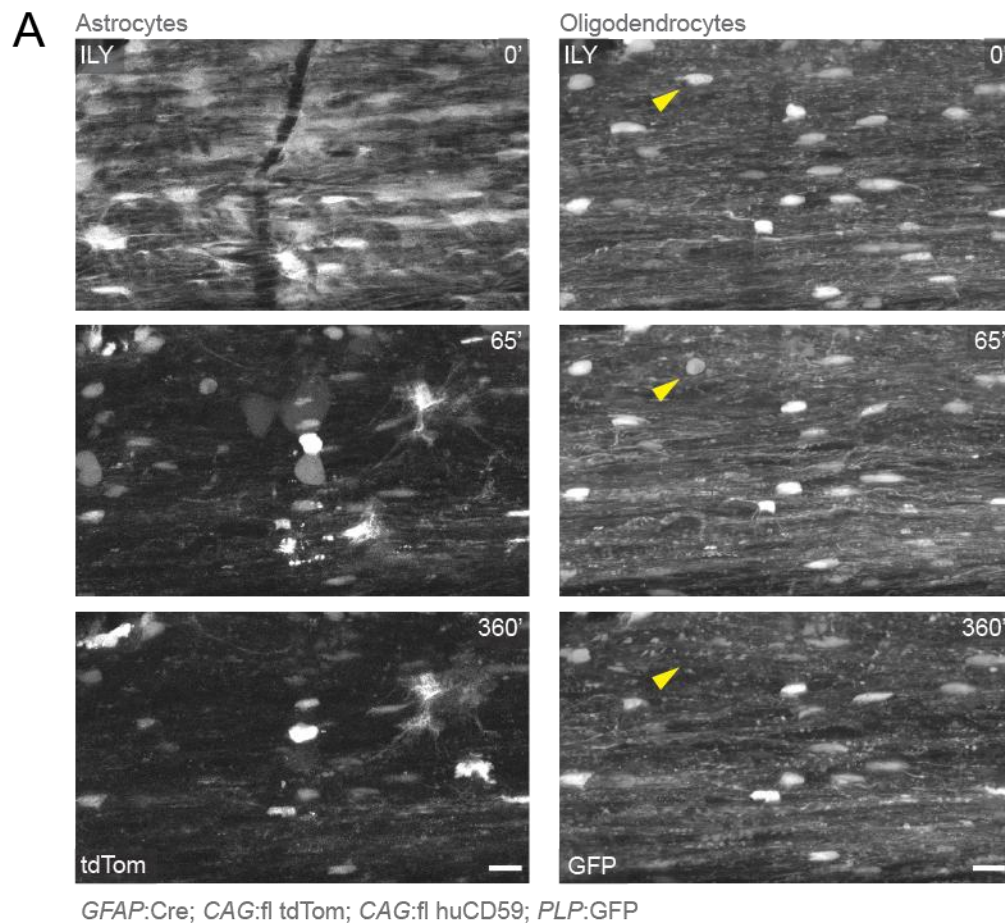


Supplementary Information



Supplementary Figure 1. Selective, toxin-based astrocyte depletion does not induce oligodendrocyte injury

A. Local spinal application of intermedilysin toxin (200ng/mL) for 1-hour resulted in marked depletion of astrocytes. The same region was imaged for up to 6 hours following ILY exposure. Despite profound astrocytic loss, oligodendrocyte somata remain largely unaffected with the exception of a single cell exhibiting swelling with spheroid soma and subsequent cell death (yellow arrowheads). Scale bar 20 μ m.

Supplementary Video 1

In vivo spinal cord two-photon imaging in *ALDH1L1:GFP*; *PLP:CreERT* x *CAG:fl tdTom* mouse over an 8-hour time-lapse, corresponding to images shown in **Figure 1A, B**. Local application of AQP4-IgG and complement induced experimental lesions observed with global, lytic astrocyte death (green) followed by oligodendrocyte injury (magenta). Scale bar 40 μm .

Supplementary Video 2

Magnified (3.5x) in vivo two-photon time-lapse of oligodendrocytes showing early signs of injury along processes with beadings (arrowheads) and subsequently progressed to a swollen phenotype with the appearance of a spheroid soma. *ALDH1L1:GFP*; *PLP:CreERT* x *CAG:fl tdTom* mouse, corresponding to AQP4-IgG treatment images in **Figure 1A**. Scale bar 20 μm .

Supplementary Video 3

In vivo spinal cord two-photon imaging in *GFAP:Cre*; *CAG-fl-PCGCaMP5g-IRES-tdTom* mouse over an 3-hour time-lapse, corresponding to images shown in **Figure 3A**. Local application of r-AQP4-IgG and complement induced calcium signals (orange) in astrocytes (green). Scale bar 30 μm .

Supplementary Video 4

In vivo spinal cord two-photon imaging in *PLP:CreERT*; *CAG-fl-PCGCaMP5g-IRES-tdTom* mouse over an 4-hour time-lapse, corresponding to images shown in **Figure 3C**. Local application of r-AQP4-IgG and complement induced calcium signals (orange) in oligodendrocytes. Scale bar 30 μm .