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Neuroprotective effects of papaverine on retinal ganglion cells in optic nerve transection model

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Papaverine is an opium alkaloid antispasmodic drug, used primarily in the treatment of visceral spasm and vasospasm. It is also known as a specific inhibitor of phosphodiesterase (PDE) 10A. In striatonigral and striatopallidal neurons, inhibition of PDE 10A is by papaverine activated cAMP/PKA signal cascade. This study was aimed to investigate the effects of papaverine on the survival of retinal ganglion cells in rat optic nerve transection model. After intra-orbital optic nerve (ON) crush of the right eye, 2 µl of BSS or 50, 200, 500 µg/ml papaverine was injected to vitreous cavity in the injured eye. At 2 or 7 days after the insult, retina samples were collected for retinal ganglion cell (RGC) count and immunohistochemistry analysis. At seven days, comparing to the BSS control group, RGC density of the 500 µg/ml group showed significant increased survival of RGC. Immunoreactivity of phosphorylated-cAMP response element binding protein (p-CREB) was not detectable in the BSS control group. Increased expression of p-CREB was detected in the RGC layer and inner nuclear layer of the papavarine treated groups at both 2 and 7 days groups. Our result showed that papaverine was neuroprotective to RGC when their axons were transected in the crush model. This effect might be through up-regulation of the p-CREB.

Biography

Kin Chiu completed her Master and Bachelor of Clinical Medicine degree in Tianjin Medical University, PR China. She focused on neuroscience research and got her PhD in the University of Hong Kong. Her long term research goal is to find a way to prevent continuous visual loss in neurodegenerative retinal diseases, such as glaucoma and age-related macular degeneration. Her research works focus on investigating the mechanism of neuronal degeneration and finding new approaches to prevent neuronal death and promote neuronal survival and regeneration. Related treatment strategies include immune modulation, electrical stimulation and optogenetic therapies.

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