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Using nanocarriers against synucleinopathies

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α -Synuclein (α -Syn) is a protein present in the brains of a range of neurodegenerative disordered patients as plaque-like compact structures in the form of amyloid fibrils. There is a strong relationship between α -Syn amyloid fibrillation and the pathology of the neurodegenerative disorders such as Parkinson's disease. There is a serious effort to apply the compounds, known as small molecules, with inhibitory effects on the different steps of α -SN fibrillation and its related neurotoxicity. However, the small molecules can possess some problems like high hydrophobicity/low solubility in physiological fluids, instability, and difficulty in passing across blood brain barrier (BBB). In this respect, employing of nanocarriers has been pointed because of a lot of advantages i.e., biocompatibility, easy surface modification, low immunogenicity, protecting cargo against enzymatic degradation. In this regard, we used three different nanocarriers including serum albumin nanoparticles (SA-NPs), mesoporous silica nanoparticles (MS-NPs) and neutral charged nanoliposomes (NC-NLPs). We found that each kind of nanocarrier possess specific characters when applying for loading drugs or treating α -Syn or neuronal cells. SA-NPs with a moderate drug loading efficiency (DLE) for polyphenols, showed some inducing effect on α -Syn fibrillation when treating with bare SA-NPs. Although MS-NPs with similar DLE did not show inducing effect on α -Syn fibrillation, they had a small neurotoxicity effect. On the other hand, NC-NLPs had high DLE for polyphenols and also, they did not indicate any considerable induction on the α -Syn fibrillation or any neurotoxicity effects. It seems that NC-NLPs have more potential for using regarding synucleinopathies treating than the two other NPs.

Biography

Dina Morshedi is working as a Professor in National Institute of Genetic Engineering and Biotechnology since 2002. Research assistant in an Institute of Biochemistry and Biophysics (IBB). Tehran University since 2005-2009. Dina Morshedi active research areas are Study on different aspects of neurodegenerative diseases, especially Parkinson' including amyloid formation, cytotoxicity and pharmacognosy and Application of Nanofibrils.

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