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Comparative assessment of poly (D,L-lactide-co-glycolide) nanoparticles modified by either cetyltrimethylammonium bromide or chitosan for plasmid DNA adsorption (Article)

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Abstract

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Purpose: To evaluate poly (D,L-lactide-co-glycolide) PLGA nanoparticles modified by cetyltrimethyl ammonium bromide (CTAB) or chitosan for plasmid DNA adsorption. Methods: PLGA nanoparticles were prepared by solvent diffusion method and modified by including CTAB in the aqueous (F1) or oil phase (F2), or by including low (F3) or medium (F4) molecular weight chitosan. The nanoparticles were characterised by differential scanning calorimetry (DSC) and Fourier transform infrared spectroscopy (FTIR), as well as for cell toxicity, cell uptake and transfection. Results: CTAB failed to confer positive charge on the nanoparticles. CTAB desorbed easily from F1 surface. This resulted in negative zeta potential, increased cytotoxicity as well as decreased cell uptake and transfection. In F2, CTAB was located mainly in PLGA matrix, resulting in negative charge with decreased cytotoxicity, and increased cell uptake and transfection compared to F1. On the other hand, chitosan-modified nanoparticles (F3 and F4) showed stronger interaction between chitosan and PLGA, leading to positively-charged particles, decreased cytotoxicity, as well as increased cell uptake and transfection. Amongst the four formulations, F4 exhibited the highest transfection. Conclusion: These results should aid in understanding how PLGA nanoparticles are modified by CTAB and chitosan. Modification with chitosan yields PLGA nanoparticles with higher DNA adsorption and transfection with lower cytotoxicity. © Pharmacotherapy Group.

Author keywords

Cetyltrimethyl ammonium bromide (CTAB) | Chitosan | Gene therapy | Nanoparticle | Plasmid DNA adsorption | Poly (D,L-lactide-co-glycolide) PLGA

Indexed keywords

EMTREE drug terms: cetrimide | chitosan | nanoparticle | plasmid DNA | polyglactin

EMTREE medical terms: adsorption | Article | biological activity | comparative study | cytotoxicity | differential scanning calorimetry | drug screening | fluorescence microscopy | genetic transfection | infrared spectroscopy | nerve cell membrane conductance | nonhuman | physical chemistry | zeta potential

Chemicals and CAS Registry Numbers:

cetrimide, 57-09-0, 6899-10-1, 8044-71-1; chitosan, 9012-76-4; polyglactin, 26780-50-7, 34346-01-5

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References (25)

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1 Bala, I., Hariharan, S., Kumar, M.N.V.R.
PLGA nanoparticles in drug delivery: The state of the art
(2004) *Critical Reviews in Therapeutic Drug Carrier Systems*, 21 (5), pp. 387-422. Cited 437 times.
doi: 10.1615/CritRevTherDrugCarrierSyst.v21.i5.20
View at Publisher

2 Doolaanea, A.A., Ismail, A.F.H., Mansor, N.I., Mohd Nor, N.H., Mohamed, F.
Effect of surfactants on plasmid DNA stability and release from poly (D,L-lactide-co-glycolide) microspheres
(2015) *Tropical Journal of Pharmaceutical Research*, 14 (10), pp. 1769-1778. Cited 2 times.
http://www.tjpr.org/admin/12389900798187/2015_14_10_6.pdf
doi: 10.4314/tjpr.v14i10.6
View at Publisher