced mitochondrial oxidative damage in rats. Mitochondrial damage was evaluated by the extent of lipid peroxidation and in situ antioxidant enzymes status. The levels of cytochrome c, iNOS and COX-2 were determined. Cellular apoptosis was examined and levels of caspases were studied. Results showed that in comparison to free curcumin (FC), the nanoencapsulated form could exert better protection to the cerebral tissue mitochondria by preventing ROS mediated oxidative damage.

Biography

Nirmalendu Das has completed his Ph.D. at the age of 28 years from University of Calcutta and Postdoctoral studies as an NIH fellow from North-Western Medical School, Chicago. He was a former faculty member at Utah State University, Logan, Utah. He was the Deputy Director of Indian Institute of Chemical Biology, a premier Biomedical Research Institute at Kolkata, India. He has published more than 45 papers in reputed journals related to drug delivery.

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