

**Supplemental Table 2: PRV and HSV-1 strains used in this study.**

Strain	UL37 allele	Capsid fusion	Tegument fusion	Source
<b>replication kinetics / axonal transport / neuroinvasion</b>				
PRV-GS4284	WT	pUL25/mCherry	-	<i>Bohannon, 2012</i>
PRV-GS5321	R1	pUL25/mCherry	-	<i>Pitts, 2014</i>
PRV-GS5604	R2	pUL25/mCherry	-	<i>Pitts, 2014</i>
PRV-GS5350	R3	pUL25/mCherry	-	<i>Pitts, 2014</i>
PRV-GS4379	WT	pUL25/eGFP	-	<i>Bohannon, 2012</i>
PRV-GS2564	WT	gG::CMV>eGFP	-	This study
PRV-GS6145	R2	gG::CMV>eGFP	-	This study
HSV1-GS5923	WT	-	-	<i>Richards, 2016</i>
HSV1-GS6264	R2	-	-	This study
HSV1-GS4553	WT	pUL25/mCherry	-	<i>Huffmaster, 2015</i>
HSV1-GS6298	R2	pUL25/mCherry	-	This study
HSV1-GS4677	WT	pUL25/eGFP	-	This study
<b>virion fusion-based entry and disassembly</b>				
PRV-GS5179	WT	pUL25/mCherry	gD-eGFP	This study
PRV-GS6032	R2	pUL25/mCherry	gD-eGFP	This study
PRV-GS5507	WT	pUL25/mCherry	eGFP-pUL36	<i>Huffmaster, 2015</i>
PRV-GS6105	R2	pUL25/mCherry	eGFP-pUL36	This study
PRV-GS5976	WT	pUL25/mCherry	pUL37-eGFP	This study
PRV-GS6131	R2	pUL25/mCherry	pUL37-eGFP	This study
PRV-GS6063	WT	pUL25/mCherry	pUL47-eGFP	This study
PRV-GS6065	R2	pUL25/mCherry	pUL47-eGFP	This study
PRV-GS6064	WT	pUL25/mCherry	pUL49-eGFP	This study
PRV-GS6066	R2	pUL25/mCherry	pUL49-eGFP	This study
PRV-GS1968	WT	-	-	<i>Leelawong, 2011</i>
PRV-GS3800	WT	$\beta$ -lac-pUL35	-	This study
PRV-GS6366	R2	$\beta$ -lac-pUL35	-	This study
HSV1-GS6394	WT	pUL25/mCherry	eGFP-pUL47	This study
HSV1-GS6395	R2	pUL25/mCherry	eGFP-pUL47	This study