

**Abstract Title:**

**Lack Of Intermediate Filaments In GFAP<sup>-/-</sup>vim<sup>-/-</sup> Mice Leads To Changes in Mueller Cell Endfeet and Ganglion Cells Following Retinal Detachment**

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289 retinal detachment - RC

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**Purpose:** An increase in the intermediate filament proteins GFAP and vimentin occurs in Mueller cells after retinal detachment in humans and in animal models. Here we sought to characterize changes in the inner retina of mice deficient in these proteins (GFAP<sup>-/-</sup>vim<sup>-/-</sup> mice).

**Methods:** Retinal detachments were generated in wild-type and GFAP<sup>-/-</sup>vim<sup>-/-</sup> mice. Detached and control retinas were harvested 7 or 28 days later. Laser scanning confocal images were acquired from vibratome sectioned retinas labeled with antibodies to glutamine synthetase and S100 (glia) and neurofilament (ganglion cells) and to the inner limiting membrane (ILM; laminin). Electron microscopy was also performed.

**Results:** The Mueller cell endfeet of the GFAP<sup>-/-</sup>vim<sup>-/-</sup> mice had a club-like appearance compared to wild-type controls, and this difference was exaggerated following detachment. Ganglion cells in the detached GFAP<sup>-/-</sup>vim<sup>-/-</sup> mice retinas showed greatly enhanced neurofilament immunoreactivity and neurite outgrowth compared to those in normal or detached wild-type or non-detached GFAP<sup>-/-</sup>vim<sup>-/-</sup> retinas. These ganglion cells were found in areas where the ILM and endfeet of the Mueller cells appeared torn away from the neural retina. Focal areas of ILM/endfoot separation were also found in the non-detached retinas, but they did not exhibit increased neurofilament immunoreactivity and neurite outgrowth.

**Conclusions:** The lack of GFAP and vimentin in Mueller cells led to abnormal Mueller cell responses after retinal detachment. In GFAP<sup>-/-</sup>vim<sup>-/-</sup> retinas, the ILM-endfoot complex appeared to easily separate from the inner retina. Mueller cells appeared to survive this severe mechanical damage to their endfoot region. The increased reactivity of ganglion cells in the damaged areas suggests a link between ILM/Mueller cell endfoot integrity and the maintenance of normal morphology in these neurons following injury.

**Commercial Relationship:**

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