Protective effect of endogenous apelin against age-related loss of retinal ganglion cells in mice

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Age-related visual impairments can occur even in the absence of recognized eye diseases. Retinal ganglion cells (RGCs) are neurons that transmit visual information from the retina to the brain and are more vulnerable to age-related loss than other retinal neurons. Recently, it has been reported that deficiency of apelin, an endogenous peptide ligand of the G protein-coupled receptor APJ, enhances several tissues aging. In the present study, we investigated the effect of the apelin-APJ system against the loss of RGCs with aging. Two- and 12-month-old male wild-type and apelin-knockout mice on a C57BL/6N background were used. Real-time RT-PCR demonstrated that the expression level of retinal apelin mRNA was markedly lower in the old mice than that in the young ones. In contrast, retinal APJ mRNA expression level was significantly greater in the old mice than in the young ones. APJ immunoreactivity was detected in RGCs of the old mice as well as in those of the young mice. Apelin deficiency in mice accelerated the age-related reduction in the amplitude of electroretinogram and the loss of RGCs stained with anti-Brn-3a antibodies. These results suggest that the apelin-APJ system is protective against age-associated loss of RGCs.