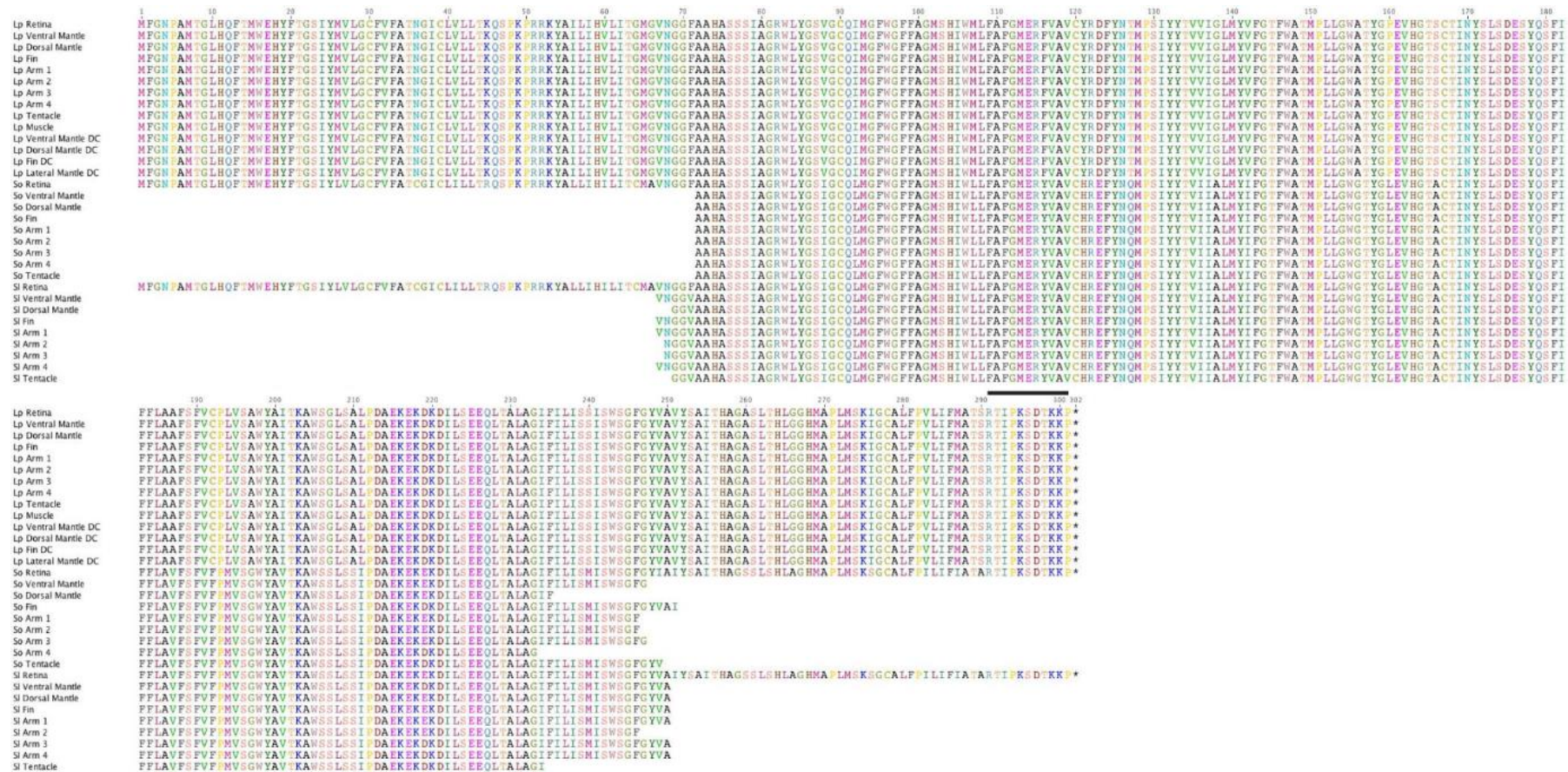
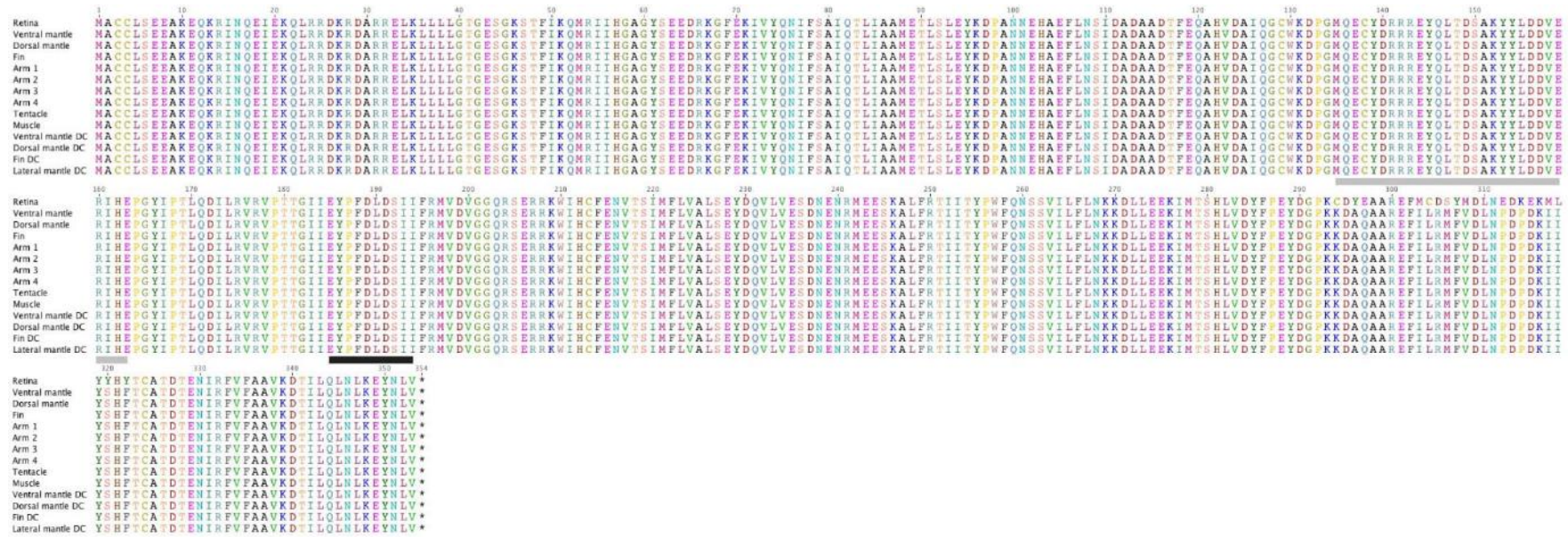


**Fig. S1.** Predicted amino acid alignment of rhodopsin identified by RT-PCR in *Doryteuthis pealeii*, *Sepia officinalis*, and *Sepia latimanus*. The black bar represents the region against which anti-rhodopsin antibody was designed.





**Fig. S2.** Predicted amino acid alignment of retinochrome identified by RT-PCR in *Doryteuthis pealeii*, *Sepia officinalis*, and *Sepia latimanus*. The black bar represents the region against which anti-retinochrome antibody was designed.

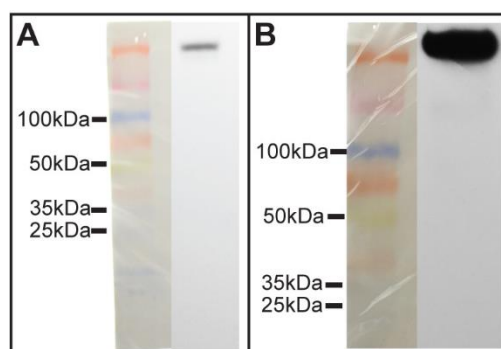


**Fig. S3. Predicted amino acid alignment of full length Gqa identified by RT-PCR in *Doryteuthis pealeii*.** The black bar represents the region of the protein against which anti-Gqa targets. The gray bar represents the region of the Gqa transcript identified in the retina that is different from the Gqa transcripts identified in dermal tissues.

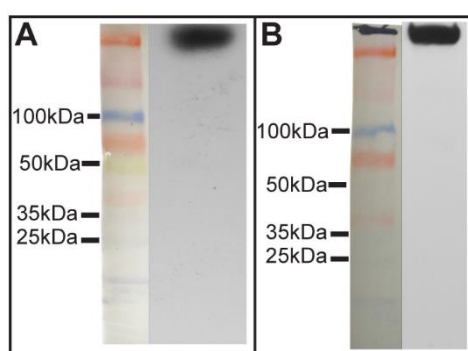




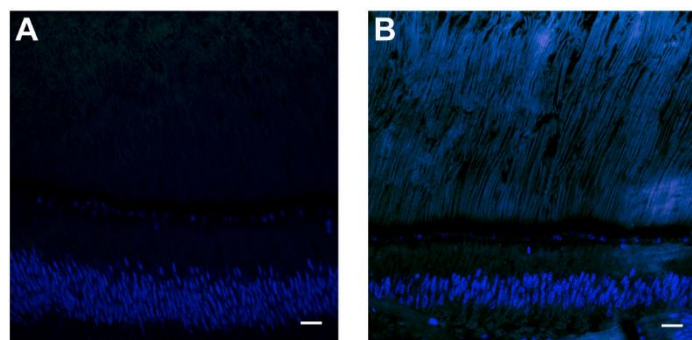
Fig. S4. Predicted amino acid alignment of partial transient receptor potential channel (TRP) identified by RT-PCR in *Doryteuthis pealeii*.



**Fig. S5. Secondary only control for anti-rabbit horseradish peroxidase-conjugate (A) and anti-chicken horseradish peroxidase-conjugate (B) Western blots.** Secondary-only controls lack primary antibody and show no labeling. Bands at the top of each blot represent excess protein.

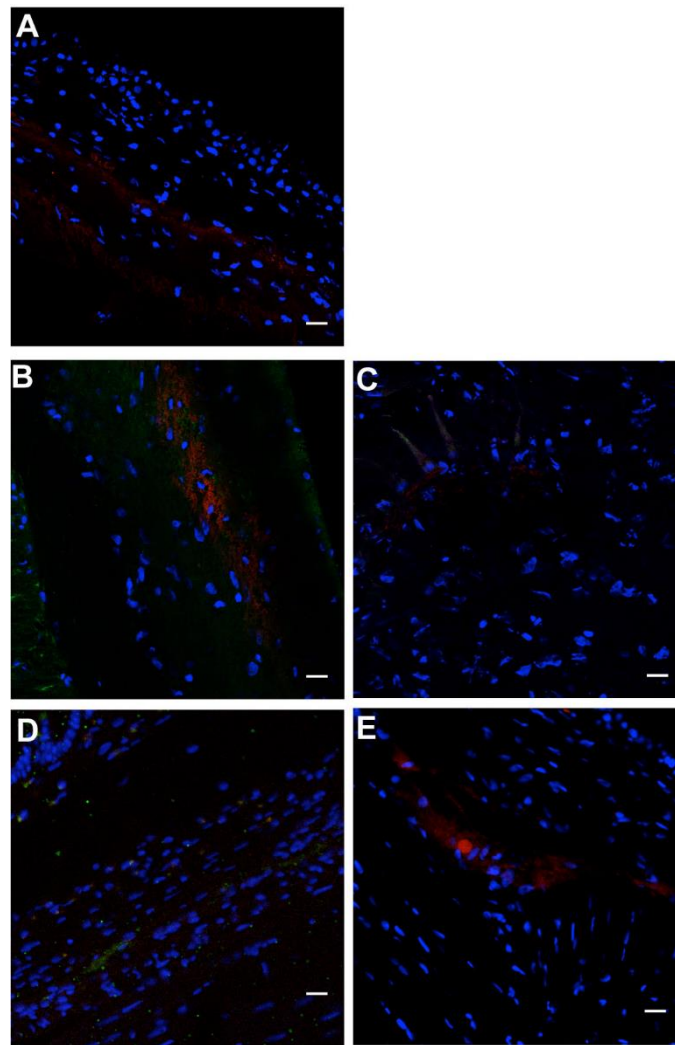


**Fig. S6. Absorption controls for anti-rhodopsin (A) and anti-retinochrome (B) Western blots.** Rhodopsin absorption control is labeled with rhodopsin primary antibody incubated with antigenic peptide to inhibit functionality of primary antibody (A). Retinochrome absorption control is labeled with retinochrome primary antibody incubated with peptide to inhibit functionality of primary antibody (B). Bands at the top of each blot represent excess protein.

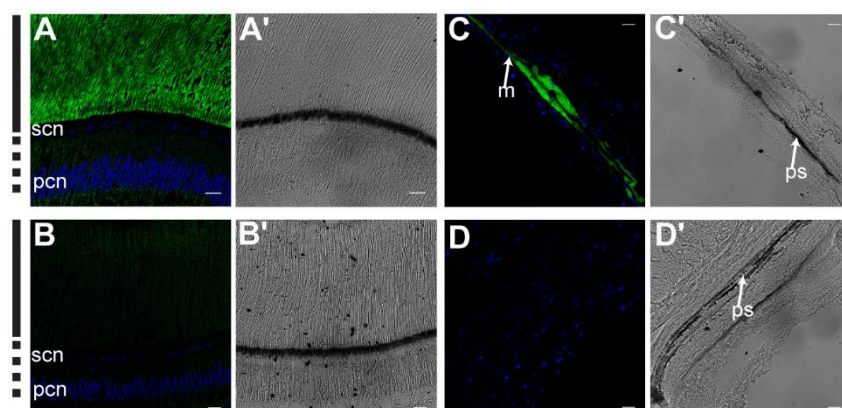


**Fig. S7. Immunohistochemical secondary antibody-only control lacks primary antibody.**

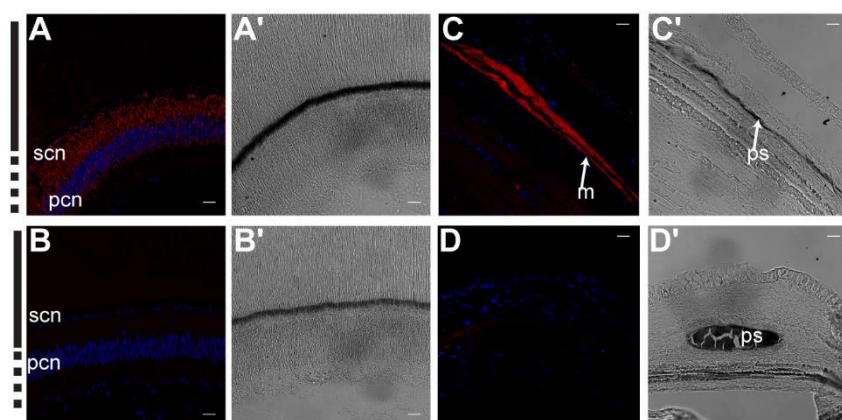
*Doryteuthis pealeii* retina is labeled with (A) anti-rabbit 488 and anti-chicken 633 and (B) anti-rabbit 488 and anti-chicken 555 to ensure no non-specific labeling of secondary antibodies.



**Fig. S8. Immunohistochemical secondary antibody-only control lacks primary antibody.** *Doryteuthis pealeii* (A) ventral mantle, (B) dorsal mantle, (C) fin, (D) arm 1, and (E) tentacle labeled with anti-rabbit 488 and anti-chicken 555 to ensure no non-specific labeling of secondary antibodies.



**Fig. S9. Absorption control immunolabeling of rhodopsin protein.** Rhodopsin protein is expressed in retina outer segments (A) and chromatophores (C). When antibody is absorbed with antigenic peptide, protein labeling is blocked in retinal sections (B) and mantle sections (D). Transmitted light images are included to show tissue structure (A'', B'', C'', D''). Blue represents DAPI labeling of nuclei. The location of the outer segments is represented by the vertical solid black line; that occupied by the inner segments is represented by the vertical dotted lines. Letter labels: supporting cell nuclei; pcn, photoreceptor cell nuclei; m, membrane; ps, pigment sac. Scale bar, 25 $\mu$ m.



**Fig. S10. Absorption control immunolabeling of retinochrome protein.** Retinochrome protein is expressed in retina inner segments (A) and chromatophores (C). When antibody is absorbed with antigenic peptide, protein labeling is blocked in retinal sections (B) and mantle sections (D). Transmitted light images are included to show tissue structure (A'', B'', C'', D''). Blue represents DAPI labeling of nuclei. The location of the outer segments is represented by the vertical solid black line; that occupied by the inner segments is represented by the vertical dotted lines. Letter labels: supporting cell nuclei; pcn, photoreceptor cell nuclei; m, membrane; ps, pigment sac. Scale bar, 25 $\mu$ m.



**Table S1.** Presence of phototransduction component transcripts in dermal tissues from *D. pealeii* (black), *S. officinalis* (red), and *S. latimanus* (blue). + indicates transcript found; X indicates transcript not found.

	<b>Rhodopsin</b>	<b>Retinochrome</b>	<b>Gqα</b>	<b>sTRP</b>
<b>Retina</b>	+++	+++	+	+
<b>Ventral mantle</b>	+++	+++	+	+
<b>Dorsal mantle</b>	+++	+++	+	+
<b>Fin</b>	+++	+++	+	+
<b>Arm 1</b>	+++	+++	+	+
<b>Arm 2</b>	+++	+++	+	+
<b>Arm 3</b>	+++	+++	+	+
<b>Arm 4</b>	+++	+++	+	+
<b>Tentacle</b>	+++	+++	+	+
<b>Muscle</b>	+++	+++	+	+
<b>Fin nerve</b>	X	X		
<b>Stellate ganglion</b>	X	X		

**Table S2.** Presence of phototransduction transcripts in chromatophores dissociated from *D. pealeii* dermal tissue.

	<b>Rhodopsin</b>	<b>Retinochrome</b>	<b>Gqα</b>
<b>Ventral mantle</b>	+	+	+
<b>Dorsal mantle</b>	+	+	+
<b>Lateral mantle</b>	+	+	+
<b>Fin</b>	+	+	+

**Table S3.** Gene specific primer sequences used to characterize cephalopod phototransduction transcripts.

<b>Gene</b>	<b>Primer</b>	<b>Sequence 5'&gt;3'</b>
<b>Rhodopsin</b>	<b>L.pealeiiRhoF1</b>	<b>ATGGGTCGCGATATCCCAGACAATG</b>
	<b>L.pealeiiRhoR1325</b>	<b>TTAGGCCTGGTTGTCAACCCCCTGAG</b>
	<b>SepiaRhoF1</b>	<b>ATGGGTAGAGACATCCCAGATA</b>
	<b>SepiaRhoR1395end</b>	<b>TCAAGCCTGGTAGGCCTGGTTGTCAA</b>
	<b>S.latimanusF91</b>	<b>GACGCTGTTTACTACTCCCTCGGTAT</b>
	<b>S.latimanusF189</b>	<b>TCCCTCCAGACTCCAGCCAACATG</b>
	<b>L.pealeiiR860</b>	<b>CATAAGGTGTTACCCATTTCGAGTGGACC</b>
<b>Retinochrome</b>	<b>CephRetF1</b>	<b>ATGTTTCGGAAATCCAGCAATGACTGG</b>
	<b>CephRetR906</b>	<b>TTAGGGCTTCTTGGTGTCACTTTTGG</b>
	<b>S.latimanusRetR196</b>	<b>GGGTCAATGGAGGAGTTGCTGCTC</b>
	<b>L.pealeiiRetR775</b>	<b>GTGACCTCCCAAGTGAGTAAGGCTGGC</b>
<b>Gqα</b>	<b>LpGq_F1short</b>	<b>ATGGCGTGCTGCCTCAGCG</b>
	<b>LpGq_Rend</b>	<b>TCAGACCAAGTTATACTCCTTCAAGTTAAG</b>
<b>sTRP</b>	<b>L.pealeiiTRP F1852</b>	<b>CAACTTGCTTATCGCTATGATGAGC</b>
	<b>L.pealeiiTRP R2365</b>	<b>CCATAAGTGTTTCGGTCTGGCCC</b>