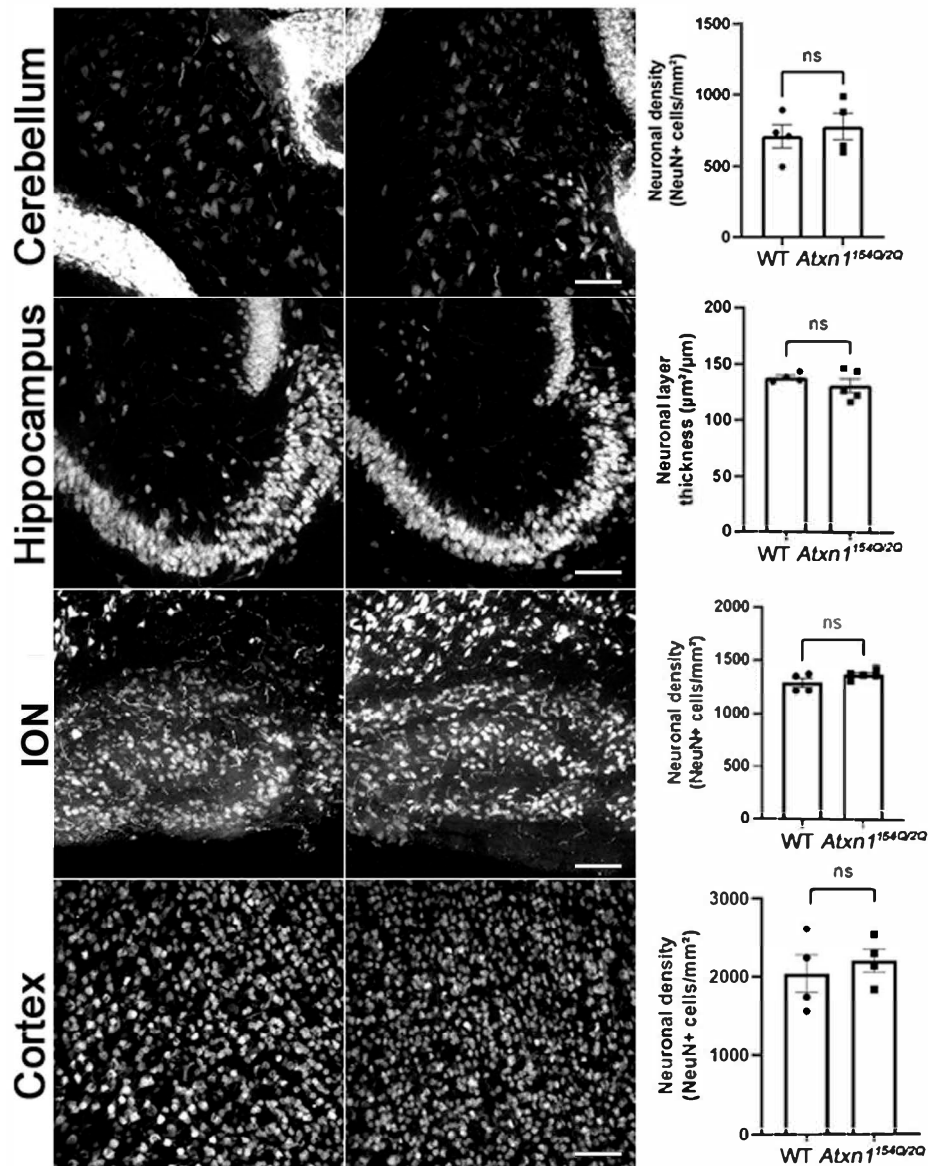


Supplementary Figure S1.

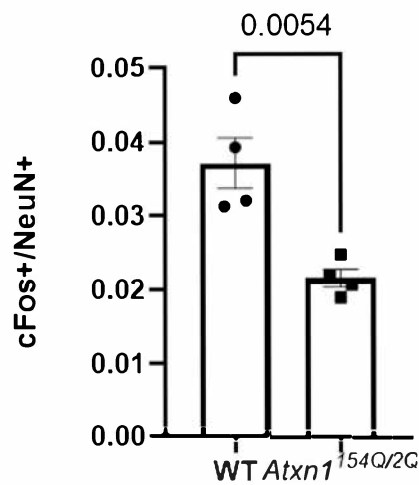
**Supplementary Figure S1. Pearson's correlation between *Gfap* and homeostatic astrocyte genes in the cerebellum.** mRNA was extracted from the cerebellum of 12 weeks old Atxn1154Q/2Q and wild-type littermate controls (N = 4-6) and RTqPCR was used to evaluate expression of astrocyte specific genes.



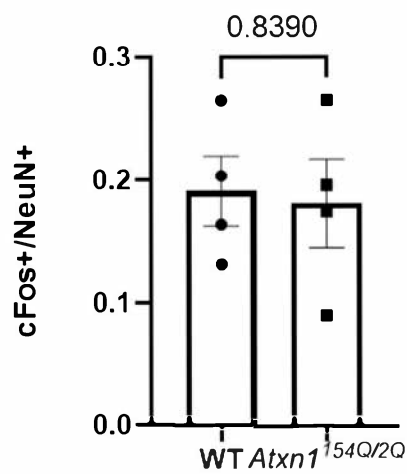
**Supplementary Figure S2.**

**Supplementary Figure S2. Neuronal density is not altered early in SCA1.** Brain sections from 12 weeks old Atxn1<sup>154Q/2Q</sup> and wild-type littermate controls (N = 3-5) were stained for NeuN. Confocal images of cerebellum (deep cerebellar nuclei), hippocampus (CA2/CA3), ION (inferior olivary nucleus), and motor cortex (layer 6) were used to quantify density of NeuN+ neurons. Scale bar is 100 μm. Data are presented as mean ± SEM with average values for each mouse represented by a dot. \* p<0.05 Students t-test.

### A. Hippocampus

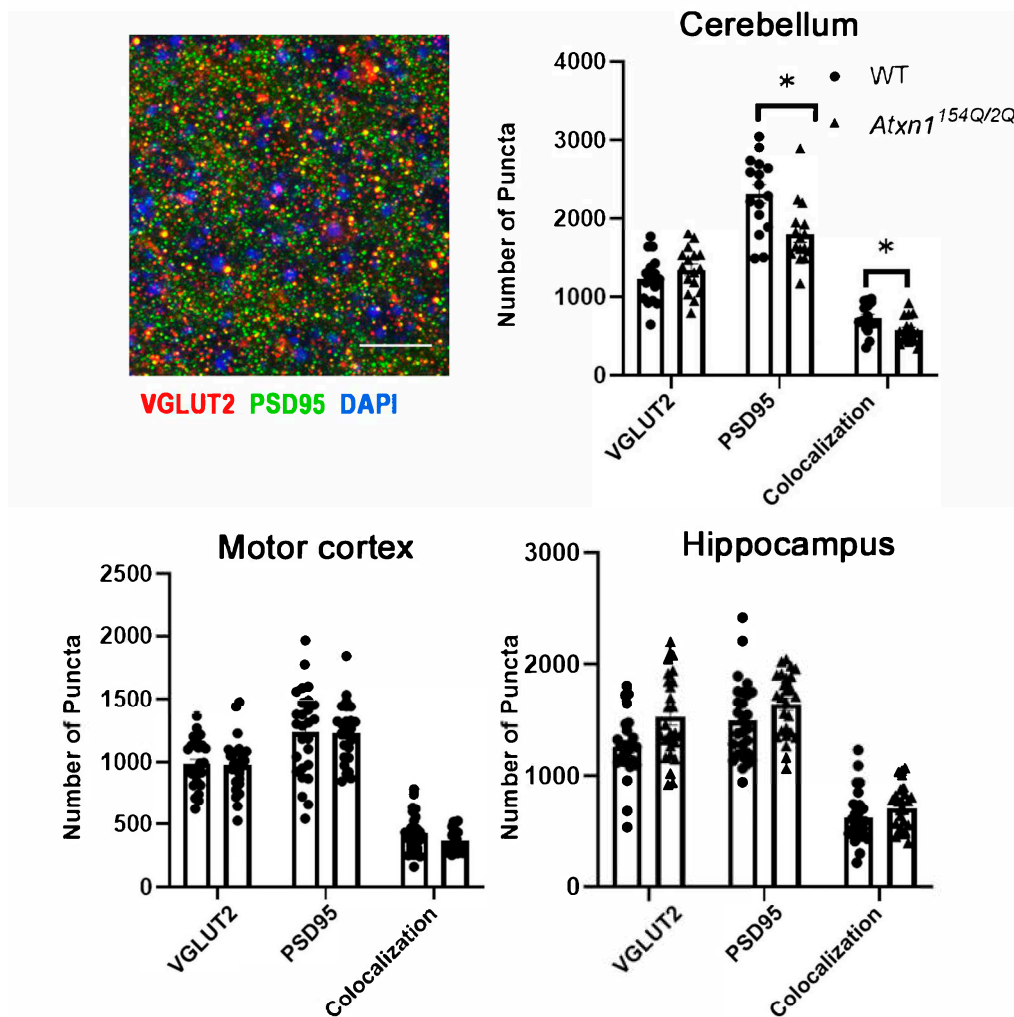


### B. Motor cortex



**Supplementary Figure S3.**

**Supplementary Figure S3. Neuronal activity is altered in the hippocampus but preserved in motor cortex early in SCA1.** Brain sections from 12 weeks old *Atxn1*<sup>154Q/2Q</sup> and wild-type littermate controls (N = 3-5) were stained for NeuN and c-Fos. Confocal images of hippocampus (A, dentate gyrus), and motor cortex (B, layer 6) were used to quantify density of NeuN+ and c-Fos+ neurons. Data are presented as a mean ratio of c-Fos/NeuN+ cells ± SEM with average values for each mouse represented by a dot. Student's t-test P values are shown.



**Supplementary Figure S4. Synaptic quantification in the cerebellum, hippocampus and cortex.** Brain sections from 18 weeks old *Atxn1*<sup>154Q/2Q</sup> and wild-type littermate controls (N = 3-5) were stained for VGLUT2 and PSD95. Confocal images were used to quantify the number of VGLUT2 and PSD 95 puncta and their overlay in cerebellum (lobule X upper 1/3), motor cortex and hippocampus (dentate gyrus). Scale bar is 10µm. Data are presented as a mean ± SEM with average values for each region of interest represented by a dot. \* p<0.05 Student's t-test.