



This is a repository copy of *The gene cortex controls mimicry and crypsis in butterflies and moths* .

White Rose Research Online URL for this paper:

<https://eprints.whiterose.ac.uk/98941/>

Version: Supplemental Material

Article:

Nadeau, N.J. orcid.org/0000-0002-9319-921X, Pardo-Diaz, C., Whibley, A. et al. (16 more authors) (2016) The gene cortex controls mimicry and crypsis in butterflies and moths. *Nature*, 534. pp. 106-110. ISSN 0028-0836

<https://doi.org/10.1038/nature17961>

Reuse

Items deposited in White Rose Research Online are protected by copyright, with all rights reserved unless indicated otherwise. They may be downloaded and/or printed for private study, or other acts as permitted by national copyright laws. The publisher or other rights holders may allow further reproduction and re-use of the full text version. This is indicated by the licence information on the White Rose Research Online record for the item.

Takedown

If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.



eprints@whiterose.ac.uk
<https://eprints.whiterose.ac.uk/>

CLUSTAL W (1.83) multiple sequence alignment

Homo_cdc20_NP_001246 MAQF-AFESDL-HS-----LLQLD-API-----PNAPP-A-RWQRK-----AK-EA-AGPAPSP
Homo_fzr1_NP_001129670 MDQD-Y-ERRL-LR-----QIVIQ-NEN-----T--M-P-----
Saccharomyces_cdc20_NP_011399 MPES-SRDKGN-AAISGNRSVLSIA-SPTKLNILSSDWSRNQGVSKNSL-K-RSSSL-----NIRNS-KRPSLQA
Saccharomyces_cdh1_NP_011512 MSTN-LNPF-M-NN-----TPSS-SPL-----KGSES-K-RVS-----
Tricoplax_cdc20_XP_002114324 MNSN-IG-----IFNLD-EPL-----SGPA-P-RWKRK-----RD-AC-FSTGEKS
Tricoplax_rap_XP_002114232 MYNC-----
Acyrtosiphon_fzr_ACYPI009652 MEVD-DDPNQL-KS-----FKKFK-----
Bombyx_rap_BGIBMGA007924 MFSK-HYETRL-LQ-----Q-----
Apis_fzr_XP_003251084 MFHH-EYEKRL-LK-----S-----
Drosophila_rap_FBpp0070655 MFSP-EYEKRI-LK-----H-----
Drosophila_fzr2_FBpp0072055 MFQS-EYQQRLLP-----GV-----
Danaus_rap_DPOGS208818-PA MFSG-SYERRL-LQ-----Q-----
Heliconius_rap_HMEL015096-RA MFSK-PYEKRL-LE-----Q-----
Pediculus_fzr_XP_002425882 MLGAIDYEKRL-YL-----KQOCE-FAE-----N---I-PQIG-----EINV
Anopheles_rap_XP_320924 MFSP-EYEKRY-MQ-----L-----
Nasonia_fzr_XP_001601463 MDEC--YEKRL-LK-----Q-----
Daphnia_fzr_EFX80184 MKEE-LSPTS--SS-----
Tribolium_rap_XP_968256 MSFE-NIDDRI-FR-----Q-----
Pediculus_cortex_XM_002425496 MKKK-FQ-----
Heliconius_cortex_HMEL000025 MDRR-TFDRKT-NN-----
Drosophila_cortex_FBpp0078949 MFVE-MSVCDSPNK-----NSKLD-K-----
Acyrtosiphon_cortex_XP_003244209 MFKY-NQ-----
Danaus_cortex_DPOGS200358-PA MDRT-TFGRKT-LN-----
Anopheles_cortex_XP_552645 XXQP-ANF-----
Apis_cortex_XP_001122629 MRRR-IVLNFR-NS-----EDQAS-ENI-----DTTPL-R-RSTVAFPRLLRLLHKDF-KS-D-----
Tribolium_cortex_XP_970475 MLRL-SNS-----
Nasonia_cortex_XP_003425331 MDTL-TFVSGC-SS-----VKKKK-KKK-----KKNVGSRPWQGF-----P--RP-FGASISN
Drosophila_fzy_FBpp0080391 MSQF-NFVSDL-QN-----ALIMD-GE-----TRGPA-P-RWKKK-----LE-AS-LNGSVN
Heliconius_fzy_HMEL017486 MAQF-NYLNEL-NS-----LATID-GPI-----TRGPL-Q-RWVKK-----SNSEN-INPSLSA
Danaus_fzy_DPOGS205285-PA MAQF-NYRNEI-IS-----LATID-GPL-----TRGPP-Q-RFAKK-----NTKEN-INPGLS
Bombyx_fzy_BGIBMGA011028 MSQF-NYLNEI-NS-----LATMD-GPI-----TRGPL-Q-RWAKK-----GCNEN-INPSLN
Anopheles_fzy_XP_310009 MAQF-KHLNEL-NT-----FLTMD-GEN-----AKGPV-P-RWQRK-----LN-LSGASTSFN
Apis_fzy_XP_624567 MSHL-KYMKEI-NN-----LTRMD-ETI-----KGPL-P-RWQKK-----CL-ET-SNSSVNI
Pediculus_fzy_XP_002425384 MSSF-SFSNDL-NR-----LLTMD-DPV-----TKGPL-P-RWQKK-----LP-DL-SNTSKNC
Acyrtosiphon_fzy_NP_001135925 MSQF-SYVNDL-KS-----AVRMD-EPI-----TSGPA-P-RWMKK-----SV-ES-TSSSANT
Daphnia_fzy_EFX72563 MNLS-EVNL-----MSNKKENHL-----SSAKH-D-QSAKL-----GK-SL-CNGSINM
Nasonia_fzy_NP_001154940 MSHL-KYMKEL-NN-----LTRMD-EAI-----KGPV-P-RWQKK-----CL-ET-SNSSGNI
Tribolium_fzy_XP_969612 MSQF-KFVTEM-NN-----LVTMD-GPL-----TKGPP-P-RWQRK-----GQ-EN-YQSSNNL
Bombyx_cortex_XP_004921982.1 MNRT-AFGKKS-LN-----

Homo_cdc20_NP_001246 -----MRA-----A-----NRS-HS---AGRTP--G-----
Homo_fzr1_NP_001129670 -----RV-----TEM--R---RT--
Saccharomyces_cdc20_NP_011399 S-----ANS-IYSRPKIT---IGAPPLIRRDSSFFKDEFDAKKDKATFSA--YS---SR--
Saccharomyces_cdh1_NP_011512 -----
Tricoplax_cdc20_XP_002114324 KT-----G---STPQKH---A---NKA-MANTSTSGKTP--S-----S--
Tricoplax_rap_XP_002114232 -----
Acyrtosiphon_fzr_ACYPI009652 -----T--
Bombyx_rap_BGIBMGA007924 -----
Apis_fzr_XP_003251084 -----
Drosophila_rap_FBpp0070655 -----
Drosophila_fzr2_FBpp0072055 -----
Danaus_rap_DPOGS208818-PA -----
Heliconius_rap_HMEL015096-RA -----
Pediculus_fzr_XP_002425882 -----SP--I-----
Anopheles_rap_XP_320924 -----
Nasonia_fzr_XP_001601463 -----
Daphnia_fzr_EFX80184 -----
Tribolium_rap_XP_968256 -----
Pediculus_cortex_XM_002425496 -----
Heliconius_cortex_HMEL000025 -----
Drosophila_cortex_FBpp0078949 -----KS--
Acyrtosiphon_cortex_XP_003244209 -----
Danaus_cortex_DPOGS200358-PA -----
Anopheles_cortex_XP_552645 -----
Apis_cortex_XP_001122629 -----K---DSQKP--VV-----ANYQVT---VAK--
Tribolium_cortex_XP_970475 -----
Nasonia_cortex_XP_003425331 DF-----NRFQRLINPASV---QSAA-TS---TGFTS--SQ-----I---N---VL--
Drosophila_fzy_FBpp0080391 -----TTRSVLSVSY---NTS-FS---GV-----QA---PT--
Heliconius_fzy_HMEL017486 SFKNISNINLSSCNQSMQKLSISANHSN-NSN-IS---NNKTP--TR---IEN-KK---GK--
Danaus_fzy_DPOGS205285-PA -----ISSINQSVQKLSVSGNQSYNNSVLSST---NNKTP--TR---NDN-KS---K--
Bombyx_fzy_BGIBMGA011028 -----ISSCNQSLQKLSISANQSCNNSA-LS---NNKTP--TR---NEN-KK---GK--
Anopheles_fzy_XP_310009 -----SSAL-ANTS---RQT-LS---GT--A--S-----SAS-KK---FS--
Apis_fzy_XP_624567 -----NSSRKI---SNG-S---FTN-ST---TGKTP--TK---KND-NR---TK--
Pediculus_fzy_XP_002425384 SL-----NSSKLS---S---NS---NT-----
Acyrtosiphon_fzy_NP_001135925 -----SRK-----T--NEL-MP---IKKTP--S-----
Daphnia_fzy_EFX72563 SL-----NCST---NSQ-SV---VAKTP--KR---TETSFS---NN--
Nasonia_fzy_NP_001154940 SL-----NNSRKAMSTMA-S---NSN-TS---TGKTP--KK---GVE-NQNRGTKA---
Tribolium_fzy_XP_969612 SL-----NSSKQK---S---FS-TS---ITKTP--TK---S-E-VK---SKKT
Bombyx_cortex_XP_004921982.1 -----

Homo_cdc20_NP_001246 --RTP-GK-----SSS--KVQ---TTPSKPGGDRYIPHSAA-----
Homo_fzr1_NP_001129670 --LTP-A-----S---S---PVSSPSKHGDRFIPSRAGA-----
Saccharomyces_cdc20_NP_011399 --SYP-TI-----GSESVVSQTSLSQP-----TTS---RE--VDEQFTVAADRYIPIIQGA-----
Saccharomyces_cdh1_NP_011512 --KRP-IS-----S--S-----SSA-----SLL--SSPSRRSRPSTVYVYDRYIPSRITDI-----
Tricoplax_cdc20_XP_002114324 --ITP-GI-----H-----S-----KST--IGK--SKTPKTPSADRIFIPNRDAM-----
Tricoplax_rap_XP_002114232 -----
Acyrthosiphon_fzr_ACYPI009652 --DQP-CT-----S-----VQ---T--YDQFNGFRADRFIPYREAH-----
Bombyx_rap_BGIBMGA007924 --CSP-VA-----R-----KQS---V--LVQAEFNNGDRFTPCRAGN-----
Apis_fzr_XP_003251084 --NSE-SH-----IDSLAG---S-----GLHS-----SVY--F-S--PTKMMNNSFDRFIPTRSGN-----
Drosophila_rap_FBpp0070655 --YSP-VA-----R-----NLF--NNF--ESSTPTSLDRFIPCRAYN-----
Drosophila_fzr2_FBpp0072055 --AV-----GKKEDIDLRCIPTRAGN-----
Danaus_rap_DPOGS208818-PA --CSP-VS-----R-----RQ-----SVFVRPEPMDRFIPCRLEN-----
Heliconius_rap_HMEL015096-RA --CSP-TG-----K-----K-----YIMSRPDCSDRFIPCRVEN-----
Pediculus_fzr_XP_002425882 --TSP-LA-----K-----PML--ERF--RSPTKCPNADRIFIPSRSE-----
Anopheles_rap_XP_320924 --RSP-AA-----R-----SLF-----SASESSSAHDRFIPCRANN-----
Nasonia_fzr_XP_001601463 --ANS-EP-----PQAMESCSL-P-----TPPT-----PIF--Y-S--PTKMSNNSFDRFIPTRLGN-----
Daphnia_fzr_EFX80184 -----MRNREGPPVA-----
Tribolium_rap_XP_968256 --LKLSVS-----K-----DLFGAKTY--QEPRTSANCDFRIFPCRAGN-----
Pediculus_cortex_XM_002425496 -----VE-----
Heliconius_cortex_HMEL000025 -----PQRYRLDRFVATRDSFS-----
Drosophila_cortex_FBpp0078949 --LTP-FKKVRRKNW---KQ--E-----AAKY-----S--DTS--KGQEVSYVGERFIPNRFER-----
Acyrthosiphon_cortex_XP_003244209 -----GRDRFVDRHRS-----
Danaus_cortex_DPOGS200358-PA -----TQSRMRDFVAPRTSFD-----
Anopheles_cortex_XP_552645 -----LPNSYVDRFIPRRYAL-----
Apis_cortex_XP_001122629 ---SV-QQ-----I-----VKK--YTP--KAPKTYEYDRFIFKN--Y-----
Tribolium_cortex_XP_970475 -----VRNSCDFRIFPLRLND-----
Nasonia_cortex_XP_003425331 --KNV-VRD-----E-----HSSR-----QLA--HAG--LHSYNGNIGDRFIPRRRGV-----
Drosophila_fzy_FBpp0080391 --KTP-GK-----S-----SEG---K--TKK--SNT--TPSKTPGGGDRFIPNRAAT-----
Heliconius_fzy_HMEL017486 --KTP-SK-----N--K-----SPG---R--STT--PTPN--KASKTPNKADRIFIPSRSNS-----
Danaus_fzy_DPOGS205285-PA ---SK-----S--K-----SPG---R--STT--PTPN--KAAKTPNKADRIFIPSRSNS-----
Bombyx_fzy_BGIBMGA011028 --KTP-SK-----S-----H--STT--PTPN--KASKTPNKADRIFIPSRSNS-----
Anopheles_fzy_XP_310009 --QTP-SK-----G-----PTA-----SSN--TNG--NAQNPQGGGDRFIPSRSTAT-----
Apis_fzy_XP_624567 --KTP-SK-----TSKK-----SP--SRT--STP--AKTPSGGDRFIPSRSTT-----
Pediculus_fzy_XP_002425384 -----K-----SP-----GCK--SNP--VTPSQQTGDRFIPNRSAS-----
Acyrthosiphon_fzy_NP_001135925 --KTP-NK-----S--K-----SPAS---R--SAS--NTP--AKPKTPGGDRFIPSRMST-----
Daphnia_fzy_EFX72563 --KTP-KM-----TQGP-----TLGKPNWSPVGVG--GGA--CRKAQNILDRMVPSRSTT-----
Nasonia_fzy_NP_001154940 --KTP-SK-----GSKK-----SP-----SRS--TTP--AKTPCGGDRFIPARSTT-----
Tribolium_fzy_XP_969612 PTKTP-NK-----N--R-----SNG-----SKT--PTPN--KTASKTPVADRIFIPVRSMS-----
Bombyx_cortex_XP_004921982.1 -----RRRPRVDRFVLPREQLAEIKSRA-----

Homo_cdc20_NP_001246 -----Q---MEVASFLL---SKE-N-QPENS-----
Homo_fzr1_NP_001129670 -----N---WSVNFHRI---NEN-E-KSP-SQ-----NRKAKD-----A-----
Saccharomyces_cdc20_NP_011399 --SQNKVDPETLHEAL---PPP-N-ASP-ISHLRAQTKI-----
Saccharomyces_cdh1_NP_011512 -----D---FNSIVSIS---SMA-S-VPALNP-----S-----STEDQ-----
Tricoplax_cdc20_XP_002114324 -----N---MDVSHHKV---MNS-T-NKDD-----
Tricoplax_rap_XP_002114232 -----
Acyrthosiphon_fzr_ACYPI009652 -----N---LSARFNI---SDI-R-YGL-DY-----GKK--D-----F-----
Bombyx_rap_BGIBMGA007924 -----N---WQTAFOGK---ITKKGTENQ-PA-----KKARN-----DGG-----G-S-----
Apis_fzr_XP_003251084 -----N---WQTFFSMI---SEN-N-RNG-IV-----TKKTR-----
Drosophila_rap_FBpp0070655 -----N---WQTNFASI---NKS-N-DNSPQT-----SKKQRD-----
Drosophila_fzr2_FBpp0072055 --H---WNRNFVNA---PGD-S-----
Danaus_rap_DPOGS208818-PA -----N---WRTSFQAI---LCGN--ENQ-PA-----KKPRS-----DGS-----N-----
Heliconius_rap_HMEL015096-RA -----N---WKTSFQAK---KRSR--DGG-----
Pediculus_fzr_XP_002425882 -----N---WETHYAMI---SEN-S-SIP-AL-----RKARE-----
Anopheles_rap_XP_320924 -----N---WTTNFATI---STKSN-ENSPOS-----TKKQRD-----
Nasonia_fzr_XP_001601463 -----N---WQTFFSMI---SES-N-RTG-VV-----NKKTR-----N-----
Daphnia_fzr_EFX80184 -----
Tribolium_rap_XP_968256 -----N---WETSFATL---PDT-N-KNS-QT-----GKKTR-----
Pediculus_cortex_XM_002425496 -----
Heliconius_cortex_HMEL000025 ---ETRR-RRS---WHAADFVH---PVN-N-D--RW-----
Drosophila_cortex_FBpp0078949 -----EN---IEFNLYI---GKR-K-E--RD-----I-----LETG--VTL-----
Acyrthosiphon_cortex_XP_003244209 -----P---YSF--YSV---PHT-A-ENHQYD-----CVSNNSFDE-PGSTDF---LE-----
Danaus_cortex_DPOGS200358-PA ---ESRR-RRS---WHATSN---PEI-V-D--TW-----
Anopheles_cortex_XP_552645 -----S---RSSRFKAE---SMP-E-Q-K-TD-----P-----M--V--MKE-----
Apis_cortex_XP_001122629 -----N---LEAANYLL---KKR-N-ENQLHR-----DE--ID---V---FKQ--VDS-----
Tribolium_cortex_XP_970475 -----E---ISPDPNSFNDPLDHEVL-E-N--TG-----I-----FINYAKIRY-----
Nasonia_cortex_XP_003425331 -----N---VDAAHYLL---TRT-E-KYKEND-----GHYLDV-----FEE--VQN-----
Drosophila_fzy_FBpp0080391 -----N---FELAHFLV---NKD-S-GDKSDE-----E-----N-DKA-----
Heliconius_fzy_HMEL017486 -----N---YDLCHYML---SRD-E-DKKE-----
Danaus_fzy_DPOGS205285-PA -----N---YDLCHYML---NRE-E-DQVE-----
Bombyx_fzy_BGIBMGA011028 -----N---YDLCHYML---SRD-D-DKSE-----
Anopheles_fzy_XP_310009 -----D---FDLGHYIV---KQG-T-ASNEEG-----EGGGNL-----
Apis_fzy_XP_624567 -----N---FDLGYIKI---QQQ-T-NAEKDE-----E-----KLD-----
Pediculus_fzy_XP_002425384 -----N---FDLGHFFT---NKK-I-QEED-----D-----
Acyrthosiphon_fzy_NP_001135925 -----N---FDISHFKM---NQE-N-ENLD-----
Daphnia_fzy_EFX72563 -----D---FEAAHKKM---TSE-E-SSG-----
Nasonia_fzy_NP_001154940 -----N---FELGYKQ---STD-Q-ESNKS-----E-----
Tribolium_fzy_XP_969612 -----N---FDLAHYKL---SQN-E-DTSD-----
Bombyx_cortex_XP_004921982.1 LWKIPSAYTGDI----WSSEYLG-----

Homo_cdc20_NP_001246 -----Q-----TP---TKK---E-H-----QKAWAL-NLNGFDVEE-----
Homo_fzr1_NP_001129670 -----TSDNGK---DGL---A-Y-----SALLKN-ELLGAGIEKVDQPQT-E-----
Saccharomyces_cdc20_NP_011399 -----V-----F-----KQNVAE-A-CGLDM-N-----
Saccharomyces_cdh1_NP_011512 -----VE-----Y-----QKERQAHE---T-Y-----NTLLKN-ELFGEMLSK-----DTVGS
Tricoplax_cdc20_XP_002114324 -----G-----
Tricoplax_rap_XP_002114232 -----VIAN-EVLGTR-----
Acyrtosiphon_fzr_ACYPI009652 -----QSEAAAN---KDN---A-Y-----KAILHN-ELLGSSVGEISIQDK-N-----
Bombyx_rap_BGIBMGA007924 -----D-----GASGGR---DQL---A-Y-----SCLLQN-ELLGAGIEEVRNPSA-T-----
Apis_fzr_XP_003251084 -----NGESNR---DGI---A-Y-----SCLLKN-ELLGASIEDVKQCE-E-----
Drosophila_rap_FBpp0070655 -----CGETAR---DSL---A-Y-----SCLLKN-ELLGSAIDDVKTAGE-E-----
Drosophila_fzr2_FBpp0072055 -----NVY---ESS---V-Y-----SCLLRN-EFLDENITSLENCEQ-T-----
Danaus_rap_DPOGS208818-PA -----D-----GAGGGR---DHL---A-Y-----DCLLRN-ELLDADIEELRTPPT-N-----
Heliconius_rap_HMEL015096-RA -----D-----GAGG---PQH---S-Y-----DCLLRN-ELLGASIEELRGPPK-N-----
Pediculus_fzr_XP_002425882 -----D-----SGETGR---DGL---A-Y-----SYLLKN-EVLGSDNIEDIKTNCD-E-----
Anopheles_rap_XP_320924 -----CGENAR---DSL---A-Y-----SCLLKN-ELLGTDGDDVKKLVAD-D-----
Nasonia_fzr_XP_001601463 -----NGEGSR---DGI---A-Y-----SCLLKN-ELLGASIEDVKQCE-E-----
Daphnia_fzr_EFX80184 -----SDAAGR---DRS---L-F-----RSILEN-EVLNSGIEDPRELQNKK-----
Tribolium_rap_XP_968256 -----TGENTR---DSS---V-Y-----NILLRN-ELFGENTEDVKSQCD-E-----
Pediculus_cortex_XM_002425496 -----
Heliconius_cortex_HMEL000025 -----SEGNLKK-----
Drosophila_cortex_FBpp0078949 -----TAS-YW---RQS---G-F-----ISNINR---TFGIGE-----
Acyrtosiphon_cortex_XP_003244209 -----PFECERQEQQH-RS---FRQLQSY-MSLDFIGGHLLRDVLNK-RKHGTDEAD-----
Danaus_cortex_DPOGS200358-PA -----FGKYIKQ-----
Anopheles_cortex_XP_552645 -----MPG-YW---RTH---H-Y-----SSVLKS-Q-LGLVSTH-----
Apis_cortex_XP_001122629 -----LHT-KW---QRK---FMH-----QLMVE-NVIP-GVRQKQVL-----
Tribolium_cortex_XP_970475 -----NRN---N-Y-----KNALR-----
Nasonia_cortex_XP_003425331 -----ATE-HW---RRE---Y-M-----QNAFGRIN-IFEGLN-----
Drosophila_fzy_FBpp0080391 -----TSSNSNESNVQA---SA---HKG---D-R-----QKLISE-VAQVDSKG-----
Heliconius_fzy_HMEL017486 -----E-----FA---LQS---V-T-----SEAIRS-AL--TDTEP-----
Danaus_fzy_DPOGS205285-PA -----E-----TA---PS---V-A-----SEAIGR-AL--SDNEP-----
Bombyx_fzy_BGIBMGA011028 -----E-----TP---QT---A-A-----GEAIGR-AL--NDTEP-----
Anopheles_fzy_XP_310009 ENEEGAAGGGSTSNIPV-----SF---KQS---E-R-----MKSLSLSE-AMRGCDISK-----
Apis_fzy_XP_624567 -----N-----T-----SP---SKR---E-M-----QRLMGE-NLHGDDINQ-----
Pediculus_fzy_XP_002425384 -----D-----AL---PKN---D-N-----QRILAE-TIHGGDLNN-----
Acyrtosiphon_fzy_NP_001135925 -----L-----SP---TQS---D-Y-----RKAMSE-NLHGCDINN-----
Daphnia_fzy_EFX72563 -----
Nasonia_fzy_NP_001154940 -----C-----S-----SF---SKR---E-M-----QRLIGE-NLHGDDVNN-----
Tribolium_fzy_XP_969612 -----SP---TQK---E-L-----QKAMFE-NLHGANIDS-----
Bombyx_cortex_XP_004921982.1 -----R-----

Homo_cdc20_NP_001246 -----
Homo_fzr1_NP_001129670 -----DRRL-----QP-----STP-----
Saccharomyces_cdc20_NP_011399 -----
Saccharomyces_cdh1_NP_011512 ESSIDRIKNTRPSTRGNVHAENTTRHGYELERVSTPPPEA-----AGLEE
Tricoplax_cdc20_XP_002114324 -----
Tricoplax_rap_XP_002114232 -----
Acyrtosiphon_fzr_ACYPI009652 -----RDRL-----A-----
Bombyx_rap_BGIBMGA007924 -----CPDGNK-TIGT-----VQT---PGR-SSQ-----
Apis_fzr_XP_003251084 -----RRV-----L-----SPL-----
Drosophila_rap_FBpp0070655 -----RNEN-----AY-----TPA-----
Drosophila_fzr2_FBpp0072055 -----AQV-----H-----AQTDDF-----
Danaus_rap_DPOGS208818-PA -----YADGNKSALGS-----LQVS---PAT-----
Heliconius_rap_HMEL015096-RA -----CTEGNRAALGF-----VQLASATRAAQA-----
Pediculus_fzr_XP_002425882 -----RRA-----L-----STI-----
Anopheles_rap_XP_320924 -----KNGSGGGGGGGGGGGGGAGGGGLH-----ANS-----
Nasonia_fzr_XP_001601463 -----RRI-----L-----SPL-----
Daphnia_fzr_EFX80184 -----RR-----
Tribolium_rap_XP_968256 -----RQV-----L-----TPV-----
Pediculus_cortex_XM_002425496 -----
Heliconius_cortex_HMEL000025 -----
Drosophila_cortex_FBpp0078949 -----
Acyrtosiphon_cortex_XP_003244209 -----
Danaus_cortex_DPOGS200358-PA -----
Anopheles_cortex_XP_552645 -----
Apis_cortex_XP_001122629 -----
Tribolium_cortex_XP_970475 -----
Nasonia_cortex_XP_003425331 -----
Drosophila_fzy_FBpp0080391 -----
Heliconius_fzy_HMEL017486 -----
Danaus_fzy_DPOGS205285-PA -----
Bombyx_fzy_BGIBMGA011028 -----
Anopheles_fzy_XP_310009 -----
Apis_fzy_XP_624567 -----
Pediculus_fzy_XP_002425384 -----
Acyrtosiphon_fzy_NP_001135925 -----
Daphnia_fzy_EFX72563 -----
Nasonia_fzy_NP_001154940 -----
Tribolium_fzy_XP_969612 -----
Bombyx_cortex_XP_004921982.1 -----

Homo_cdc20_NP_001246 -----AKILRLSG-KP-Q--NAP---EGY-----Q-----N-RLKVLVY
Homo_fzr1_NP_001129670 -----EKGLFTYSL-STKRS---SPD---DGN-----DVSPTSLS-PVS-NK
Saccharomyces_cdc20_NP_011399 -----KRLQYMP-EP-P--KCS---SLR-----Q--KSYI-M-KKRTHY
Saccharomyces_cdh1_NP_011512 FSPHSTPVTPrRLFTSQQDEITRPSNSVRGASLLTYQQ-RK--GRRLSAA---SLLQSQFFDSM-----S-PVR-PD
Tricoplax_cdc20_XP_002114324 -----SH-----Q-----N-NNRVLY
Tricoplax_rap_XP_002114232 -----
Acyrtosiphon_fzr_ACYPI009652 -----TKRNLFOYYS-SSP---EQV---DNI-----QSRVPYLS-PLG-SK
Bombyx_rap_BGIBMGA007924 -----AYQVFRFKA-PIHR---AE---ENI-----DPSPTSLS-PIS-AK
Apis_fzr_XP_003251084 -----VTRNLFKYIT-PTKD---HT---LLD-----QSSPYLS-PLS-AK
Drosophila_rap_FBpp0070655 -----AKRSLFKYQS-PTKQ---D---YN-----GECPSLS-PVS-AK
Drosophila_fzr2_FBpp0072055 -----RDRHNRIFGFAS-GSS-----SFPVRTPFA-NIS-ES
Danaus_rap_DPOGS208818-PA -----KCKPVFRFRA-PVHS---AE---ENI-----DPSPTSLS-PVS-AK
Heliconius_rap_HMEL015096-RA -----FSPVFRYRT-PVYS---AE---ENI-----DPSPTSLS-PVS-AK
Pediculus_fzr_XP_002425882 -----EGSNLFHYQS-PKKR---LD---FNE-----PTTPYLS-PVS-CY
Anopheles_rap_XP_320924 -----QRTGLFKYQS-PTKQ---D---YN-----EQCPYLS-PVS-IK
Nasonia_fzr_XP_001601463 -----AGKNLKFQTT-PTKD---KA---LLD-----QTSPTSLS-PLS-AK
Daphnia_fzr_EFX80184 -----VF-----HPYLS-PLS-PA
Tribolium_rap_XP_968256 -----KSRNLFRTYGT-PSKM---EKTPTNKF-----QSSPSMS-PLS-VS
Pediculus_cortex_XM_002425496 -----
Heliconius_cortex_HMEL000025 -----KNYIKYLD-KA--F--D-----L-ES-PDKN-K
Drosophila_cortex_FBpp0078949 -----RRLQFQSS-QQ--G--T-----RSRVVD
Acyrtosiphon_cortex_XP_003244209 -----LM-TIYRD-A---N-----M-TW-FIRM-V
Danaus_cortex_DPOGS200358-PA -----KKYTTYLD-EA--F--E-----L-EQ-EVRVY
Anopheles_cortex_XP_552645 -----DKILSFRD-ST--S--RQV-CKRLA-----NKRPL-EC-IVRPTY
Apis_cortex_XP_001122629 -----RGNHLSTEN-KL--P--GNL---AG-----R-Pre-LW
Tribolium_cortex_XP_970475 -----SALLPYEP-KV--L--N-----F-FP-PKK--F
Nasonia_cortex_XP_003425331 -----KRVLNIGR-E--P--S-----LAGAY-RLAIQEFV
Drosophila_fzy_FBpp0080391 -----GRLLCYQN-KA--P--AAP---ETH-----N-----N-PLKVVY
Heliconius_fzy_HMEL017486 -----GKLLQYTC-KA--P--AAP---EGY-----N-----N-RLRVY
Danaus_fzy_DPOGS205285-PA -----GRMLQYTC-KA--P--AAP---EGY-----Q-----N-RLRVY
Bombyx_fzy_BGIBMGA011028 -----GRLLQYTC-KA--P--AAP---EGY-----Q-----N-RLRVY
Anopheles_fzy_XP_310009 -----QRLLAFRT-KV--P--APP---EGH-----V-----N-PLKAIY
Apis_fzy_XP_624567 -----MRVLSYQN-KA--P--APP---EGY-----Q-----N-PLRVY
Pediculus_fzy_XP_002425384 -----MKILSYQN-KA--P--APP---EGY-----M-----N-PLRVMY
Acyrtosiphon_fzy_NP_001135925 -----VRVLSYQN-KA--P--APP---DGY-----Q-----N-ALKVVY
Daphnia_fzy_EFX72563 -----DRVLSYQTVQI--P--KPQ---EAY---I-----N-HQKALY
Nasonia_fzy_NP_001154940 -----MRVLSYQN-KA--P--APP---EGY-----Q-----N-PLRVY
Tribolium_fzy_XP_969612 -----QKILSYTN-KP--P--TAP---AGF-----Q-----N-PMRVYI
Bombyx_cortex_XP_004921982.1 -----KKYAEYLD-EA--F--G-----L--E-PLKA-H

Homo_cdc20_NP_001246 -----S--QKATPGSSRKTCTR-----YIPS-LPDRILDAPAIRNDY-----YLNLDWSSGNVLAV
Homo_fzr1_NP_001129670 -----S--Q--KLLRSPRPKPTR-----KISK-IPFKVLDAPELQDDF-----YLNLDWSSLNVLV
Saccharomyces_cdc20_NP_011399 -----S--YQQEQKIPDLIKLR-----KINT-NPERILDAPGFQDDF-----YLNLLSWSKKNVLA
Saccharomyces_cdh1_NP_011512 -----S--K-QLLLSPGKQFR-----QIAK-VPYRVLDAPELADDF-----YSLIDWSSTDVLA
Tricoplax_cdc20_XP_002114324 -----T--QNVTSSSCKKSSR-----FIPS-TPERVLDAPELVDY-----YLNLLDWSVNNHVA
Tricoplax_rap_XP_002114232 -----AEFPR-----KIPK-APYKVLDAPELQDDF-----YLNLDWSSPQNVLV
Acyrtosiphon_fzr_ACYPI009652 -----S--Q--EILRSPRKIPR-----KISR-VPYKVLDAPELQDDF-----YLNLDWSSNLLAV
Bombyx_rap_BGIBMGA007924 -----S--E--KLLRSPRKATR-----KISR-IPFKVLDAPELQDDF-----YLNLDWSAQNVLSV
Apis_fzr_XP_003251084 -----S--Q--KLLRSPRKATR-----KISR-IPFKVLDAPELQDDF-----YLNLDWSSQNVLSV
Drosophila_rap_FBpp0070655 -----S--Q--KLLRSPRKATR-----KISR-IPFKVLDAPELQDDF-----YLNLDWSSQNVLSV
Drosophila_fzr2_FBpp0072055 -----S--Q--RLLSIFKRPFR-----RLPR-RPYKILDAPELQDDF-----YLNLDWSSKNTLAV
Danaus_rap_DPOGS208818-PA -----S--Q--KLLRSPRKATR-----KISR-IPFKVLDAPELQDDF-----YLNLDWSSIQNVLSV
Heliconius_rap_HMEL015096-RA -----S--Q--KLLRSPRKATR-----KISR-IPFKVLDAPELQDDF-----YLNLDWSSAQNVLSV
Pediculus_fzr_XP_002425882 -----S--Q--KLLRSPRKATR-----KISR-IPFKVLDAPELQDDF-----YLNLDWSSQNVLSV
Anopheles_rap_XP_320924 -----S--Q--KLLRSPRKATR-----KISK-IPFKVLDAPELQDDF-----YLNLDWSSAQNVLSV
Nasonia_fzr_XP_001601463 -----S--Q--KLLRSPRKATR-----KISR-IPFKVLDAPELQDDF-----YLNLDWSSQNVLSV
Daphnia_fzr_EFX80184 -----S--Q--KLLQSPRKAAR-----KIAK-VPFKVLDAPELQDDF-----YLNLDWSSQNVLSV
Tribolium_rap_XP_968256 -----S--Q--RLLRSPHKATR-----KISR-IPFKVLDAPELQDDF-----YLNLDWSSQNVLSV
Pediculus_cortex_XM_002425496 -----SI--KR-MNRLWPCIPR--KK-----TYLS-SADSILDLPTYSYAI-----YPELLDWSNDNMLVA
Heliconius_cortex_HMEL000025 -----ND--S-ADSDWPCNPR--AR-----PYA-IQNATHEMPCICSPV-----DYNMMDWSSGGVMAM
Drosophila_cortex_FBpp0078949 -----S--S--QRRLARKFNH-AT-----SKSL-VADLLDMPNLSNDW-----MTKILDWSSGTGLTA
Acyrtosiphon_cortex_XP_003244209 -----KE--A-WLRFPWPCVPR--KK-----NYLS-SADSIDLPTYSYAI-----FPELLDWSNDNMLVA
Danaus_cortex_DPOGS200358-PA -----SN--Q--QKLDWSCHPR--TK-----PIG-FIEAVHDLPNIK-TY-----YHKIIDWSATGQIAA
Anopheles_cortex_XP_552645 -----D--EDQFEDGMWKSRRKR-----PLIG-IIDSILDMPGFQTSRPTLPTQGRLLVDWGSRNIIAA
Apis_cortex_XP_001122629 -----KVKKTPG-MEHTWPVKPR--EK-----PVIG-LPKTVLDMQFDSTI-----FHHVCDWSSEGCAT
Tribolium_cortex_XP_970475 -----DEGQWPCRPR--KQPLMSMRGENSKRYRDHGAQIFRFAMSI---K-----AQNVLDWSAKDTLAA
Nasonia_cortex_XP_003425331 -----S--I--KTIPTKSGSR-----YIPT-TSERILDAPDFINDY-----YLNLDWSSADNIVAV
Drosophila_fzy_FBpp0080391 -----S--Q--QAKVPSTVKNSTR-----YIPQ-APERILDAPDILDDY-----YLNLDWSSASNILAV
Heliconius_fzy_HMEL017486 -----S--Q--QAKVPSTVKNSTR-----YIPQ-GPDRILDAPDILDDY-----YLNLDWSSASNILAV
Danaus_fzy_DPOGS205285-PA -----S--Q--QAKVPSTVKNSTR-----YIPQ-APERILDAPDILDDY-----YLNLDWSSASNILAV
Bombyx_fzy_BGIBMGA011028 -----S--V--KTPMSAKSGSR-----YIPN-APERILDAPEIMNDY-----YLNLDWSTDNVIAV
Anopheles_fzy_XP_310009 -----S--Q--QAKVPSTVKNSTR-----YIPQ-NPDRILDAPDILDDY-----YLNLDWSSASNILAV
Apis_fzy_XP_624567 -----S--Q--QKSSSTVKGSSR-----YIPQ-SPERILDAPDILDDY-----YLNLDWSTTNILAV
Pediculus_fzy_XP_002425384 -----S--Q--QKTPMNVRGATR-----YIPH-APDRILDAPDILDDY-----YLNLDWSSASNILAV
Acyrtosiphon_fzy_NP_001135925 -----S--A--TASQKPKPSNR-----FIPN-TADRVLDAPEAMNDY-----YLNLDWSSQTNFISV
Daphnia_fzy_EFX72563 -----S--Q--QKTPASVKSSSR-----YIPQ-APDRILDAPDILDDY-----YLNLDWSSASNILAV
Nasonia_fzy_NP_001154940 -----T--Q--QKTPASVKSSNR-----YIPQ-APDRILDAPDILDDY-----YLNLDWSSASNILAV
Tribolium_fzy_XP_969612 -----DCNQSI PD---GY-RAQAWPCVPR--KR-----RYLT-SADSILDLPTYSYAL-----FPELLDWSNDNMLVA
Bombyx_cortex_XP_004921982.1 -----

Homo_cdc20_NP_001246 ALDNSVYLWS-ASSG-D--ILQLLQMEQPG-----EYISSVAWIKE-GNYLAVGT-----
Homo_fzr1_NP_001129670 GLGTCVYLWS-ACTS-Q--VTRLCDLSVEG-----DSVTSVWGSEER-GNLVAVGT-----
Saccharomyces_cdc20_NP_011399 ALDTALYLWN-ATTG-D--VSLLTDFE--N-----TTICSVTWSDDD-DCHISIGK-----
Saccharomyces_cdh1_NP_011512 ALGKSIFLTD-NNTG-D--VVHLCDFE-----NEYTSLSWIGA-GSHLAVGQ-----
Tricoplax_cdc20_XP_002114324 ALRNVLYLWN-AGDG-T--IHQLMQMESTN-----DYISAVSWIKE-GNYLAVGT-----
Tricoplax_rap_XP_002114232 GLGTCVYLWS-ANNG-Q--VTKLCDQFQSEG-----DSVTSVSWTEK-GNHIAVGT-----
Acyrthosiphon_fzr_ACYPI009652 GLGSCVYLWS-ATTS-K--VTRISDLSSDG-----NVVTSVAWVNDK-GNYLAFGT-----
Bombyx_rap_BGIBMGA007924 GLGSCVYLWS-ACTS-Q--VTRLCDLSTEG-----NAVTSVAWSEER-GHLVAVGT-----
Apis_fzr_XP_003251084 GLGSCVYLWS-ACTS-Q--VTRLCDLSSDG-----NSVTSVAWNER-GNLVAVGT-----
Drosophila_rap_FBpp0070655 GLGSCVYLWS-ACTS-Q--VTRLCDLSPDA-----NTVTSVSWNER-GNTVAVGT-----
Drosophila_fzr2_FBpp0072055 GLGSCVYLWS-AVSG-Q--VTRLCDFNNEED-----NLITAVSWHGE-GRQVAIGT-----
Danaus_rap_DPOGS208818-PA GLGSCVYLWS-ACTS-Q--VTRLCDLSSEG-----NAVTSVAWSEER-GHLVAVGT-----
Heliconius_rap_HMEL015096-RA GLGSCVYLWS-ACTS-Q--VTRLCDLSSEG-----NAVTSVAWSEER-GHLVAVGT-----
Pediculus_fzr_XP_002425882 GLGSCVYLWS-ACNS-Q--VTRLCDLSSDG-----NSVTSVAWNER-GNLVAVGT-----
Anopheles_rap_XP_320924 GLGSCVYLWS-ACTS-Q--VTRLCDLSSDS-----NTITSVSWSER-GHQLAVGT-----
Nasonia_fzr_XP_001601463 GLGSCVYLWS-ACTS-Q--VTRLCDLSGDG-----NSVTSVAWNER-GNLVAVGT-----
Daphnia_fzr_EFX80184 GLGACVYLWA-AATS-Q--VTRLCDLAPEG-----DSVTSVAWAER-GHLVAVGT-----
Tribolium_rap_XP_968256 GLGSCVYLWS-ACTS-Q--VTRLCDLSADG-----NVVTSVAWSEER-GHLVAVGT-----
Pediculus_cortex_XM_002425496 LVKKNKIVAGCNFSEK-QTSTETVT-EYEG-----DSGTAVAWSGN-GVTLAAGT-----
Heliconius_cortex_HMEL000025 ALGSSYHKWS-WRSQ-S--LIGHGF--AE-----YEIQCKKFDPR-GELLALGT-----
Drosophila_cortex_FBpp0078949 SSGQDVMLWR-NLDE-S--TMVF---SV-----ESPTSLKYSFD-GKHLAIGC-----
Acyrthosiphon_cortex_XP_003244209 AIQSSIHLSW-SQTQ-S--VQYTTAAVDAHDPTQTEGGATKTTIGCLKWVQ-GEKLGYSFTVGRGEDSSFDSSGDSSGP-----
Danaus_cortex_DPOGS200358-PA ALGRNYHKWS-WRSQ-S--LISQGY--TQ-----NEIQCKKFDPR-GDLLVLTG-----
Anopheles_cortex_XP_552645 IFSKLVLIWT-PNTD-E--IIGL---GA-----QYATSI AFEP A-GTRLAMGI-----
Apis_cortex_XP_001122629 AVHDIVMLYN-GQNA-S-DNTELENVE--I-----SNISALKWNHA-GTKLAICT-----
Tribolium_cortex_XP_970475 IFQNEVHIWN-HVTQ-R--RIRITS-TTH-----RIEYSIKWKNG-GTQFAVGL-----
Nasonia_cortex_XP_003425331 GMSNALCVCD-VDSKSY--LSKVYRIDHV-----SDLCCVKWNAQ-GTQVSMG-----
Drosophila_fzy_FBpp0080391 ALGSCVYLWN-AQTG-N--IEQLTEFEE-G-----DYAGSLSWIQE-QQILAIGN-----
Heliconius_fzy_HMEL017486 ALNNSIYLWN-AGTG-Q--IEQLLSLEA-S-----ETVCSVGVVQGGGSHLAVGT-----
Danaus_fzy_DPOGS205285-PA ALGNSVYLWN-AGTG-L--IEQLLTLEG-S-----ETVCSVSWVQGGGSHLAVGT-----
Bombyx_fzy_BGIBMGA011028 ALGNSVYLWN-AGTG-Q--IEQLLTLEG-A-----ETVCSVGVVQGGGSHLAVGT-----
Anopheles_fzy_XP_310009 ALGASVYLWN-AATG-T--IEMLFENEG-N-----DHACSLSWIHE-GHILAVGT-----
Apis_fzy_XP_624567 ALGANVYLWN-AATG-T--IEQLLELNG-N-----DYVCSVAWIQE-GPYLAVGT-----
Pediculus_fzy_XP_002425384 ALSNCVYLWN-AATG-A--IEELLELEG-S-----DYVTSVAWIQE-GNYLAVGT-----
Acyrthosiphon_fzy_NP_001135925 ALGTSVYLWN-ADTG-A--IDQLLDLEG-A-----DYVTSLSWVFN-GNLLGVGT-----
Daphnia_fzy_EFX72563 ALDKQVYLWN-AASG-D--IQELMECEGED-----NYISSVQFTQD-GSYLAIGL-----
Nasonia_fzy_NP_001154940 ALGANVYLWN-AGTG-T--IEQLFELEG-N-----DYVCSVAWIQE-GLYLAVGT-----
Tribolium_fzy_XP_969612 ALGAHVYLWN-AGTG-N--IEDLLELQG-N-----DYVCSLAWIQD-GDHLAVGT-----
Bombyx_cortex_XP_004921982.1 ALGRNYHKWS-WRTQ-S--LTNQGF--TQ-----YEIQCKKFDPR-GELLLLGT-----

Homo_cdc20_NP_001246 -----SSAE---VQ
Homo_fzr1_NP_001129670 -----HKGf---VQ
Saccharomyces_cdc20_NP_011399 -----EDGN---TE
Saccharomyces_cdh1_NP_011512 -----ANGL---VE
Tricoplax_cdc20_XP_002114324 -----STNS---VQ
Tricoplax_rap_XP_002114232 -----QRGY---IH
Acyrthosiphon_fzr_ACYPI009652 -----QEGS---VE
Bombyx_rap_BGIBMGA007924 -----QKGH---IS
Apis_fzr_XP_003251084 -----HLGY---IQ
Drosophila_rap_FBpp0070655 -----HHGY---VT
Drosophila_fzr2_FBpp0072055 -----QSGY---VT
Danaus_rap_DPOGS208818-PA -----QKGH---IS
Heliconius_rap_HMEL015096-RA -----
Pediculus_fzr_XP_002425882 -----HHGQ---VQ
Anopheles_rap_XP_320924 -----QHGY---VT
Nasonia_fzr_XP_001601463 -----NLGY---IQ
Daphnia_fzr_EFX80184 -----HRGT---VQ
Tribolium_rap_XP_968256 -----HHGY---VT
Pediculus_cortex_XM_002425496 -----ESGL---VQ
Heliconius_cortex_HMEL000025 -----YMKT---LE
Drosophila_cortex_FBpp0078949 -----MDRNPVLD
Acyrthosiphon_cortex_XP_003244209 GDSSLLERILLGDGGLDSSLLERMNAYAARDQRLLEQDDPDFVTYRSPAINASADDTYQQIPRRINNAIKNTGH---VK
Danaus_cortex_DPOGS200358-PA -----DNKM---VE
Anopheles_cortex_XP_552645 -----FMMNRPWLN
Apis_cortex_XP_001122629 -----KSSR---VN
Tribolium_cortex_XP_970475 -----FPSS---VG
Nasonia_cortex_XP_003425331 -----VDGH---TS
Drosophila_fzy_FBpp0080391 -----STGA---VE
Heliconius_fzy_HMEL017486 -----SSGI---VE
Danaus_fzy_DPOGS205285-PA -----SSAT---VE
Bombyx_fzy_BGIBMGA011028 -----SMAT---VE
Anopheles_fzy_XP_310009 -----SAGT---VE
Apis_fzy_XP_624567 -----TIGN---TE
Pediculus_fzy_XP_002425384 -----FTGS---TQ
Acyrthosiphon_fzy_NP_001135925 -----ALGP---VQ
Daphnia_fzy_EFX72563 -----NTGS---VE
Nasonia_fzy_NP_001154940 -----TVGN---TE
Tribolium_fzy_XP_969612 -----TNGT---VE
Bombyx_cortex_XP_004921982.1 -----DNQI---TE

Homo_cdc20_NP_001246
Homo_fzr1_NP_001129670
Saccharomyces_cdc20_NP_011399
Saccharomyces_cdh1_NP_011512
Tricoplax_cdc20_XP_002114324
Tricoplax_rap_XP_002114232
Acyrtosiphon_fzr_ACYPI009652
Bombyx_rap_BGIBMGA007924
Apis_fzr_XP_003251084
Drosophila_rap_FBpp0070655
Drosophila_fzr2_FBpp0072055
Danaus_rap_DPOGS208818-PA
Heliconius_rap_HMEL015096-RA
Pediculus_fzr_XP_002425882
Anopheles_rap_XP_320924
Nasonia_fzr_XP_001601463
Daphnia_fzr_EFX80184
Tribolium_rap_XP_968256
Pediculus_cortex_XM_002425496
Heliconius_cortex_HMEL000025
Drosophila_cortex_FBpp0078949
Acyrtosiphon_cortex_XP_003244209
Danaus_cortex_DPOGS200358-PA
Anopheles_cortex_XP_552645
Apis_cortex_XP_001122629
Tribolium_cortex_XP_970475
Nasonia_cortex_XP_003425331
Drosophila_fzy_FBpp0080391
Heliconius_fzy_HMEL017486
Danaus_fzy_DPOGS205285-PA
Bombyx_fzy_BGIBMGA011028
Anopheles_fzy_XP_310009
Apis_fzy_XP_624567
Pediculus_fzy_XP_002425384
Acyrtosiphon_fzy_NP_001135925
Daphnia_fzy_EFX72563
Nasonia_fzy_NP_001154940
Tribolium_fzy_XP_969612
Bombyx_cortex_XP_004921982.1
LWDVQQQK-----RLRNM-T-----SHSARV-----GSLSWN--SYILSSGSRSGHIH--HHDVRT
IWDAAAGK-----KLSML-E-----GHTARV-----GALAWN--AEQLSSGSRDRMIL--QRDIRT
IWDVETMS-----LIRTMS-----GLGVRV-----GSLSWL--DTLLATGSRSGEIQ--INDVRI
IYDVMKRR-----CIRTL-S-----GHIDRV-----ACLSWN--NHVLTSGSRDHRIL--HRDVRM
IWDVGQSK-----CLRSM-S-----GHSARI-----GALAWN--EHLILASGSGGSAIH--CHDVVY
IWDVTVSR-----LIALL-D-----GHTARV-----GTLAWN--NDLLYSGSRDKCIF--QRDLRT
VWDIAAEK-----QVNSL-T-----GHAGRV-----GAIAWN--GDVSSGSRDRNIF--LRDMRG
VWDVAVNK-----EVTKL-Q-----GHIARV-----GALAWN--GDILSSGSRDRHIR--QRDTRT
VWDVAVSK-----QVSKL-Q-----GHSARV-----GALAWN--GEVLSSGSRDRDLIL--QRDVRT
VWDVAANK-----QINKL-N-----GHSARV-----GALAWN--SDILSSGSRDRWII--QRDTRT
IWDAENQK-----QINRL-E-----EHSARV-----TALAWC--GNRLASGSRDRSIL--QRDIRN
VWDVAVNK-----EVTKL-Q-----GHIARV-----GALAWN--GDVLSSGSRDRHIR--QRDTRT
-----KL-Q-----GHIARV-----GALAWN--GDILSSGSRDRHIR--QRDTRT
VWDVTA-----
VWDVAASK-----QVNKL-Q-----GHSARV-----GALAWN--GDVLSSGSRDRDLIM--QRDTRT
VWDVAVNK-----QVNKL-Q-----GHSARV-----GALAWN--GEVLSSGSRDRDLIL--LRDVRT
VWDVTAGK-----RIHTL-E-----GHTARV-----GALAWN--GDLLASGSRDRDLIL--QRDIRT
VWDVSVNK-----QVNKL-Q-----GHSARV-----GALAWN--GDVLSSGSRDRDLIL--QRDTRT
IWNLTCK--T-----LILEE-----KCCV--NKCIVTAC--SRGKIS--RRDFRD
IHNNKSK-----KIMSN-T-CKCLE-----IDNMNCSI-----TAVDWSPTGNSFAAGSGGAVT--SF-TRA
LWEVRSPTFEFL-VSYRKL-F-----KSMGYI-----SCIEWSHDGKEVICGTQCGVII--VLAMPT
VWLLNAPNDK-----TNNEQ-----KTSSCGCVTDDTCQWIYGCRI-----IVMDWLANGHVLTGCTRATVTFFRYDFAQ
LHNNLSLK-----KIATH-R-CPDVD-----TIEHPCSV-----ASTVWNSDKHMTGCNNGYLV--LIDTSS
IFDDPARPQSERHGSLKML-D-----PLDHP-----SCLTWDGSGLYVLCGFGNGQIS--IVRIRP
LYCVNSQK-----VWTS-P-----CCGKNYPLCYSRICWPODDRYVITGCV-GVIT--VHSHVEN
IWDVVANK-----LICWE-SCGH-----YAHCKV-----FALEWI--NAQLLVTCGSLGSLK--VFENSEL
LYDVTSSK-----IAWTI-K-CP-----NAPRCIV-----ASTVWNSDKHMTGCNNGYLV--LIDTSS
LWDCSKVK-----RLRVM-D-----GHSARV-----GSLAWN--SFLVSSGSRDGTIV--HHDVRA
LWDCEKIK-----RLRAM-E-----GHSGRV-----GSLAWN--LYMVSSGARDGQIV--HHDVRQ
MWDCEKIK-----RLRTM-D-----GHTGRV-----GSLAWN--LYVSSGARDGNIV--HHDVRQ
LWDCEKIK-----RLRVM-D-----GHSGRV-----GSLAWN--MYIVSSGARDGHIV--HHDVRQ
LWDCENMK-----RLRVM-N-----GHSARV-----GVLAWN--SYVLCSSGSRDGTIV--NHDVRT
LWDCSQT-----RIRVM-N-----GHAARV-----GSLAWN--SHILTSGCRAGQIV--HHDVRQ
IWDENEMR-----RLRTM-E-----GHTARV-----CNSHWN--QFILLSSGSRSGQII--HHDVRQ
LWDASQTK-----RLRIM-N-----SHSRV-----GAMSWN--SHILTTGCRNGQLV--HHDVRQ
LWDIQQR-----RLRTM-A-----GHAARI-----GVLAWN--EHLVSSGSRSGLIF--HHDVRI
LWDCGQMK-----RVRVM-S-----GHSARV-----GSLAWN--SHIISGCRAGQIV--HHDVRQ
LWDCGRAK-----RLRVM-D-----GHSARV-----GSLAWN--SYVLTSGCRSGQII--HHDVRQ
IHNNAMSK-----WVAC-S-CLCNR-----F-VAICSI-----TAVDWSPTGNSFITGCSRGVIV--SY-TRT

Homo_cdc20_NP_001246
Homo_fzr1_NP_001129670
Saccharomyces_cdc20_NP_011399
Saccharomyces_cdh1_NP_011512
Tricoplax_cdc20_XP_002114324
Tricoplax_rap_XP_002114232
Acyrtosiphon_fzr_ACYPI009652
Bombyx_rap_BGIBMGA007924
Apis_fzr_XP_003251084
Drosophila_rap_FBpp0070655
Drosophila_fzr2_FBpp0072055
Danaus_rap_DPOGS208818-PA
Heliconius_rap_HMEL015096-RA
Pediculus_fzr_XP_002425882
Anopheles_rap_XP_320924
Nasonia_fzr_XP_001601463
Daphnia_fzr_EFX80184
Tribolium_rap_XP_968256
Pediculus_cortex_XM_002425496
Heliconius_cortex_HMEL000025
Drosophila_cortex_FBpp0078949
Acyrtosiphon_cortex_XP_003244209
Danaus_cortex_DPOGS200358-PA
Anopheles_cortex_XP_552645
Apis_cortex_XP_001122629
Tribolium_cortex_XP_970475
Nasonia_cortex_XP_003425331
Drosophila_fzy_FBpp0080391
Heliconius_fzy_HMEL017486
Danaus_fzy_DPOGS205285-PA
Bombyx_fzy_BGIBMGA011028
Anopheles_fzy_XP_310009
Apis_fzy_XP_624567
Pediculus_fzy_XP_002425384
Acyrtosiphon_fzy_NP_001135925
Daphnia_fzy_EFX72563
Nasonia_fzy_NP_001154940
Tribolium_fzy_XP_969612
Bombyx_cortex_XP_004921982.1
AEHH---VA-----TLSGHSQEVCGLR--WAPDGRHLASGGNDN-----LV-NVWPSAP
PPLQ--SER-----RLQGHREQVCGLK--WSTDHQLLASGGNDN-----KL-LVWNHSS
KQHI---VS-----TWAEHTGECVGLS--YKSDGLQLASGGNDN-----TV-MIWDTRT
PDPF---FE-----TIESHTQEVCGLK--WNVADNKLASGGNDN-----VV-HVYEGTS
ANHH---IS-----TLSNHVQEVCGLK--WSPNGKYLASGGNDN-----VV-TIWQDNS
PCS---ITR-----KLRAHKQEVCGLK--WSDRQYLASGGNDN-----KL-FIWNLSA
PSLS---TCR-----RYAGHRQEVCGLK--WSPDNRYLASGGNDN-----RL-YVWNTHA
PPIQ---LSR-----VLQGHREQVCGLK--WSPDGQSLASGGNDN-----KL-FVWSMHS
PCVV---SER-----RLGAHRQEVCGLK--WSPDNQYLASGGNDN-----RL-YVWNLHS
PQLQ---SER-----RLAGHRQEVCGLK--WSPDNQYLASGGNDN-----RL-YVWNQHS
PPTH---ITR-----CLRGHKLEVCGLQ--WSPSNRYLASGGNDN-----RL-LVWTDW
PPVQ---AAR-----VLQGHREQVCGLK--WSPDGQSLASGGNDN-----KL-FVWSMHS
PPSQ---SSR-----ILQGHREQVCGLK--WSPDGQSLASGGNDN-----KL-FVWSNVP

PSQV---PER-----RLAGHRQEVCGLK--WSPDNQYLASGGNDN-----RL-YVWNQHS
PCLV---SER-----KLAGHRQEVCGLK--WSPDNQYLASGGNDN-----RL-YVWNLHS
PPSI---AQR-----RLSGHRQEVCGLK--WSPDNQLLASGGNDN-----KL-FVWGLHS
PPTV---TER-----RLVGHREQVCGLK--WSPDNQYLASGGNDN-----RL-YVWNMQS
N---ITTE-----VEYAHDCICNLK--YSPNTANYLCSGEGD-----YV-RIWKGDS
A---KLIS-----WRHLVREAILLR--VSPNARYLAVTAMNT-----ALVLLLSWPS
L---NTLM-----QLREHRHTVKKMK--FAPTHKYFASDSDTG-----KI-FIFDAVL
K---KLIITRIIRRIEKYSVISCIVSQDKWSRHLAVATHSQSCVCLKVWRIEDPLELCPHYDQ-----RL-DSSINVT
A---KLIT-----WRRVVREAIQIVR--VSPDARYVAISSVNS-----SFVLLLSWPT
AANINQCES-----KYCVHKGSI IAIK--FSCGCRYMATADDLG-----QL-YLWHWSG
G-KV---VQ-----YNHAHVSEILLE--FSSNRYIASASHSLDRNIRI--FLWPYL-
N---KIRE-----STFAHTGAILTIV--RSCDGRFIATTGMDK-----MM-IVWRIPT
G---RSV-----MVKEFECEIRAIA--VSVKDKYLVLSGTDR-----LV-KLFEYPS
REHK---LS-----TLSGHTQEVCGLK--WSTDFKYLASGGNDN-----LV-NVWSAAS
RDHA---VA-----TVAHTQEIICGLK--WSPDGKYLASGGNDN-----LL-NIWPILA
RDHA---VA-----TISAHTQEIICGLK--WSPDGKYLASGGNDN-----LL-NIWPILAQ
RDHA---VA-----NIHGHTQEIICGLK--WSPDGRYLASGGNDN-----LL-NIWPILAQ
RQHN---IG-----VLQGHREQVCGLK--WSPDGKYLASGGNDN-----LV-HVWSAAH
RDHL---IS-----TINAHVQEVCGLK--WSPDGKYLASGGNDN-----ML-QIWPVS
RNHT---IA-----VLNGHSEEVCGLK--WSPDGKYLASGGNDN-----LL-NIWPQLQ
REHI---VG-----TIQSHHTQEVCGLK--WSTDGRYLASGGNDN-----LL-NVYSGLP
PQHL---VA-----SLEGHTEVCSLK--WSDGHRYLASGGNDN-----LV-HIWEGET
REHL---VA-----TMNAHAQEVCGLK--WSDLGKYLASGGNDN-----ML-QIWPVMA
REHI---IT-----TLSGHTQEVCGLK--WSPDGRYLASGGNDN-----VL-NIWSQST
G---DMLG-----WRR-VGETMLAVR--VSPDARYVAAAANG-----TTVLVMTWPL

Homo_cdc20_NP_001246 GEG--GW---VPL--QTFTQHOGA-VKAWAWCPWQSNVLATGGGT-S-----DR--HIRIW----NVCSGAC--LSA
Homo_fzr1_NP_001129670 -----L---SPV--QYQTEHLAA-VKAIAWSPHQHGLLASGGGT-A-----DR--CIRFW----NTLTGQP--LQC
Saccharomyces_cdc20_NP_011399 -----S---LPQ--FSKKTHTAA-VKALSWCYSPNLLASGGGQ-T-----DK--HIHFW----NSITGAR--VGS
Saccharomyces_cdh1_NP_011512 -----K---SPI--LTFDEHKAA-VKAMAWSPHKRGVLTGGGT-A-----DR--RLKIW----NVNTSIK--MSD
Tricoplax_cdc20_XP_002114324 -----ML--HSLTDHQAA-VKAVSWCPWHDNLLATGGGT-A-----DR--CIRLW----NASTGSC--LNS
Tricoplax_rap_XP_002114232 -----E---TPI--QTYADHEAA-VKAIAWSPHQHGLLASGGGT-A-----DR--CIRFR----NILTNQS--INC
Acyrthosiphon_fzr_ACYPI009652 -----Y---TPQ--LTYHQHTAA-VKAIAWSPHQRGLTSGGGT-A-----DK--CIRFW----NTLTGQP--MQC
Bombyx_rap_BGIBMGA007924 -----L---SPV--QTYSAHVAA-VKAIAWSPHQHGLLASGGGT-A-----DR--CIRFW----NTLTGQP--MQC
Apis_fzr_XP_003251084 -----L---SPI--QTYTEHLAA-VKAIAWSPHHHGLLASGGGT-A-----DR--CIRFW----NTLTGQP--MQC
Drosophila_rap_FBpp0070655 -----V---NPV--QSYTEHMAA-VKAIAWSPHHHGLLASGGGT-A-----DR--CIRFW----NTLTGQP--MQC
Drosophila_fzr2_FBpp0072055 -----P---EPI--YAFDEHKAV-VKALGWSPHKSGLLASGGGS-A-----DR--CLRFW----NVLTKGL--VKC
Danaus_rap_DPOGS208818-PA -----T---SPV--QTYSSHVAA-VKAIAWSPHQHGLLASGGGT-A-----DR--CIRFW----NTLTTQP--MQC
Heliconius_rap_HMEL015096-RA -----K---SA-----TWRGR-STPANWCPHM-----
Pediculus_fzr_XP_002425882 -----S---TPV--HSYSEHMAA-VKAIAWSPHHHGLLASGGGT-A-----DR--CIRFW----NTLTGQP--MQC
Anopheles_rap_XP_320924 -----L---SPV--QTYTEHLAA-VKAIAWSPHHHGLLASGGGT-A-----DR--CIRFW----NTLTGQP--MQC
Nasonia_fzr_XP_001601463 -----V---APL--QTFTEHLAA-VKAIAWSPHHHGVLASGGGT-A-----DR--CIRFW----NTLTGQP--MQY
Daphnia_fzr_EFX80184 -----L---SPV--QTYTDHLAA-VKAIAWSPHHHGLLASGGGT-A-----DR--CIRFW----NTLTGQP--MQS
Tribolium_rap_XP_968256 -----C---DPY--MEIEMSHP-VRAIAWHPWRTGLLAVGEGE-PT-----TG--PLSIW----NVNTTKL--EYM
Pediculus_cortex_XM_002425496 -----LEM--YSSIDSDWS-IRAICWHPWRSALLGVGAVT-D-----DLQARIALW----NAPTREV--RDT
Heliconius_cortex_HMEL000025 -----K---VRL--LKL---DGR-SIVFDWHPWTGEDLVAER--S-----PA--SIFIF--NI PRQR--VAS
Drosophila_cortex_FBpp0078949 -----ETLTDRYDSKQNGRAKWL-IKAFAWHPWKHALMCAVAVTAVPQDGAQMYINR--KCPSWFVLNACKGQV--LKR
Acyrthosiphon_cortex_XP_003244209 -----LEI--TSRLSDSWT-IRTIAWHPWRSALLGVGAVT-S-----DLQARIALW----DAPTSKV--RET
Danaus_fzy_DPOGS200358-PA G---NL---TPI--TNW---DSSMCAFFDWHWPREDIIVADS--E-----PI--LIALY----HVPSRQV--LSY
Anopheles_cortex_XP_552645 -----IPY---VDIDYCEP-VLALAWHPYESGHLICGGGY-G-----NA--SLSLW----NVNTLVEGYRN
Apis_cortex_XP_001122629 -----L---EKH--FTF-ETDTI-SRAVAWHPWRGSLAVGVGQ-R-----NG--HIVIF--NINKKSS--IAE
Tribolium_cortex_XP_970475 -----M---EPL--FEI-AFFTT-IKAFAWHPWRSGILCIGGGP-G-----DG--ALSILW--NVSTQVQ--LSY
Nasonia_cortex_XP_003425331 GVGVTAT---DPL--HKFNDHQAA-VRALAWCPWQPSTLASGGGT-A-----DR--CIRFW----NVNNGTL--MKS
Drosophila_fzy_FBpp0080391 GEHYSQP---QYL--YSFNQHLAA-VKGLAWCPWSSGMLASGGGT-A-----DR--TIRIW----NINTGVN--VNT
Heliconius_fzy_HMEL017486 GQHYTQP---QYL--YSFNQHLAA-VKGLAWCPWSSGMLASGGGT-A-----DR--TIRIW----NVNNGTL--MKS
Danaus_fzy_DPOGS205285-PA GQHYSQP---QHI--LSFNQHLAA-VKGLAWCPWSAGILASGGGT-A-----DR--TIRLW----NISTGSN--LNT
Bombyx_fzy_BGIBMGA011028 GAPHATG---EPL--HVFNQHQA--IRALAWCPWQPNVLASGGGT-A-----DR--TIRFW----NVANGOL--MNS
Anopheles_fzy_XP_310009 VQSHNTN---QPI--YSLNQHQA--VKALAWCPWQSSILASGGGT-A-----DR--TIRFW----NCNTGVC--LNM
Apis_fzy_XP_624567 DQMYTAS---QPL--HTFSEHQA--VKALAWCPWQPGVVASGGGT-A-----DR--CIRIW----NINSGSL--LST
Pediculus_fzr_XP_002425384 GQATYQS---EPI--YFSFQHQA--VKALDWCPWQTNVLASGGGT-A-----DR--TIRFW----NCNNGQC--INS
Acyrthosiphon_fzy_NP_001135925 GQT-TRN---TPV--HVFNQHQA--VKGMAWCPWQNRLLATGGGS-N-----DR--SIKLW----NMNVGEC--VDT
Daphnia_fzy_EFX72563 GQNYSHV---QPI--YSLNQHQA--VKALAWCPWQNHVLASGGGT-A-----DR--TIRFW----NCNVTGAC--LNT
Nasonia_fzy_NP_001154940 GSHHTNN---QPL--HIFTAQA--VKALAWCPWQGHVVASGGGT-A-----DR--HIRFW----NCNIGSC--INS
Tribolium_fzy_XP_969612 -----LHL--YSSLGSNWT-VKALSWHWRSALLGVGAVT-S-----RMAHVAVW----DAPTSRV--TDT
Bombyx_cortex_XP_004921982.1

Homo_cdc20_NP_001246 ---VDAHSQV-----CSILWSPH-----YKELISGH-GFA-----QNLVIWKYP---TM
Homo_fzr1_NP_001129670 ---IDTGSQV-----CNLAWSKH-----ANELVSTH-GYS-----QNLVWKYP---SL
Saccharomyces_cdc20_NP_011399 ---INTGSQV-----SSLHWQSHSTNGGMMNKEIVATG-GNP-----ENAI SVYNYE--TK
Saccharomyces_cdh1_NP_011512 ---IDSGSQI-----CNMVWSKN-----TNELVTSH-GYS-----KYNLTLWDCN--SM
Tricoplax_cdc20_XP_002114324 ---IDTASQV-----CNILWSKE-----YRELISGH-GYS-----QYQLTIWKYP---SM
Tricoplax_rap_XP_002114232 ---IDTGSQV-----CNLAWSKY-----TNELVSTH-GYS-----KNHVIWKYP---SL
Acyrthosiphon_fzr_ACYPI009652 ---IDTGSQV-----CNLAWSRN-----TQELVSTH-GYS-----QNLIVWKYP---SM
Bombyx_rap_BGIBMGA007924 ---VDTGSQV-----CNLAWSKH-----SSELVSTH-GYS-----QNLVWKYP---SL
Apis_fzr_XP_003251084 ---VDTGSQV-----CNLAWSKH-----SSELVSTH-GYS-----QNLVWKYP---SL
Drosophila_rap_FBpp0070655 ---VDTGSQV-----CNLAWSKH-----SSELVSTH-GYS-----QNLVWKYP---SL
Drosophila_fzr2_FBpp0072055 ---INTGAI-----SNLAWARD-----SRELVTTT-GHA-----QPQVIAWRYP---SL
Danaus_rap_DPOGS208818-PA ---VDTGSQV-----CNLAWSKH-----SSELVSTH-GYS-----QNLVWKYP---SL
Heliconius_rap_HMEL015096-RA -----GKQV-----CNLAWSKH-----SSELVSTH-GYS-----QNLVWKYP---SL
Pediculus_fzr_XP_002425882 ---VDTGSQV-----CNLAWSKH-----SSELVSTH-GYS-----QNLVWKYP---SL
Anopheles_rap_XP_320924 ---VDTGSQV-----CNLAWSKH-----SSELVSTH-GYS-----QNLVWKYP---SL
Nasonia_fzr_XP_001601463 ---VDTGSQV-----CNLAWSKH-----SSELVSTH-GYS-----QNLVWKYP---SL
Daphnia_fzr_EFX80184 ---VDTGSQV-----CNLAWSKH-----SSELVSTH-GYS-----QNLVWKYP---SL
Tribolium_rap_XP_968256 ---VDTGSQV-----CNLAWSKH-----SSELVSTH-GYS-----QNLVWKYP---SL
Pediculus_cortex_XM_002425496 ---AK--SSRQVA-----IKSLEFSKIS-----GELVCAQ-WVHDTQ-----EETHCELLV--SG--GA
Heliconius_cortex_HMEL000025 ---SIGPKGYRL-----DSMLFSHRT-----GELVLSM-WHSDRATLHP-----KTCSQLVVLSDP--DT
Drosophila_cortex_FBpp0078949 YRRRDDRIVI-----KTLTYSKIT-----GELLVNV-IRRDDA--D-----LAVCEILV--LA--SL
Acyrthosiphon_cortex_XP_003244209 ---VE-QTASNCCPTVDIMHVNTSHMTFSRLT-----GELLSATTVYNVR--YNAYSAPVLVEKNSVVV--MH--AL
Danaus_cortex_DPOGS200358-PA ---TLPKRHSL-----DAMLFSHRT-----GELVLSL-WNSDRALLHP-----KTCSHLVLSDP--KT
Anopheles_cortex_XP_552645 YQRRESDCIL-----TTLSFNKLS-----GELVVCY-SFTGKY-----KPPEILV--LA--SM
Apis_cortex_XP_001122629 ---VYFHGAV-----KNLAWNKR-----AELVNVW-SYF-----VQQAECTLMPVLGSL
Tribolium_cortex_XP_970475 EKFTYRNATV-----NSLTFNPIS-----GELVASY-FVRDAR-DRR-----KGVGVVVV--FS--NI
Nasonia_cortex_XP_003425331 ---KKVDFVGSV-----DSMMFNKLS-----GELLVHW-FYLAND-----KLRSKIVI--LA--AL
Drosophila_fzy_FBpp0080391 ---VDSKSQV-----CSLLFSRH-----YKELISAH-GFA-----NNQLTIWKYP---TM
Heliconius_fzy_HMEL017486 ---VDTKSQV-----CSIQWSTH-----YKELISGH-GYA-----QNLTIWKYP---SL
Danaus_fzy_DPOGS205285-PA ---VDTKSQV-----CSIWSTH-----YKELVSGH-GYA-----HNQLVIWKYP---TL
Bombyx_fzy_BGIBMGA011028 ---VDTKSQV-----CSIWSTH-----YKELISGH-GYA-----HNQLTIWKYP---TM
Anopheles_fzy_XP_310009 ---VDTKSQV-----CGLLFSKT-----YKELISAH-GYV-----NNQLSIWKYP---SM
Apis_fzy_XP_624567 ---VDTKSQV-----CSLLWSTT-----YKEIVSGH-GYA-----QNLTIWKYP---AM
Pediculus_fzy_XP_002425384 ---TDTKSQ-----LISGH-GYA-----NNQLTIWKYP---SM
Acyrthosiphon_fzy_NP_001135925 ---VNANSQV-----CAILWSK-----YRELVSAH-GFA-----NNQLTIWKYP---SL
Daphnia_fzy_EFX72563 ---IDTKSQV-----SGIFWNTE-----YQELISAH-GFP-----NHTLQIWKYP---TK
Nasonia_fzy_NP_001154940 ---IDTKSQV-----CSLLWSTT-----YKEIVSGH-GYA-----QNLTIWKYP---AM
Tribolium_fzy_XP_969612 ---VDTKSQV-----CALLWSCN-----YKEIISGH-GFA-----NNELTIWKYP---AM
Bombyx_cortex_XP_004921982.1 ---TIRSRHSL-----DAMLFSHKT-----GELVISL-WNPERAVSSP-----KTCSQLVVMGSP---DK

Homo_cdc20_NP_001246 --AKVAE--L--KGHTSR-VLSLTMSPDGATVASAAADETLRLWRCFELDPARR---RERE-KA-----S-----
Homo_fzr1_NP_001129670 --TQVAK--L--TGHSYR-VLYLAMPDGEAIVTGAGDETLRFWNVFSKTRSTK---VKW--ES-----V-----
Saccharomyces_cdc20_NP_011399 --FKVAE--V-VHAHEAR-CCSQSPDGTTLATVGGDENLKFYKIFDPRCTGR---SREDGLM-----D-----
Saccharomyces_cdh1_NP_011512 --DPIAI--L--KGHSFR-VLHLTSLNDGTTVVSGAGDETLRYWKLFDKPKAKV---QFNS-----S-----
Tricoplax_cdc20_XP_002114324 --VRVTD--L--YGHTDR-VLYMTLSPDGSTVASAAADETLRFWVKCFVADKKEK---VKKT-KS-----V-----
Tricoplax_rap_XP_002114232 --SKVAE--L--SGHTYR-VLYLSVSPGEGSIVTGAGDETLRFWNVFCKPKASK-----ES-----K-----
Acyrthosiphon_fzr_ACYPI009652 --SQIAK--L--TGHTFR-VLYLSMSPDGESIVTGAGDETLRFWNVFSKARSHK-----EP-----K-----
Bombyx_rap_BGIBMGA007924 --TQVAK--L--TGHSYR-VLYLALSPDGEAIVTGAGDETLRFWNVFSKTPSHK-----EN-----K-----
Apis_fzr_XP_003251084 --TQVAK--L--TGHSYR-VLYLAMPDGEAIVTGAGDETLRFWNVFSKARSQK-----EN-----K-----
Drosophila_rap_FBpp0070655 --TQVAK--L--TGHSYR-VLYLALSPDGEAIVTGAGDETLRFWNVFSKARSQK-----EN-----K-----
Drosophila_fzr2_FBpp0072055 --KQMAR--L--SGHTQR-VLHLSVSPDNESIVTGGADETLRFWVFTKQKISK-----EP-----N-----
Danaus_rap_DPOGS208818-PA --TQVAK--L--TGHSYR-VLYLALSPDGEAIVTGAGDETLRFWNVFSKIPSHK-----EN-----K-----
Heliconius_rap_HMEL015096-RA ---VAK--L--TGHSYR-VLYLALSPDGEAIVTGAGDETLRFWNVFSKTPSHK-----EN-----K-----
Pediculus_fzr_XP_002425882 --VQVAK--L--TGHSYR-VLYLAMPDGEAIVTGAGDETLRFWSVFSKARTQK-----EN-----R-----
Anopheles_rap_XP_320924 --TQVAK--L--TGHSYR-VLYLALSPDGEAIVTGAGDETLRFWNVFSKARSQK-----EN-----K-----
Nasonia_fzr_XP_001601463 --TQVAK--L--TGHSYR-VLYLAMPDGEAIVTGAGDETLRFWNVFSKARSQK-----EN-----K-----
Daphnia_fzr_EFX80184 --AQVAQ--L--TGHSYR-VLYLALSPDGEAIVTGAGDETLRFWSVFNKTRSQK-----ET-----R-----
Tribolium_rap_XP_968256 --TQVAK--L--TGHSYR-VLYLALSPDGEAIVTGAGDETLRFWNVFSKARSQK-----ET-----R-----
Pediculus_cortex_XM_002425496 ---NHVVDVSS--QG-NGY-ITSLWSPDGEKLGTAETDFKIFKFYQSKKEEGK---RKKM-K-----K-----
Heliconius_cortex_HMEL000025 MVDQWGE--G--RSGLDR-VRTMIFSPDGTKLATATDEDLI IWNFLPEDNKMK---KTCC-RS---FS---AL---P---
Drosophila_cortex_FBpp0078949 ---NRVVD--L--MSHQDRGTLFLMWNPDGTKIATGGLDDTFLSNWFFPTYKREAILRQEQ--KA---KD-----
Acyrthosiphon_cortex_XP_003244209 --DRIVETLS--SSHTDR-GLFFAWSPDGKRIALTSSDESRLIWNFWPTSNVQK---TSNN-CPPHVYT---TN---ATY
Danaus_cortex_DPOGS200358-PA VVDQWGE--G--RSGLDR-VRTMIFSPDGTKLATATDEDLI IWNFLPEDNKMK---NTNC-KS---FS---AM---P---
Anopheles_cortex_XP_552645 --DRVVDV-M--RNHDDC-IVHLLWSPDGKQLASVGYDETLTIWNFFGTSPTN-----EC-----
Apis_cortex_XP_001122629 --DRVVD--MIMVDKLDQ-VNSIMWNPDHTQLAVQYYLEDIFIFIDL-----
Tribolium_cortex_XP_970475 --DRIEEE-L--HLHDGP-ILYLLWGNKGRNLASASADENLCIWDFFFGKMDQEQS-NGRKK-KE---KN---T-----
Nasonia_cortex_XP_003425331 ---NRVVDVAVP--IQPEHK-MLNI IWGPDHTKLAHM-HRDTLVIWDFFGNDKKNWS-KYRRT-DR---GKTKTVTGDSS--
Drosophila_fzy_FBpp0080391 --VKQAD--L--TGHTSR-VLQMAMSPDGSTVLSAGADETLRLWNCFADPDLASK--KAVS-TS-----K-----
Heliconius_fzy_HMEL017486 --NRVTD--L--HGHMAR-VLHLAVSPDGTSVLSAGADETLRLWKCFLMDPSKK---KEPT-DS-----K-----
Danaus_fzy_DPOGS205285-PA --TRVAE--L--SGHVAR-VLHLALSPDGTTLVLSAGADETLRLWKCFLMDPTKK---KEAT-DS-----K-----
Bombyx_fzy_BGIBMGA011028 --SRVAE--L--SGHMAR-VLHLALSPDGTTLVLSAGADETLRLWKCFLMDPSKK---KEPT-DA-----K-----
Anopheles_fzy_XP_310009 --MKQVD--L--MGHTGR-VLQIAMSPDGSTVMSAGADETLRLWNCFADPDLAK--KEKS-AV-----R-----
Apis_fzy_XP_624567 --TKVAE--L--TGHSR-VLHLAMPDGTTLVLSAGADETLRLWKCFLMDPYKK---KDTN-EI-----K-----
Pediculus_fzy_XP_002425384 --NKVTE--L--TGHTAR-VLHLCTSPDGSSVMSAGADETLRLWMCFADPNKK---GEKP-QK-----K-----
Acyrthosiphon_fzy_NP_001135925 --TKVAE--L--TGHTNR-ILNLAMPDGTTLVLSAGADETLRLWKCFLMDPNKK---KEHE-KR-----S-----
Daphnia_fzy_EFX72563 --AKVAE--L--TGHTNR-ILHLAMPDGTTLVLSAGADETLRLWNCFQTDPNKK---KGTAGRR---N-----
Nasonia_fzy_NP_001154940 --SKVAE--L--TGHTNR-VLHLAMPDGTTLVLSAGADETLRLWKCFLMDPHKK---KETT-EV-----K-----
Tribolium_fzy_XP_969612 --TKVAE--L--TGHTAR-VLHLVMSPDGTTLVLSAGADETLRLWKCFLVKNSTKT---KTGV-QT-----L-----
Bombyx_cortex_XP_004921982.1 VVDQWGE--E--RSGLDR-IRTMVSPDGTKLATATADEDLI IWNFLPEDSKRK---KWKC-DR---FW---AL---P---

Homo_cdc20_NP_001246 A-----A-KSS--L--IHQGLIR
Homo_fzr1_NP_001129670 S-----VL--N--LFTIR
Saccharomyces_cdc20_NP_011399 G-----MLGLIGKEGCRNTNDKENRSKNSSEIHRRP--SS--T--SQYLIR
Saccharomyces_cdh1_NP_011512 L-----IF--D--AFNQIR
Tricoplax_cdc20_XP_002114324 E-----YS--K--LAKVIR
Tricoplax_rap_XP_002114232 S-----LL--N--PFPCAR
Acyrthosiphon_fzr_ACYPI009652 S-----KL--N--LFTNIR
Bombyx_rap_BGIBMGA007924 S-----VL--N--LYTALR
Apis_fzr_XP_003251084 S-----VL--N--LFTSIR
Drosophila_rap_FBpp0070655 S-----VL--N--LFANIR
Drosophila_fzr2_FBpp0072055 S-----VL--R--LFGKIR
Danaus_rap_DPOGS208818-PA S-----VL--N--LYTALR
Heliconius_rap_HMEL015096-RA S-----VL--N--LYTALR
Pediculus_fzr_XP_002425882 S-----VL--N--LFTNIR
Anopheles_rap_XP_320924 S-----VL--N--LFTNIR
Nasonia_fzr_XP_001601463 S-----VL--N--LFTSIR
Daphnia_fzr_EFX80184 S-----VL--N--LFTSLR
Tribolium_rap_XP_968256 S-----VL--S--LYTGIR
Pediculus_cortex_XM_002425496 -----NYGSMAFN--E--CHTTVR
Heliconius_cortex_HMEL000025 -----ECL-----DNA--M--LGYSLR
Drosophila_cortex_FBpp0078949 -----KC-----SSL--S--LYKGLIR
Acyrthosiphon_cortex_XP_003244209 AVTSAHFAEDGDLNSNSYRL-----LHNRSQNSQSAMSEL--SFDAAIRIK
Danaus_cortex_DPOGS200358-PA -----VYL-----DQA--T--QGFSLR
Anopheles_cortex_XP_552645 -----KK-----RKL--Q--CEP--
Apis_cortex_XP_001122629 -----NNFIR
Tribolium_cortex_XP_970475 -----P-----TSS--V--LRSTIR
Nasonia_cortex_XP_003425331 -----GLL---RMADFTNAHSSLADA-RR-----GKS--L--GYCIR
Drosophila_fzy_FBpp0080391 G-----K--QS--V--FRQIR
Heliconius_fzy_HMEL017486 A-----T--KSLLN--MNSLIR
Danaus_fzy_DPOGS205285-PA A-----A--KSLLN--MNALIR
Bombyx_fzy_BGIBMGA011028 A-----A--KSLLN--LNSLIR
Anopheles_fzy_XP_310009 E-----K--PS--L--LKQSLR
Apis_fzy_XP_624567 A-----V--AS--R--LKQSLR
Pediculus_fzy_XP_002425384 A-----I--SS--I--LKQSLR
Acyrthosiphon_fzy_NP_001135925 S-----R--PT--M--LPGIR
Daphnia_fzy_EFX72563 E-----P--RSALD--AMSNFIR
Nasonia_fzy_NP_001154940 S-----V--AS--R--LKQSLR
Tribolium_fzy_XP_969612 E-----K--PS--I--LKQSLR
Bombyx_cortex_XP_004921982.1 -----LYL-----DET--T--YGLSMIR

Sequences with names highlighted in red were manually adjusted based on BLAST search results using functionally characterised proteins. The C-box region is

highlighted in yellow (DR(F/Y)IPXRX[~45-75a.a.](K/R)XL) and the IR tail in blue, which mediate binding to the APC/C.