**Novel roles of the oligodendrocyte lineage in brain function**

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Cells of the oligodendrocyte lineage are largely regarded as important for myelination. However, recent studies demonstrate additional function for NG2-expressing progenitors as well as for mature oligodendrocytes.

NG2 glia express L-type VGCC in white and gray matter during development that gradually decreases with age. The function of VGCCs in NG2 glia is still not clear. We took advantage of NG2-CreERT2 knock-in mice crossbred to floxed Cav1.2 and flexed Cav1.3 transgenic mice to delete Cav1.2 and Cav1.3 genes in NG2 glia. Most strikingly, without Cav1.2 and Cav1.3 genes NMDA-dependent long-term depression (LTD) was significantly eliminated in hippocampus and medial prefrontal cortex (mPFC), while the synaptic input to NG2 glia from axons remained unaltered, thereby suggesting an important role for L-type VGCC of NG2 glia in modulating neuronal network activity.

We also studied the oligodendrocyte lineage in brain injury. By in vivo 2P-LSM analysis we observed oligodendrocytes adjacent to the lesion site. These oligodendrocytes turned into an intermediate cell stage with astro- and oligodendroglial gene expression properties that could differentiate into astrocytes, highlighting a plastic potential of oligodendrocytes in acute brain trauma.