Abstract

Viral particles derived from mouse polyomavirus can be potentially used as a delivery system for therapeutic genes and drugs into target cells. This thesis focuses on preparation and characterization of polyomaviral particles that are modified with cell-penetrating peptides in order to increase efficiency of transduction of reporter genes into human cells. Viral particles that are composed of major capsid protein VP1 in combination with minor capsid protein VP2 and minor capsid protein VP3 that is modified with octaarginine, LAH4 peptide or with transduction domain of adenoviral protein VI are analysed in transduction assays. The thesis also provides information about the effect of the modification on encapsidation of heterologous DNA. The results of transduction assays performed with modified particles containing encapsidated luciferase gene revealed that efficiency of transduction did not increase but decreased in comparison with unmodified particles. These findings help to elucidate the role of polyomaviral minor capsid proteins in gene transfer mediated by viral particles and contribute to the design of new strategies for modifications of viral particles derived from mouse polyomavirus for their successful application in nanomedicine.

Key words: mouse polyomavirus, pseudovirions, virus-like particles, minor capsid proteins of polyomavirus, transduction, cell-penetrating peptides