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## The effects of matrix metalloproteinase 3 on neuronal loss in the ganglion cell layer of rats after retinal ischemia/reperfusion (I/R)

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Emerging evidences have demonstrated that matrix metalloproteinase 3 (MMP3) is involved in neuronal degeneration in central nervous system (CNS) by activating glia cells, promoting neuronal apoptosis and injuring the brain– blood barrier (BBB). However, little known is that whether MMP3 can contribute to neuronal degeneration induced by retinal I/R. In our present study, we detected whether MMP3 is localized in adult rat retinae and investigated its relationship with neuronal loss in ganglion cell layer (GCL) after retinal I/R. We first found that MMP3 was widely expressed in many cell types throughout the layers of rat retinae, which including retinal ganglion cells (RGCs), bipolar cells, horizontal cells, amacrine cells, Müller cells, astrocytes and microglia cells. In next experiments, all rats were treated with acute high intraocular pressure (aHIOP), to mimic the retinal I/R injury, for 1 hour (h) and sacrificed at different survival time points after aHIOP: 6 h, 1 day (d), 3 d and 7 d. We found that the aHIOP treatment increased the expression of both proenzyme MMP3 and active MMP3 compared to the normal control but it didn't alter their laminar distribution pattern. Moreover, inhibiting the expression of MMP3 by the inhibitor NNGH ameliorated the loss of neuronal loss in GCL following aHIOP. Taken together, our data demonstrate that MMP3 is expressed in multiple types of retinal neurons and glia cells. Meanwhile, the up-regulated expression and activity of MMP3 is involved in the loss of neuronal loss in GCL after I/R. This study was supported by National Natural Science Foundation of China (No. 81371011, No. 81400399), the Project of Innovation-driven Plan of Central South University (2015CXSS022), and National Key Technologies Research and Development Program of China (2012BAK14B03).

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