iScience, Volume *24*

Supplemental information

Identification of early-onset photoreceptor degeneration in transgenic mouse models of Alzheimer's disease

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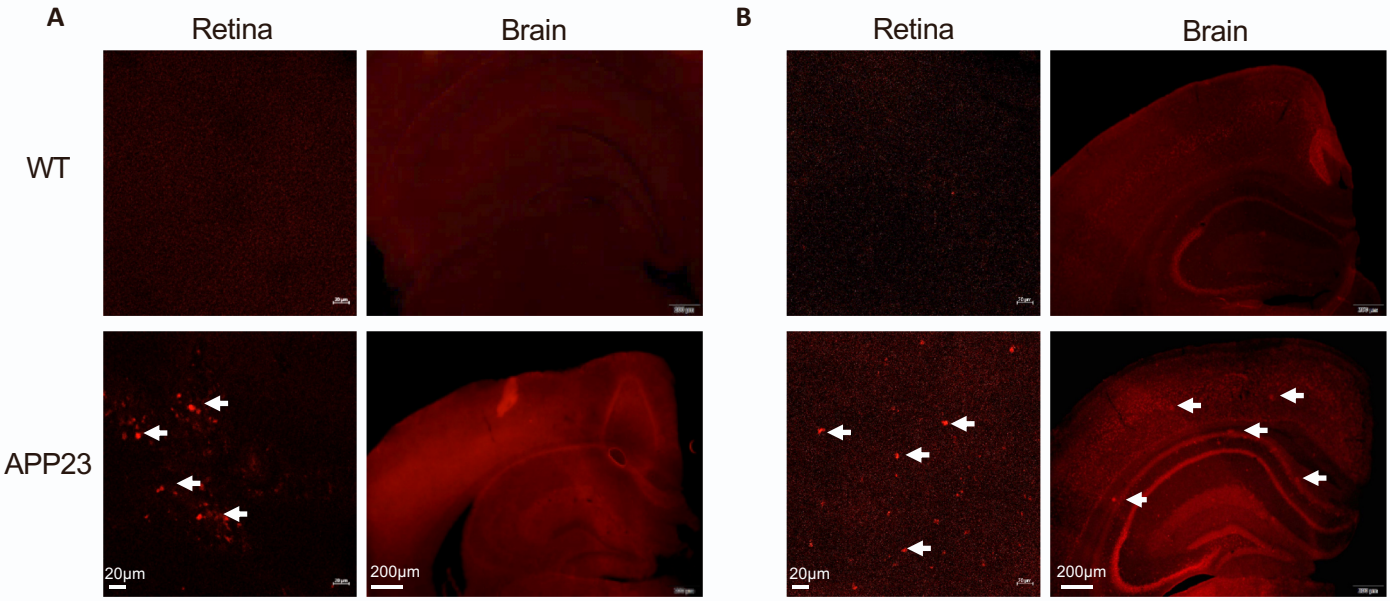

Figure S1. Aβ plaques labeled with curcumin (red color) in whole-mounted retinas and brain cryosections of APP23 and WT mice at 9 and 12 months. Related to Figure 1 and 2. (A) At 9 months, ex-vivo curcumin-labeled Aβ plaques were detected in the retinas (but not brain) of APP23 mice, but were not detected in either the retinas or brains of WT controls. (B) Curcumin-labeled Aβ plaques were detected in both the retinas and brains of APP23 mice, but not in WT controls, at 12 months.

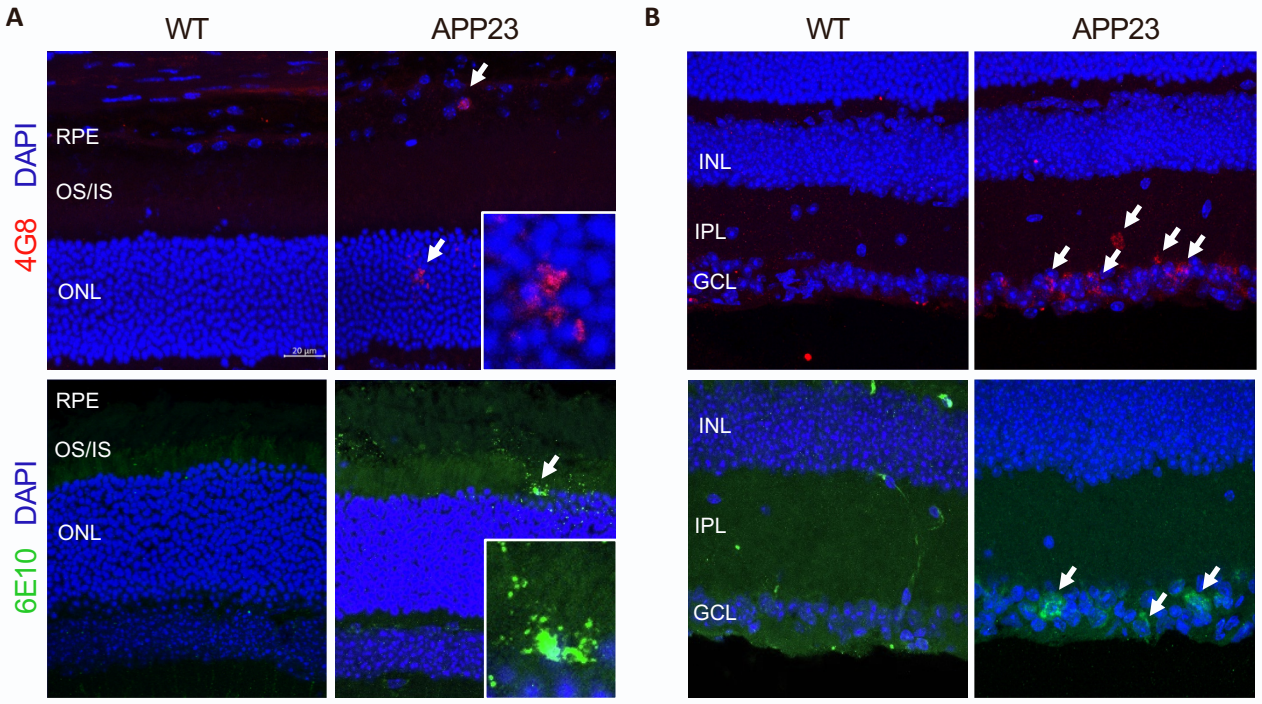

Figure S2. Detection of Aβ plaques using anti-human Aβ antibodies (4G8: red; 6E10: green) on retinal cross sections from APP23 and WT mice at 12 months. Related to Figure 1 and 2. (A) *Left:* No Aβ plaques were detected in WT mice. *Right:* Aβ plaques deposit in the OS, IS and nucleus of photoreceptor cells in APP23 mice. (B) Accumulation of retinal Aβ was mainly in the GCL of APP23 mice. Scale bar=20 μm

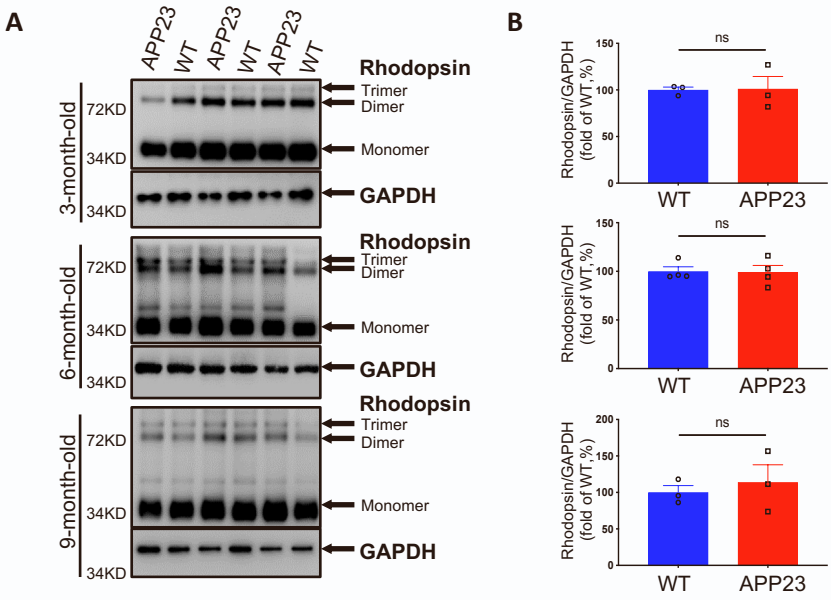

Figure S3. Expression of rhodopsin in retinas from APP23 and WT mice at 3, 6, 9 months. Related to Figure 1. (A) Rhodopsin levels was evaluated by western blot analysis using anti-rhodopsin(1D4) antibody. Rhodopsin monomer levels were analyzed using densitometry and normalized by GAPDH level. (B) Rhodopsin levels of APP23 were not different to that of control WT mice. Data are represented as mean±SEM. ns: not significant, Student's *t* test.

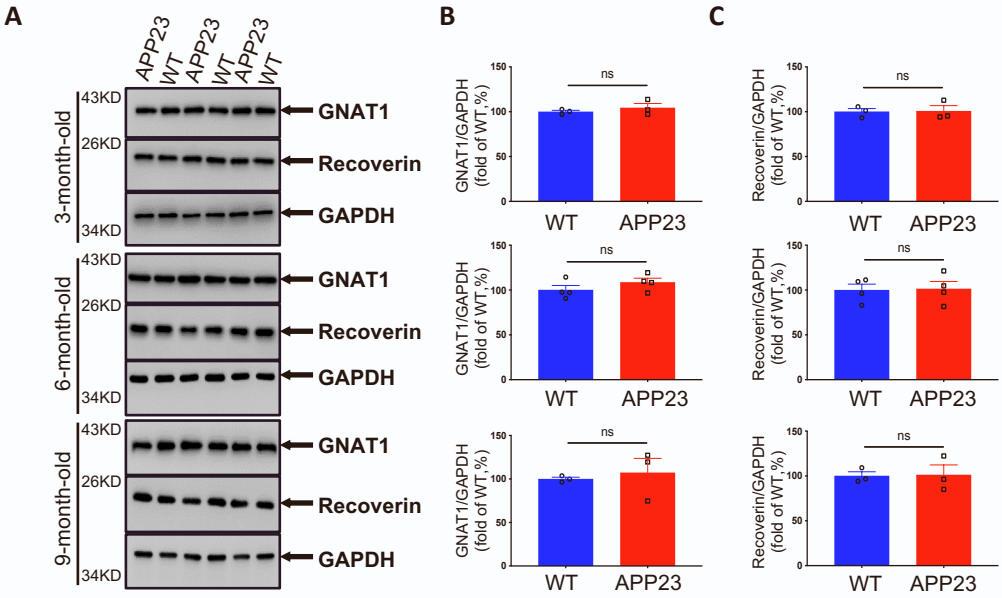

Figure S4. Expression of rod-specific photo-transduction proteins GNAT1 and recoverin in retinas from APP23 and WT mice at 3, 6 and 9 month. Related to Figure 1. (A) GNAT1 and recoverin levels was evaluated using western blot. Expression levels were analyzed using densitometry and normalized by GAPDH level. (B-C) GNAT1 and recoverin levels of APP23 were not different to those of control WT mice. Data are represented as mean±SEM. ns: not significant, Student's *t* test.

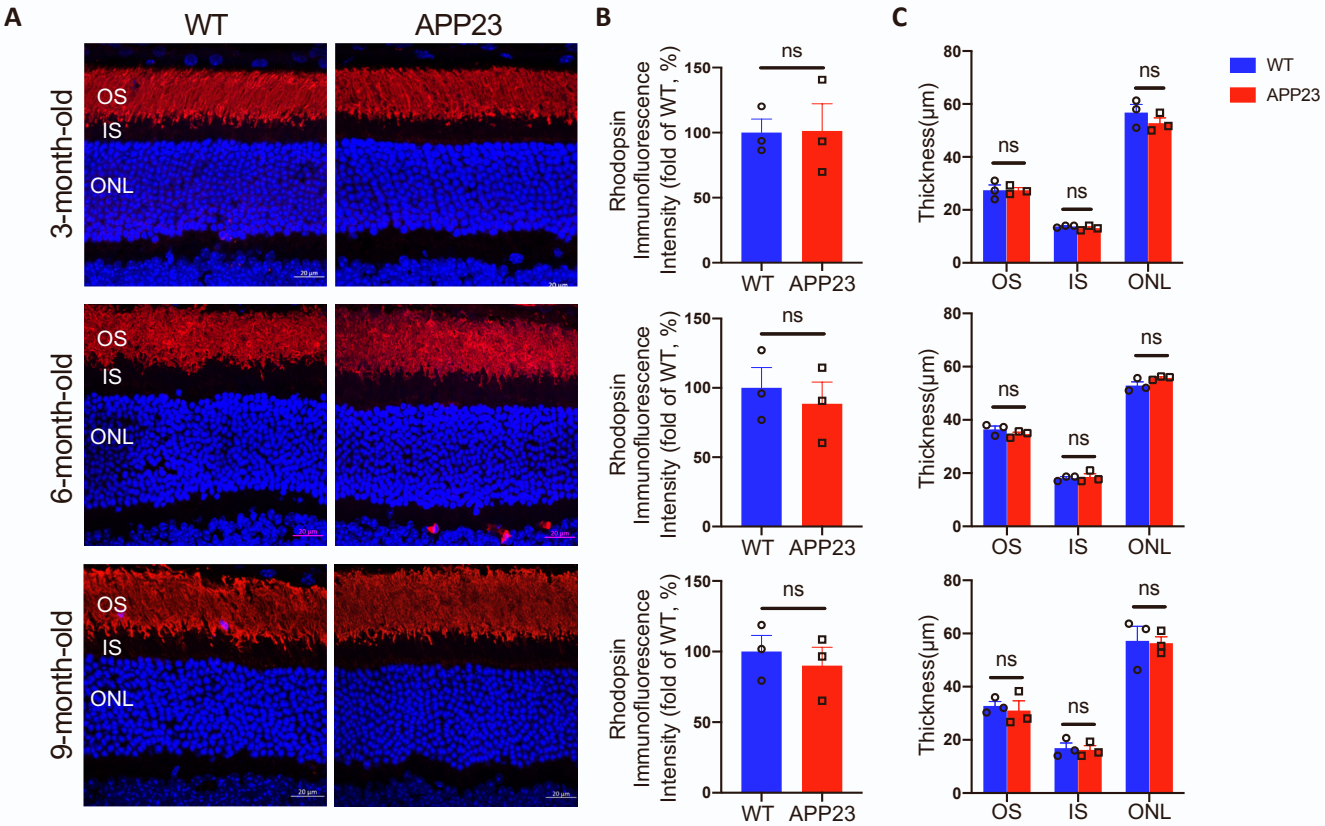

Figure S5. Histology and immunofluorescence labeling of rhodopsin on retinal cross sections of APP23 and WT mice at 3, 6 and 9 months. Related to Figure 1. (A) Representative images of rhodopsin labeling on retinal cross sections of APP23 and control WT mice. (B) Rhodopsin fluorescence intensity in APP23 mice was not different to that of control WT mice. (C) Thicknesses of rod outer segment (OS), inner segment (IS) and outer nuclear layer (ONL) in APP23 mice were not different to those of control WT mice. Data are represented as mean±SEM. ns: not significant, Student's *t* test. Scale bar=20 μm

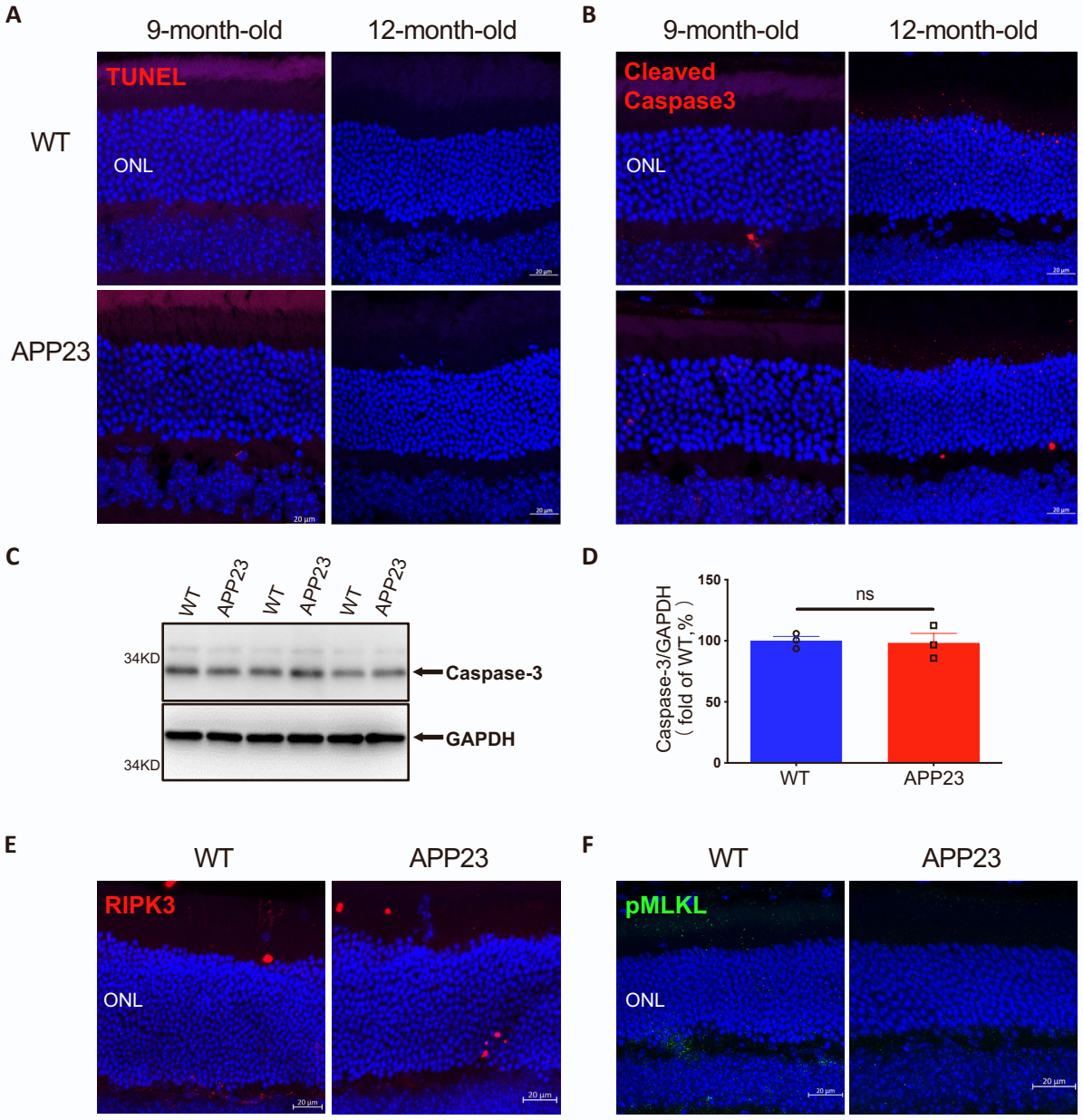

Figure S6. No apoptosis photoreceptor cells in APP23 and WT mice at 9 and 12 months. (A) No TUNEL-positive photoreceptor was detected in APP23 and control WT mice at 9 and 12 months. Related to Figure 5. (B) No apoptosis photoreceptor labeling with cleaved caspase 3-specific antibody was detected in APP23 and control WT mice at 9 and 12 months. (C-D) Expression of apoptosis-specific protein caspase 3 detected by western blot in APP23 and control WT mice at 12 months. (E-F) No necroptotic photoreceptor labeling with RIPK3 and pMLKL was detected in APP23 and control WT mice at 9 months. Data are represented as mean±SEM. ns: not significant, Student's *t* test. Scale bar=20μm

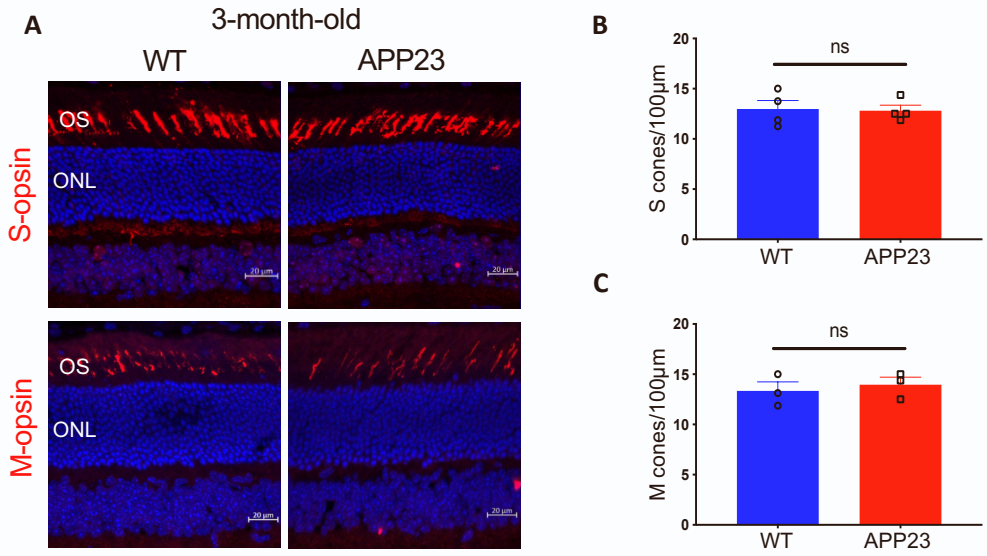

Figure S7. Immunofluorescence labeling of cone opsins on retinal cross sections of APP23 and control WT mice at 3 months. Related to Figure 7. (A) Representative images of S- and M-opsin labeling on retinal cross sections from APP23 and control WT mice. (B-C) Quantitative analysis show that there was no difference in density of S-cones (B) or M-cones (C) between APP23 and control WT mice. DATA are represented as mean±SEM. ns: not significant, Student's *t* test. Scale bar=20µm

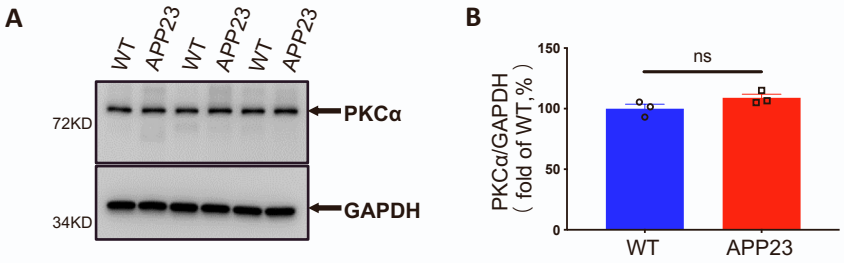

Figure S8. Expression of rod bipolar cell-specific protein in retinas from APP23 and WT mice at 12 months. Related to Figure 8. (A) PKCα levels was evaluated by western blot analysis and GAPDH was included as a loading control. (B) Quantitative analysis shows that there was no difference in the PKCα level between APP23 mice and control WT mice at 12 months. Data are represented as mean±SEM. ns: not significant, Student's *t* test.

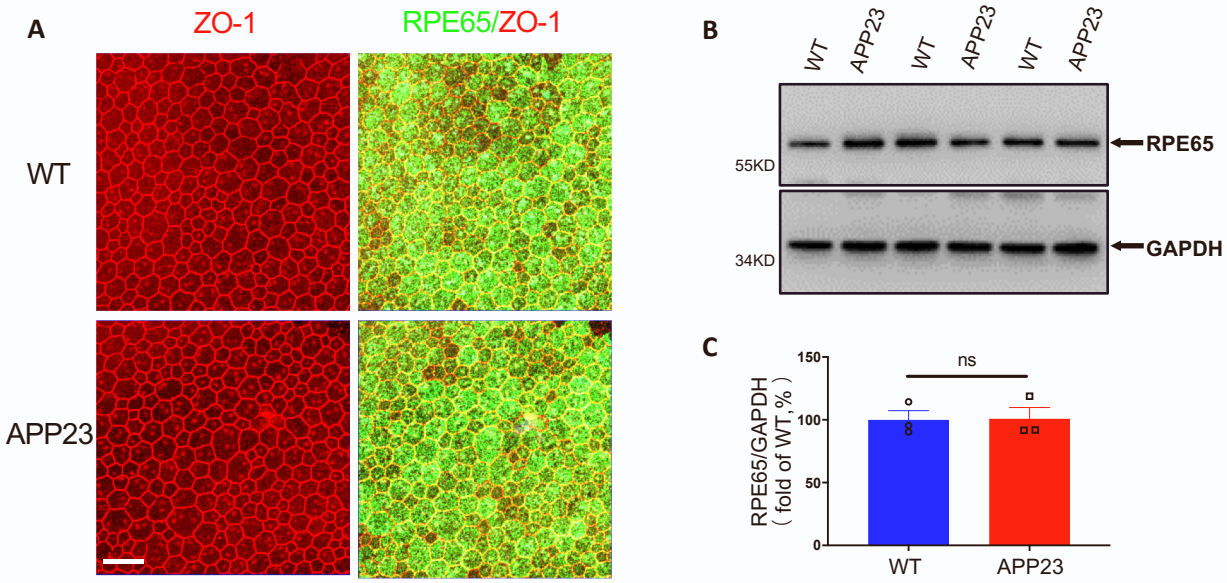

Figure S9. The retinal pigment epithelium (RPE) was maintained in APP23 and control WT mice at 12 months. Related to Figure 1 and 2. (A) Immunofluorescence labeling of the tight junction between the RPE cells using ZO-1-specific antibody. RPE65-specific protein was used to detected RPE65 in the RPE cells. (B) Expression of RPE65 was detected by western blot analysis and GAPDH was included as a loading control in APP23 and control WT mice. (C) Quantitative analysis shows that there was no difference in the RPE65 level between APP23 mice and control WT mice at 12 months. Data are represented as mean±SEM. ns: not significant, Student's *t* test. Scale bar=50μm