

Description of Additional Supplementary Files

File Name: Supplementary Data 1

Description: Mass spectrometry of 3 month old *Rpgr*^{Ex3d8} and wild type retina.

File Name: Supplementary Data 2

Description: Mass spectrometry of 6 week old *Rpgr*^{Ex3d8} and wild type outer segments.

File Name: Supplementary Movie 1

Description: Movie of rotating 3D tomogram of a wild type photoreceptor connecting cilium at the level of the basal disc. Segmented reconstruction is overlaid to highlight the ciliary and disc membranes (green), microtubule-based axoneme (cyan) and microfilaments (purple). Microfilaments extend from the connecting cilium into the basal disc. Slice from this tomogram is displayed in Fig. 1b & c.

File Name: Supplementary Movie 2

Description: Movie of tomographic slices along the y axis of a 3D reconstruction of a wild type photoreceptor connecting cilium at the level of the basal disc. Slice from this tomogram is displayed in Fig. 5a.

File Name: Supplementary Movie 3

Description: Movie of tomographic slices along the y axis of a 3D reconstruction of a *Rpgr*^{Ex3d8} photoreceptor connecting cilium at the level of the basal disc. Slice from this tomogram is displayed in Fig 5b.

File Name: Supplementary Movie 4

Description: Movie of rotating 3D tomogram of a wild type photoreceptor connecting cilium at the level of the basal disc. Reconstruction is overlaid to highlight the ciliary and disc membranes (cyan), microtubule based axoneme (tan) and actin filaments (purple). Slice from this tomogram is displayed in Fig. 5a.

File Name: Supplementary Movie 5

Description: Movie of rotating 3D tomogram of a *Rpgr*^{Ex3d8} photoreceptor connecting cilium at the level of the basal disc. Reconstruction is overlaid to highlight the ciliary and disc membranes (cyan), microtubule based axoneme (tan) and actin filaments (purple). Slice from this tomogram is displayed in Fig. 5b.

File Name: Supplementary Movie 6

Description: Subtomogram averaged maps (after imposing helical symmetry) of actin from wild type (left with fitted cofilactin model (3J0S pdb)) and *Rpgr*^{Ex3d8} (right, with fitted F-actin model (3J0S pdb)) connecting cilia.