Piperine

Piperine is a chief alkaloid compound of natural black pepper exhibits excellent anti-convulsant efficiency in the anti-epileptic treatment. Nonetheless, the poor water solubility of the piperine molecules has some difficulties in drug delivery and clinical applications. Herein we report the synthesis of Copper oxide quantum dots coated Hyaluronic acid (HA)/ Poly(lactic-co-glycolic acid) (PLGA) with for the effective delivery of piperine in the targeted drug delivery for epilepsy treatment. The physicochemical characterization was performed using the preparation material. The crystal structure, surface morphology and the elemental composition were investigated from XRD, SEM, TEM and EDX analyses respectively. The surface morphology clearly stated the loading of CuO QDs loaded HA/PLGA microspheres. The capping of the polymer matrix was also studied using FTIR analysis. A Photoluminescence spectrum is also recorded. This study was illustrating that Piperine loaded CuQDs@HA/PLGA nanostructures exhibit improved neuroprotection and encourage the activation of astrocytes in the chemical kindling model of epilepsy. This proposed material could be a novel and effective therapeutic platform for the targeted drug delivery systems [1)].

It has been reported to alleviate cerebral ischemic injury. However, the mechanisms underlying its neuroprotective effects following cerebral ischemia remain unclear. In a study, rats were administered vehicle (dimethyl sulfoxide) or piperine, 20 mg/kg, daily for 14 days before focal cerebral artery occlusion. After occlusion for 2 h followed by reperfusion for 24 h. Histological examinations were used to assess whether piperine has a neuroprotective effect in the rat model of cerebral ischemia/reperfusion injury. The levels of proteins in the ischemic penumbra were evaluated by isobaric tags for relative and absolute quantitation-based proteomics. A total of 3687 proteins were identified, including 23 proteins that were highly significantly differentially expressed between the control and piperine groups. The proteomic findings were verified by immunofluorescence and western blot analysis. Interestingly, piperine administration downregulated a number of critical factors in the complement and coagulation cascades, including complement component 3, fibrinogen gamma chain, alpha-2-macroglobulin, and serpin family A member 1. Collectively, our findings suggest that the neuroprotective effects of piperine following cerebral ischemia/reperfusion injury are related to the regulation of the complement and coagulation cascades [2)].

The primary active component of black pepper is piperine, which is purified and used to treat epilepsy, achieving higher efficiency when purified. The present study was conducted to evaluate whether the anticonvulsant effect of piperine ameliorates pilocarpine-induced epilepsy, and to investigate the mechanism underlying these effects. Epilepsy was induced in Sprague Dawley rats using pilocarpine. Pilocarpine-induced epilepsy in the rats was treated with 40 mg/kg piperine for 45 consecutive days. Status epilepticus and a Morris water maze test were used to analyze the anticonvulsant effects of piperine in the epileptic rats. Inflammation and oxidative stress were then measured using commercially-available kits following piperine treatment. Lastly, the activity of caspase-3 and the protein expression levels of B-cell lymphoma 2 (Bcl-2) and Bcl-2-associated X protein (Bax) were evaluated using commercially-available kits and western blot analysis, respectively. The results demonstrated that treatment with piperine was able to reduce the status epilepticus and prevented memory impairment following pilocarpine-induced epilepsy in rats. The anticonvulsant effects of piperine decreased inflammation and oxidative stress following pilocarpine-induced epilepsy in rats. The upregulated activity of caspase-3 and expression levels of Bax/Bcl-2

were suppressed following treatment with piperine in the rats with pilocarpine-induced epilepsy. These results suggest that the anticonvulsant effects of piperine ameliorate memory impairment, inflammation and oxidative stress in a rat model of pilocarpine-induced epilepsy [3].

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