**Supplemental Figures Caption:**

**Suppl. 1 Respiratory chain inhibitors induce a global change of mitochondrial morphology** Additional immunofluorescence staining of experiment from Fig. 1 for MAP2 and MTCO1 (mitochondrial marker. **a**: Magnification shows healthy, elongated mitochondria forming a network. **b**: Changed morphology of mitochondria after treatment with 50μM Rotenone for 2 hours, magnification shows scattered and rounded mitochondria as a sign of stress.

**Suppl. 2 Somatodendritic activation of MPD does not result in TAU-missorting a-b**: The experiment from Fig. 4 e-g was also performed in co-transfected control cells in both MPN and iPSC-derived-neurons, this time firing the UV-laser at the AIS-mitochondria cluster before the addition on MPD (a) or at a ROI of similar size in the somatodendritic compartment after addition of MPD. TAU-fluorescence intensity was measured in the soma of the these cells, untreated cells in the same plate served as controls (similar to Fig. 4f-g). Each point represents one cell, a: MeanControl=1.0, MeanUV without MPD=0.9974 b: MeanControl=1.0, MeanSomato.act=0.9966.