Tumor necrosis factor alpha protects retinal ganglion cells against excitotoxicity via reduction of oxidative stress in the mice

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Excitotoxicity is thought to be involved in the neuronal cell death induced by glaucoma. We reported that tumor necrosis factor alpha (TNF α) was involved in the protective effects of a Toll-like receptor 9 agonist on the retinal ganglion cell loss induced by excitotoxicity in the mice. In the present study, we examined whether TNF α protected retinal ganglion cells against the NMDA-induced neurotoxicity via reduction of oxidative stress in the mice, *in vivo*. Male ICR mice of 8-12 weeks old were subjected to intravitreal NMDA (40 nmol/eye). TNF α (1 ng/eye) was intravitreally injected 18 hours before NMDA injection. Eyes were enucleated 24 hours and 7 days after NMDA injection, and the paraffin-embedded sections and the whole mount retinas were prepared, respectively. Immunohistochemistry using anti-8-OHdG antibody and Alexa Fluor 488-conjugated anti-NeuN antibody was carried out. TNF α significantly reduced the number of 8-OHdG-positive cells in the retinal ganglion cell layer 24 hours after NMDA injection, and the retinal ganglion cell loss 7 days after NMDA injection. These results suggest that TNF α protects retinal ganglion cells against excitotoxicity via reduction of oxidative stress in the mice.