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Tunable lipid polymer hybrid nanoparticles for enhanced hydrophilic drug loading

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The emergence of nanotechnology has exerted remarkable impact on drug delivery, yet encapsulation of water soluble drugs remains challenging. Efficacy of water soluble (hydrophilic) drugs is strongly limited by their poor intracellular absorption and rapid clearance. In addition, the leakage of water soluble molecules, from the polymeric matrix into the external phase, makes their encapsulation troublesome . Here, we report on the preparation of tunable hybrid lipid polymeric Nanoparticles (NPs) that carried up to 51.29±1.5% of a cationic-hydrophilic drug. The core shell (Rivastigmine/L-α-phosphatidylcholine/poly-lactide/glycolide) Riv/EPC/PLGA hybrid NPs showed an average diameter of 119.4±5.1 nm. The use of core shell hybrid NPs platform for efficiently delivering hydrophilic drugs is a promising approach with a very high potential in curing many diseases.

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