

Effect of Piezo 1, a mechanoreceptor, on intraocular pressure and trabecular meshwork

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In primary open angle glaucoma patients, inhibition of aqueous humor discharge due to accumulation of extracellular matrix (ECM) in trabecular meshwork (TM) is often observed. It is known as a cause of high intraocular pressure (IOP). A previous report showed that TM cells express 11 types of mechanoreceptor including Piezo 1. However, its role in TM cell is still unclear and this study has evaluated the effect of Piezo 1 on ECM expression level in TM. At first, we measured the IOP in mice treated with a Piezo 1 agonist, Yoda 1, and observed a drop in IOP. Fibronectin expression level in the TM after Yoda 1 treatment in mice was evaluated by immunostaining, and they were both decreased. Then, by Western blotting analysis, we evaluated cPLA2 phosphorylation, MMP-2 expression and fibronectin expression using human cultured TM cells. Yoda 1 increased phosphorylated-cPLA2 and MMP-2 expression, and suppressed fibronectin expression in TM cells. These results suggest that Piezo 1 activation in TM may be responsible for suppressing fibronectin expression through cPLA2 activation, and one of new therapeutic targets for glaucoma.