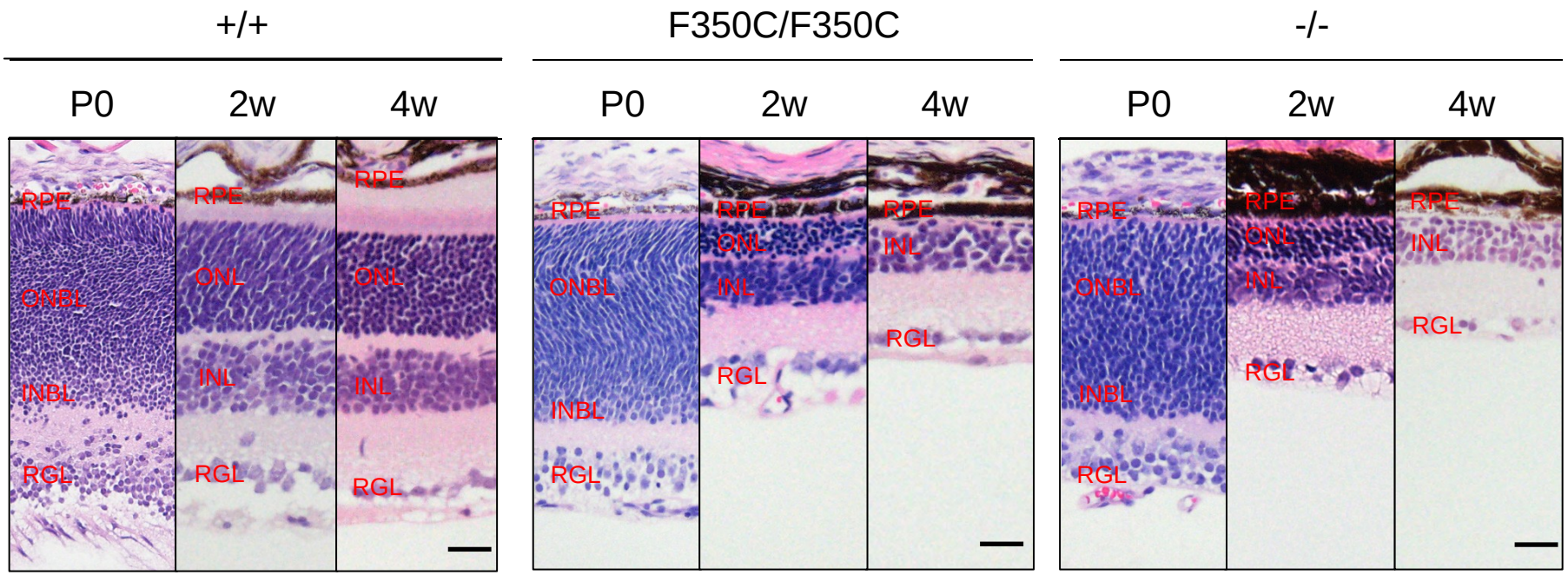
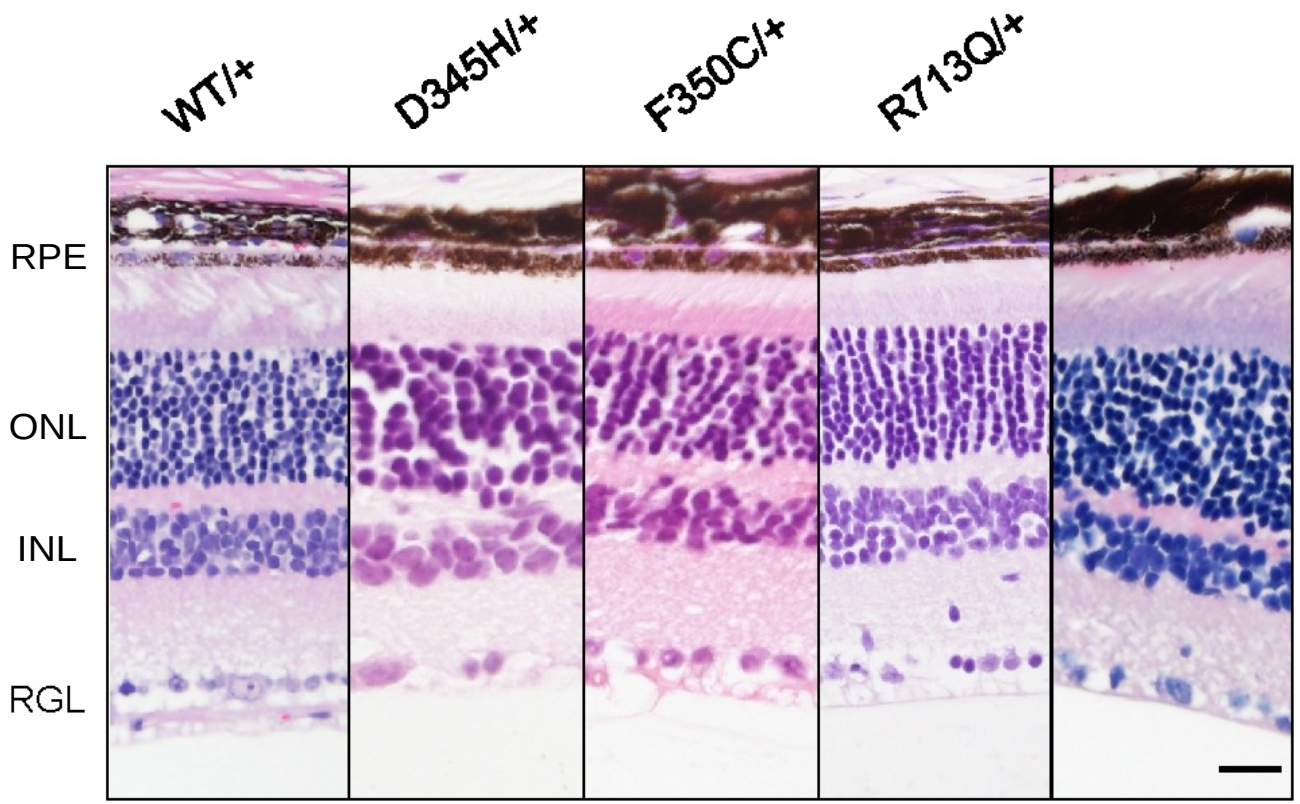
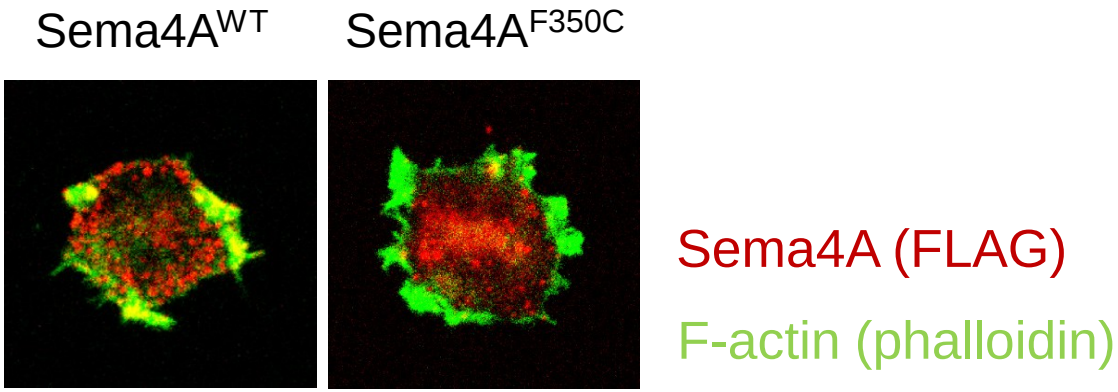


Supplementary Figure S1. Time-course study of histological changes in *Sema4A*$^{F350C/F350C}$ retina.
Hematoxylin and eosin (HE) staining of retinas of wild-type (*Sema4A*$^{+/+}$), *Sema4A*$^{F350/CF350C}$, and *Sema4A*$^{-/-}$ mice. The histology of every mouse was evaluated immediately after birth (P0), at 2 weeks of age (2w), or at 4 weeks of age (4w). Scale bars, 50 μm. RPE, retinal pigment epithelium; ONBL, outer neuroblastic layer; INBL, inner neuroblastic layer; ONL, outer nuclear layer; INL, inner nuclear layer; RGL, retinal ganglion layer.



Supplementary Figure S2. Heterozygous knock-in mice do not exhibit photoreceptor degeneration. Hematoxylin and eosin (HE) staining of retinas in *Sema4AWT1+*, *Sema4AD345HI+*, *Sema4AF350c1+*, *Sema4AR713Qf+*, and *Sema4A+I-* mice. As shown, none of the heterozygous knock-inmice showed retinal photoreceptor degeneration. Scale bars, 50 J.llll.



Supplementary Figure S3. Lentiviral vectors efficiently express the Sema4A-FLAG proteins.
293T cells were transfected with lentiviral vectors encoding Sema4A^{WT}-FLAG or Sema4A^{F350C}-FLAG, fixed and immunolabeled with a Cy5-conjugated anti-FLAG antibody. As shown in the representative images, the Sema4A^{F350C}-FLAG protein did not localize to the plasma membrane, including lamellipodia, whereas Sema4A^{WT}-FLAG was present at the plasma membrane. Scale bars, 10 μm.

Supplementary Table S1. Primer sequences for preparation of lentiviral vectors.

primer	sequence
AgeI-Sema4A-Fow	5’-CATGACCGGTCTGACCATGGCCCTACCATCCC-3’
FLAG-EcoRI-Rev	5’-GTCAGAATTCGGGATCACTACTTGTCATCGTCATCC-3’