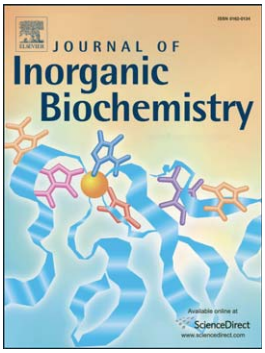

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Enantioselective DNA condensation induced by heptameric lanthanum helical supramolecular enantiomers

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ABSTRACT

DNA condensation induced by a pair of heptameric La(III) helical enantiomers *M*-$[La_7(S\text{-}L)_6(CO_3)(NO_3)_6(OCH_3)(CH_3OH)_7]\cdot 2CH_3OH\cdot 5H_2O$ and *P*-$[La_7(R\text{-}L)_6(CO_3)(NO_3)_6(OCH_3)(CH_3OH)_5(H_2O)_2]\cdot 2CH_3OH\cdot 4H_2O$ (***M*-La** and ***P*-La**, L = 2-(2-hydroxybenzylamino)-3-carbamoylpropanoic acid) has been investigated by UV/Vis spectroscopy, fluorescence spectroscopy, CD spectroscopy, EMSA, RALS, DLS, and SEM. The enantiomers ***M*-La** and ***P*-La** could induce CT-DNA condensation at a low concentration as observed in UV/Vis spectroscopy. DNA condensates possessed globular nanoparticles with nearly homogeneous sizes in solid state determined by SEM (ca. 250 nm for ***M*-La** and ca. 200 nm for ***P*-La**). The enantiomers bound to DNA through electrostatic attraction and hydrogen bond interactions in major groove, and rapidly condensed free DNA into its compact state. DNA decompaction has been acquired by using EDTA as disassembly agent, and analyzed by UV/Vis spectroscopy, CD spectroscopy and EMSA. Moreover, the enantiomers ***M*-La** and ***P*-La** displayed discernable discrimination in DNA interaction and DNA condensation, as well as DNA decondensation. Our study suggested that lanthanum(III) enantiomers ***M*-La** and ***P*-La** were efficient DNA packaging agents with potential applications in gene delivery.

Keywords: DNA condensation; Supramolecular cylinders enantiomers; Enantioselective; lanthanum.

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