**Figure legends**

**Fig. 1. Effect of sodium iodate (NaIO3) on retina morphology in young and old C57BL/6J (WT) and DJ-1 knockout (KO) mice.** (**A**) Representative images of RPE/choroid whole-mounts labeled with phalloidin-TRITC (red) and injected with increasing concentration of NaIO3; degeneration edges are highlighted by white arrows. (**B**) Representative images of toluidine blue stained retinas of 3- month-old (young) and 15- month-old (old) WT and DJ-1 KO mice injected with PBS and NaIO3. Quantification of degenerated area in young RPE/choroid whole-mounts (**C**) and whole retinas (**D**) of both young and old mice. Degeneration is expressed as mean ± SEM (n = 3-5). Unpaired, two-tailed Student’s t-test was performed; \* p ≤ 0.05, \*\*p ≤ 0.01, \*\*\*p ≤ 0.001, \*\*\*\* p ≤ 0.000.

**Fig. 2.** **Expression of retinal markers during aging and under low-level oxidative stress (10 mg/kg NaIO3)**. Representative images of young and old retinas from WT and DJ-1 KO mice injected with PBS or NaIO3 and stained for anti-glial fibrillary acidic protein (GFAP) (**A**), Nile Red dye for neutral lipids (**B**) and advanced glycation end products (AGEs) (**C**). Quantification of Nile Red stained neutral lipid droplets in RPE (**D**) and AGEs in Bruch’s membrane (**E**) of young and old WT and DJ-1 KO mice. The apical and basal borders of the RPE is highlighted by brackets in **B** and **C**. Data are represented as mean ± SEM; n = 3-4 mice per group. Two-way Anova with Tukey’s multiple comparisons test was performed; \*\*\*\* p ≤ 0.0001.

**Fig. 3. Transcriptional changes in retina and RPE due to aging and low-level oxidative stress (10 mg/kg NaIO3).** Quantitative RT‐PCR analysis of *Nrf2*, *Sod1*, *Sod2*, *Nqo1*, *Hmox1*, *Prdx1*, *Gstp1*, *Gpx1* and *Park7* (DJ-1) in the retina (**A**) and RPE (**B**) of young and old WT and DJ-1 KO mice; the retina of young (**C**) and old (**E**) WT and DJ-1 KO mice with or without NaIO3 treatment; and the RPE of young (**D**) and old (**F**) WT and DJ-1 KO mice with or without NaIO3 treatment. Data are represented as mean ± SEM; n = 3-4 per group. Two-way Anova with Tukey’s multiple comparisons test was performed; \* p ≤ 0.05, \*\*p ≤ 0.01, \*\*\*p ≤ 0.001, \*\*\*\* p ≤ 0.0001.

**Fig. 4. Antioxidant protein changes in retina and RPE due to aging.** Western blot analysis for SOD1, PRDX1 and PARK7 (DJ-1) in retina (**A**) and RPE (**C**) old young and old WT and DJ-1 KO mice. Quantification of protein signal from western blots in retina (**B**) and RPE (**D**) of young and old WT and DJ-1 KO mice. Data are represented as mean ± SEM; n = 3-4 mice per group. Two-way ANOVA with Tukey’s multiple comparisons test was performed; \* p ≤ 0.05, \*\*p ≤ 0.01, \*\*\*p ≤ 0.001, \*\*\*\* p ≤ 0.0001.

**Supplemental Fig. S1. Scheme of the quantification of degeneration induced by NaIO3.** Total and degenerated retinal areas were delineated on whole-mount RPE preparation labeling with Phalloidin-TRITC (A) and epon sections labeled with toluidine blue (B) using the free hand line tool of ImageJ 2.0 software.

**Supplemental Fig. S2. Effects of low-level oxidative stress on RPE morphology.** Representative high magnification images of RPE/choroid whole-mounts labeled with phalloidin-TRITC (red). Images were acquired at the border of the RPE degenerated area (\*) in WT mice injected with 15 and 20 mg/kg of NaIO3 and DJ-1 KO mice injected with 10, 15 and 20 mg/kg of NaIO3. RPE cells at the edge of the degeneration edges are bigger and displayed stress fibers (white arrows) and atypical cell shape. Both mice injected with PBS and WT mice injected with low-level oxidative stress displayed RPE typical polygonal, mostly hexagonal shape.

**Supplemental Fig. S3. Effects of aging and low-level oxidative stress in the retinas of WT and DJ-1 KO mice.** Representative high magnification images of toluidine blue stained retinas of 3- month-old and 15- month-old WT and DJ-1 KO mice injected with PBS and low-level oxidative stress. All mice injected with PBS displayed normal morphology with the RPE containing dark melanin granules and the photoreceptor outer segments extending into the apical surface of the RPE cells. Retinas of young (3-month-old) WT mice injected with low-level oxidative stress were similar to the retinas of mice injected with PBS. However, aged (15-month-old) WT mice injected with low-level oxidative stress displayed vesiculation of the RPE cells. In both young and aged DJ-1 KO mice injected low-level oxidative stress the RPE was mostly gone and the presence of inflammatory cells was observed in the subretinal space (red asterisks).

**Supplemental Fig. S4. Effects of aging and low-level oxidative stress in the GS in retinas of WT and DJ-1 KO mice.** (**A**) Representative images of GS-labeled (green) retinas injected with PBS and 10 mg/kg of NaIO3. Nuclei were labeled with TO-PRO-3 (blue).

**Supplemental Fig. S5. Effects of aging and low-level oxidative stress on NRF2 levels in retinas of WT and DJ-1 KO mice.** (**A**) Representative images of NRF2-labeled (green) retinas injected with PBS and 10 mg/kg of NaIO3. Nuclei were labeled with TO-PRO-3 (blue). (**B**) Quantification of NRF2 signal intensity. Signal intensity data are expressed as mean ± SEM (n = 3-6).