

Identification of Tmem10 as a Novel Late-stage Oligodendrocytes Marker for Detecting Hypomyelination

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Abstract :

Oligodendrocytes ensheath axons to form compact insulating multilamellar structures known as myelin. Tmem10 is a novel type I transmembrane glycoprotein that is highly expressed in oligodendrocytes and whose biological function remains largely unknown. Furthermore, the expression pattern of Tmem10 remains a matter of some controversy. Given the inconsistency of its expression pattern and the lack of validated specific antibodies, Tmem10 is not widely accepted as a marker for mature oligodendrocytes. As a means to solve these problems and to aid future studies of oligodendrocyte-associated diseases, we have generated a highly specific Tmem10 antibody. Using this Tmem10 antibody, we clarify that Tmem10 protein is firstly expressed at 2 weeks in the postnatal mouse brain with age-related increase, only in the central nervous system (CNS). We also reveal that Tmem10 is expressed specifically in late stage oligodendrocytes and later than MAG, a late-stage myelin marker. Finally, we show that Tmem10 co-expresses with MOG- and MBP-positive myelin fibers and is dramatically reduced in a hypomyelination mouse model. In conclusion, our study demonstrates that Tmem10 can be used as a specific marker for myelinating oligodendrocytes and perhaps for the evaluation of myelination diseases, such as multiple sclerosis.

Key Word :

Tmem10; polyclonal antibody; late stage oligodendrocytes maker; Myelination