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Transfer of recombinant nucleic acids into cells (transfection) by means of histones and other nuclear proteins

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Abstract

Currently a protein/peptide-mediated gene delivery has been considered a promising approach in non-viral gene transfer. The previous investigations have shown that histones and other nuclear proteins might be effective vectors for gene transfer into cells. Transfection of eukaryotic cells by nucleic acid and histone complexes (histonefection) effectively occurs with various histone proteins. The presence of DNA-binding domains and specific signal sequences of nuclear location allows to use histones (H1/H5, H2A, H2B, H3, H4) and other nuclear proteins (such as HMG family proteins and histonelike prokaryotic proteins) for recombinant genes transfer. The positive charge of histone protein molecules enables electrostatic interaction with negatively charged molecules of nucleic acids and charge neutralization that facilitates the complexes penetration through a negatively charged cell membrane. Thus, histonefection is a promising method for non-viral transfer of recombinant nucleic acids in gene therapy.

Keywords

Histone proteins, Histonoinfection, Nuclear proteins, Transfection