

## **Development of HSV-1 as a nanoparticle delivery vector**

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Herpes simplex virus type 1 (HSV-1) is an enveloped dsDNA virus. Due to its relatively large genome, HSV-1 has been investigated for use in gene therapy. In addition, genetic modifications of this virus have enabled its safe and successful use as an oncolytic cancer therapy agent. Together, these studies have shown HSV-1 is amenable to gene delivery and cell-specific targeting. Further development of this virus as a magnetic nanoparticle delivery vector will be valuable for both diagnostic and therapeutic applications. To this end, we are developing a methodology for the attachment of inorganic nanoparticles to the viral envelope. This methodology allows for the specific and directional attachment of inorganic nanoparticles to proteins under physiological conditions, minimizing structural damage to the conjugated proteins and, thus, enhancing biological functionality. Because HSV-1 contains an envelope, it is much more amenable to surface protein changes than naked viruses. Thus, we can mutate some of the envelope glycoproteins for nanoparticle attachment, and others for cell-specific targeting. Our long-term goal is the development of HSV-1 as a single vector that can be utilized for gene therapy, oncolytic therapy, magnetic hyperthermia, and enhanced diagnostics.