

Oligodendrocytes, Composition & Function

Prashanthi Vasudev

Department of Neurology, Government Medical College Kozhikode, India.

Corresponding Author*

Vasudev P,

Department of Neurology, Government Medical College Kozhikode, India;

E-mail: prashanthiv@gmail.com

Copyright: 2021 Vasudev P. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Received 05 March 2021; **Accepted** 19 March 2021; **Published** 26 March 2021

Oligodendrocytes (from Greek 'cells with many branches'), or oligodendroglia, are a type of neuroglia whose fundamental capacities are to supply back and cover to axons within the central nervous system framework of a few vertebrates, proportionate to the work performed by Schwann cells within the peripheral nervous system framework. Oligodendrocytes do this by making the myelin sheath. A single oligodendrocyte can amplify its forms to 50 axons, wrapping roughly 1 μm of myelin sheath around each axon; Schwann cells, on the other hand, can wrap around as it were one axon. Each oligodendrocyte shapes one fragment of myelin for a few adjoining axons.

Oligodendrocytes are found as it were within the central nervous system framework, which comprises the brain and spinal cord. These cells were initially thought to have been created within the ventral neural tube; but that as it may, inquiry about presently appears oligodendrocytes start from the ventral ventricular zone of the embryonic spinal cord and conceivably have a few concentrations within the forebrain. They are the final cell sort to be created within the CNS [1].

Oligodendrocytes are a sort of glial cell. They emerge amid advancement from oligodendrocyte antecedent cells (OPCs), which can be distinguished by their expression of a number of antigens, counting the ganglioside GD3, the NG2 chondroitin sulfate proteoglycan, and the platelet-derived development factor- α receptor subunit (PDGF- α R). Develop oligodendrocytes are broadly classified into either myelinating or non-myelinating oligodendrocytes. Antecedents and both develop sorts are ordinarily recognized by their expression of the translation calculate OLIG2.

Function

Myelination

Mammalian nervous systems depend significantly on myelin sheaths, which diminish particle spillage and diminish the capacitance of the

cell layer, for quick signal conduction. Myelin moreover increments drive speed, as saltatory conduction of activity possibilities happens at the hubs of Ranvier in between Schwann cells (of the PNS) and oligodendrocytes (of the CNS). Moreover, conduction speed of myelinated axons increments straightly with the axon distance across, though the drive speed of unmyelinated cells increments as it were with the square root of the breadth. The cover must be relative to the breadth of the fiber interior. The ideal proportion of axon breadth isolated by the full fiber breadth (which incorporates the myelin) is 0.6 [2,3].

Myelination is as it were predominant in a couple of brain regions at birth and continues into adulthood. The whole brain isn't total until almost 25–30 a long time of age. Myelination is an critical component of insights, and white matter amount may be emphatically related with IQ test results in children. Rats that were raised in an improved environment, which is known to extend cognitive adaptability, had more myelination in their corpus callosum [4].

Metabolic support

Oligodendrocytes associated closely with nerve cells and give trophic support by the generation of glial cell line-derived neurotrophic factor (GDNF), brain-derived neurotrophic factor (BDNF), or insulin-like development factor-1 (IGF-1). They may too straightforwardly give metabolites to neurons, as depicted by the lactate carry speculation [5].

It is hypothesized that perineuronal oligodendrocytes (or perineuronal oligodendrocytes) are practically unmistakable from other oligodendrocytes. They are not connected to neurons by means of myelin sheaths and, thus, don't contribute to cover. They stay restricted to neurons and direct the extracellular liquid. Perineuronal oligodendrocytes are considered to be a portion of the white matter while myelinating oligodendrocytes are a portion of the white matter. They may support neuronal digestion system. Mature oligodendrocytes may be enrolled to create modern myelin after a demyelinating damage

References

1. Carlson, Neil. Physiology of Behavior. Boston, MA: Allyn & Bacon. United States. 2010.
2. Baumann, Nicole., et al. "Biology of Oligodendrocyte and Myelin in the Mammalian Central Nervous System". Physiological Reviews. 81. 2 (2001): 871–927.
3. Richardson WD., et al (Jan 2006). "Oligodendrocyte wars". Nature Reviews. Neuroscience. 7 (2006): 11–18.
4. Pérez-Cerdá., et al. "Pío del Río Hortega and the discovery of the oligodendrocytes". Front. Neuroanat. 9 (2015): 92.
5. Thomas J., Let al. "Spatiotemporal development of oligodendrocytes in the embryonic brain". J. Neurosci. Res. 59. 4 (2000): 471–476.