Role of glial cells in angiogenesis in the neonatal rat retina with neurodegenerative injury

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Neuronal and glial cells play an important role in the development of vasculature in the retina. In this study, we investigated the role of glial cells in angiogenesis in retinas with neurodegenerative injuries. To induce retinal neurodegenerative injuries, *N*-methyl-D-aspartic acid (NMDA, 200 nmol) was injected into the vitreous chamber of the eye on postnatal day (P)7. Morphological changes in retinal neurons and vasculature were assessed on P14, P21, and P35. Prevention of angiogenesis and regression of some capillaries were observed on P14 in retinas of NMDA-treated eyes. However, angiogenesis started on P21, and the retinal vascular network was established by P35 in retinas with neurodegenerative injuries. The results of mechanistic analyses suggest that astrocytes activated by the injury produce and secrete fibronectin to form a scaffold for endothelial cell migration. Vascular endothelial growth factor (VEGF) released mainly from glial cells stimulates the process of angiogenesis. These results suggest that glial cells play an important role in angiogenesis in neonatal rat models of retinal neurodegeneration.

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