

**World's first discovery of the molecular mechanisms of violet light for myopia:  
Violet light suppresses myopia progression via the non-visual photoreceptor, OPN5.  
We highly expect the elucidation of its photobiological functions and development of  
therapeutic targets for myopia.**

Tsubota Laboratory, Inc. is engaged in research and development to decrease the global myopic population by innovative and revolutionary technology development and application to medical devices.

An international team of researchers from Tsubota Laboratory, Inc. and Department of Ophthalmology at Keio University School of Medicine demonstrated that the non-visual photoreceptor called OPN5, or neuropsin, expressed in retinal ganglion cells receives violet light and suppresses myopia progression. This finding was published in the journal *Proceedings of the National Academy of Sciences of the United States of America* (PNAS June 1, 2021 118 (22) e2018840118).

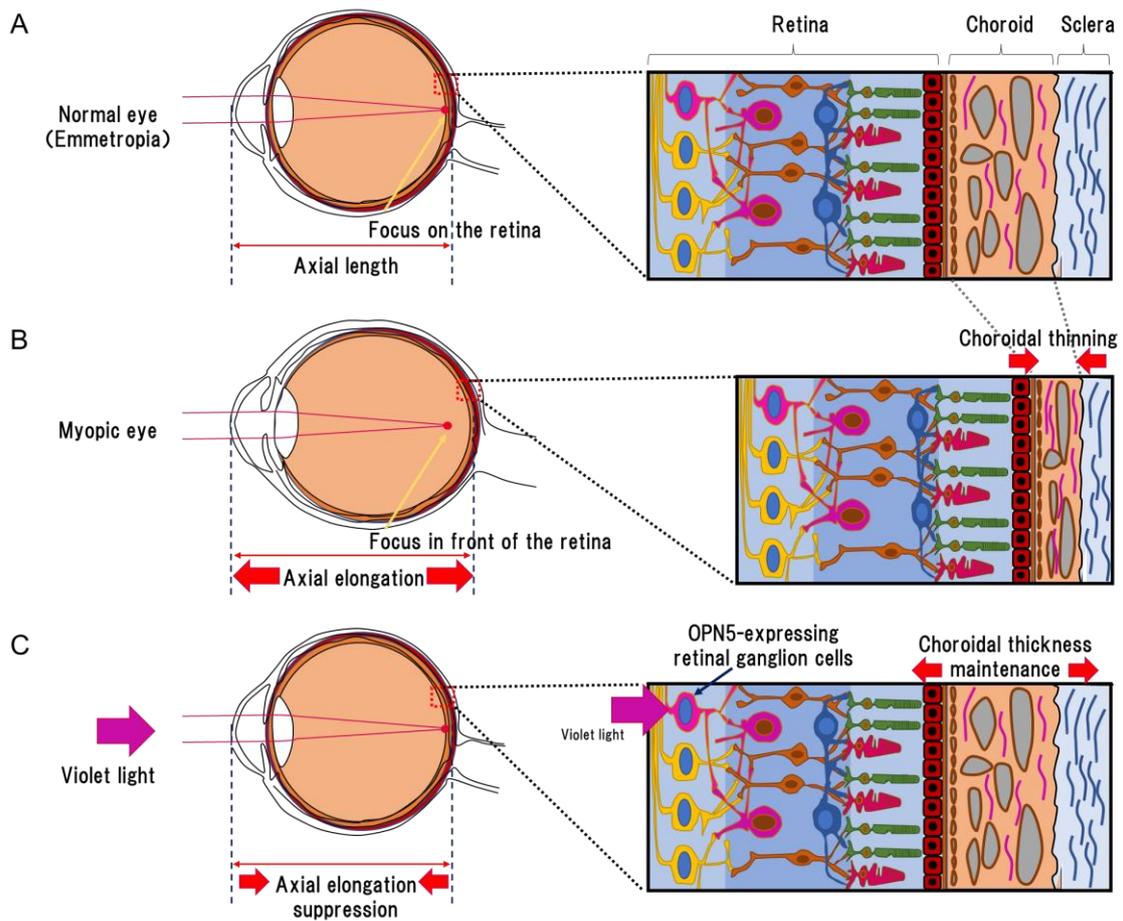
The Keio team reported for the first time that violet light (visible light with a wavelength of 360 to 400 nm) suppressed the progression of myopia. However, the mechanism of action has not been clarified in detail. In this study, by using the proprietary myopia mouse model, the international team found that violet light suppresses myopia progression by preventing choroidal thinning via OPN5 that is related to local circadian rhythms in the retina, intraocular vascular development, and deep body temperature regulation. This finding not only theorizes the myopia-suppressing effect of violet light, but also provides a new insight into the mode of action of this newly discovered non-visual photoreceptor protein, OPN5. It could also provide development of a useful intervention method as a target for suppressing myopia progression.

Our CEO Kazuo Tsubota said, "The progress in elucidating the molecular mechanism of violet light for the suppression of myopia will promote clinical applications. We believe that this will lead to the development of drugs and medical devices that will contribute to halting the growing myopic population."

For more information, please refer to the following press releases from Keio University School of Medicine.

<https://www.keio.ac.jp/ja/press-releases/2021/5/25/28-80141/>

<https://www.keio.ac.jp/en/press-releases/2021/May/25/49-80146/>



### Violet light-OPN5-choroid pathway in preventing myopia progression.

(A) In normal eyes (emmetropia), vision focuses exactly on the retina. (B) Under myopic condition, vision focuses in front of the retina caused by the elongation of axial length. Note that the choroid thinning can also be observed. (C) Violet light-OPN5-choroid pathway. Violet light can prevent choroid thinning by stimulating OPN5 expressed in a subset of the retinal ganglion cells (RGCs), resulting in the prevention of myopia progression.