

Description of Additional Supplementary Files

File Name: Supplementary Data 1

Description: Terms obtained from the GO enrichment analysis of *P. canaliculata* (Pc) genes bioinformatically defined as orthologs of human (Hs) or fly (Dm) genes annotated with GO terms related to eye development and function (adjusted p value cutoff of 1e-5).

File Name: Supplementary Data 2

Description: Genes belonging to the vertebrate GRN for optic cup patterning and retinal differentiation (Buono and Martinez-Morales, 2020), their reciprocal best BLAST hits in *P. canaliculata* genome and their expression during eye regeneration (expressed in TPMs).

File Name: Supplementary Data 3

Description: Terms obtained from the GO enrichment analyses run on the up-regulated genes obtained from comparing each time point to 1 dpa (first tab) and each time point with the previous one (second tab) (p value ≤ 0.01 , q value ≤ 0.05).

File Name: Supplementary Data 4

Description: Size, domains and domain conservation of human *pax6*, *D. melanogaster eyeless* and *P. canaliculata* genes annotated as pax6-like.

File Name: Supplementary Data 5

Description: Developed mutant lines through CRISPR/Cas9 technology, genes targeted, gRNA sequences, primers to test for indels and length and position of indels.

File Name: Supplementary Movie 1

Description: Adult *P. canaliculata* shows behavioral phenotype when *pax6* is mutated Adult *P. canaliculata* free in the tank recorded at 30 frames per second (fps) for about 30 min. Wild-type intact snails, *pax6*^{-/-} animals and wild-type snails at 1 dpa after eye amputation are shown. Videos are played at speed 64x. This video is representative of three rounds of observations.