

**Supplemental data**

Table 2. Summary of the results

Mutation	N <sub>M</sub> /N <sub>F</sub>	Total neurite length		Longest neurite length		Branching	
		T <sub>M</sub> /T <sub>F</sub>	Percentage	L <sub>M</sub> /L <sub>F</sub>	Percentage	B <sub>M</sub> /L <sub>F</sub>	Percentage
D598N	127/106	534±16/	103.41±	226±7/	93.03±	6.01±0.25/	113.72±
		516±14	3.15%	243±6	2.90%	5.29±0.25	4.78%
	82/79	588±20/	90.19±	335±13/	115.45±	4.69±0.30/	67.87±
		652±20	3.07%	290±10	4.63%	6.91±0.44	54.27%
	97/88	562±15/	95.01±	283±9/	98.08±	5.85±0.32/	94.03±
591±19		2.58%	288±10	3.09%	6.22±0.35	5.10%	
A426D	104/106	508±17/	98.39±	272±10/	112.09±	4.87±0.27/	91.97±
		516±14	3.31%	243±6	4.13%	5.29±0.25	5.14%
	99/90	649±18/	100.14±	329±12/	122.96±	6.94±0.40/	96.98±
		648±16	2.77%	268±7	4.59%	7.18±0.35	5.63%
	57/90	421±22/	103.79±	264±13/	107.50±	5.25±0.56/	126.20±
406±14		5.37%	246±6	5.27%	4.16±0.28	13.44%	
I219T	84/106	362±19/	70.19±	270±14/	111.28±	2.27±0.15/	42.91±
		516±14	3.68%	243±6	5.63%	5.29±0.25	2.76%
	89/100	341±17/	63.78±	270±12/	104.87±	1.93±0.11/	40.55±
		535±17	3.11%	258±8	4.81%	4.76±0.23	2.29%
	71/100	340±16/	56.02±	271±12/	108.33±	2.63±1.99/	35.16±
607±18		2.63%	250±7	4.91%	7.48±4.45	3.17%	
E309K	109/106	440±14/	85.31±	225±8/	92.58±	5.39±0.32/	101.80±
		516±14	2.63%	243±6	3.55%	5.29±0.25	5.97%
	85/97	398±16/	78.64±	229±9/	86.53±	4.29±0.27/	88.06±
		506±18	3.20%	264±10	3.41%	4.88±0.29	5.60%
	105/90	369±15/	90.91±	242±9/	98.54±	3.74±0.27/	89.90±
406±14		3.78%	246±6	3.69%	4.16±0.28	6.47%	
W1036L	129/106	388±14/	75.24±	238±13/	98.25±	3.60±0.15/	68.05±
		516±14	3.29%	243±6	5.23%	5.29±0.25	2.85%
	114/90	460±14/	71.06±	261±10/	97.52±	3.83±0.18/	53.29±
		648±16	2.20%	268±7	3.60%	7.18±0.35	2.48%
	97/100	390±15/	72.86±	237±10/	92.04±	3.43±0.20/	72.12±
535±17		2.72%	258±8	3.97%	4.76±0.23	4.14%	
S542P	56/106	281±17/	54.42±	170±9/	69.93±	3.70±0.31/	69.87±
		516±14	3.29%	243±6	3.91%	5.29±0.25	5.82%
	48/90	326±19/	50.30±	203±12/	75.76±	3.23±0.31/	44.98±
		648±16	2.92%	268±7	4.42%	7.18±0.35	4.37%
	54/100	255±14/	47.66±	171±9/	66.13±	2.98±0.28/	62.61±
535±17		2.60%	258±8	3.39%	4.76±0.23	5.95%	

In all experiments WT HL1 was transfected into L1KO neurons and plated on L1 substrates. About one hundred of the L1KO neurons expressing HL1 were analyzed and used as reference values for determining the degree of neurite growth and branching for the different mutants. N<sub>M</sub> is the number of mutant L1-expressing neurons measured and N<sub>F</sub> is the number of WT HL1-expressing neurons measured in the same set of experiment. T<sub>M</sub> is the average total neurite length of the mutant L1-expressing neurons

and  $T_F$  is the average total neurite length of the WT HL1-expressing neurons in the same set of experiment.  $L_M$  is the average longest neurite length of the mutant L1-expressing neurons and  $L_F$  is the average longest neurite length of the WT HL1-expressing neurons in the same set of experiment.  $B_M$  is the average branching number of the mutant L1-expressing neurons and  $B_F$  is the average branching number of the WT HL1-expressing neurons in the same set of experiment. All values are expressed as mean  $\pm$  SEM. The percentage for  $T_M/T_F$ ,  $L_M/L_F$  and  $B_M/B_F$  is calculated by dividing the mean and SEM value for the mutant by the mean value for the WT HL1 in the same set of experiment. The percentage values are expressed as mean percentage  $\pm$  SEM percentage.