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Autor(en) des Beitrags: Rudolph, C; Plank, C; Lausier, J; Schillinger, U; Müller, RH; Rosenecker, J

Titel des Beitrags: Oligomers of the arginine-rich motif of the HIV-1 TAT protein are capable of transferring plasmid DNA into cells.

Abstract: We constructed multimers of the TAT-(47-57) peptide. This polycationic peptide is known to be a protein and particle transduction domain and at the same time to comprise a nuclear localization function. Here we show that oligomers of the TAT-(47-57) peptide compact plasmid DNA to nanometric particles and stabilize DNA toward nuclease degradation. At optimized vector compositions, these peptides mediated gene delivery to cells in culture 6-8-fold more efficiently than poly-L-arginine or the mutant TAT(2)-M1. When DNA was precompacted with TAT peptides and polyethyleneimine (PEI), Superfect, or LipofectAMINE was added, transfection efficiency was enhanced up to 390-fold compared with the standard vectors. As early as after 4 h of transfection, reporter gene expression mediated by TAT-containing complexes was higher than the 24-h transfection level achieved with a standard PEI transfection. When cells were cell cycle-arrested by serum starvation or aphidicolin, TAT-mediated transfection was 3-fold more efficient than a standard PEI transfection in proliferating cells. In primary nasal epithelial cells and upon intratracheal instillation in vivo, TAT-containing complexes were superior to standard PEI vectors. These data together with confocal imaging of TAT-DNA complexes in cells support the hypothesis that the TAT nuclear localization sequence function is
involved in enhancing gene transfer.