Investigation of Gene Transfer Using the Human JC Virus-like Particle to Inhibit Human Urothelial Carcinoma Cell Growth

Introduction and Objective: Previously, it has been demonstrated that the JC virus-like particle (VLP) is able to package expression plasmid DNA in *E. coli*. The packaged plasmid DNA can then be delivered by the VLP into its susceptible cells allowing gene expression at high efficiency. Recently, a high incidence of JCV infection in human urothelial carcinoma was found in Taiwan. In this study, we further investigated whether the JC VLP could package and deliver genes of interest into human urothelial carcinoma cells for possible gene therapy.
Materials and Methods: Plasmids, ∆pFlag-JC VP1 and pEGFP, were co-transformed into *E. coli* cells. Expression of the JC VP1 was induced by adding IPTG. Sucrose gradient centrifugation and hemagglutination assay were then employed to purify and analyze the gfp-VLP. Human urothelial carcinoma cells was pseudoinfected by the gfp-VLP. Expression of GFP protein was examined under a confocal microscope at different time points after infection.
Results: Plasmid DNA, pEGFP, was packaged by the self-assembled JC VLP in *E. coli*. Purity and titer of the VLP were confirmed by Western blotting and hemagglutination assay. The packaged gfp plasmid DNA was delivered by the VLP into human urothelial carcinoma cells. Expression of GFP protein was detected at 72h post pseudoinfection.
Conclusions: The packaged plasmid DNA was delivered by the JC VLP into human urothelial carcinoma cells for gene expression with high efficiency. It may be possible to use the JC VLP as a gene delivery vector for therapy of human urothelial carcinoma in the future.
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