

# Herpesviruses as friends and enemies

*Herpes simplex viruses as vectors for gene therapy, and new antiviral approaches*

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**Project description:** We develop herpes simplex virus (HSV) vectors for therapy of cancer and autoimmune diseases (EAE, model of human MS). HSV is a promising tool for gene therapy: an oncolytic HSV has recently gained European marketing approval. We improve delivery and targeting of HSV vectors. We study host responses to HSV vectors and their backbones. The latency of HSV is studied by use of novel 3D-ganglion culture models. We also develop a unique antiviral RNAi approach utilizing enzymatically produced siRNA swarms against essential genes of HSV. We study genetic diversity of HSV strains from clinical isolates by NGS sequencing, using the data for validation of our RNAi approach and for HSV vector backbone development. We elucidate the interaction of exosomes with HSV and HSV vectors in infection and in gene therapies.

## Publications:

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- Heikkilä O, Ryödi E, Hukkanen V.  $\gamma$ <sub>134.5</sub> neurovirulence gene of herpes simplex virus type 1 modifies the exosome secretion profile in epithelial cells, **Journal of Virology**, 2016, doi:10.1128/JVI.01157-16, in press.
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- Karttunen H., Savas J.N., McKinney C., Chen Y.-H., Yates J.R. 3rd, Hukkanen V., Huang T.T., Mohr I. Co-opting the Fanconi Anemia Genomic Stability Pathway Enables Herpesvirus DNA Synthesis and Productive Growth, **Molecular Cell** 55:111-122, 2014.
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**Number of Ph.Ds. supervised 2010-2015: 4**

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