

A note on Neural, Astrocyte and Oligodendrocyte Markers for Central Nervous System

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Editorial

Neurons are electrically excitable cells in the Central Nervous System (CNS) and Peripheral Nervous System (PNS) that send and acquire electrical impulses and neurochemical signals to process information. Neurons drive activity in the brain, spinal cord, and peripheral sensory and motor systems. They are exceedingly specialised to rapidly transmit electrical alerts and neurotransmitters throughout synapses. Although there is an extensive range of neuronal types and morphologies in the nervous system signals are typically received on the cell body or dendrites and sent out alongside the axon. Neurons are regularly recognized by observing expression of cell-specific intracellular proteins, such as NeuN etc.

Neuronal Nuclei (NeuN) is a pre-mRNA choice splicing regulator that used to be first recognized in mammals by producing a monoclonal antibody that focused on an antigen, which turned out to be Fox-3, in the nuclei of neurons. Antibodies to this protein are frequently used to label nuclei in the majority of neurons in vertebrates. Microtubule-associated protein 2 (MAP2) is a neuronal phosphor protein that regulates the shape and balance of microtubules, neuronal morphogenesis, cytoskeleton dynamics, and organelle trafficking in axons and dendrites. Isoforms of MAP2 are expressed in the perikarya and dendrites of neurons, making antibodies that target MAP2 beneficial equipment to highlight the dendritic projections of neurons.

Astrocytes are the most prevalent type of glial cell in the CNS and are found within the brain and spinal cord. In a healthy nervous system, astrocytes play crucial roles in development, regulation of blood flow (by helping endothelial cells in the blood brain barrier), synaptic transmission and function, and energy and metabolism (by providing vitamins to neurons and synthesizing positive neurotransmitters). The loss or unusual characteristic of astrocytes is implicated in a vast variety of neurodegenerative disease processes. Chronic activation of astrocytes outcomes in the formation of lesions comparable to those found in Alzheimer's sickness and Huntington's disease. Some beneficial astrocyte markers consist of GFAP and ALDH1L1.

Glial Fibrillary Acidic Protein (GFAP) is a class-III intermediate

filament that makes up the cytoskeleton of astrocytes in the CNS. GFAP establishes and keeps astrocyte morphology and is vital for mitosis as well as neuron-astrocyte communication. Antibodies that detect GFAP are regularly used to label astrocytes and disclose their extraordinary morphologies in the brain.

Aldehyde dehydrogenase 1 family member L1 is a key enzyme in folate metabolism and, as such, performs a vital function in the regulation of cell metabolism and proliferation. Down regulation of ALDH1L1 has been determined in tumors, leading to decrease suppression of cancers cell proliferation. Antibodies that target ALDH1L1 label the cytoplasm of astrocytes in the brain, effectively staining the cell body and processes of these cells.

Oligodendrocytes are highly specialised glial cells which produce myelin, a lipid-rich substance that offers a defensive sheath round axons and improves the conduction velocity of signals between neurons. They are characterised by means of the expression of the myelin family proteins: Myelin Oligodendrocyte Glycoprotein (MOG), Myelin-Associated Glycoprotein (MAG), and Myelin Basic Protein (MBP). Oligodendrocyte progenitor cells exist in the talent to facilitate regeneration of cells due to injury. However, the breakdown of myelin and incapacity to regenerate completely myelinated oligo-dendrocytes is correlated with a number of neurodegenerative diseases, such as Alzheimer's ailment (AD), Parkinson's sickness (PD), Amyotrophic Lateral Sclerosis (ALS), and Multiple Sclerosis (MS).

Myelin basic protein (MBP) is one of the most considerable proteins in the CNS and performs an vital position in the myelination of nerve cells. As a key factor of myelin sheaths that encompass axons, MBP contributes to the adhesion of the cytosolic membranes of compacted myelin. This is integral to facilitate the conduction of neuronal impulses. MBP antibodies are regularly used to stain myelin sheaths of oligo-dendrocytes and Schwann cells in each the CNS and PNS. Myelin Proteolipid Protein (PLP1) is the fundamental membrane certain phospholipid protein that is enriched in oligo-dendrocytes of the CNS. It performs a vital position in the formation and preservation of the multilamellar shape of myelin. Antibodies in opposition to this cell marker stain the myelin of oligo-dendrocytes in the CNS.

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