

Cerium oxide nanoparticle

Cerium oxide nanoparticles have been shown to defend against blood brain barrier damage in cerebral ischemic brain stroke. While cerium oxide nanoparticles is highly permeable across the blood-brain barrier and also these nanoparticles are effective antioxidants, due to its ability to either donate or obtain electrons with alternative +3 and +4 valence states. This oxidation state of cerium oxide has shown efficiency in neutralizing generated free radicals in biological systems has been explored action for cerebral ischemic brain stroke. The nanoparticles are encapsulated on the poly-(lactide-co-glycolide)-polyethyleneglycol copolymer matrixes as nanoparticulate delivery vehicles and it can be enhanced brain targeted drug delivery. Furthermore, the results of spectroscopic and microscopic analysis confirmed that peripheral PEG-PLGA co-polymer chains provide excellent reactivity with nanoparticles which might improve the interface bonds of the nanocomposite formation. Mainly, neuroprotective properties of prepared CeO₂-PEG/PLGA matrixes with and without nanoparticles are comparatively studied by using transient middle cerebral artery occlusion (MCAO) model of brain stroke. The prepared CeO₂ nanoparticles combined with effective PEG/PLGA matrixes exhibited greater efficacy resulted in a lessening of focal ischemia by 60% and 78% decrease in brain edema in comparable to the control animals. The results are demonstrated that the neuroprotective efficiency of CeO₂ nanoparticles with PEG/PLGA has enhanced and primarily protected the brain cortex areas from ischemic damage ¹⁾.

¹⁾

Gao Y, Chen X, Liu H. A facile approach for synthesis of nano-CeO₂ particles loaded co-polymer matrix and their colossal role for blood-brain barrier permeability in Cerebral Ischemia. J Photochem Photobiol B. 2018 May 3;187:184-189. doi: 10.1016/j.jphotobiol.2018.05.003. [Epub ahead of print] PubMed PMID: 30173122.

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