Autophagy modulation following retinal ischemia in mice

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Autophagy is a highly conserved catabolic pathway by which cellular components are degraded through the lysosomes. Dysfunctional autophagy has been associated with several neuropathological conditions and a considerable number of studies have proved autophagy as a potential target for pharmacological modulation to achieve neuroprotection.
In this study we analyzed the expression of autophagy related proteins (Atg) and the effect of autophagy modulation on retinal ganglion cell (RGC) survival following transient retinal ischemia, a common feature of ocular pathologies including glaucoma, anterior ischemic optic neuropathy and retinal vessels occlusion.
Retinal ischemia was induced in C57BL/6J mice by acutely increasing the intraocular pressure (IOP); reperfusion was allowed for different time points. A significant reduction of the autophagosome-associated form of LC3 (LC3II) was observed at the end of the ischemia and this was followed by a significant accumulation of the protein during the late phase of reperfusion. A substantial reduction of the autophagic substrate p62 was reported during the reperfusion suggesting an increase of the autophagic flux.
Induction of retinal ischemia in transgenic Ambra$^{+/gt}$ mice, where the reduced expression of Ambra-1 protein alters the autophagy machinery, was associated with increased RGCs death. Our results suggest that autophagic pathway is modulated under ischemia/reperfusion injury in mice and support a neuroprotective role of autophagy in RGCs *in vivo*.

Acknowledgment: MIUR, Italy. PRIN Project protocol20109MXHMR_008