

Claimed Research for Sun Pharma Research Award

Intranasal delivery of chitosan decorated PLGA core /shell nanoparticles containing flavonoid to reduce oxidative stress in the treatment of Alzheimer's disease

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Curcumin (Cur), an antioxidant flavonoid has demonstrated high efficiency in attenuating oxidative stress in Alzheimer's disease (AD). Nevertheless, despite of its therapeutic potential, its clinical applications are hindered due to low solubility and low bioavailability and first-pass metabolism. Thus, we fabricated Cur encapsulated chitosan functionalized PLGA core/shell NPs (CH@Cur-PLGA C/S NPs) and administered via intranasal route. Research also include comparative study of PLGA NPs (core) and CH@Cur-PLGA C/S NPs (C/S NPs) to investigate effect of CH coating over PLGA NPs on therapeutic efficacy, cellular uptake and stability. Fabricated NPs were extensively characterized and confirmed Cur encapsulation with 75% of entrapment efficiency and particle size in the range of 200 nm. TEM analysis confirmed uniform coating of CH over PLGA NPs. Release and permeation study demonstrated sustained release and enhanced permeation through nasal mucosa. Cellular uptake mechanism showed caveolae-mediated-enhance endocytosis of NPs. In-vitro BBB-co-culture model exhibited efficient passage for C/SNPs. Antioxidant assay demonstrated significant ROS scavenging activity of C/ SNPs. In-vivo toxicity showed insignificant toxicity. Bio-distribution of C/S NPs was higher in brain following intranasal route. Photo and thermal stability confirmed protection of Cur by C/SNPs. Obtained results demonstrate potential application of C/SNPs for reducing oxidative stress in brain for effective AD treatment.

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Signed by



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