Supplementary Material

Supplementary Figure 1. Predicted activation of mouse photoreceptor classes. Predicted activation (alpha-opic lux) is shown for animals contained within clear (open bars) and red-tinted (red bars) IVCs. Figures based on the irradiance toolbox described by Lucas et al\textsuperscript{21}. 
Supplementary Figure 2. The inferior: superior ratio of PRL thickness is greater for \textit{Rho}^{p23H/+} mice housed in red compared to clear IVCs suggesting an attenuation of the sector phenotype. Animals were born in red cages and divided between the two cage types at weaning. Points are plotted as mean ± SEM. The horizontal dotted line represents the PRL ratio of one that would be expected if no sector phenotype were to be present. Repeated measures two-way ANOVA with factors of cage type and time post-randomisation: F(1, 20) = 14.47, \( p=0.001 \) for effect of cage type; F(3, 60) = 3.75, \( p=0.015 \) for interaction cage type x time; ***\( p<0.001 \), Sidak’s multiple comparison test.
Supplementary Figure 3. Rearing in red IVCs has no effect on the rate of outer retinal degeneration in the Rpgr<sup>−/−</sup> mouse as measured by SD-OCT. Animals born in red IVCs were divided between clear and red IVCs at the point of weaning on PND21. Error bars representing the 95% confidence interval about the mean are smaller than the size of every symbol for both groups and so are not displayed. Repeated measures two-way ANOVA with factors of cage type and time post-weaning: F(1, 16) = 0.016, p=0.90 for effect of cage type. The dashed horizontal line represents the mean PRL thickness measured from four C57BL/6J wild type mice at six months post-weaning.
Supplementary Figure 4. *Rho<sup>P23H/+</sup>* mice are homozygous for the M450 variant of *Rpe65*.

Restriction length polymorphism assay. The M450 polymorphism eliminates the MwoI restriction site within the 545bp Rpe65 PCR amplicon. Presence of bands of length 180 and 360bp indicates the presence of an L450 allele. Three bands of 180, 360 and 545bp were thus detected for *Rpe65<sup>L450/M450</sup>* heterozygous mice. Single bands of 545bp were apparent for *Rho<sup>P23H/+</sup>* mice indicating *Rpe65<sup>M450/M450</sup>* homozygosity in this strain.