



## Gene delivery by JC virus-like particle

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Human JC virus (JCV) is a neurotropic virus, and is the etiological agent of progressive multifocal leukoencephalopathy (PML), a fatal neurological disease. Due to its natural infection tropism, it is possible to use the JCV capsid as a gene-transducing vector for therapeutic purposes in neurological disorders. The major shell protein, VP1, is essential as virus attachment sites for infection of host cells, agglutination of erythrocytes, and in viral DNA packaging. The recombinant VP1 protein was able to self-assemble into a structure of virus-like particle (VLP) in both eukaryotic and prokaryotic expression systems. The VLP without viral genetic materials can be purified to near homogeneity and with abundance. Furthermore, human brain cells are highly susceptible to the VLP entry which benefits gene transduction by the VLP. Therefore, the JCV VLP potentially could be developed as a gene delivery vector for therapeutic uses in human neurological diseases. The efficiency of DNA packaging by the VLP is crucial for further gene transduction. Methods for in vitro DNA packaging including osmotic shock, mixing and capsomere re-assembly appear to be inefficient for gene transduction by the VLP. However, DNA packaging in cells by the VLP drastically increases the efficiency of gene transduction.