Clemastine

Clemastine is an antihistamine medication that is used to treat symptoms of allergic reactions such as sneezing, itching, and runny nose. It works by blocking the action of histamine, a chemical that is released by the body during an allergic reaction. Clemastine is available in both over-the-counter and prescription form. It is commonly used to treat hay fever and other allergic conditions. It is also used to treat symptoms of the common cold, such as a runny nose, and as a sleep aid. Clemastine can cause side effects such as drowsiness, dry mouth, and blurred vision. It should be used with caution in people who have a history of glaucoma, heart disease, or difficulty urinating.

Visual impairment in diabetes is a growing public health concern. Apart from the well-defined diabetic retinopathy, disturbed optic nerve function, which is dependent on the myelin sheath, has recently been recognized as an early feature of visual impairment in diabetes. However, the underlying cellular mechanisms remain unclear. Using a streptozotocin-induced diabetic mouse model, Wu et al. observed a myelin deficiency along with a disturbed composition of oligodendroglial lineage cells in the diabetic optic nerve. They found that new myelin deposition, a continuous process that lasts throughout adulthood, was diminished during pathogenesis. Genetically dampening newly generated myelin by conditionally deleting olig2 in oligodendrocyte precursor cells within this short time window extensively delayed the signal transmission of the adult optic nerve. In addition, clemastine, an antimuscarinic compound that enhances myelination, significantly restored oligodendroglia and promoted the functional recovery of the optic nerve in diabetic mice. The results point to the role of new myelin deposition in optic neuropathy under diabetic insult and provide a promising therapeutic target for restoring visual function [1)]

Clinical evidence suggests that clemastine can decrease the loss of axons after spinal cord injury, stimulating the differentiation of oligodendrocyte progenitor cells into mature oligodendrocytes that are capable of myelination. While clemastine can aid not only in the remyelination and preservation of myelin sheath integrity, it also protects neurons. However, its role in neurogenic muscle loss remains unclear [2)]

Investigation reveals that CLM resulted in reduction of cerebral hematoma volume, decreased cerebral edema and lower rates of neuronal apoptosis as well as improved behavioral scores in an acute ICH murine model. CLM treatment was noted to decrease pro-inflammatory effectors and increased anti-inflammatory effectors post-ICH. In addition, CLM reduced the deleterious effects of activated microglia on neurons in a transwell co-culture system. Our findings show that CLM likely mediates its therapeutic effect through inhibition of microglia-induced inflammatory response and apoptosis, thereby enhancing restoration of neuronal function [3)].

1)
Wu H, Chen X, Yu B, Zhang J, Gu X, Liu W, Mei F, Ye J, Xiao L. Deficient deposition of new myelin impairs adult optic nerve function in a murine model of diabetes. Glia. 2023 Jan 20. doi: 10.1002/glia.24341. Epub ahead of print. PMID: 36661098.
2)
Myatich A, Haque A, Sole C, Banik NL. Clemastine in remyelination and protection of neurons and skeletal muscle after spinal cord injury. Neural Regen Res. 2023 May;18(5):940-946. doi: 10.4103/1673-5374.355749. PMID: 36254972; PMCID: PMC9827778.

3)
Zhi C, Zeng S, Chen Y, Liao D, Lai M, Wang Z, Wang Y, Xiao S. Clemastine promotes recovery of neural function and suppresses neuronal apoptosis by restoring balance of pro-inflammatory mediators in an experimental model of intracerebral hemorrhage. Int J Med Sci. 2021 Jan 1;18(3):639-645. doi: 10.7150/ijms.51150. PMID: 33437198; PMCID: PMC7797547.