# Supplementary Materials

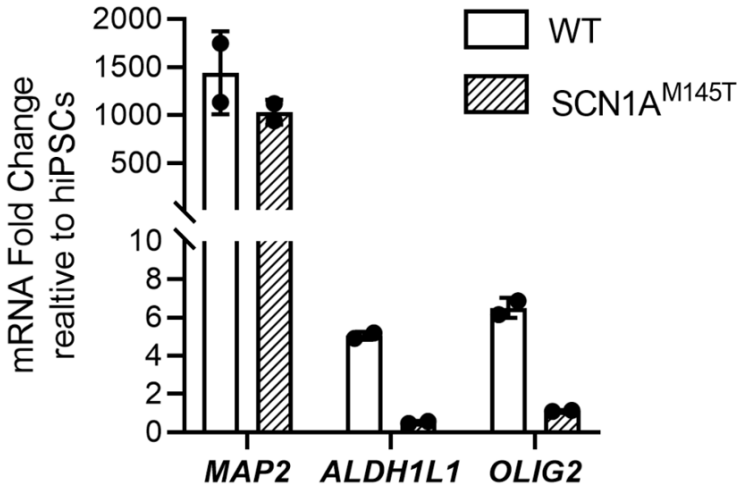


**Figure S1.** Differentiated idNs presented low levels of astrocyte marker *ALDH1L1* and oligodendrocyte marker *OLIG2*, compared to the expression of neuronal marker *MAP2*. *GAPDH* was used as control. Data are presented as mean ± SEM of two biological replicates (black dots).

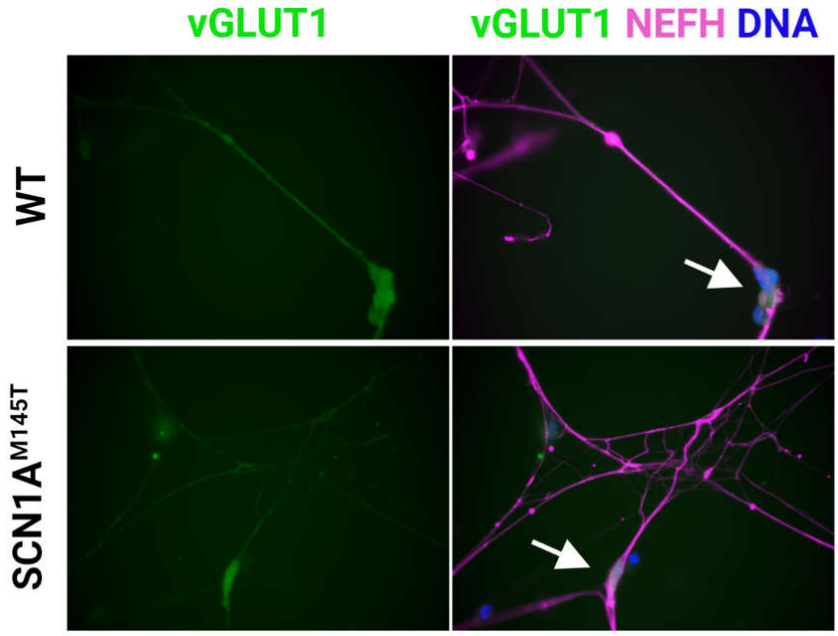


**Figure S2.** Immunofluorescence analysis of vesicular glutamate transporter vGLUT1 expression compared to neuronal marker NEFH in idNs of WT (upper images) and SCN1A$^{M145T}$ (lower images) subjects. White arrows indicate idNs positive for vGLUT1.

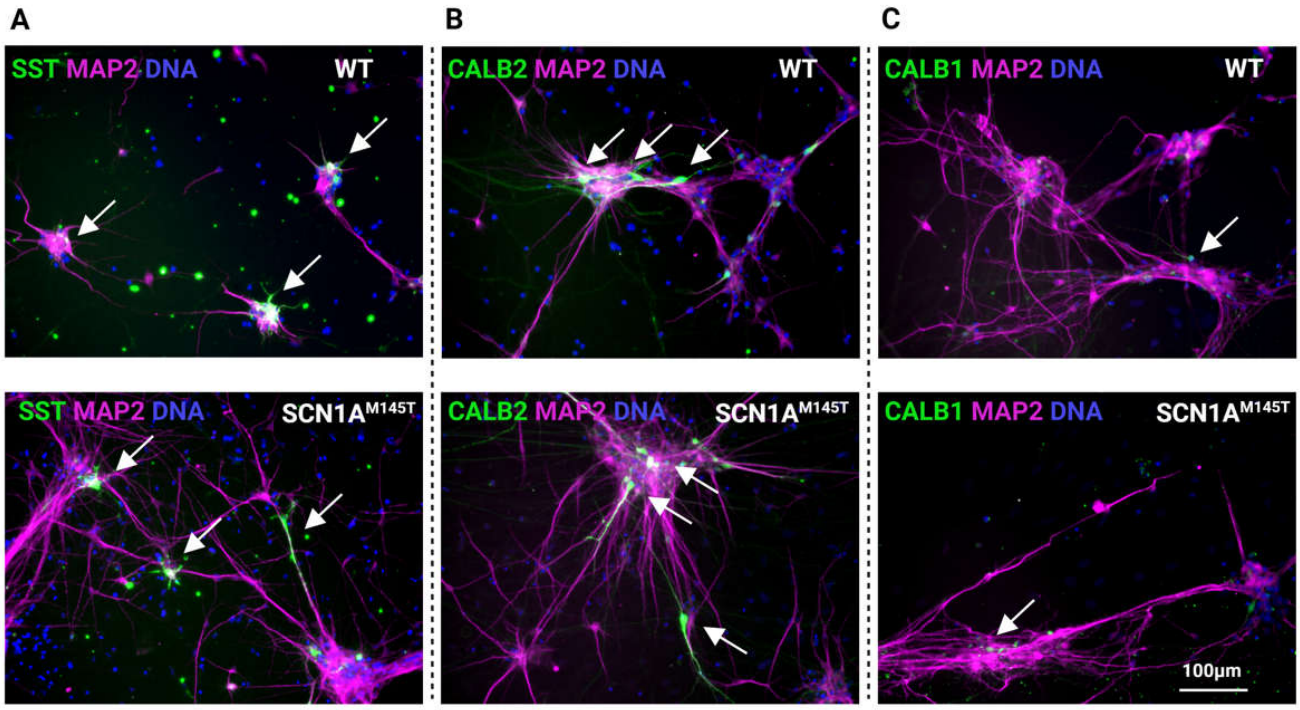


**Figure S3.** Immunofluorescence analysis of idNs showing the interneuronal subtype markers distribution compared to MAP2 expression: (**A**), somatostatin (SST) (**B**), calretinin (CALB2), and (**C**), calbindin (CALB1). Nuclei are stained in blue with DAPI. For each marker tested, WT-idNs are shown in the upper panels, while SCN1A$^{M145T}$ idNs are shown in the lower panels. Arrows indicate neurons expressing the specific interneuronal makers.

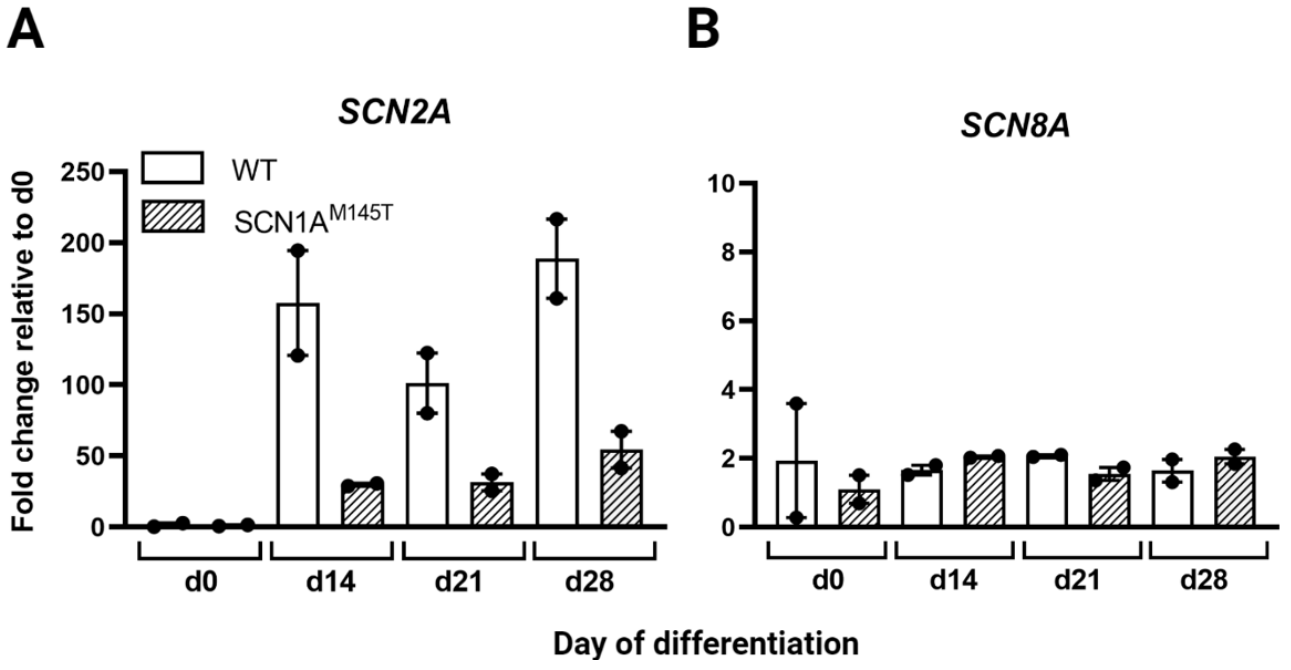


**Figure S4.** Quantitative RT-PCR analysis of CNS VSVGs genes in WT-idNs and SCN1A$^{M145T}$-idNs at day of differentiation 0 (NSCs), d14, d21, and d28. (**A**), *SCN2A* results expressed in both, control and diseased idNs, but shows a significantly higher expression in the WT cells. (**B**), *SCN8A*, the adult isoform, is the VSVGs with the lowest expression among both WT and SCN1A$^{M145T}$ groups during all time points analyzed. Data are presented as mean±SEM of two biological replicates (black dots).

Table S1. List of primers used in qRT-PCR experiments.

| Gene Name | Forward Primer | Reverse Primer |
|---|---|---|
| *GAPDH* | TCCTCTGACTTCAACAGCGA | GGGTCTTACTCCTTGGAGGC |
| *MAP2* | CCACCTGAGATTAAGGATCA | GGCTTACTTTGCTTCTCTGA |
| *NEFM* | TCCTCAACGTCAAGATGGCT | GTGTTGGACCTTAAGCTTGGG |
| *NEFL* | AGACCCTGGAAATCGAAGCA | TCACGTTGAGGAGGTCTTGG |
| *SYP* | CAAGGGGCTGTCAGATGTGA | CCTGTCTCCTTAAACACGAACC |
| *PSD95* | CGTTCGCCTCTATGTCATGC | TCCAATCTGCAACCTCCCAT |
| *GAD2* | CTCATTGCCTTCACGTCTGA | GCTGTCTGTTCCAATCCCTAA |
| *vGLUT2* | GACCTACCCAGCATGTCATG | ACCAGACCATTCCAAAGCTTC |
| *SCN1A* | GTGTGGTTTCCTTGGTTGGT | GTCCATGGAAACGTGGAAAG |
| *SCN2A* | ATCAGGCCACATTGGAAGAG | GATGCTACTGAAGAACTCTCTGAAAA |
| *SCN3A* | GCCAAACCATGTGCCTTATT | CCCTTTTGCATTCTTCCTACTG |
| *SCN8A* | GGGGAACCTTCGAAACAAGT | GCATCAGAACTGTTCCCACA |
| *KCC2* | GCCACGCTTTCGATATTACC | GCATGGCTACCAGTGCATAA |
| *NKCC1* | TGACTTGAGAGAAGGTGCACAG | TGTTTGGCTTCATACGACCA |