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Applying Cationic Porphyrin Derivative 5, 10-Dihexyl-15, 20bis Porphyrin, as Transfection Reagent for Gene Delivery into Mammalian Cells

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Abstract : Porphyrins are organic, aromatic compounds found in heme, cytochrome, cobalamin, chlorophyll , and many other natural products with essential roles in biological processes that their cationic forms have been used as groups of favorable non-viral vectors recently. Cationic porphyrins are self-chromogenic reagents with a high capacity for modifications, great interaction with DNA and protection of DNA from nuclease during delivery of it into a cell with low toxicity. In order to have high efficient gene transfection into the cell while causing low toxicity, genetically manipulations of the non-viral vector, cationic porphyrin, would be useful. In this study newly modified cationic porphyrin derivative, 5, 10-dihexyl-15, 20bis (N-methyl-4-pyridyl) porphyrin was applied. Cytotoxicity of synthesized cationic porphyrin on Chinese Hamster Ovarian (CHO) cells was evaluated by using MTT assay. This cationic derivative is dose-dependent, with low cytotoxicity at the ranges from 100 µM to 0.01µM. It was uptake by cells at high concentration. Using direct non-viral gene transfection method and different concentration of cationic porphyrin were tested on transfection of CHO cells by applying derived transfection reagent with X-tremeGENE HP DNA as a positive control. However, no transfection observed by porphyrin derivative and the parameters tested except for positive control. Results of this study suggested that applying different protocol, and also trying other concentration of cationic porphyrins and DNA for forming a strong complex would increase the possibility of efficient gene transfection by using cationic porphyrins.

Keywords : cationic porphyrins, gene delivery, non-viral vectors, transfection reagents
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