Novel inhalable formulation based on hybrid lipid-polymer nanoparticles for pulmonary siRNA delivery

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Inhalation-based siRNA delivery has a unique potential for the treatment of several lung diseases, by silencing the expression of the target gene in a post-transcriptional way. However, for optimum siRNA pulmonary delivery, an appropriately designed delivery system is required. [1] [2]
Here, novel hybrid lipid-polymer nanoparticles (LPHNPs), comprising a fluorescent cationic polyaspartamide-poly(lactic-co-glycolic) acid (PHEA-DY700-bAPAE-PLGA) core and a lipid shell of 1,2-distearoyl-sn-glycero-phosphoethanolamine-N-(polyethyleneglycol)$_{2000}$ (DSPE-PEG$_{2000}$), were prepared by emulsion/solvent diffusion for pulmonary delivery of siRNA. These exhibit colloidal size, a negative ζ potential, 50 wt % phospholipid, and spherical shape. They are able to incorporate successfully siGFP and interact slightly with mucin. LPHNPs are well internalized into lung cancer cells and do not exert any cytotoxic effect. Moreover, to achieve an inhalable formulation, the nano-into-micro strategy was applied.

References:

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