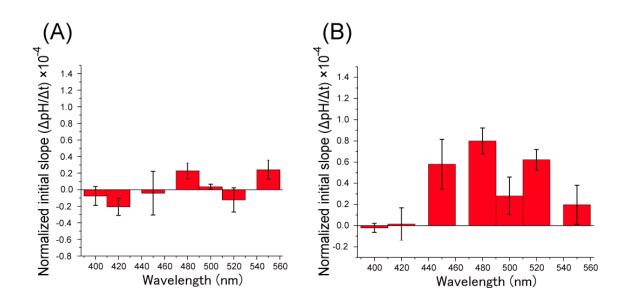
(A)											
	0	10	20	30	40	()	50	60	70	80	
	I MASQVVYG <mark>E</mark>										
ACR2 ACR1	SSITCDPAIYGE										
CrChR1	NGSVICIPNNGQ										
VChR1	LGNGTVCMPRGQ										
HpChR1 DChR	ANGDWVVGPRDS SDKEWVVGPSDQ										
CaChR1											
CyChR1	GIDGWIAIPAGD										
PsChR1	LNPEYLNETILL										
CrChR2											
VChR2	VQSAYGKLAIVQ LNNGSIVIPSDA										
MChR	TIRYFVENDFEG										
ASR					TIGALHFWSLS						
ppR	×										
BR	A	VEGVSQA	QITGRPEWI	WLALGTALMO	GLGTLYFLVKG	MGV	DPDAKKF IA	ITTLVPAIA	FIMILSMLLG	IGLIM	
					120 						170
ACR2	GRFFPW										
ACR1	GKYLPW										
	YS-SN-GNKTVW										
VChR1	WL-SS-GNGVVW										
HpChR1 DChR	YL-ST-GNQVLW YL-ND-GQMVPW										
	YL-ST-ANIVNW	LRYSEWLLC	CPVILIHLS	NVTG-LSDD	GRRTMGLLVS	DIATIVFGIT	AAMLVSW	PKIIFYLLG	FTMCCYTFYL	AAKVLIE	SFHQV
CyChR1	YL-ST-SNVVNW										
PsChR1	YQ-TN-GEVTPW YL-AT-GHRVQW										
	YL-PT-GNWVLW										
VChR2	YL-AN-GNRVLW	LRYGEWLLT	CPVILIHLS	NLTG-LKDDY	(NKRTMRLLVS	DVGTIVWGAT	AAMSTGY	IKVIFFLLG	CMYGANTFFH	AAKVYIE	SYHTV
MChR	YL-TN-GQISPQ										
ASR ppR	AAGQIAHY VAERTVFA										
BR	VPF-GG-EQNPI										
	180 I										
ACR2	ESVGTPLAQKVV										
		ERLKLMRIV									
ACR1	QTIGSPMSLKVV		VECCHAMED							QKVNVAG	
CrChR1	PKGICR	DLVRYLAWL					INMWGVLGN	TRAVITER		OVIDIAC	
CrChR1 VChR1	PKGICR	DLVRYLAWL ELVRVMAWT	FFVAWGMFP					FLRVKIHEH			
CrChR1	PKGICR	DLVRYLAWL ELVRVMAWT KIVRFMAWD	FFVAWGMFP YFG <mark>S</mark> WCMFP	ILFVLGPEG-	FGHISAYGSV	IAHQVLDITS	KNIWSMAGH		IIVHGNITKK	TKITLAG	EPVEVEEYID
CrChR1 VChR1 HpChR1 DChR CaChR1	PKGICR PKGICR PKGICR PKGQCR PKGICR	DLVRYLAWL ELVRVMAWT KIVRFMAWD NLVRAMAWT HLVKAMAIT	FFVAWGMFP YFGSWCMFP YFVSWAMFP YYVGWSFFP	PILFVLGPEG- PILFILGREG- PLIFLFGQSG-	-FGHISAYGSV -FGHITYFGSS -FKKISPYADV	IAHQVLDITS IGHFILEIFS IASSFGDLIS	KNIWSMAGH KNLWSLLGH KNMFGLLGH	GLRYRIRQH FLRVKIHEH	IIVHGNITKK IIIHGNLTKK ILKHGDIRKT	TKITLAG NKINIAG THLRIAG	EPVEVEEYID DNVEVEEYVD EEKEVETFVE
CrChR1 VChR1 HpChR1 DChR CaChR1 CyChR1	PKGICR PKGICR PKGICR PKGICR PKGICR	DLVRYLAWL ELVRVMAWT KIVRFMAWD NLVRAMAWT HLVKAMAIT HLVKAMAIT	FFVAWGMFP YFGSWCMFP YFVSWAMFP YYVGWSFFP YFVGWSFFP	PILFVLGPEG- PILFILGREG- PLIFLFGQSG- PLIFLFGQSG-	-FGHISAYGSV -FGHITYFGSS -FKKISPYADV -FKKISPYADV	IAHQVLDITS IGHFILEIFS IASSFGDLIS IASSFGDLIS	KNIWSMAGH KNLWSLLGH KNMFGLLGH KNAFGMLGH	GLRYRIRQH FLRVKIHEH FLRVKIHEH	IIVHGNITKK IIIHGNLTKK ILKHGDIRKT ILKHGDIRKT	TKITLAG NKINIAG THLRIAG THLRIAG	EPVEVEEYID DNVEVEEYVD EEKEVETFVE EEKEVETFVE
CrChR1 VChR1 HpChR1 DChR CaChR1 CyChR1 PsChR1	PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR	DLVRYLAWL ELVRVMAWT KIVRFMAWD NLVRAMAWT HLVKAMAIT HLVKAMAIT NMVLAMAAV	FFVAWGMFP YFGSWCMFP YFVSWAMFP YYVGWSFFP YFVGWSFFP FFTSWFMFP	PILFVLGPEG- PILFILGREG- PLIFLFGQSG- PLIFLFGQSG- PGLFLAGPEG-	-FGHISAYGSV -FGHITYFGSS -FKKISPYADV -FKKISPYADV -TNALSWAGST	IAHQVLDITS IGHFILEIFS IASSFGDLIS IASSFGDLIS IGHTVADLLS	KNIWSMAGH KNLWSLLGH KNMFGLLGH KNAFGMLGH KNAFGMLGH	GLRYRIRQH FLRVKIHEH FLRVKIHEH FLRLEIHKH	IIVHGNITKK IIIHGNLTKK ILKHGDIRKT ILKHGDIRKT IIIHGDVRRP	TKITLAG NKINIAG THLRIAG THLRIAG ITVNTLG	EPVEVEEYID DNVEVEEYVD EEKEVETFVE EEKEVETFVE REVTVSCFVD
CrChR1 VChR1 HpChR1 DChR CaChR1 CyChR1 PsChR1 CrChR2	PKGICR PKGICR PKGICR PKGICR PKGICR	DLVRYLAWL ELVRVMAWT KIVRFMAWD NLVRAMAWT HLVKAMAIT HLVKAMAIT NMVLAMAAV QVVTGMAWL	FFVAWGMFP YFGSWCMFP YFVSWAMFP YYVGWSFFP YFVGWSFFP FFTSWFMFP FFVSWGMFP	ILFVLGPEG- PILFILGREG- PLIFLFGQSG- PLIFLFGQSG- PLFLAGPEG- PILFILGPEG-	-FGHISAYGSV -FGHITYFGSS -FKKISPYADV -FKKISPYADV -TNALSWAGST -FGVLSVYGST	IAHQVLDITS IGHFILEIFS IASSFGDLIS IASSFGDLIS IGHTVADLLS VGHTIIDLMS	KNIWSMAGH KNLWSLLGH KNMFGLLGH KNAFGMLGH KNAWGMIGH KNCWGLLGH	GLRYRIRQH FLRVKIHEH FLRVKIHEH FLRLEIHKH YLRVLIHEH	IIVHGNITKK IIIHGNLTKK ILKHGDIRKT ILKHGDIRKT IIIHGDVRRP ILIHGDIRKT	TKITLAG NKINIAG THLRIAG THLRIAG ITVNTLG TKLNIGG	EPVEVEEYID DNVEVEEYVD EEKEVETFVE EEKEVETFVE REVTVSCFVD TEIEVETLVE
CrChR1 VChR1 HpChR1 DChR CaChR1 CyChR1 PsChR1 CrChR2 CraChR2 VChR2	PKGICR PKGICR PKGICR PKGICR PKGICR PKGRCR PKGRCR PKGRCR	DLVRYLAWL ELVRVMAWT KIVRFMAWD NLVRAMAWT HLVKAMAIT HLVKAMAIT MVVLAMAAV QVVTGMAWL VIVRLMAYC QLVRAMAWL	FFVAWGMFP YFGSWCMFP YFVSWAMFP YFVGWSFFP FFTSWFMFP FFTSWFMFP FFVSWGMFP FFVLAWTMFP FFVSWGMFP	ILFVLGPEG- ILFILGREG- LIFLFGQSG- GLFLAGPEG- ILFILGPEG- ILFALGPEG- VLFLLGPEG-	FGHISAYGSV FGHITYFGSS FKKISPYADV FKKISPYADV TNALSWAGST FGVLSVYGST -MGQMSAYMST -FGHLSVYGST	IAHQVLDITS IGHFILEIFS IASSFGDLIS IASSFGDLIS IGHTVADLLS VGHTIIDLMS ILTTIADVLS IGHTIIDLLS	KNIWSMAGH KNLWSLLGH KNMFGLLGH KNAFGMLGH KNAWGMIGH KNCWGLLGH KNCWGLLGH	GLRYRIRQH FLRVKIHEH FLRVKIHEH FLRLEIHKH YLRVLIHEH HLRVKIYQH FLRLKIHEH	IIVHGNITKK IIIHGNLTKK ILKHGDIRKT ILKHGDIRKT IIIHGDVRRP ILIHGDIRKT ILIHGDIRKK ILLYGDIRKV	TKITLAG NKINIAG THLRIAG THLRIAG ITVNTLG TKLNIGG TTMQVGG QKIRVAG	EPVEVEEYID DNVEVEEYVD EEKEVETFVE REVTVSCFVD TEIEVETLVE EDVEVEEFVD EELEVETLMT
CrChR1 VChR1 HpChR1 DChR CaChR1 CyChR1 PsChR1 CrChR2 CraChR2 VChR2 MChR	PKGICR PKGICR PKGICR PKGICR PKGICR PKGRCR PKGRCR PKGLCR PKP-LA	DLVRYLAWL ELVRVMAWT KIVREMAWD NLVRAMAWT HLVKAMAIT HLVKAMAIT NMVLAMAAV QVVTCMAWL VIVRLMAYC QLVRAMAWL WYVRAMGYV	FFVAWGMFP YFGSWCMFP YFVSWAMFP YFVGWSFFP FFTSWFMFP FFVSWGMFP FFVLAWTMFP FFVSWGMFP FFTSWLTFP	ILFVLGPEG- ILFILGREG- LIFLFGQSG- GLFLAGPEG- ILFILGPEG- ULFILGPEG- VLFLLGPEG- GWFLLGPEG-	FGHISAYGSV FGHITYFGSS FKKISPYADV TNALSWAGST FGVLSVYGST MGQMSAYMST FGHLSVYGST LEVVTGTVST	IAHQVLDITS IGHFILEIFS IASSFGDLIS IGHTVADLLS VGHTIIDLMS ILTTIADVLS IGHTIIDLLS LMHACSDLIS	KNIWSMAGH KNIWSLLGH KNMFGLLGH KNAFGMLGH KNAWGMIGH KNCWGLLGH KNCWGLLGH KNCWGLLGH	GLRYRIRQH FLRVKIHEH FLRVKIHEH FLRLEIHKH YLRVLIHEH HLRVKIYQH FLRLKIHEH HLRVLVARH	IIVHGNITKK IIIHGNLTKK ILKHGDIRKT ILKHGDIRKT IIIHGDVRRP ILIHGDIRKT ILIHGDIRKK ILLYGDIRKV HRKLFKAEEE	TKITLAG NKINIAG THLRIAG ITVNTLG TKLNIGG TTMQVGG QKIRVAG HALKKGQ	EPVEVEEYID DNVEVEEYVD EEKEVETFVE REVTVSCFVD TEIEVETLVE EEDVEVEEFVD EELEVETLMT TLEPGMPRST
CrChR1 VChR1 HpChR1 DChR CaChR1 CyChR1 PsChR1 CrChR2 CraChR2 VChR2	PKGICR PKGICR PKGICR PKGICR PKGICR PKGRCR PKGRCR PKGRCR	DLVRYLAWL ELVRVMAWT KIVRFMAWD NLVRAMAWT HLVKAMAIT NMVLAMAAV QVVTCMAWL VIVRLMAYC QLVRAMAWL WYVRAMGYV NLYDKLVTY	FFVAWGMFP YFGSWCMFP YFVSWAMFP YFVGWSFFP FFTSWFMFP FFVSWGMFP FFVSWGMFP FFVSWGMFP FFVSWGMFP FFTSWLTFP FTVLWIGYP	ILFVLGPEG- ILFILGREG- LIFLFGQSG- GLFLAGPEG- ILFILGPEG- ILFALGPEG- WIFLLGPEG- GWFLLGPEG- IVWIIGPSG-	FGHISAYGSV FGHITYFGSS FKKISPYADV FKKISPYADV TNALSWAGST FGVLSVYGST FGHLSVYGST FGHLSVYGST FGWINQTIDT	IAHQVLDITS IGHFILEIFS IASSFGDLIS IASSFGDLIS IGHTVADLLS VGHTIIDLMS ILTTIADVLS IGHTIDLS LMHACSDLIS FLFCLLPFFS	KNIWSMAGH KNLWSLLGH KNMFGLLGH KNAFGMLGH KNAFGMLGH KNCWGLLGH KNCWGLLGH KNCWGLLGH KNLWGFMDW	SLRYRIRQH FLRVKIHEH FLRVKIHEH FLRLEIHKH YLRVLIHEH HLRVKIYQH FLRLKIHEH HLRVLVARH HGLRNLNDS	IIVHGNITKK IIIHGNLTKK ILKHGDIRKT ILKHGDIRKT IIIHGDIRKT ILIHGDIRKK ILLYGDIRKK HRKLFKAEEE RQTTGDRFAE	TKITLAG NKINIAG THLRIAG ITVNTLG TKLNIGG TTMQVGG QKIRVAG HALKKGQ NTLQFVE	EPVEVEEYID DNVEVEEYVD EEKEVETFVE REVTVSCFVD TEIEVETLVE EDVEVEEFVD EELEVETLMT TLEPGMPRST NITLFANSRR
CrChR1 VChR1 HpChR1 DChR CaChR1 CyChR1 PsChR1 CrChR2 CraChR2 VChR2 WChR ASR	PKGICR PKGICR PKGICR PKGICR PKGICR PKGRCR PKGRCR PKGRCR PKGLCR PKPLA	DLVRYLAWL ELVRVMAWT KIVRFMAWD NLVRAMAWT HLVKAMAIT HLVKAMAIT NMVLAMAAV QVVTGMAWL QVVTGMAWL QLVRAMAWL QLVRAMAWL NLVRLVTY SLYVRLRNL	FFVAWGMFP YFGSWCMFP YFVSWAMFP YFVGWSFFP YFVGWSFFP FFTSWFMFP FFVSWGMFP FFVLAWTMFP FFTSWLTFP FFTSWLTFP FFTVLWGYP TVILWAIYP	VILFULGPEG- VILFILGREG- VLIFLFGQSG- VLIFLFGQSG- VILFILGPEG- VILFILGPEG- VULFLGPEG- VULFLGPEG- VUWIIGPSG- FIWLLGPPG-	FGHISAYGSV FGHITYFGSS FKKISPYADV FKKISPYADV FKKISPYADV FGVLSVYGST FGULSVYGST FGHLSVYGST LEVVTGTVST FGWINQTIDT VALLTPTVDV	IAHQVLDITS IGHFILEIFS IASSFGDLIS IASSFGDLIS IASSFGDLIS IGHTVADLLS VGHTIIDLMS ILTTIADVLS ILTTIADVLS ILMHACSDLIS FLFCLLPFFS ALIVYLDLV	KNIWSMAGH KNLWSLLGH KNMFGLLGH KNAFGMLGH KNAFGMLGH KNCWGLLGH KNCWGLLGH KNCWGLLGH KNCWGFMDW KVGFSFLDL	SLRYRIRQH FLRVKIHEH FLRVKIHEH FLRLEIHKH YLRVLIHEH HLRVKIYQH FLRLKIHEH HLRVLVARH HGLRNLNDS DAAATLRAE	IIVHGNITKK IIIHGNLTKK IILHGDIRKT IILHGDIRKT IIIHGDVRRP ILIHGDIRKK IILYGDIRKV HRKLFKAEEE RQTTGDRFAE HGESLAGVDT	TKITLAG NKINIAG THLRIAG THLRIAG ITVNTLG TKLNIGG TTMQVGG QKIRVAG HALKKGQ NTLQFVE DAPAVAD	EPVEVEEYID DNVEVEEYVD EEKEVETFVE REVTVSCFVD TEIEVETLVE EDVEVEEFVD EELEVETLMT TLEPGMPRST NITLFANSRR
CrChR1 VChR1 HpChR1 DChR CaChR1 CyChR1 PsChR1 CrChR2 CraChR2 VChR2 MChR ASR ppR BR	PKGICR PKGICR PKGICR PKGICR PKGICR PKGRCR PKGRCR PKGRCR PKGLCR PKSLA SSLA	DLVRYLAWL ELVRVMAWT KIVRFMAWD NLVRAMAWT HLVKAMAIT HLVKAMAIT NMVLAMAAV QVVTGMAWL QVVTGMAWL QLVRAMAWL QLVRAMAWL NLVRLVTY SLYVRLRNL	FFVAWGMFP YFGSWCMFP YFVSWAMFP YFVGWSFFP YFVGWSFFP FFTSWFMFP FFVSWGMFP FFVLAWTMFP FFTSWLTFP FFTSWLTFP FFTVLWGYP TVILWAIYP	VILFULGPEG- VILFILGREG- VLIFLFGQSG- VLIFLFGQSG- VILFILGPEG- VILFILGPEG- VULFLGPEG- VULFLGPEG- VUWIIGPSG- FIWLLGPPG-	FGHISAYGSV FGHITYFGSS FKKISPYADV FKKISPYADV FKKISPYADV FGVLSVYGST FGULSVYGST FGHLSVYGST LEVVTGTVST FGWINQTIDT VALLTPTVDV	IAHQVLDITS IGHFILEIFS IASSFGDLIS IASSFGDLIS IASSFGDLIS IGHTVADLLS VGHTIIDLMS ILTTIADVLS ILTTIADVLS ILMHACSDLIS FLFCLLPFFS ALIVYLDLV	KNIWSMAGH KNLWSLLGH KNMFGLLGH KNAFGMLGH KNAFGMLGH KNCWGLLGH KNCWGLLGH KNCWGLLGH KNCWGFMDW KVGFSFLDL	SLRYRIRQH FLRVKIHEH FLRVKIHEH FLRLEIHKH YLRVLIHEH HLRVKIYQH FLRLKIHEH HLRVLVARH HGLRNLNDS DAAATLRAE	IIVHGNITKK IIIHGNLTKK IILHGDIRKT IILHGDIRKT IIIHGDVRRP ILIHGDIRKK IILYGDIRKV HRKLFKAEEE RQTTGDRFAE HGESLAGVDT	TKITLAG NKINIAG THLRIAG THLRIAG ITVNTLG TKLNIGG TTMQVGG QKIRVAG HALKKGQ NTLQFVE DAPAVAD	EPVEVEEYID DNVEVEEYVD EEKEVETFVE REVTVSCFVD TEIEVETLVE EDVEVEEFVD EELEVETLMT TLEPGMPRST NITLFANSRR
CrChR1 VChR1 HpChR1 DChR CaChR1 CyChR1 PsChR1 CrChR2 CraChR2 VChR2 MChR ASR ppR	PKGICR PKGICR PKGICR PKGICR PKGICR PKGRCR PKGRCR PKGRCR PKGLCR PKSLA SSLA	DLVRYLAWL ELVRVMAWT KIVRFMAWD NLVRAMAWT HLVKAMAIT HLVKAMAIT NMVLAMAAV QVVTGMAWL QVVTGMAWL QLVRAMAWL QLVRAMAWL NLVRLVTY SLYVRLRNL	FFVAWGMFP YFGSWCMFP YFVSWAMFP YFVGWSFFP YFVGWSFFP FFTSWFMFP FFVSWGMFP FFVLAWTMFP FFTSWLTFP FFTSWLTFP FFTVLWGYP TVILWAIYP	VILFULGPEG- VILFILGREG- VLIFLFGQSG- VLIFLFGQSG- VILFILGPEG- VILFILGPEG- VULFLGPEG- VULFLGPEG- VUWIIGPSG- FIWLLGPPG-	FGHISAYGSV FGHITYFGSS FKKISPYADV FKKISPYADV FKKISPYADV FGVLSVYGST FGULSVYGST FGHLSVYGST LEVVTGTVST FGWINQTIDT VALLTPTVDV	IAHQVLDITS IGHFILEIFS IASSFGDLIS IASSFGDLIS IASSFGDLIS IGHTVADLLS VGHTIIDLMS ILTTIADVLS ILTTIADVLS ILMHACSDLIS FLFCLLPFFS ALIVYLDLV	KNIWSMAGH KNLWSLLGH KNMFGLLGH KNAFGMLGH KNAFGMLGH KNCWGLLGH KNCWGLLGH KNCWGLLGH KNCWGFMDW KVGFSFLDL	SLRYRIRQH FLRVKIHEH FLRVKIHEH FLRLEIHKH YLRVLIHEH HLRVKIYQH FLRLKIHEH HLRVLVARH HGLRNLNDS DAAATLRAE	IIVHGNITKK IIIHGNLTKK IILHGDIRKT IILHGDIRKT IIIHGDVRRP ILIHGDIRKK IILYGDIRKV HRKLFKAEEE RQTTGDRFAE HGESLAGVDT	TKITLAG NKINIAG THLRIAG THLRIAG ITVNTLG TKLNIGG TTMQVGG QKIRVAG HALKKGQ NTLQFVE DAPAVAD	EPVEVEEYID DNVEVEEYVD EEKEVETFVE REVTVSCFVD TEIEVETLVE EDVEVEEFVD EELEVETLMT TLEPGMPRST NITLFANSRR
CrchR1 VchR1 HpchR1 DchR CachR1 CychR1 PschR1 CrchR2 VchR2 WchR ASR BR BR	PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR	DLVRYLAWL ELVRVMAWT KIVRFMAND NIURAMAWT HLVKAMAIT HLVKAMAIT HLVKAMAIT HUVKAMAIY VUVRLMAVC QUVTGMAWL QUVTGMAWL QUVRLMAVC QLVRAMAVL NIVRLMAVS SLYVRLRNL STFKVLRNV	PFVANGMPP YFGSWCMF YFVSWAMF YFVGWSFPP FFVSWGMP FFVSWGMP FFVSWGMP FFVSWGMP FFVSUGMP FTVLWIGYP TVLLWAIYP TVLLWAIYP	ILFUGPEG- ILFIGQSG- LIFLFQQSG- CLIFLFQQSG- CLIFLGPEG- ULFLGPEG- ULFLGPEG- GWFLLGPEG- GWFLLGPEG- FIWLLGPSG- FIWLLGPSG-	FGHITAYGGV FGHITYFGSS FKKISPYADU FKKISPYADU TNALSWAGST FGVLSVYGST FGVLSVYGST FGULSVYGST -LEVVTGTVST FGWINQTDT -LEVUTGTVST -GWINQTDT -AGIVPLNIET	IAHQVLDITS IGHFILEIFS IASSFGDLIS IASSFGDLIS IASSFGDLIS IGHTVADLLS VGHTIIDLMS ILTTIADVLS ILTTIADVLS ILMHACSDLIS FLFCLLPFFS ALIVYLDLV	KNIWSMAGH KNLWSLLGH KNMFGLLGH KNAFGMLGH KNAFGMLGH KNCWGLLGH KNCWGLLGH KNCWGLLGH KNLWGFMDW KVGFSFLDL	SLRYRIRQH FLRVKIHEH FLRVKIHEH FLRLEIHKH YLRVLIHEH HLRVKIYQH FLRLKIHEH HLRVLVARH HGLRNLNDS DAAATLRAE	IIVHGNITKK IIIHGNLTKK IILHGDIRKT IILHGDIRKT IIIHGDVRRP ILIHGDIRKK IILYGDIRKV HRKLFKAEEE RQTTGDRFAE HGESLAGVDT	TKITLAG NKINIAG THLRIAG THLRIAG ITVNTLG TKLNIGG TTMQVGG QKIRVAG HALKKGQ NTLQFVE DAPAVAD	EPVEVEEYID DNVEVEEYVD EEKEVETFVE REVTVSCFVD TEIEVETLVE EDVEVEEFVD EELEVETLMT TLEPGMPRST NITLFANSRR
CrchR1 VchR1 HpchR1 DchR CachR1 CychR1 PachR1 CrchR2 VchR2 VchR2 WchR ASR ppR BR (B)	PKGICR PKGCR PKGCR PKGICR PKGICR PKGCR PKGCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR PKGLCR 	DLVRYLAWL ELVRYMAW KIVRFMAWD NLVRAMAWT HLVKAMAT HLVKAMAT HLVKAMAT UVVRLMAY UVVRLMAY UVVRLMAY UVVRLMAY STPKVLNY STPKVLNY	FVVANCMFP YFGSWCMFP YFVSMANFP YFVGWSFPP FFTSWFMFP FFVSWGMFP FFVSWGMFP FFVSWGMFP FFTSWLTFP FFTSWLTFP TVLAUXAFP	ILFULGREG- ILFIFGQSG- LIFDFGQSG- ULFIFGQSG- ILFILGPEG- ILFILGPEG- ILFILGPEG- GWFLGPEG- IVWIIGPSG- IVWIIGPSG- VVWLIGSEG- 80	FGHITXFGSS FGHITXFGSS FKKISPYADU FKKISPYADU FKKISPYADU FKKISPYADU FKKISPYADU FGKISVYGST FGVISVYGST FGWINQTIDT FGWINQTIDT FGWINQTIDT AGIVPLNIET	IAHQULDITS IGHFILEIPS IGHFILEIPS IASSFGLIS IASSFGLIS IGHTIADUS ILTTIADUS ILTTIADUS ILTTIADUS ILTTIADUS LIMACSDLIS LLFMVLDVS/ 100	KNIWSMAGH KNLWSLLGH KNNFGLLGH KNAFGMLGH KNAWGMIGH KNCWGLLGH KNCWGLLGH KNCWGLLGH KNCWGFJILL KVGFGFILLL 110	SLRYRIRQH FLRVKIHEH FLRVKIHEH FLRLEIHKH YLRVLIHEH HLRVKIYQH FLRLKIHEH HLRVLVARH HGLRNLNDS DAAATLRAE	IIVHGNITKK IIIHGNLTKK IILHGDIRKT IILHGDIRKT IIIHGDVRRP ILIHGDIRKK IILYGDIRKV HRKLFKAEEE RQTTGDRFAE HGESLAGVDT	TKITLAG NKINIAG THLRIAG THLRIAG ITVNTLG TKLNIGG TTMQVGG QKIRVAG HALKKGQ NTLQFVE DAPAVAD	EPVEVEEYID DNVEVEEYVD EEKEVETFVE REVTVSCFVD TEIEVETLVE EDVEVEEFVD EELEVETLMT TLEPGMPRST NITLFANSRR
CrchR1 VchR1 HpchR1 DchR CachR1 CachR1 PschR1 CrchR2 VchR2 WchR ASR BR (B) 50 ACR2	PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGRCR PKGRCR PKGRCR PKGRCR PKGRCR PKGRCR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR 	DLVRYLAWL ELVRYMAWT KLVRRMAWT NLVRAMANT HLVKAMAIT HLVKAMAIT HLVKAMAIT HLVKAMAIT VLVRLMAYC QLVRAMAWL VLVRLMAYC SLYVRLMY STFKVLRWV 70 PFV SITYA	FVJANGMEP YFGSWCMFP YFVSMANFP YFVGWSFPF FFTSWEMFP FFTSWEMFP FFTSWEMFP FFTVLWIGYP TVLWIGYP TVLWAYP	ILFULGPEG- ILFILGPEG- LIFIFGQGG- GLPLAGPEG- LIFIGPEG- GUFLAGPEG- GUFLGPEG- GWFLLGPEG- GWFLLGPEG- WUWLIGSEG- WUWLIGSEG- 1000000000000000000000000000000000000	PGHITAYGSW FGHITYPGSS FKKISPYADU TNALSWAGST FKKISPYADU TNALSWAGST FGVLSVIGST MGQMSAYMST LEVVTGTVST FGHLSVYGST LEVVTGTVST FGWLNQTDT AGIVPLNIET 90 1 CGRFFPWSRMA	IAHQULDITS IGHFILEIFS IGSSEGLIS IGSSEGLIS IGHTADLLS VGHTIDLMS UGHTIDLMS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTTLAVLS ILTT	KNIWSMAGH KNIWSLLGH KNNFCLLGH KNNFCMLGH KNNWGLIGH KNIWGLLGH KNIWGLLGH KNIWGFGILLL KVGFGFILL KVGFGFILL LVGFGFILL III0 I GQISNMAL	SLRYRIRQH FLRVKIHEH FLRVKIHEH FLRLEIHKH YLRVLIHEH HLRVKIYQH FLRLKIHEH HLRVLVARH HGLRNLNDS DAAATLRAE	IIVHGNITKK IIIHGNLTKK IILHGDIRKT IILHGDIRKT IIIHGDVRRP ILIHGDIRKK IILYGDIRKV HRKLFKAEEE RQTTGDRFAE HGESLAGVDT	TKITLAG NKINIAG THLRIAG THLRIAG ITVNTLG TKLNIGG TTMQVGG QKIRVAG HALKKGQ NTLQFVE DAPAVAD	EPVEVEEYID DNVEVEEYVD EEKEVETFVE REVTVSCFVD TEIEVETLVE EDVEVEEFVD EELEVETLMT TLEPGMPRST NITLFANSRR
CrchR1 VchR1 HpchR1 DchR CachR1 CrchR2 CrachR2 VchR2 WchR BR BR (B) 50 ACR2 ACR1	PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR PKGICR SSGIK SSGIK SSGIK SSGIK SSGIK SSGIK SSGIK SSGIK SSGIK SSGIK SSGIK SSGIK SSGIK SSGIK SSGIK SSGIK SSGIK SSGIK SSGIK SSGIK SSGIK SSGIK 	DLVRYLAWL ELVRVMAWT KLVRRMAD NLVRAMAT HLVKAMAIT HLVKAMAIT HLVKAMAIT VIVRLMAYC QUVRAMAV VIVRLMAYC SLYVRLRNY SLYVRLRNV 70 PPVISITYA	FVANKMEPF YFGSWCMFP YFVGNASFPF YFVGNSFPF PFTSWEMFP FFVSWGMEPF FFVSWGMEPF FFVSWLTPF FTVLNICYF TVLLWAIYF TVLLWAIYF TVLLWAYF LASTGNG LASTGNG	ILFULGPEG- ILFLIGPEG- LIFLFGQGG- GEFLACPEG- ILFLLGPEG- ILFLLGPEG- ILFLLGPEG- VUFLLGPEG- FINLLGPEG- FINLLGPEG- FINLLGPEG- VUWLIGSEG- NUMLIGSEG- VUWLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG- NUMLIGSEG-	FGHITAYGGV FGHITYFGSS FKKISPYADU FKKISPYADU FKKISPYADU FKKISPYADU FKKISPYADU FKUSYAGT HOLSYYGST HOLSYYGST LEVUTGTYST -VALLTPTVDU AGIVPLNIET 90 1 JGRFFPWSRMA GKYLPWARMA	IAHQULDITS IAHQULDITS IASSFGLII IASSFGLII IGHTVALLL VGHTIILMM ILTTIADVLS ILTTIADVLS ILTTIADVLS ILTTIADVLS ILTTIADVLS MHACSDLI FHFCLEPFS ALIVYLDLVJ ILLFWVLDVS I00 SWLCTCPIMI SWLCTCPIMI	KNIWSMAGH KNIWSLLGH KNAFGLIGH KNAFGLIGH KNAWGLIGH KNIWGLLGH KNIWGELLGH KNUWGELGH KVGFGFLILL 110 I GQISIMAL GUVSNMAL	SLRYRIRQH FLRVKIHEH FLRVKIHEH FLRLEIHKH YLRVLIHEH HLRVKIYQH FLRLKIHEH HLRVLVARH HGLRNLNDS DAAATLRAE	IIVHGNITKK IIIHGNLTKK IILHGDIRKT IILHGDIRKT IIIHGDVRRP ILIHGDIRKK IILYGDIRKV HRKLFKAEEE RQTTGDRFAE HGESLAGVDT	TKITLAG NKINIAG THLRIAG THLRIAG ITVNTLG TKLNIGG TTMQVGG QKIRVAG HALKKGQ NTLQFVE DAPAVAD	EPVEVEEYID DNVEVEEYVD EEKEVETFVE REVTVSCFVD TEIEVETLVE EDVEVEEFVD EELEVETLMT TLEPGMPRST NITLFANSRR
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Supplementary Figure S1. Amino acid sequence alignment of microbial rhodopsins including ACRs. (A) The region containing 7-transmembrane (TM) helices in ACR2 is shown. The green colored background indicates the conserved carboxylates. Positively and negatively

charged residues are colored blue and red, respectively. Aromatic amino acids are colored green. **(B)** An alternative sequence alignment for MD simulations, in which ACR has a β-sheet in the BC-loop and did not show chloride binding (Fig. 5). NCBI accession numbers used in this figure are as follows; ACR2 (KP171709), ACR1 (KP171708), CrChR1 (AF508965), VChR1 (ABZ90901), HpChR1 (JN596950), DChR (JX983144), CaChR1 (JN596951), CyChR1 (JN596948), PsChR1 (JX983143), CrChR2 (AF508966), CraChR2 (JN596949), VChR2 (ABZ90903), MChR (JF922293), ASR (WP_010997316), ppR (WP_011324120) and BR (WP 010903069).



Supplementary Figure S2. Dependency on wavelength of light for anion transport in the E159Q and D230N mutants of ACR2. The normalized initial slope amplitudes of the light-induced pH changes of E159Q (A) and D230N (B) were plotted against the wavelength of light in a solution containing 300 mM NaCl. The samples were illuminated with a Xenon lamp (Asahi Spectra Co. Ltd., Tokyo, Japan) through a series of band-pass filters ($400 \pm 10 \text{ nm}$, $418.5 \pm 9 \text{ nm}$, $450 \pm 10 \text{ nm}$, $480 \pm 10 \text{ nm}$, $500 \pm 10 \text{ nm}$, $520 \pm 10 \text{ nm}$ and $550 \pm 10 \text{ nm}$), where the light intensity was measured and adjusted to $8-10 \text{ mW/cm}^2$ using an optical power meter with an optical sensor. All error bars represent the SEM of more than three independent measurements.