Abstract Information

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Title :	Plasticity of oligodendrocyte lineage cells during development and acute brain injury
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Abstract :

OPCs and oligodendrocytes (OLs) exhibit heterogeneity in their location, function, and origin. However, whether their responses to acute brain injuries are similarly heterogeneous remains unclear. Recently, we demonstrated that a subset of OPCs temporarily downregulate the expression of the Olig2 transcription factor, previously thought to be ubiquitously expressed in OPCs. Unlike Olig2-expressing OPCs, these Olig2-negative OPCs exhibit limited proliferation and simpler morphologies. Interestingly, one week after injury, these cells begin to re-express Olig2, indicating a high degree of OPC plasticity in response to injury. Moreover, through the use of multiple transgenic mouse models and in vivo two-photon laser scanning microscopy (2P-LSM), we revealed that a subset of mature OLs in the mouse cortex undergoes plastic changes and gives rise to astrocytes following acute injury. Notably, we identified a transitional cell stage termed AO cells (cells exhibiting both astrocytic and oligodendroglial properties). These AO cells arise from oligodendrocytes and have the capacity to differentiate into astrocytes. Our findings suggest a significant plasticity within the oligodendrocyte lineage and offer potential therapeutic avenues for acute brain injuries by targeting these cells.