

Fig. S1

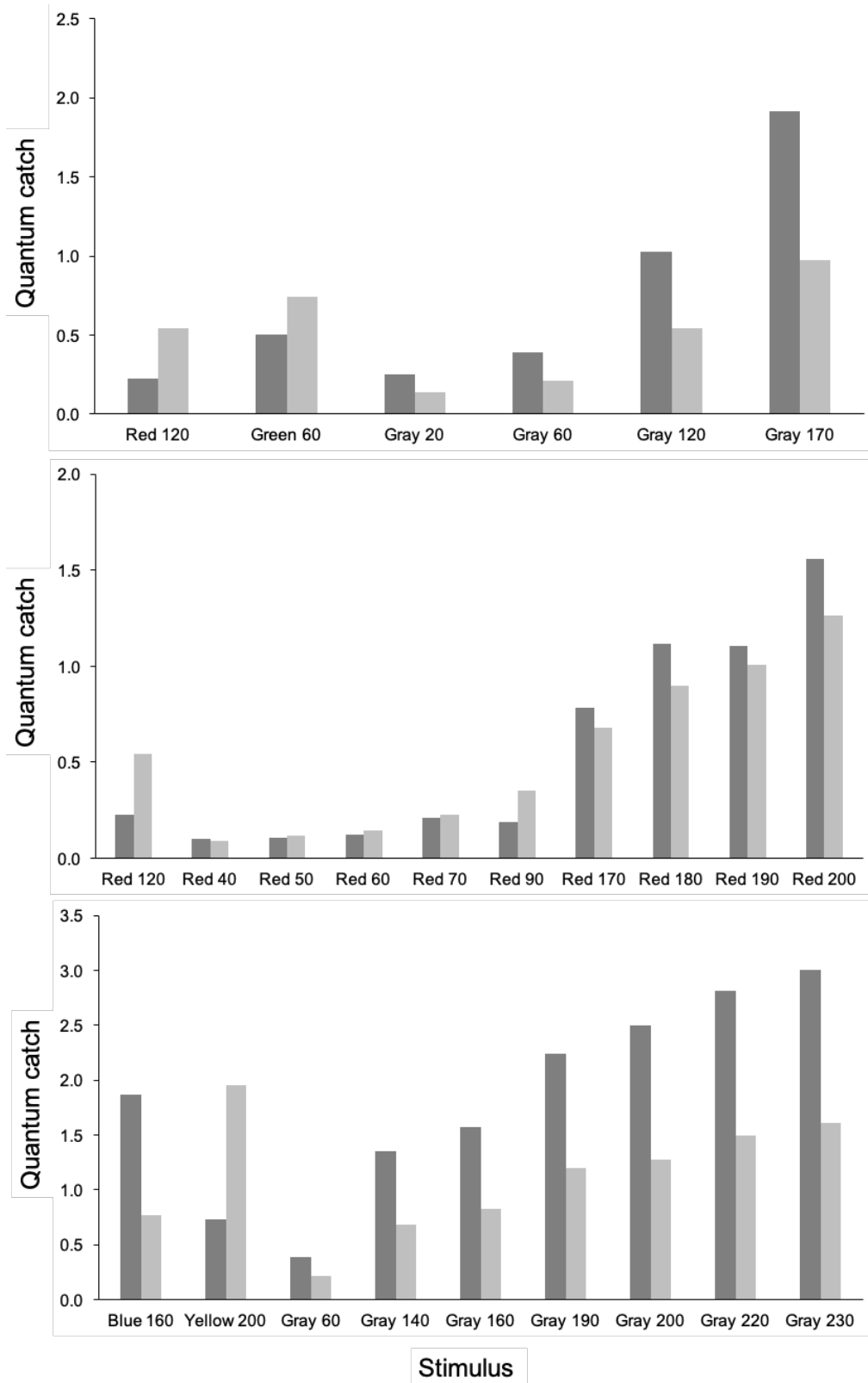


Fig. S1.

Individual quantum catches. Individual quantum catches for the M-cone (dark grey) and L-cone (light grey) for each stimulus used in experiment 1a (top), 1b (middle) and experiment 2 (bottom).

Fig. S2

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.....|.....|.....|.....|.....|.....|
          10      20      30      40      50
Homo sapiens RH1      MNGTEGP--- -----NFYV PFSNATGVVR --SPFEYYPQY
Danio rerio rh1.1     MNGTEGP--- -----AFYV PMSNATGVVR --SPYEYPQY
Danio rerio rh1.2     MNGTEGP--- -----DFYV PMSNESGVVR --SPYEYPQY
Potamotrygon motoro rh1 MNGTEGE--- -----NFYV PMSNKTGIVR --SPFEYYPQY
Orectolobus ornatus rh1 -----GIVR -----SPFEYYPQY
Orectolobus maculatus rh1 ---SQG--- -----PMS-QTGVVR --SPFEYYPQY
Rhincodon typus rh1 -----
Scyliorhinus canicula rh1 MNGTEGE--- -----NFYI PMSNKTGVVR --SPFDYYPQY
Chiloscyllium melastomus rh1 MNGTEGE--- -----NFYV PMSNKTGVVR --NPFEYYPQY
Raja erinacea rh1     MNGTEGE--- -----NFYV PMSNKTGVVR --SPFDYYPQY
Etmopterus spinax rh1 MNGTEGE--- -----NFYV PMSNKTGLVR --SPFEYYPQY
Scyliorhinus torazame rh1 MNGTEGD--- -----NFYI PMSNKTGVVR --SPFEYYPQY
Chiloscyllium plagiosum rh1 MNGTEGE--- -----NFYV PMSNKTGIVR --SPFEYYPQY
Callorhinchus milii rh1 MNGTEGE--- -----NFYI PMSNKTGVVR --SPFEYYPQY
Danio rerio rh2.1     MNGTEGS--- -----NFYI PMSNRTGLVR --SPYDYTPQY
Danio rerio rh2.2     MNGTEGN--- -----NFYI PMSNRTGLVR --SPYEYTPQY
Danio rerio rh2.3     MNGTEGN--- -----NFYI PMSNRTGLVR --SPYEYYPQY
Danio rerio rh2.4     MNGTEGN--- -----NFYI PLSNRTGLAR --SPYEYYPQY
Potamotrygon_motoro rh2 MNGTEGE--- -----NFYV PLSNKTGVVR --SPYEYYPQY
Callorhinchus milii rh2 MNGTKGS--- -----NFYI PMSNRTGVVR --NPFEYYPQY
Danio rerio sws2      MKQQQQTPEL -----FEDFHM PITLDVSNIS AYSPLFLVPQD
Homo sapiens SWS1     MRKMSEEEE--- -----F YLFKNISSVG ---PWDGYPQY
Danio rerio sws1      MDAWAVQ--- -----FGNASKVS ---PFEGEPQY
Homo sapiens LWS      MAQQWSQLRL AGRH---PQD SYEDSTQSSI FTYTNSNSTR --GPFEQPNY
Homo sapiens MWS      MAQQWSQLRL AGRH---PQD SYEDSTQSSI FTYTNSNSTR --GPFEQPNY
Danio rerio lws1      MAEHWGDAIY AARR---KGD ---ETTREAM FTYTNSNNTK --DPFEQPNY
Danio rerio lws2      MAE-WANGAF AARR---RGD ---ETTRDNA FSYTNSNNTK --DPFEQPNY
Potamotrygon_motoro lws MTESWNMVGY AARRRY--DE E-E-TTRGSI FTYTNSNFTR --GPFEQPNY
Orectolobus ornatus lws -----
Orectolobus maculatus lws -----
Chiloscyllium punctatum lws -MASWGLVTY AGRRRYVLDD DSETTTKGSV FIYTNSNSTR --GPFEQPNY
Rhincodon typus lws   -MASWGPVTY AARRRYELED --EATTRGSI FTYTNTNSTR --GPFEQPNY
Callorhinchus milii lws2 MAEPRGSVAF AARRWHDHEG -----TTVGE FTYTNSNSTR --DPFEQPNY
Callorhinchus milii lws1 MTQSWELVAP AARRGFKYDE P----THSGI FVYTNSNQTR --GPFEQPNY
Danio rerio va1       -----MEASSA AVNA---VSP AEDPFSAPLS
Danio rerio va2       -----MESFGF SVTESTDVTT PDDPFRGPLK

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	60	70	80	90	100
Homo sapiens RH1	YLAEPWQFSM	LAAYMFLIIV	LGFPINFLTL	YVTVQHKKLR	TPLNYILLNL
Danio rerio rh1.1	YLVAWPWAYGL	LAAYMFFLII	TGFPVNFLLTL	YVTIEHKKLR	TPLNYILLNL
Danio rerio rh1.2	YLASPFAYFC	MAAYMFLIIV	TCVPVNGTL	YVTIENKKLR	TPLNYILLNL
Potamotrygon motoro rh1	YLAEPWKYSA	LAAYMFFLII	TGFPINFLTL	YVTVQHKKLR	QPLNYILLNL
Orectolobus ornatus rh1	YLAEPWKFSV	LAAYMFFLII	TGFPVNFLLTL	YVTIQHKKLR	QPLYYILLNL
Orectolobus maculatus rh1	YLAEPWKFSV	LAAYMFFLII	TGFPVNFLLTL	YVTIQHKKLR	QPLNYILLNL
Rhincodon typus rh1	-----	----MFFLII	TGFPINFLTL	YVTIQHKKLR	QPLNYILLNL
Scyliorhinus canicula rh1	YLAEPWKFSV	LAAYMFFLII	AGFPVNFLLTL	YVTIQHKKLR	QPLNYILLNL
Galeus melastomus rh1	YLADHWMFAV	LAAYMFFLII	TGFPVNFLLTL	FVTIQNKKLR	QPLNYILLNL
Raja erinacea rh1	YLGEPPWMFSA	LAAYMFFLIL	TGLPVNFLLTL	FVTIQHKKLR	QPLNYILLNL
Etmopterus spinax rh1	YLAEPWKYSV	VAAAYMMFLII	VGFVNFLLTL	FVTFQHKKLR	QPLNYILLNL
Scyliorhinus torazame rh1	YLAEPWKFSV	LAAYMFFLII	TGFPVNFLLTL	YVTIQNKKLR	QPLNYILLNL
Chiloscyllium plagiosum rh1	YLADPWKFSV	LAAYMFFLII	TGFPVNFLLTL	YVTIQHKKLR	QPLNYILLNL
Callorhinchus milii rh1	YLAEPWQFSI	LAAYMFFLII	TCFPVNFLLTL	YVTFVHKKLR	QPLNFILLNL
Danio rerio rh2.1	YLAEPWKFKA	LAFYMFLIIV	FGFPINFLTL	VVTAQHKKLR	QPLNYILVNL
Danio rerio rh2.2	YLADPWQFKA	LAFYMFFLIC	FGLPINFLTL	LVTQAQHKKLR	QPLNYILVNL
Danio rerio rh2.3	YLAEPWQFKL	LAVYMFFLMC	FGFPINGLTL	VVTAQHKKLR	QPLNFILVNL
Danio rerio rh2.4	YLAEPWQFKL	LAVYMFFLIC	LGFPIINGLTL	LVTQAQHKKLR	QPLNFILVNL
Potamotrygon motoro rh2	YLAEPWKFSI	IAAYMFLIMG	IGLPINGLTL	VVTFRHKKLR	HPLNYILVNL
Callorhinchus milii rh2	YLADRWLFSV	ISAYMFLIC	AGLPINGLTL	LVTVKHKKLR	QPLNYILVNL
Danio rerio sws2	HLGHSGVFMG	MSAFMFLFI	AGTAINVLT	VCTIQYKKLR	SHLNYILVNL
Homo sapiens SWS1	HIAPVWAFYL	QAAFMGTVFL	IGFPLNAMVL	VATLRYKKLR	QPLNYILVNV
Danio rerio sws1	HIAPKWAFL	QAAFMGVFI	VGTPMNGIVL	FVTMKYKKLR	QPLNYILVNI
Homo sapiens MWS	HIAPRWVYHL	TSVWMI FVVI	ASVFTNGLVL	AATMKFKKLR	HPLNWILVNL
Danio rerio lws1	HIAPRWVYV	ATVWMMFFVVV	ASTFTNGLVL	VATAKFKKLR	HPLNWILVNL
Danio rerio lws2	HIAPRWVYV	ATVWMMFFVVV	ASTFTNGLVL	VATAKFKKLR	HPLNWILVNL
Potamotrygon motoro lws	HIAPRWVYV	TSCWMMVVI	ASVFTNGLVL	VSTWKFKKLR	HPLNWILVNM
Orectolobus ornatus lws	-----	-----	----NGLVL	VATWRYKKLR	HPLNWILVNM
Orectolobus maculatus lws	-----	-----	----NGLVL	VATWRYKKLR	HPLNWILVNM
Chiloscyllium punctatum lws	HIAPRWVYTL	TSVWMI FVVI	ASVFTNGLVL	VATWKYKKLR	HPLNWILVNM
Rhincodon typus lws	HIIPRWVYV	TSVWMI FVVI	SSVFTNGLVL	VATWKYKKLR	HPLNWILVNL
Callorhinchus milii lws2	HIAPRWTYNL	TSLWMMVVI	LSVFTNGLVL	VATWKFKKLR	HPLNWILVNL
Callorhinchus milii lws1	HIAPRWAYNL	TSVWMMVGVV	ASVFTNGLVL	VATVRFKKLR	HPLNWILVNM
Danio rerio val	SIAP-WNYSV	LAALMFVVTA	LSLSENFVTV	LVTFRFQQLR	QPLNYIIVNL
Danio rerio va2	SVAP-WNYTF	LACLMI FVTS	LSITENFVTV	LVTYRFKQLR	KPLNYIIVNL

	110	120	130	140	150
Homo sapiens RH1	AVADLFMVLG	GFTSTLYTSL	HGYFVFGPTG	CNLEGGFFATL	GGEIALWLSLV
Danio rerio rh1.1	AIADLFMVFG	GFTTTMYTSL	HGYFVFGRLG	CNLEGGFFATL	GGEMGLWLSLV
Danio rerio rh1.2	AVADLFMVFG	GFTTTFYTSM	HGYFVLGRAG	CNLEGLFATV	GGEIALWLSLV
Potamotrygon motoro rh1	AVADLFMVFG	GFTTIVVTSM	NGYFIFGPTG	CNFEGFFATL	GGEVSLWCLV
Orectolobus ornatus rh1	AVSDLFMVFG	AFTTTIITSM	NGYFIFGPTG	CNFEAFFATL	GGEVSLWLSLV
Orectolobus maculatus rh1	AVSDLFMVFG	GFTTTIITSM	NGYFIFGPTG	CNLEAFFATL	GGEVSLWLSLV
Rhincodon typus rh1	AVSDLFMVLG	GFTTAIITAM	NGYFIFGPAG	CNFEGFFATL	GGEISLWLSLV
Scyliorhinus canicula rh1	AVADLFMIFG	GFPSTMVTSM	NGYFVFGPSG	CNFEGFFATL	GGIIGLWLSLV
Galeus melastomus rh1	AVANLFMVFG	GFTTTLITSM	NGYFVFGSTG	CNLEGGFFATL	GGEISLWLSLV
Raja erinacea rh1	AVSDLFMVFG	GFTTTIITSM	NGYFIFGPAG	CNFEGFFATL	GGEVGLWCLV
Etmopterus spinax rh1	AVANLFMVFG	GFTTIVITSL	NGYFVFGPLG	CNLEGGFFATL	GGEVSLWLSLV
Scyliorhinus torazame rh1	AVADLFMVFG	GFTTIVVTSM	NGYFVFGPTG	CDFEGFFATL	GGIISLWLSLV
Chiloscyllium plagiosum rh1	AISDLFMVFG	GFTTTIITSM	NGYFIFGPTG	CNFEGFFATL	GGEVSLWLSLV
Callorhinchus milii rh1	AVADLFMVFG	GFTITVYTSL	HGYFVFGVTG	CNFEGFFATL	GGIIGLWLSLV
Danio rerio rh2.1	AFAGTIMVIF	GFTVSFYCSL	VGYMALGPLG	CVMEGFFATL	GGQVALWLSLV
Danio rerio rh2.2	AFAGTIMAFV	GFTVTFYCSI	NGYMALGPTG	CAIEGFFATL	GGIISLWLSLV
Danio rerio rh2.3	AVAGTIMVCF	GFTVTFYTAI	NGYFVLGPTG	CAIEGFMATL	GGQISLWLSLV
Danio rerio rh2.4	AVAGTIMVCF	GFTVTFYTAI	NGYFVLGPTG	CAIEGFMATL	GGEVALWLSLV
Potamotrygon motoro rh2	SVANLFMVLV	GFMVTFYTAI	HGYFVLGPTG	CAIEGFFATL	GGEVALWLSLV
Callorhinchus milii rh2	AVANLVMIMF	GFLVSFYTM	NGYFIFGPIG	CIFEGFFATL	GGQVALWLSLV
Danio rerio sws2	AISNLWVSVF	GSSVAFYAFY	KKYFVFGPIG	CKIEGFTSTI	GGMVSLSLSLA
Homo sapiens SWS1	SFGGFLLCIF	SVFPVAVASC	NGYFVFGRHV	CALEGFLGTV	AGLVTGWSLA
Danio rerio sws1	SLAGFIFDTF	SVSQVSVCAA	RGYYSLSGYTL	CSMEAAMGSI	AGLVTGWSLA
Homo sapiens LWS	AVADLAETVI	ASTISVNVQV	YGYFVLGHPM	CVLEGYTVSL	CGITGLWLSLA
Danio rerio lws1	AIADLGETLF	ASTISVINQF	FGYFILGHPM	CIFEGYTVSV	CGIAALWLSLT
Danio rerio lws2	AIADLGETLF	SSTISVINQV	FGYFILGHPM	CIFEGYTVSV	CGIAGLWLSLT
Potamotrygon motoro lws	AVADLGETLF	ASTISICNQI	FGYFILGHPM	CIFEGFTVSV	CGITALWLSLT
Orectolobus ornatus lws	AVADLGETLF	ASTISICNQI	FGYFILGHPM	CIFEGFTVSV	CGITALWLSLT
Orectolobus maculatus lws	AIADLGETLF	ASTISICNQI	FGYFILGHPM	CIFEGFTVSV	CGITALWLSLT
Chiloscyllium punctatum lws	AVADLGETVF	ASTVSVWNQI	YGYFILGHPL	CVFEGFIVSV	CGITALWLSLT
Rhincodon typus lws	AIADLGQTLF	ASTISYNEV	YGYFILGHPV	CVFEGFTVSV	CGITALWLSLT
Callorhinchus milii lws2	AIADLGETLF	ASTISICNQV	FGYFILGHPM	CVFEGFTVSA	CGITALWLSLT
Callorhinchus milii lws1	ALADLGETVL	ASTVSVANQF	FGYFILGHPL	CVFEGFVVSL	CGITALWLSLT
Danio rerio val	SLADFLVSLT	GGISIFLTNY	HGYFFLGKWA	CVLEGFAVTF	FGIVALWLSLA
Danio rerio va2	SVADFLVSMT	GGTISFLTNA	RGFFFLGVWA	CVLEGFAVTF	FGIVALWLSLA

	160	170	180	190	200
Homo sapiens RH1	VLAIERYVVV	CKPMSNFRFG	ENHAIMGVAF	TWVMALACAA	PPLAGWSRYI
Danio rerio rh1.1	VLAIERWMVV	CKPVSNFRFG	ENHAIMGVAF	TWVMACSCAV	PPLVGWSRYI
Danio rerio rh1.2	VLAVERWVVV	CKPFTKFRFS	QLHATLGVAF	SWSMACSCAI	PPLLGWSRYI
Potamotrygon motoro rh1	VLAIERYVVV	CKPMSNFRFG	SQHAIIGVAF	TWIMALSCAG	PPLFGWSRYI
Orectolobus ornatus rh1	VLAIERYVVV	CKPMSNFRFG	NQHAIMGVTF	TWIMALACAF	PPLVGWSRYI
Orectolobus maculatus rh1	VLAIERYVVV	CKPMSNFRFG	NQHAVMGVTF	TWIMALACAF	PPLVGWSRYI
Rhincodon typus rh1	VLAIERYVVV	CKPMSNFRFG	SQHAIMGVTF	TWIMALACAF	PPLVGWSRYI
Scyliorhinus canicula rh1	VLAIERYVVV	CKPMSNFRFG	SQHAFMGVGL	TWIMAMACAF	PPLVGWSRYI
Galeus melastomus rh1	VLAIERYVVV	CKPMSNFRFG	SQHAIAGVSL	TWVMAMACAA	PPLVGWSRYI
Raja erinacea rh1	VLAIERYMVV	CKPMANFRFG	SQHAIIGVVF	TWIMALSCAG	PPLVGWSRYI
Etmopterus spinax rh1	VLAIERYVVV	CKPISNFRFS	NEHAMSGIIF	TWTMALACSV	PPLLGWSRYI
Scyliorhinus torazame rh1	VLAVERYVVV	CKPMSNFRFG	SQHAFMGVGL	TWFMALACAF	PPLVGWSRYI
Chiloscyllium plagiosum rh1	VLAIERYVVV	CKPMSNFRFG	SQHAFMGVAF	TWIMALACAF	PPLVGWSRYI
Callorhinchus milii rh1	VLAIERYVVV	CKPMSNFRFG	TNHAIMGVAF	TWVMALACAV	PPLMGWSRYI
Danio rerio rh2.1	VLAIERYIVV	CKPMGSFKFS	ANHAMAGIAF	TWFMACSCAV	PPLFGWSRYL
Danio rerio rh2.2	VLAIERYIVV	CKPMGSFKFS	SNHAMAGIAF	TWVMASCAV	PPLFGWSRYI
Danio rerio rh2.3	VLAIERYIVV	CKPMGSFKFS	SNHAFAGIGF	TWIMALSCAA	PPLVGWSRYI
Danio rerio rh2.4	VLAVERYIVV	CKPMGSFKFS	ASHAFAGCAF	TWVMAMACAA	PPLVGWPRYI
Potamotrygon motoro rh2	VLAIERYIVV	CKPMGNFRFG	NNHALIGIAF	TWILGLAAAG	PPLVGWSRYI
Callorhinchus milii rh2	VLAIERYIVI	CKPMGNFRFG	TSHALMGMGF	TWFMALTAAV	PPLVGWSRFI
Danio rerio sws2	VVALERWLVI	CKPLGNFTFK	TPHAIAGCIL	PWCMALAAAGL	PPLLGWSRYI
Homo sapiens SWS1	FLAFERYIVI	CKPFGNFRFS	SKHALTVVLA	TWTIGIGVSI	PPFFGWSRFI
Danio rerio sws1	VLAVERYVVI	CKPFGSFKFG	QQQAVGAVVF	TWIIIGTACAT	PPFFGWSRYI
Homo sapiens LWS	IISWERWLVV	CKPFGNVKFD	AKLAIIVGIAF	SWIWSAVWTA	PPIFGWSRYW
Danio rerio lws1	VISWERWVVV	CKPFGNVKFD	AKWASAGIIF	SWVWAAAWCA	PPIFGWSRYW
Danio rerio lws2	VISWERWVVV	CKPFGNVKFD	GKWASAGIIF	SWVWAAVWCA	PPIFGWSRYW
Potamotrygon motoro lws	VIAWERWVVV	CKPFGNIKFD	GKWASAGIIF	SWAWSAIWCL	PPIFGWSRYW
Orectolobus ornatus lws	IIAWERWVVV	CKPFGNVKFD	GKWASFGIVF	SWAWSIIWCL	PPIFGWSRYW
Orectolobus maculatus lws	IIAWERWVVV	CKPFGNVKFD	GKWASFGIVF	SWAWSIIWCL	PPIFGWSRYW
Chiloscyllium punctatum lws	IIAWERWVVV	CKPFGNVKFD	SKWASFGIVF	SWAWSITWCL	PPIFGWSRYW
Rhincodon typus lws	MIAWERWVVV	CKPFGNVKFD	SKWASFGIVF	SWAWATAWCL	PPVFGWSRYW
Callorhinchus milii lws2	IIAWERWVVV	CKPFGNVKFD	GKWAAFGIIF	SWVWSIGWCL	PPVFGWSRYW
Callorhinchus milii lws1	IIAWERWVVV	CKPFGNMKFD	SKMAVAGIVF	SWVWSAGWCL	PPIFGWSRYW
Danio rerio val	VLAFERFFVI	CRPLGNIRLR	GKHAALGLVF	VWSFSFIWTV	PPVLGWSSTY
Danio rerio va2	ILAFERFFVI	CRPLKNVRLG	GKHAAMGLIF	VWTFFSFIWTI	PPVLGWSNSTY

	210	220	230	240	250
Homo sapiens RH1	PEGLQCSCGI	DYYTLKPEVN	NESFVIYMFV	VHFTIPMIII	FFCYGQLVFT
Danio rerio rh1.1	PEGMQCSCGV	DYYTRTPGVN	NESFVIYMFI	VHFFIPLIVI	FFCYGRLVCT
Danio rerio rh1.2	PEGLQCSCGV	DYYTPNPETE	NESFVIYMFV	VHFSIPLTII	SFCYGRLLCT
Potamotrygon motoro rh1	PEGMQCSCGV	DYYTLKPEVN	NESFVIYMFT	VHFVLPPLTVI	FFCYGRLVCT
Orectolobus ornatus rh1	PEGMQCSCGI	DYYTLKPEVN	NESFVIYMFI	VHFSIPLTVI	FFCYGRLVCT
Orectolobus maculatus rh1	PEGMQCSCGI	DYYTLKPEVN	NESFVIYMFV	VHFSIPLTVI	FFCYGRLVCT
Rhincodon typus rh1	PEGMQCSCGI	DYYTLKPEVY	NESFVIYMFV	VHFSIPLTVI	FFCYGRLVCT
Scyliorhinus canicula rh1	PEGMQCSCGI	DYYTLKPEVN	NESFVIYMFV	VHFSIPLTVI	FFCYGRLVCT
Galeus melastomus rh1	PEGLQCSCGI	DYYTPKPEIN	NVSFVIYMFV	VHFSIPLTII	FFCYGRLVCT
Raja erinacea rh1	PEGLQCSCGV	DYYTMKPEVN	NESFVIYMFV	VHFTIPLIVI	FFCYGRLVCT
Etmopterus spinax rh1	PEGMQCSCGV	DYYTPKPEIN	NESFVIYMFV	VHFSIPLSVI	FFCYGRLVCA
Scyliorhinus torazame rh1	PEGMQCSCGI	DYYTLKPEVN	NESFVIYMFV	VHFSIPLSVI	FFCYGRLVCT
Chiloscyllium plagiosum rh1	PEGMQCSCGI	DYYTLKPEVN	NESFVIYMFT	VHFSIPLTVI	FFCYGRLVCT
Callorhinchus milii rh1	PEGLQCSCGV	DYYTLKPEIN	NESFVIYMFV	VHFLIPLTII	FFCYGRLVCT
Danio rerio rh2.1	PEGMQTSCGP	DYYTLNPEYN	NESYVMYMFV	CHFCIPVTTI	FFTYGSLVCT
Danio rerio rh2.2	PEGMQTSCGP	DYYTLNPEFN	NESYVLYMFS	CHFCVPVTTI	FFTYGSLVCT
Danio rerio rh2.3	PEGMQTSCGP	DYYTLNPDYN	NESYVLYMFC	CHFIFPVTTI	FFTYGRLVCT
Danio rerio rh2.4	PEGMQCSCGP	DYYTLNPEYN	NESYVLYMFI	CHFILPVTTI	FFTYGRLVCT
Potamotrygon motoro rh2	PEGYQCSCGP	DYYTRNPHYN	NESYVIYLFV	LYFIVPVILI	FFSYGNLICK
Callorhinchus milii rh2	PEGFQCSTP	DFYTTNPLYN	NDSYLMYLFV	VHFAPVPTLI	FFSYGRLLICK
Danio rerio sws2	PEGLQCSCGP	DWYTTNNKFN	NESYVMFLFC	FCFAVPFSTI	VFCYGQLLIT
Homo sapiens SWS1	PEGLQCSCGP	DWYTVGTYR	SESYTWFLFI	FCFIVPLSLI	CFSYQLLRA
Danio rerio sws1	PEGLGTACGP	DWYTKSEEYN	SESYTYFLLI	TCFMMPTTII	IFSYSQLLGA
Homo sapiens MWS	PHGLKTSCGI	DVFSGSSYPG	VQSYMIVLMV	TCCIIPLAII	MLCYLQVWLA
Homo sapiens MWS	PHGLKTSCGP	DVFSGSSYPG	VQSYMIVLMV	TCCITPLSII	VLICYLQVWLA
Danio rerio lws1	PHGLKTSCGP	DVFSGSEDPG	VQSYMVLMV	TCCIIPLAII	ILCYIAVYLA
Danio rerio lws2	PHGLKTSCGP	DVFGGNEDEPG	VQSYMVLMV	TCCILPLAII	ILCYIAVFLA
Potamotrygon motoro lws	PHGLKTSCGP	DVFSGSTDPG	VKSYMVTLTV	TCAVPLSVI	IICYLQVWMA
Orectolobus ornatus lws	PHGLKTSCGP	DVFSGSTDPG	VKSYMVTLTV	TCAVPLSII	IICYLQVWMA
Orectolobus maculatus lws	PHGLKTSCGP	DVFSGSTDPG	VKSYMVTLTV	TCAVPLSII	IICYLQVWMA
Chiloscyllium punctatum lws	PHGLKTSCGP	DVFSGSTDPG	VKSYMVTLTV	TCAVPLSII	IICYLQVWMA
Rhincodon typus lws	PHGLNTSCGP	DVFSGSSDPG	VRSYMITLTV	TCAVFPPLSII	IICYLQVWMA
Callorhinchus milii lws2	PHGLKTSCGP	DVFSGSSDPG	VKSYMVTLVI	TCAALPLTII	IVCYLQVWLA
Callorhinchus milii lws1	PHGLKTSCGP	DVFSGNEDPG	VQSYMVALTL	SCAVLPLLII	ILCYFQVWMA
Danio rerio val	VSRIQTTCPE	NWYSGN--FH	DHTFIIITLFS	TCFIFPLGVI	IVCYCKLIRK
Danio rerio va2	VSKIQTTCPE	NWYSTN--YY	DHTYIIITFFV	TCFILPLGVI	IISYGLKMQK

	260	270	280	290	300
Homo sapiens RH1	VKEAAAQQQE	SATTQKAEKE	VTRMVIIMVI	AFLICWVPYA	SVAFYIFTHQ
Danio rerio rh1.1	VKEAAAQQQE	SETTQRAERE	VTRMVIIMVI	AFLICWLPYA	GVAWYIFTHQ
Danio rerio rh1.2	VKVAAAQQQE	SETTQRAERE	VTRMVIIMVI	AFLICWLPYA	SVAWYIFTHQ
Potamotrygon motoro rh1	VKEAAAQQQE	SETTQRAERE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Orectolobus ornatus rh1	VKEAAAQQQE	SETTQRAERE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Orectolobus maculatus rh1	VKEAAAQQQE	SETTQRAERE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Rhincodon typus rh1	VKEAAAQQQE	SETTQRAERE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Scyliorhinus canicula rh1	VKEAAAQQQE	SETTQRAERE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Galeus melastomus rh1	VKAAAAQQQE	SETTQRAERE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Raja erinacea rh1	VKEAAAQQQE	SETTQRAERE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Etmopterus spinax rh1	VKEAAAQQQE	SETTQRAERE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Scyliorhinus torazame rh1	VKEAAAQQQE	SETTQRAERE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Chiloscyllium plagiosum rh1	VKEAAAQQQE	SETTQRAERE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Callorhinchus milii rh1	VKEAAAQQQE	SETTQRAERE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Danio rerio rh2.1	VKAAAAQQQE	SETTQRAERE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Danio rerio rh2.2	VKAAAAQQQE	SETTQRAERE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Danio rerio rh2.3	VKAAAAQQQE	SETTQRAERE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Danio rerio rh2.4	VKAAAAQQQE	SETTQRAERE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Potamotrygon motoro rh2	VKEAAAQQQE	SATTQKAEKE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Callorhinchus milii rh2	VKEAAAQQQE	SATTQKAEKE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Danio rerio sws2	LKLAQAQQQE	SATTQKAEKE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Homo sapiens SWS1	LKVAQAQQQE	SATTQKAEKE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Danio rerio sws1	LRAVAQAQQE	SETTQRAERE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Homo sapiens MWS	IRAVAKQQKE	SETTQRAERE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Danio rerio lws1	IHAQAQQQK	SETTQRAERE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Danio rerio lws2	IHAQAQQQK	SETTQRAERE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Potamotrygon motoro lws	IRSVAMQQKE	SETTQRAERE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Orectolobus ornatus lws	IRAVAQAQQE	SETTQRAERE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Orectolobus maculatus lws	IRAVAQAQQE	SETTQRAERE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Chiloscyllium punctatum lws	IRAVAQAQQE	SETTQRAERE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Rhincodon typus lws	IRAVAMQQKE	SETTQRAERE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Callorhinchus milii lws2	IRAVAMQQKE	SETTQRAERE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Callorhinchus milii lws1	IRAVAMQQKE	SETTQRAERE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Danio rerio val	LRKVSNTHGR	LGNARKPERQ	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ
Danio rerio va2	LRKVSNTHGR	LGNARKPDRE	VTRMVIIMVI	AFLICWLPYA	SVAFYIFTHQ

	310	320	330	340	350
Homo sapiens RH1	GSNFGPIFMT	IPAFFAKSAA	IYNPVIYIMM	NKQFRNCMLT	TICCGKNPLG
Danio rerio rh1.1	GSEFGPVFMT	LPAFFAKTSA	VYNPCIYICM	NKQFRHRCMIT	TLCCGKNPFE
Danio rerio rh1.2	GSQFGPVFMT	VPAFFAKSAA	LYNPLIYVFM	NKQFRHSMM	TVCCGKDPPQ
Potamotrygon motoro rh1	GSDFGPIFMT	IPAFFAKSSS	LYNPLIYVLM	NKQFRNCMIT	TVCCGKNPFE
Orectolobus ornatus rh1	GSEFGPVFMT	IPAFFAKSSS	-----	-----	-----
Orectolobus maculatus rh1	GSEFGPVFMT	IPSEFFAKSSA	LYNPLIYILM	NKQFRNCMIT	TLCCGKNPFE
Rhincodon typus rh1	GSEFGPVFMT	IPAFFAKSSA	LYNPLIYILM	NKQFRNCMIT	TICCGKNPFE
Scyliorhinus canicula rh1	GSEFGPIFMT	IPAFFAKAAS	LYNPLIYILM	NKQFRNCMIT	TICCGKNPFE
Galeus melastomus rh1	GSEFGPVFMT	IPSEFFAKSSA	LYNPLIYILM	NKQFRNCMIT	TLCCGKNPFE
Raja erinacea rh1	GCDFTPFMT	VPAFFAKSSA	VYNPLIYILM	NKQFRNCMIT	TICLGNPFE
Etmopterus spinax rh1	GMEIGAIVMS	IPAFFAKGSA	LYNPLIYILM	NRQFRNCMIT	TIFCGKNPFE
Scyliorhinus torazame rh1	GSEFGPVFMT	IPSEFFAKSSS	LYNPLIYILM	NKQFRNCMIT	TICCGKNPFE
Chiloscyllium plagiosum rh1	GSEFGPVFMT	IPAFFAKSSA	LYNPLIYILM	NKQFRNCMIT	TLCCGKNPFE
Callorhinchus milii rh1	GSEFGPIFMA	VPAFFAKSSA	LYNPLIYILL	NKQFRNCMIT	TLCCGKNPFE
Danio rerio rh2.1	GAAFSQAQAMA	VPAFFSKTSA	VFNPIIYVLL	NKQFRSCMLN	TLFCGKSPPLG
Danio rerio rh2.2	GAAFSQAQAMA	IPAFFSKASA	LFNPIIYVLL	NKQFRSCMLN	TLFCGKSPPLG
Danio rerio rh2.3	GAAFSQAQFMA	VPAFFSKSSS	IFNPIIYVLL	NKQFRNCMLT	TLFCGKNPLG
Danio rerio rh2.4	GAAFSQAQFMA	VPAFFSKTSA	LYNPLIYVLL	NKQFRNCMLT	TLFCGKNPLG
Potamotrygon motoro rh2	GAEFSAGFMT	LPAFFSKSSV	IYNPIIYVLM	NKQFRSCMIT	TLCCGKNPLG
Callorhinchus milii rh2	GAWISPLLMT	IPSEFFSKSSV	LYNPLIYILM	NKQFRSSMIT	TVCCGKNPFG
Danio rerio sws2	GAPFDLRLAT	IPSCLCKAST	VYNPVIYVLM	NKQFRSCMMK	MVFN-KN---
Homo sapiens SWS1	NHGLDLRLVT	IPSEFFSKSAC	IYNPIIYCFM	NKQFQACIMK	MVCGKAMT--
Danio rerio sws1	EPNKDYRLVA	IPAFFSKSSS	VYNPLIYAFM	NKQFNACIME	TVFGKKID--
Homo sapiens LWS	GYAFHPLMAA	LPAYFAKSAT	IYNPVIYVFM	NRQFRNCILQ	LFGKKVD---
Homo sapiens MWS	GYPFHPLMAA	LPAFFAKSAT	IYNPVIYVFM	NRQFRNCILQ	LFGKKVD---
Danio rerio lws1	GYAFHPLAAA	MPAYFAKSAT	IYNPVIYVFM	NRQFRVCIMQ	LFGKKVD---
Danio rerio lws2	GYAFHPLAAA	MPAYFAKSAT	IYNPIIYVFM	NRQFRVCIMQ	LFGKKVD---
Potamotrygon motoro lws	GYAFHPLAAA	LPAYFAKSAT	IYNPIIYVFM	NRQFRNCIMQ	LLGRKVD---
Orectolobus ornatus lws	GYSFHPLMAA	LPAYFAKSST	IYNPIIYVFM	NRQFRNCILQ	LFGKQVE---
Orectolobus maculatus lws	GYSFHPLMAA	LPAYFAKSST	IYNPIIYVFM	NRQFRNCILQ	LFGKQVE---
Chiloscyllium punctatum lws	NYAFHPLAAA	VPAYFAKSST	IYNPIIYVFM	NRQFRNCILH	LFGRQVE---
Rhincodon typus lws	NHAFHPLVEH	LPSYFAKSST	IYNPIIYVFM	NRQFRNCILH	LFGRQVE---
Callorhinchus milii lws2	GYSFHPLMAA	LPAYFAKSST	IYNPIIYVFM	NRQFRNCIMQ	MFGKKVD---
Callorhinchus milii lws1	GYAFHPLVAS	IPSYFAKSST	IYNPIIYVFM	NRQFRNCILQ	LFGKKVD---
Danio rerio val	SMHVDPRLAA	IPAFVAKTAA	VYNPIIYVFM	NKQFRKCLVQ	LLSCSKVTVV
Danio rerio va2	TIYIDPRLGS	IPAFFSKTAA	VYNPIIYVFM	NKQFRKCLIQ	MFKNGNTALE

	360	370	380	390	400
Homo sapiens RH1	-----DD	EASATVSKTE	TS-----QVA	PA*-----	-----
Danio rerio rh1.1	-----EEE	GASSTASKTE	ASSVSSSSVS	PA*-----	-----
Danio rerio rh1.2	D-----EEE	GSSSSKSKTE	TSSVSSSSAS	SA*-----	-----
Potamotrygon motoro rh1	-----EEE	TTSASASKTE	ASSVSSSQVA	PA*-----	-----
Orectolobus ornatus rh1	-----	-----	-----	-----	-----
Orectolobus maculatus rh1	-----EDE	SASASASKTE	ASSVSSSQVA	PA*-----	-----
Rhincodon typus rh1	-----EDE	SASVSASKTE	ASSVSSSQVA	PA*-----	-----
Scyliorhinus canicula rh1	-----EEE	STSASASKTE	ASSVSSSQVA	PA*-----	-----
Galeus melastomus rh1	-----EEE	STSASASKTE	ASSVSSSQVS	PA*-----	-----
Raja erinacea rh1	-----EEE	STSASASKTE	ASSVSSSQVA	PA*-----	-----
Etmopterus spinax rh1	-----EPE	-ESAAASKTE	ASSVSSSQVA	PA*-----	-----
Scyliorhinus torazame rh1	-----EEE	STSASASKTE	ASSVSSSQVA	PA*-----	-----
Chiloscyllium plagiosum rh1	-----EDE	SASASASKTE	ASSVSSSQVA	PA*-----	-----
Callorhinchus milii rh1	-----EDE	STSAASKTE	ASSVSSSQVS	PA*-----	-----
Danio rerio rh2.1	-----DDE	SSSVTSKTE	VSSVSPA*--	-----	-----
Danio rerio rh2.2	-----DDE	SSSVTSKTE	VSSVSPA*--	-----	-----
Danio rerio rh2.3	-----DDE	SSTVTSKTE	VSSVSPA*--	-----	-----
Danio rerio rh2.4	-----DDE	SSTVTSKTE	VSSVSPA*--	-----	-----
Potamotrygon motoro rh2	D-----DES	-MVSSQSKTE	VSSVSSNQVT	PA*-----	-----
Callorhinchus milii rh2	D-----DDS	SSVTSQSKTE	VSSVSTSQVS	PA*-----	-----
Danio rerio sws2	I-----EED	EASSSSQVTQ	VSSVAPEK*-	-----	-----
Homo sapiens SWS1	-----DE	SDTCSSQKTE	VSTVSSQVG	PN*-----	-----
Danio rerio sws1	-----ES	SEVSS--KTE	TSSVSA*---	-----	-----
Homo sapiens LWS	-----DG	SELSSASKTE	VSSVS--SVS	PA*-----	-----
Homo sapiens MWS	-----DG	SELSSASKTE	VSSVS--SVS	PA*-----	-----
Danio rerio lws1	-----DG	SEVS-TSKTE	VS-----SVA	PA*-----	-----
Danio rerio lws2	-----DG	SEVS-TSKTE	VS-----SVA	PA*-----	-----
Potamotrygon motoro lws	-----DG	SELSSTSKTE	VSSVSNSSVS	PA*-----	-----
Orectolobus ornatus lws	-----DG	SEVSSTSKTE	VSSVSNSS--	-----	-----
Orectolobus maculatus lws	-----DG	SEVSSTSKTE	VSSVSNSSVS	PA*-----	-----
Chiloscyllium punctatum lws	-----DG	SELSSTSKTE	VSSVSNSSVS	PA*-----	-----
Rhincodon typus lws	-----DG	SELSSTSKTE	VSSVSNSSVS	PA*-----	-----
Callorhinchus milii lws2	-----DG	SDVSSTSKTE	VSSVSNSSVA	PA*-----	-----
Callorhinchus milii lws1	-----DG	SELSSTSKTD	VSSVSNSSVS	PA*-----	-----
Danio rerio val	EGNNNQTTTER	AGMTSGSNT-	-GEMSAIAAR	VSVPKT----	---EENPGDR
Danio rerio va2	STNLNQTSKD	GPITATADTH	LGEMSTIAAR	VPMSMCNMEK	SEEEEEPEQ

	
	410	420
Homo sapiens RH1	-----	-----
Danio rerio rh1.1	-----	-----
Danio rerio rh1.2	-----	-----
Potamotrygon motoro rh1	-----	-----
Orectolobus ornatus rh1	-----	-----
Orectolobus maculatus rh1	-----	-----
Rhincodon typus rh1	-----	-----
Scyliorhinus canicula rh1	-----	-----
Galeus melastomus rh1	-----	-----
Raja erinacea rh1	-----	-----
Etmopterus spinax rh1	-----	-----
Scyliorhinus torazame rh1	-----	-----
Chiloscyllium plagiosum rh1	-----	-----
Callorhinchus milii rh1	-----	-----
Danio rerio rh2.1	-----	-----
Danio rerio rh2.2	-----	-----
Danio rerio rh2.3	-----	-----
Danio rerio rh2.4	-----	-----
Potamotrygon motoro rh2	-----	-----
Callorhinchus milii rh2	-----	-----
Danio rerio sws2	-----	-----
Homo sapiens SWS1	-----	-----
Danio rerio sws1	-----	-----
Homo sapiens LWS	-----	-----
Homo sapiens MWS	-----	-----
Danio rerio lws1	-----	-----
Danio rerio lws2	-----	-----
Potamotrygon motoro lws	-----	-----
Orectolobus ornatus lws	-----	-----
Orectolobus maculatus lws	-----	-----
Chiloscyllium punctatum lws	-----	-----
Rhincodon typus lws	-----	-----
Callorhinchus milii lws2	-----	-----
Callorhinchus milii lws1	-----	-----
Danio rerio va1	STFS---HIP	IPENKVCPM*
Danio rerio va2	SGGGPKQLP	LSDSRVCPL*

Fig. S2. A codon-matched protein sequence alignment of the three visual photopigments expressed in the retina of *P. motoro* (i.e. lws, rh2 and rh1) compared to other representative gnathostome visual opsin orthologue classes (i.e. lws, sws1, sws2, rh2 and rh1). Vertebrate ancient (va) opsins, namely va1 and va2, from zebrafish (*Danio rerio*) were also included as they served as outgroups for phylogenetic analysis. Dashes represent gaps that were inserted to maintain a high degree of sequence identity present between the different opsin classes. Abbreviations: Long-wavelength-sensitive (lws or LWS) opsin, short-wavelength-sensitive 1 (sws1 or SWS1) opsin, short-wavelength-sensitive 2 (sws2 or SWS2) opsin, rod opsin-like 2 or rhodopsin-like 2 (rh2 or RH2) opsin, and rod (rh1 or RH1) opsin (Davies et al., 2012; Yokoyama, 2000).

Table S1

Experiment	Colour Stimulus	Colour Stimulus	ΔS
1	Red 120 vs.	Green 60	3.496
		Grey 120 (T1)	10.671
		Grey 170 (T2)	10.956
	Green 60 vs.	Grey 60 (T3)	10.521
		Grey 120 (T4)	7.176
		Grey 60 (T5)	7.025
	Red 120 vs.	Grey 20 (T6)	6.893
		Red 40 (T7)	6.914
		Red 50 (T8)	5.538
		Red 60 (T9)	4.853
		Red 70 (T10)	5.691
		Red 90 (T11)	1.744
		Red 170 (T12)	7.198
		Red 180 (T13)	7.732
	Red 120 vs.	Red 190 (T14)	6.827
Red 200 (T15)		7.677	
Blue 160 vs.		Yellow 200	13.302
		Grey 60 (T1)	1.975
	Grey 140 (T2)	1.526	
	Grey 160 (T3)	1.764	
	Grey 190 (T4)	1.867	
Yellow 200 vs.	Grey 220 (T5)	1.828	
	Grey 140 (T6)	11.776	
	Grey 190 (T7)	11.435	
	Grey 200 (T8)	11.736	
	Grey 220 (T9)	11.474	
		Grey 230 (T10)	11.421

Table S1. Chromatic distances (ΔS) between colour stimuli used in experiments 1 and 2, shown are just noticeable difference (JND) units.

Table S2**(A)**

Species and Tissue	Total Raw Reads (Mb)	Total Clean Reads (Mb)	Total Clean Bases (Gb)	Clean Reads Q20 (%)	Clean Reads Q30 (%)	Clean Reads Ratio (%)
<i>P. motoro retina</i>	67.47	66.47	6.65	98.38	92.84	98.52

(B)

Species and Tissue	Total Number	Total Length	Mean Length	N50	N70	N90	GC (%)
<i>P. motoro retina</i>	131,462	84,546,897	643	1,246	517	233	43.47

(C)

Species and Tissue	Total Bases	Total Reads	Total Mapped Reads	Unique Mapped Reads
<i>P. motoro retina</i>	6,646,576,600	66,465,766	50,719,540	41,702,166

(D)

Species and Tissue	Total Number	Total Length	Mean Length	N50	N70	N90	GC (%)
<i>P. motoro retina</i>	84,016	67,701,865	805	1,537	707	289	43.53

(E)

Values	Total	NR	NT	Swiss-Prot	KEGG	KOG	Inter-Pro	GO	Inter-section	Overall
Number	84,016	35,192	23,362	29,462	28,639	25,412	26,422	11,924	6,827	38,171
Percentage (%)	100	41.89	27.81	35.07	34.09	30.25	31.45	14.19	8.13	45.43

Table S2. RNA-Seq quality metrics. (A) Quality metrics for clean reads, where raw data were filtered to remove low quality reads (where base quality is less than 10% or greater than 20% per read), reads were adapters and those with unknown bases (N bases more than 5%). (B) *De novo* transcriptome quality metrics with information included for the total number and length of clean reads, as well as the mean length and other clean read quality control metrics. (C) Trinity alignment result metrics. (D) Quality metrics of Unigenes with information included for the total number and length of Unigenes, as well as the mean length and other Unigene quality control metrics. (E) Annotation summary of Unigenes compared to the various protein and functional databases analysed (i.e. NR, NT, SwissProt, KEGG, KOG, InterPro and GO).

Table S3

(A)

Stingray	Test Condition														
	T1 Grey 120	T2 Grey 170	T3 Grey 60	T4 Grey 120	T5 Grey 60	T6 Grey 20	T7 Red 40	T8 Red 50	T9 Red 60	T10 Red 70	T11 Red 90	T12 Red 170	T13 Red 180	T14 Red 190	T15 Red 200
1	16:4	17:3	18:2	7:3	7:3	7:3	20:0	8:2	9:1	18:2	14:6	12:8	15:5	10:0	8:2
2	19:1	18:2	16:4	9:1	6:4	10:0	20:0	8:2	10:0	17:3	11:9	12:8	12:8	10:0	9:1
3	17:3	19:1	11:9	9:1	8:2	7:3	20:0	10:0	10:0	14:6	14:6	12:8	11:9	10:0	10:0
4	16:4	17:3	11:9	8:2	8:2	6:4	16:4	8:2	10:0	16:4	11:9	13:7	14:6	10:0	9:1
5	18:2	20:0	18:2	6:4	8:2	9:1	20:0	9:1	9:1	14:6	11:9	13:7	16:4	7:3	9:1

(B)

Stingray	Test Condition									
	T1 Grey 60	T2 Grey 140	T3 Grey 160	T4 Grey 190	T5 Grey 220	T6 Grey 140	T7 Grey 190	T8 Grey 200	T9 Grey 220	T10 Grey 230
1	1:7:2	7:3	15:5	10:0	10:0	8:1:1	7:3	18:2	8:2	10:0
2	4:3:3	4:5:1	16:2	10:0	10:0	10:0	8:2	13:7	4:4	5:2:1
3	3:7	2:1:5	11:9	8:2	10:0	10:0	7:3	19:1	7:1	8:2
4	3:7	4:6	16:4	9:1	10:0	10:0	10:0	20:0	6:4	7:3

Table S3. Individual transfer tests. (A) Individual transfer test results for the five stingrays. T1-T3 give results for experiment 1a (Red vs Grey), T4-T6 for experiment 1a (green vs grey) and T7-T15 give results for experiment 1b (shades of red). The first number gives the number of choices for the training stimulus, (Red 120/Green 60), the second one the number of choices for the alternative stimulus (shades of grey or red). (B) Individual transfer test results for the four stingrays for experiment

2, T1-T5 (blue vs grey) and T6-T10 (yellow vs grey). The first number gives the number of choices for the training stimulus, (Blue 160/Yellow 200), the second one the number of choices for the alternative stimulus (shades of grey), the third number stands for the number of trials no choice was made.

References

- Davies, W. I., Collin, S. P. and Hunt, D. M.** (2012). Molecular ecology and adaptation of visual photopigments in craniates. *Mol. Ecol.* **21**, 3121-3158. doi: 10.1111/j.1365-294X.2012.05617.x
- Yokoyama, S.** (2000). Molecular evolution of vertebrate visual pigments. *Prog. Retin. Eye Res.* **19**, 385-419. doi: S1350-9462(00)00002-1