

Author(s)

Principal: Kazuhisa Sugiyama
Presenting: Kazuhisa Sugiyama, M.D.
Contributing: Ari Maeda, M.D.
Sousuke Tsujiya, M.D.
Tomomi Higashide, M.D.
Kazunori Toida, M.D., Ph.D.
Hitoshi Okamura, M.D., Ph.D.

Abstract Title:

Circadian intraocular pressure rhythm is generated by clock genes

Purpose:

The present study was undertaken to reveal the role of circadian clock genes *Cry1* and *Cry2*, in the generation of the diurnal rhythm of intraocular pressures (IOPs) in mice.

Design:

Experimental study in mice

Participants:

4 groups of C57BL/6J mice (group 1 and 3, wild-type; group 2 and 4, *Cry1*-/*-Cry2*-/*-*)

Main Outcome Measures:

Diurnal IOP variations in each group were statistically analyzed by one-way ANOVA and Scheffe tests

Methods:

IOPs were measured at 8 time points, circadian time (CT) 0, 3, 6, 9, 12, 15, 18, and 21 (CT 0=6:00), using a microneedle method in 4 groups of mice (group 1 and 3, wild-type; group 2 and 4, *Cry*-deficient). During the IOP measurements, mice in group 1 and 2 were maintained in a 12-hr light/dark cycle (LD), while mice in group 3 and 4 were kept in a constant darkness (DD) that started 24 to 48 hours prior to the measurements.

Results:

In wild-type mice, IOPs measured in light phase were significantly lower than those in dark phase in LD condition. This daily rhythm was

maintained under DD conditions showing low in the subjective day and high in the subjective night. On the other hand, Cry-deficient mice did not show significant diurnal changes of IOP regardless of the environmental light conditions.

Conclusion::Cry genes are essential for the circadian IOP rhythm in mice.