

Supplementary Materials: Phylogenetic-Derived Insights into the Evolution of Sialylation in EUKaryotes: Comprehensive Analysis of Vertebrate β -Galactoside α 2,3/6-Sialyltransferases (ST3Gal and ST6Gal)

Roxana E. Teppa, Daniel Petit, Olga Plechakova, Virginie Cogez and Anne Harduin-Lepers

Data S1. 124 ST3Gal sequences used in Figure 3A: N-terminal part were manually removed and multiple sequence alignment obtained with clustal Omega at the <http://www.ebi.ac.uk/Tools/msa/clustalo/web> site with 228 informative positions. Output format is clustal.50 ST6Gal sequences used in figure 3B: N-terminal part were manually removed and multiple sequence alignment obtained with clustal omega at the <http://www.ebi.ac.uk/Tools/msa/clustalo/> web site with 256 informative positions. Output format is clustal.

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124
Oscare12      PRRDSTICPNIGTLLAN--PNLPRILKSKF-HPDVKV-MLTQDTKTLDEPI--NSWWK-K
Spur1/2       -GGQRCRRLLWK-----KGTSEWFDEKY-NDSLLP-VWMKENKKMSEEI--GKWWL-S
Bflo1/2       -TPPVVVQPTC---KRIWQKGRSSWFDSEF-DDNIRP-VWSRANIELPADA--RKWWM-S
Csav1/2       FPNKKCGRDLN-----ASEKRWFKGRF-NPEIQP-VWTESTLEIDYLV--YDWWL-S
Cint1/2       EIQQNNKCGHQ-----LDASQTRWFRARF-NPEIEP-VWTQSALEIDYLV--YDWWL-S
Sacc12        -----MPVWT-----KGEYKFFDDRY--SNIST-IWSSKHKEMTPEA--LQWWL-R
Dreri8        -RGHSCSCTSC---IAY--IGVSEWLDQRY-DQKQKP-YLTGRDDDDVDPLS--LKWWL-S
Ambmex1      -PIRPCSCDAC---ISE--SKLSPWFDERF-NDTIPT-LLTKENNEIPEDV--YQWWLE-
Siltro1       --RRQCGCDTC----VAEPEASTWFDERF-NLSVLP-LLSKQNNVIPDTV--YKWWL-T
Xlaev1        --RRQCGCDTC----VAEPEASTWFDERF-NLSVLP-LLSKQNNVIPDTV--YKWWL-T
Mondom1      -PQRPCSCSQC---ISE--TGFAPWFDERF-NHTMQP-LLNRQNAFLENDT--YTWWM-K
Loxafr1       -PPRSCTCSHC---VNE--LRVSHWFDERF-NETMQP-LLTLHNSLMEET--YSWWL-K
HSA1         IKHRPCTCTHC---IGQ--RKLSAWFDERF-NQTMQP-LLTAQNALLEDDT--YRWWL-R
Btaurus1     -SNRPCTCTRC---IGQ--RRVSSWFDERF-NRSMQP-LLTAKNALLEEDT--YNWWL-R
Ggallus1     -PRRPCSCSTC---ISE--LGHSLWFDQRF-NSTMQP-FLTSQNALIPEDS--YRWWL-K
Taegut1      -PRRPCSCSTC---ISE--LGHSLWFDQRF-NSTMQP-FLTSQNALIPEDS--YRWWL-K
Pytmor1      -SRRPSCSNTC---ILE---QTSAWFDERF-NITMQP-FLTTQNAFIPQES--YRWWL--
Chrypic1     YPERPSCSNC---VPE--LGLSFWFDERF-NQTIQF-FLTTRNTFIPES--YKWWL-K
Acaro11      -SRRPSCSCTC---ISE--QGVSLWFDGRF-NQTMQP-FLTTRNAFVPEES--YKWWK--
Latcha8      -DKKLCSCEKC---VSE--KEESAWFDERF-DPNFQP-ILMTEVQDIPSHA--LQWWL-V
Acaro18      -LQRIICNCRN-----IDHNPQWFCDHY-DASVNC-LLTRESQRIPPEV--LFWWL-K
Pytmol8      -MKEEMCHHNR-----IGLSSWDWFCDFH-DASVNC-LLTPENS DIPPEV--LQWWL-V
Chrpic8      -SEAKPCGCASC----IVELSSSAWFNERY-DSAINP-LLTVHTSKIAPDV--LLWWL-K
Galgal8      -SLPTVRCSTAS-----ANASAWFSARY-DAAAGP-LLTGPAHELSPDV--VHWWL-T
Melund8      LDAPAAAYCTTS-----TNGSMWFNARY-NRTMGP-LLTGRAHELSPDV--VQWWL-T
Latcha2A     SRKKLCSCKLC---TSE--SGLSLWFDERY-NRTVRP-LLTKSNAFISKDI--YEWVLVS
Latcha2B     SSVKPCGCRAC---ISEPGVSPWFDERY-NRTVRP-LLMKSNAFISEDT--YVWWL-S
Dreri2       -QOKTCACSRC---VGD--PGVSDWFDENY-DPDISP-VWIRDNIQLPSDV--YYWWV-M
Takrub2      -QORTCECPRC---VGD--PGVSDWFDENY-DPDVSP-VWTRDNGQLPPDV--YYWWV-M
Pmar_12      -----LSLQ-----S
Latcha2C     -LLKMTCTARC---LGD LGVSDWFDENY-NMDVLP-VWTKENINLPPDV--YYWWL-M
Strop2       RLPKTCSCRCQ---LRQ--PGFSAWFDSHY-DASVSP-VWTLENRELSPDV--LHWWM-M
Ambmex2      ALPKHCACSKC---VWEAGVSEWFDGTMIPNQISP-IWTLNMDLAPDV--QRWWM-M
Acaro12      LFKVSCSCSCHR---QVGAEDAWEFRSRY-DARISP-VWTRENMLPLDV--QRWWMER
Pytmol2      --VKRACACHRC---AIE--SIDTSWFDNRY-DSNISP-VWTKENVDLPLDV--QRWW--M
Ggallus2     --PRGCACRRC---PEDAAAAAAWFDSEY-DGGVSP-VWTKENMLPPDV--QRWWM-M
Taegut2      --PRGSCRRC---PAEEPGAADWFDGRY-DGTVSP-VWTKENMDLPPDV--QRWWM-M
Chrpic2      -GEGCACRRC---TED--AGALAWFTSHY-DSNISP-VWTKENMDLPPDV--QRWWM-M
Ornana2      --AKSCACRRC---MGD--TGASDWFDSEY-DSNISP-VWTKENMLPPDV--QRWWM-M
Loxafr2      --GKSCACRRC---MGD--TGASSWFDSEY-DSNISP-VWTKENMDLPPDV--QRWWM-M
Mondom2      --SKSCACRRC---MGD--AGASDWFDSEY-DGNISP-VWTKENMDLPLDV--QRWWM-M
Hasa2        -SGKSCACRRC---MGD--AGASDWFDSEY-DGNISP-VWTKENMDLPPDV--QRWWM-M
Btaurus2     LAGKHCACRRC---MGDTGASEWFDSEY-DSNISP-VWTKENMDLPPDV--QRWWM-M
Strop8       -DNQGCVCGR---RQEKRKQTEFFEKRF-NETVEP-LLGKQEEMPDHV--KKWWL-R
Xlaev8a      -NSQGCICGLC---RQENRKRTEFFETRF-NGTIEP-LLGKQDQMPDHV--KKWWL-R
Xlaev8b      -INSQGCMEGHC---RQEKRKRTFFESRF-NGTVEP-LLGKYQYMPDHV--KKWWL-R
Ambmex8      -RHKPCSCCKQ---ISE--VGVSDWFDSEY-NGSVNP-LLTAKNPEIPLSV--QRWWL-K
Protopt2     -----DPGVNP-LLTIRNAFLYNAV--KKWWL-N
Drerio1C     PSERCCACKDC---VREKSHSTWFNELF-DPSIQL-LLTRGNYVLNKDV--YKYWK-G
Orylat1      FSKDIDACSDC---MAD--LGEDAWLADHF-NLSILP-LMTRDSALSSED--YRWWQ-W
Tetnig1      FSRGPCACGQC---MTE--PEDDPWFTERF-NQSIQF-LMSRENSALSDET--FKWWQ-W
Takrub1      FARGPCACGQC---MTEMDDDPWTERF-NQSIHP-LMSRENSALSDET--FKWWQ-V
Drerio1D     HIFGVCACGQC---VADIFYDAWFMRHY-DPNIEL-LLTKKNSILSDAL--YRWWQ-K
Drerio1A     STGGLCACNKC---VMDLNDEWFFIRF-NPTVPT-LLNRRNSAMRSDV--FEWWQ-G
Drerio1B     -KRAACGCNTC---VAS--RENGTWFSERY-NRTIIP-LLNSTNSLNEIDI--LKWWK-G
Sacc2/6_1    ---PCTKGYT-----HRAIKRLVPTF--DPDLP-LFLNRDFRKWKDF--DRLKET
Sacc11       ---PCTKGYT-----HRAIKRLVPTF--DPDLP-LFLNRDFRKWKDF--DRLKET
bflo210      -----
Bfl_12648    -EGDTCVPGYA-----RSKVTEMNPKF--NTNLP-LFVKKGFREWKG--MDDGHDK
Bfl_13015    -QFGIHKVSIRWKDLRKPLYSSIVAGMKILTVPEIP-PSIPAQAFAFWK--CNSAL-D

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Dre7      -LSQSCHSGWS-----VERMRTMLSTPAGLLKIP-VFLENGTGDWA-----
Tru7      -LSDPCRPRWC-----LNR--LKR-LPCSEG--LLDIP-VFVQQDVPSS-----WD--
Orylat7   -LSHPQCQPHWC-----LNH--LKPLSFSKRL--LDIP-VFVQQGRPAE-----WA--
Cmi5      VLGEKCRLSFA-----HQKMAILFPHKY-DLNLSP-FLKRNSGLTGNVF-----K
Strop5    -LQAQCRPAFA-----RTQMDRLFSSKY--TKNLS-SFIKKDKSLNESL-----YK--
Ambmex5   VLEGQCRPAFV-----KREMDRLFQERY--SMSLA-SFMRKSPHLNESS-----FK
Mondom5   VLQGECRPDFA-----KKEMHRLFAQQY-DVNASP--FINENMELEEDL-----YR
Ornana5   VLQGECRPSFV-----KKGMDRLFKEY-SLGLSP--FVKQNSEANEAA-----YQ
Hsa5      VLQKECRPKFA-----KTSMLLFEHRY-SVDLLP-FVQKAPKDSEAES-----K
Mmu5      VLQKECRPRYA-----KTAMALLFEDRY-SINLEP-FVQKVPTASEAEL-----K
Anocar5   VLQAPCRPSFV-----KKEMSRLFGEKY--NINTS-SFIRKDIHAEDI-----FK
Taegut5   ALQEQRCPSYA-----KKEMRKLFAEKY-NMDISP--FVRKNMNEDEAL-----FK
Galg15    VLQEQRCPSYV-----KKAMGKLFAEKY--SMDIP-PFVGKNIDDEAL-----FK
Dre5      ILDKPCRPSFA-----RQRMVTEHHGSTPTID-PFLNKNMKLDEQI-----PQ
Tru5      VLGAQCHLSRT-----RKSLLPLLPSSSHMTQ-PFLWKDVLPSDDL-----FL
Melgal9   -----DRP-FKQELEEVWLWLHK-----
Ornana4   ---TPC-----THLTP-LCSSPSVFLAAEV-----
Cmi6      -----
Hsa6      NKIQPCLSKPA-----F-ASLLRF--HQFHP-FLCAADFRKIASL--YGSDK--
Mmu6      -MRTRNNVNNC-----FKKPAFANLLRFPQLYP-FLCRADFIKVAAM---SGINN
Anocar6   -KEAPRILDQC-----LPAVMGWMRA---NKLYP-FLCPHNFQQVSEL--HGSFS--
Taegut6   -VERRNALDTC-----LLKPAFESLLGVDKIYP-FLCANDFIRVAEF--QGSNK--
Gga6      -VERRNALNTC-----ILKPAFESLLDVEKIYP-FLCASDFIRVAEY--HGSDK--
Melgal6   -VERRNALDTC-----LLKPAFESLLDVKIYP-FLCANDFIRVAEF--HGSDK--
Ambmex6   -RKDDHFADSC-----FNQNFKSLQMPNVRP-FICPEYAKQATEEGSKK----
Str6      PTDAVKEFKSC-----YNEKFRILIINTSEIEP-FLCQDFRKQSVNL----GSNK
Spu2/6_3  -SNVTCRKGYA-----RTRLQNLVGDGF--DPDIP-LFVDSFSFLDRPNA---V-N
Spu2/6_6  -----
Spur6b    -----
Bfl8275   -EEEVCRPHHA-----SSTIVNTHPKF--RKDIP-LFVTNDYKSYSSV-----M-N
Bfl8276   -AEEQCRPHHA-----SSTIVNTHPKF--RKDIP-LFVTNDYKSYSSV--MN----
Sacc3_10  -----
Latcha3   -TEGACKPHYA-----ATQMTAIFPRRF--MKPAP-MFLDISFKRWARI-----K-D
Oryla3-r  -SEGACKPGYA-----AAKMTSIYPKF--MKLAP-MFLDPNFKRLGKV-----S-G
Dre3A     -SEGACKPGYA-----AAKMTAIYPKF--SKPAS-MFLDRNFKRLAKV-----I-N
Takrub3   -SDGVCKPGYA-----AAKMTAIYPKF--IKPAP-MFLDRNFKRLAKV-----NS
Cmi3      -TEGGCRKGYA-----SAQMTAIFPKSL-----
Siltr3    -SEGVCCKPGYA-----SALMNAIYPKF--SKPAP-MFLDDSFRRWAKI-----R-E
Xenlae3   -SEGVCCKPGYA-----SALMNAIYPKF--SKPAP-MFLDDSFRRWAKI-----RE
Hsa3      -SEGACKPGYA-----SALMTAIFPRF--SKPAP-MFLDDSFRRWARI-----RE
Mmu3      -SEGACKPGYA-----SAMMTAIFPRF--SKPAP-MFLDDSFRRWARI-----RE
Pytmol3   -SEGVCCKPGYA-----SALMTAIFPKRF--SKPAP-MFLDDSFRRWARI-----R-D
Acarol3   -SEGVCCKPGYA-----SALMTSIFPKF--SKSAP-MFLDDSFRRWARI-----R-D
Anocar3   -SEGVCCKPGYA-----SALMTSIFPKF--SKSAP-MFLDDSFRRWARI-----R-D
Galg13    -SEGACKPGYA-----SAVMTAIFPRF--SKPAP-MFLDDSFRRWARI-----R-D
Taegut3   -SEGMCCKPGYA-----SALMTVIFPKF--SKPAP-MFLDDSFRRWARI-----R-D
Melgal3   FSEGVCKPGYA-----SALMTVIFPKF--SKPAP-MFLDDSFRRWARI---RD----
Gasac3-r  -SEGACKPGFA-----AAKMTAIYPKF--IKLAP-MFLDPNFKRYSKI-----G-G
Dre3B     -SKGECKQGFA-----QAKMTLIYPKF--SKPAP-MFLDPNFKRLSKI-----SS
Pmar4     -----
Ambmex4   DTRIACSPGSV-----ETMAAAFIENY--TRGHQ-AFLQPSNYFWVKS-----NS-T
Str4      NVHEMCI PGDV-----ASKAEILISNY--SRDHP-VFLQLSDYFWVKV-----QS-K
Ornana9   -----
Hsa4      -KKEPCLQGEA-----ESKASKLFGNY--SRDQP-IFLRLLEDYFWVKT-----PS-A
Mmu4      -KKEPCFQGEA-----ERQASKIFGNRS--RDQP-IFLQLKDYFWVKT-----PST
Gga4      -NKTVCPIGEV-----ERKAAQLIGNY--TRDRP-LFLQLKDYFWVRT-----PS-L
Melgal4   -NKTVCPSGEV-----ERKAAQLIGNY--TRDRP-LFLQLKDYFWVRT--PSL----
Anocar4   DERMTCPLGEV-----EKKAAQLIANY--TRDHP-LFLQLKDYFWVRT-----PS-P
Pytmol4   DERMTCPLGEV-----EKKAAQLIANY--TRDHP-LFLQLKDYFWVRT-----PSP
Latcha4   -----
Cmi4      -----
Orylat9   -----RI--NKTTK-LFLKLEDFFWRKY-----VSQ
Dre4      PPHPTLALCPNY-----RLQKKWENLNKSMRKPFLFKLEDFFWKDH-----LSA
Tru4      -----S-----V-----SRRTQ-LFLKLNDYFWQER-----LS-T
LQPF---DNKRDPTE-LAEDLFTV-IPGE-NPFS PG-----VCRRCVVVGTAAGRLKGARQ
LQR---RENSDYIG-ALDKAFEV-IPNP-QRFLTRNVS--RCLRCVVVGNSGNLRNSGY
LQSH---KDEDPAP-LLNALFDMGAPDV-DPWASRNLT--GCLRCVVVGNSGNLRQSNY
LQSS---RGENLDK-VFENLYKIGVPRNPPFARNHDNEAICRRCVVVGNSGNLRINSKY
LQSS---EAENLDK-TFEALYKEGVPRKDPFARLTHDREAGCRSCAVVGNSGNLILNSNY
IQQSKDTFSTS DLRN-LVGKLEI-IPDV-MPYATNVS N--RCLQCAVVVGNSGNLRDSRY
LQA----SDGTIKD-VTQKMFKI-ISPP-HEDET PRQN--QCRKCAVVVGNSGNLLKSKY
-----MVKKLFET-ISGE-EDFLEASPY--RCRRCVVVGNSGNLKN SGY
LQGE---TKPKDIYE-VMEELFEV-IPGD-LDLMDQGPY--RCRTC AVVGNSGNLKSSNY
LQGE---TKPKDIYE-VMEELFEV-IPGD-LDLMDQGPY--RCRTC AVVGNSGNLKSSNY
LQRE---RTPKR LNE-TFMDLFSI-IPGDVDP L LKQGPL--ICRRC AVVGNSGNLKESHY
LQRE---KNPKNLND-TIKELFSV-VPGDVP D MLENESV--GCRRC AVVGNSGNLKQS QY
LQRE---KKPNNLND-TIKELFRV-VPGNVDP MLEKRSV--GCRRC AVVGNSGNLRESSY
LQRE---QKPNNLND-TIKELFQV-VPGDVP D LLEKGSV--GCRRC AVVGNSGNLRESWY
LQGE---KSPKNIND-TKELFGI-IPGDRDPLQERGTF--SCRRCAVVVGNSGNLRQS QY
LQGE---KAPRSLNA-TLAELFGV-IPGDGDPLQERGS D--SCRRCAVVVGNSGNLRQS QY
LQPQ---FKSHNLNE-VLSKLFQI-VPGE-NPYSSRESQ--SCRRCAVVVGNSGNLRGSSY
LQGE---SNPKNIND-TMKELFEI-IPGDGEQLLERDAS--RCRRCAVVVGNSGNLRQS QY
LQGE---RNPKG VNE-TIQEMFEI-IPGNGDQLLERSSS--QCRRC AVVGNSGNLKQS QY
QAG---NKNYNLSE-SIAKLFTV-VPRT-NHSGIRDPA--HCRKCAVVVGNSGNLKGSNH
LQRS---QDGSQIQK-I IKKLF DL-LQSPTARVQGV A---QCGTC AVVGNSGRLKGSKY
LQGS---KSAQLQG-I IQQMFDI-LPSP-MVDAWDPS--RCRTC AVVGNSGRLRGSHY
LQGT---PSTVPLRA-ILQKLFAV-VPAP-NGSVWDPS--HCRTC AVVGNSGRLKGSRH
LQGP---SRGVQLQA-ILWQLFTV-LPAP-TGSLWDPN--HCRTC AVVGNSRWLKD SGH
LQKE---GNPKNITT-VIQDLFET-IPGA-DLYTHEEPD--RCRRC AVVGNSGNLKSGSY

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LQKE---GNPKNITT-VIQDLFET-IPGA-DLYTHEEPD--RCRRCVVVGNSSGNLKGSGY
 LQPQ---FKPHNTQQ-VLQRLFQV-IPGR-SPYGSWDPG--RCLRCVVVGNSSGNLKGAGY
 LQPQ---FKPHSTQQ-VLLKLFQV-VPGR-SPYGSWDPG--RCLRCVVVGNSSGNLKGAGY
 LQSQ---YKAQDLRT-VLNHLFEI-IPGQ-NPYQDHGWA--RCRRCVVVGNSSGNLKGAGG
 LQPQ---FKPYNLKN-VLGKLFQI-IPGM-NPYNSWDPQ--SCRRCAVVVGNSSGNLHGSY
 LQPQ---FRSHNTPE-ILSQLFQI-IPGQ-NPYQQQDPL--TCRRCVVVGNSSGNLKGSSY
 LQPQ---FKSQNTNE-VLEKLFQI-VPGT-----
 GERS----FMGVLNEVLSKLFQI-IPGE-NPYRSRSP--QCLRCVVVGNSSGNLKGSSY
 LQPQ---FKSHNLNE-VLSKLFQI-VPGE-NPYSSRESQ--SCRRCAVVVGNSSGNLKGSSY
 LQPQ---FKSHNTQE-VLSKLFQI-VPGE-NPYRWRDPR--HCRRCVVVGNSSGNLKGSSY
 LQPQ---FKSHNTHE-VLSKLFQI-VPGE-DPYRSRDP--RCRRCVVVGNSSGNLKGSSY
 LQPQ---FKSHNTNE-VLGKLFQI-VPGE-NPYGSRDP--KCRRCVVVGNSSGNLKGSSY
 LHPQ---FKSHNTNE-VLAKLFQI-VPGE-NPYGSRDP--KCQRCAVVVGNSSGNLKGSSY
 LQPQ---FKSHNTNE-VLEKLFQI-VPGE-NPYRFRDP--QCRRCVVVGNSSGNLKGSSY
 LQPQ---FKSHNTNE-VLEKLFQI-VPGE-NPYRFRDP--KCRRCVVVGNSSGNLKGSSY
 LQPQ---FKSHNTNE-VLEKLFQI-VPGE-NPYRFRDP--QCRRCVVVGNSSGNLKGSSY
 LQPQ---FKSHNTNE-VLEKLFQI-VPGE-NPYRFRDP--QCRRCVVVGNSSGNLKGSSY
 LQGR---SNESDIQK-VLEQTFKV-IPTK-NLYEEQDNR--PCRRCVVVGNSSGNLKGSSY
 LQGR---NNSGDIQK-VLEQMFKV-VSTE-NLYLEQDNR--PCRRCVVVGNSSGNLKGSSY
 LQGR---NNASDIQK-VLEQTFKV-VSTE-NLYLEQDNR--PCRRCVVVGNSSGNLKGSSY
 LQGS---SNESQVQE-ALDKLFDV-FPAE-DIYSVRDET--MCRTCAVVVGNSSGNLKGSSY
 LQGV---HKNSNVDA-IMTKLFEV-IPNT-DPYQSKNET--QCRRCVVVGNSSGNLKGSSY
 LQKN---KKDSYRA-VVEKMFSL-FPDK-TRYTNASPN--RCRTCAIIGNSGNLKGSSY
 LQRE---ENPSANTQ-VVEELFRI-IPPE-GVFMDAGPQ--RCRTCAVVVGNSSGNLKGSSY
 LQSE---RQANFSW-VVEELFQI-IPDG-ALYMDAGPE--RCRTCAVVVGNSSGNLKGSSY
 LQSE---RQANFSG-VVEELFQV-IPDE-VLYMDASPE--RCRTCAVVVGNSSGNLKGSSY
 LQ----YKSRVNYKAVSEMLFGI-FPNE-EDYSDAGPG--RCRTCAVVVGNSSGNLKGSSY
 LQSD---SQKANFSD-VVDILFSL-FPDE-EHYVVTDPN--RCRCAVVVGNSSGNLKGSSY
 LQGA---ADVINYTY-VVDILFSL-FPDE-DHFSADAGPD--RCRTCAVVVGNSSGNLKGSSY
 TEP---YGFKYHVS-FVEKLMQA-LPGN-TPNIMGNDM--KCRRCVVIASSGGSIGKHL
 TEP---YGFKYHVS-FVEKLMQA-LPGN-TPNIMGNDM--KCRRCVVIASSGGSIGKHL

 LP----FYLSQDQCKKIDQLDL-LPNS-EPALLTGGG--KCRRCVVVGNSSGLVSGENL
 KSPNDYVTAAVEEAGKIDQLDL-LPNS-EPALLTGGG--KCRRCVVVGNSSGLVSGENL
 LPPP---LGLQGSEE-MAEQALKA-LPFT-AVPTGPET---CRRCVVVGNSSGLVSGENL
 LPPP---LGLRGSEE-HLALALAS-LPQL-GLPPSLRGE--GGCRRVVVGNSSGLVSGENL
 LGPP---LGLHGSEE-HLALALAS-MPEP-GLPPSLRGE--GGCRRVVVGNSSGLVSGENL
 YHPP---FGFKKHNH-TFSEILGL-LPKV-SLSEELERK--PCKRCVILGSGGIL----
 YEPP---FGFRHYVD-ELSDLLEP-MPED-GLPKELHSH--HCKRCIVVGNSSGLVSGENL
 YGPP---FGPHDVMY-HLQELLRL-MPAQ-DLPQALKAK--QCKRCIVVGNSSGLVSGENL
 YDPP---FGFRKFYS-KLQSLKLL-LPEH-GLPENLAK--PCKRCVILGSGGIL----
 YDPP---FGFRKFYS-KLQSLKLL-LPEH-GLPENLAK--PCKRCVILGSGGIL----
 YDPP---FGFRKFSS-KVQTLLEL-LPEH-DLPEHLKAK--TCRRCVVVGNSSGLVSGENL
 YDPP---FGFRKFSS-KVQSLLEL-LPEH-DLPEHLKAK--TCRRCVVVGNSSGLVSGENL
 YEPP---FGFKHFS-ELSDLLEL-LPEY-DLPEGLQSK--HCKRCVILGSGGIL----
 YEPP---FGFKHFS-ELSDLLEL-LPEY-DLPEGLQSK--HCKRCVILGSGGIL----
 YGPP---FGFKHFS-ELSDLLEL-LPEY-DLPEGLQSK--HCKRCVILGSGGIL----
 YGPP---FGFKHFS-ELSDLLEL-LPEY-DLPEGLQSK--HCKRCVILGSGGIL----
 YPPP---FGFLDMKK-KLEELNL-LPVS--SEQRLGER--DCRRCVVVGNSSGLVSGENL
 YPPP---FGFGQLRS-KVAELLKS-LPLP-GSAQELKNSDKCRRCVVVGNSSGLVSGENL
 --LP---FGFHSSGC-PMEVIARLRVMVSAIGSSLSCL--WCQRCAVVVGNSSGLVSGENL
 -----LLL-----LPQQ-GLPKSIKRL--PCRRCVVVGNSSGLVSGENL
 -----LSKLFQT-VPGD-NPYEPWDRS--RCRRCVVVGNSSGNLHGSY
 FDLF---YGMRTSAE-YFRLALSK-LQSC-DLFDEFDNI--PCKKCVVGNSSGLVSGENL
 FPLP---YGIKTFTF-YFSSALSK-LQSC-DLFDEFDRV--PCKKCVVGNSSGLVSGENL
 FDLF---YGIKRAE-FFQLALSK-SNCC-GLFAEDDSP--SCKKCVVGNSSGLVSGENL
 FELP---YGIKRAEQ-FFRLALSK-LQNC-GLSSEEDSI--PCRRCVVVGNSSGLVSGENL
 FELP---YGIKRAEQ-FFRLALSK-LQNC-GLSSEEDSV--ACRRCVVVGNSSGLVSGENL
 FELP---YGIKRAEQ-FFRLALSK-LQNC-GLSSEEDSV--ACRRCVVVGNSSGLVSGENL
 LDLP---YGIKRAEQ-FFRLALSK-LQNC-GLSSEEDSV--ACRRCVVVGNSSGLVSGENL
 LDLP---YGIKRAEQ-FFRLALSK-LQNC-GLSSEEDSV--ACRRCVVVGNSSGLVSGENL
 LDLP---YGIKRAEQ-FFRLALSK-LQNC-GLSSEEDSV--ACRRCVVVGNSSGLVSGENL
 LPMF---FGFRDAER-TVLNLIKH-MPET-EIPEDIPQD--SCLRCVVVGNSSGLVSGENL
 -----RTASD-VVGK-----LPDT-DIPADIKKL--PCRRCVVVGNSSGLVSGENL
 -----LP-----CRRCVILGSGGIL----
 YSPP---FGLRGTDK-DLMNVLKI-LPQASTMPENIERI--PCKRCIVVGNSSGLVSGENL
 YSPP---FGLRGTDK-DLMNVLKI-LPQASTMPENIERI--PCKRCIVVGNSSGLVSGENL
 -----D-----GCRRCIVVGNSSGLVSGENL
 FPPP---FGIKGQDN-IIQRILET-TKEY-NLTPELNSR--SCKRCIVVGNSSGLVSGENL
 YMPF---FGFKTQEK-LISSILSE-TKYY-GLGEHLDSL--SCKRCIVVGNSSGLVSGENL
 YLPP---FGFRTQER-IIDVILSA-AKNY-GLGPELDSL--ICKRCIVVGNSSGLVSGENL
 YLPP---FGFKTQER-IIDVILSA-AKNY-GLGPELDSL--ICKRCIVVGNSSGLVSGENL
 -----TCKRCIIVGNSSGLVSGENL
 YVPP---FGIKGQDN-LIKAILSA-TKEY-RLKPALDSL--NCRRCIIVGNSSGLVSGENL
 YVPP---FGIKGQDN-LIKAILSA-TKEY-RLKPALDSL--NCRRCIIVGNSSGLVSGENL
 FVPP---FGIKGQDN-LIKAILSV-TKEY-RLTPALDSL--RCRRCIIVGNSSGLVSGENL
 FVPP---FGIKGQDN-LIKAILSV-TKEY-RLTPALDSL--RCRRCIIVGNSSGLVSGENL
 FLPP---FGIKGQDN-LIKAILSV-TKDY-RLTPALDSL--SCRRCAVVVGNSSGLVSGENL
 FVPP---FGIKGQDN-LIKAILSA-TKDY-RLTPALDSL--SCRRCAVVVGNSSGLVSGENL
 FVPP---FGIKGQDN-LIKAILSA-TKDY-RLTPALDSL--SCRRCAVVVGNSSGLVSGENL
 FVPP---FGIKGQDN-LIKAILSA-TKDY-RLTPALDSL--SCRRCAVVVGNSSGLVSGENL
 FVPP---FGIKGQDN-LIKAILSA-TKDY-RLTPALDSL--SCRRCAVVVGNSSGLVSGENL
 FVPP---FGIKGQDN-LIKAILSA-TKDY-RLTPALDSL--SCRRCAVVVGNSSGLVSGENL
 YSPP---FGVKSQER-IIDVILSA-TKSY-GVGEELDSM--NCKTCIVVGNSSGLVSGENL
 YPPP---FGVRTQER-IIDVILSA-TRSY-FLGPELDSI--PCKKCIIVGNSSGLVSGENL

 YTLF---FGTKGIED-LILKILSI-TTSF-NLPPAMKSL--QCKTCVVVGNSSGLVSGENL
 YRLP---YGTYGSEE-LLIKFLAL-TNRY-HVPEDIKRL--RCRRCVVVGNSSGLVSGENL

 YELP---YGTGSED-LLLRVLAI-TSS--SIPKNIQSL--RCRRCVVVGNSSGLVSGENL
 YELP---YGTGSED-LLLRVLAI-TSS--SIPKNIQSL--RCRRCVVVGNSSGLVSGENL
 YELP---YGTGSED-LLLRVLAI-TSS--SIPKNIQSL--RCRRCVVVGNSSGLVSGENL

YELP---YGTGKSED-VLLRLLSV--TSY-SLPESIQSL--KCRRCVVVGNGHRLRNSSM
 YELP---YGTGKAEE-ILLRLLA--VTSY-SLPESVQSL--KCRKCAVVGNGHRLRNSSM
 YELP---YGTGKAEE-ILLRLLAI-----TSYSLPESI--QCRKCAVVGNGHRLRNSSM
 -----SL--PCKTCVVVGNGYIKNSSL
 -----LP-----CKTCVVVGNGYILKNSSL
 QPLP---YGIKGSEL-LLLKVLSA-TKSY-DMPAHIESL--ECRTC VVVGNGFAIKNTSL
 EALP---YGIKGSEL-LLLKVLA--ISSF-TMPANIELD--CRTC VVVGNGFALKNSSL
 RALP---YGMKGSEL-MLLKVLAV-IPNY-EIPAKIESL--ECRTC VVVGNGFAIKNSSL
 GKLIDSHDIVI-RMNRSPVKGYEVDVGSKTSYHLVYPESAVGYRGAES--SGKLVLFPPK
 GTAIDKHVVV-RINQAKVKGFEKDVQKETHRLMYPESFMDIAP----ETNFVLLSFK
 GEEIDGYDLIF-RMNDAPTGWKEDVGHRTTHHFMPESATDLPD----DVSFVLLNFK
 GKNIDSHDFVI-RLNKGPTGFEENDVGRKTTTHRFMPATASSLAQ----GVSLVLLPFQ
 GNVIDGHDFVI-RMNKGPTYNYENDVGSKTTTHRFMYPPTASSLPQKLFSGVSLVLPFQ
 GQLIDSHDYIM-RMNTAKTVGFEDVGSRTTHHFMPESFVEVIG----ETKFVLIPFK
 GALIDSHSTVI-RMNKAVTVGYDEDVGYRTTHHFLYPESAHLRP----GVHLVLLPFK
 GMWIDNHDFIF-RMNYAPTGVGEADVGGRTTHQFIYPESAALKQE----NATLIVIPFK
 GPEIDEHDFVL-RMNHAPTARFEKDVGGKTTTHHFVYPESVRDLQA----NVSMILIPFK
 GPEIDEHDFVL-RMNKAPTARFEKDVGGKTTTHHFVYPESVRDLQA----NVSMILIPFK
 GKIDSHDFVL-RMNRAPTAGFEVDVGRKTTTHLVYPESFRELGA----NVSMILVFPK
 GSQIDEHDFVL-RMNKAPTMGFEADVGSKTTTHLVYPESFRELGE----NVSMILVFPK
 GPEIDSHDFVL-RMNKAPTAGFEADVGTKTTHLVYPESFRELGD----NVSMILVFPK
 GPQIDSHDFVL-RMNKAPTAGFEADVGRKTTTHLVYPESFRELAE----NVSMVLVFPK
 QQIDSHDFVL-RMNRAPTIGYESDVGSKTTTHHFVYPESYKELAE----NVSMIVIPFK
 GPIDSHDFVL-RMNRAPTAGYESDVGGKTTTHHFVYPESYRELAA----NVSMILIPFK
 GQINGHDFIM-RMNQAPTGVGEPDVGSKTTTHHFVYPESYRELGE----EVSMILIPFK
 QQIDAHDVFL-RMNRAPTAGFESDVGSKTTTHLVYPESFRDLAE----NVSMIVIPFK
 GQIDNHDFV-F-RMNKAPTGVGFEADVGSKTTTHHFVYPESYKELGE----NVSMVLIPFK
 GKEIDAHHFVI-RMNRAPTAGFEPDVGIKTTHHLMYPESSQDLQ----GVHLVLLPFK
 GENIDSHFVL-RINTAPTAGFEEDVGAKTTTHHFMPESAMNLAHA----GVHMLVFPK
 GQKIDSHQFVM-RMNTAQIAGFQEDVGRRTTHHFMPESAVNLHP----GIHLVLPFK
 GREIDSHHVL-RMNRAPTAGFEEDVGRRTTHRFMPESAVDLQ----GVHLVLPFK
 GLQIDAHHHVL-RMNRAPTAGFEMDVGARTTHHFMPESAMNLP----GVHLVLPFK
 GLRIDAHDVFL-RMNRAKIAGFELDVGMRTTHHFMPESAVDLEP----GVHLVLPFK
 GNQIDHNFV-F-RMNRAPTGVGFEADVGSKTTTHHFMPESAKNLP----NISLVLPFK
 GNQIDHNFV-F-RMNRAPTGVGFEADVGSKTTTHHFMPESAKNLP----NVSLVLPFK
 GPVIDGHDFIM-RMNLAPTGVGEEDAGSRTTHHFMPESAKNLAA----NVSVLPVFPK
 GATIDGHNYI-RINLAPTGVGEEDAGSRTTHHFMPESAKNLAA----NVSVLPVFPK
 GKEIDQHDFVMRRINQAPTLGFETDVGARTTHHFMPESAKNLP----NVSVLPVFPK
 GKAIIDMHDFIM-RINQAPTGVGEADVGSRTTHHFMPESAKNLAP----NVSVLPVFPK
 GKIDIGHDFIM-RMNQAPTGVGEMDVGSRTTHHFMPESAKNLP----NVSVLPVFPK
 -----VPM-RMNQAPTAGFETDVGSRTTHHFMPESAKNLP----NVSVLPVFPK
 GREINGHDFV-F-RMNQAPTGVGEADVGSRTTHHFMPESAKNLP----NVSVLPVFPK
 GQINGHDFIM-RMNQAPTGVGEADVGSRTTHHFMPESAKNLP----NVSVLPVFPK
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 GPEIDGHDFV-F-RMNQAPTGVGEADVGSRTTHHFMPESAKNLP----NVSVLPVFPK
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 GRDIDGHNFIM-RMNQAPTLGFEDQDVGSRTTHHFMPESAKNLP----NVSVLPVFPK
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 GPVDGHNFM-RMNQAPTGVGEQDVGSRTTHHFMPESAKNLP----NVSVLPVFPK
 GKNIDSHGLIF-RMNGARTYGFEDVGSKTTTHHFMPESAVHVQP----GVHLVLPFK
 GKKIDSHGLIF-RMNGARTYGFENDVGSRTTHHFMPESAVNLQP----GVHLVLPFK
 GKKIDSHRFF-RMNGARTYGFENDVGSRTTHHFMPESAVHLQP----GVHLVLPFK
 GKNIDSHQIVL-RMNGAKTAGFEEDVGSRTTHHFMPESAVNLPP----GVHLVLPFK
 GAKIDSHDFV-F-RMNRKATSGFEKDVGNKSTHYFMPESAHHLPP----GVHVLIPFK
 GRLIDAHNFVI-RINMGPTKGYEDDVGSKTTTHRFIYPESAVDFDN----STYLVLPFK
 GALIDTSDLVI-RMNKAPTGVGEADVGAKTTHHVMYPESAVDLN----TTSVLVLPFK
 GRLIDSSDFI-RMNQAPTLGFEDDVGTKTTHHVMYPESAKDLN----GTSVLVLPFK
 GRLIDSSDFI-RMNQAPTGVGEEDVGTRTTHHIMYPESAKDLN----GTSVLVLPFK
 GVLIDAHDLVI-RINKGPTGFERDVGLKTTHRMIMYPESAVMDN----STYLVLPFK
 GQLIDSHDFV-F-RINKGPTKGYETDVGSKTTTHRMIMYPESAKDLN----STHLVLPFK
 GRLIDLHDFVL-RINKGPTKGFEDVGSKTTTHRMIMYPESAVDLN----STHLVLPFK
 GSLIDRYDVVI-RMNDAPVRNYERDVGSITAFRMLYPESATAKRIDIS--DAYIVLPFK
 GSLIDRYDVVI-RMNDAPVRNYERDVGSITAFRMLYPESATAKRIDIS--DAYIVLPFK
 -----RMNDAPVKGYESDVGSRTDFRFFYPESSTLNQADLDS-GTYVVMYK
 GSTIDKYDIVM-RMNEAPVHGYEKDIGSKTTFRFLYPESATSKEVDP--DADYIIVPYK
 GSTIDKYDIVM-RMNDAPVHGYEKDIGSKTTFRFLYPESATSKEVDP--DADYIIVPYK
 GAHIDHANII-RVNNAPVVGFEESDAGSRTTIRLIYPEGAPSHIQEYER-TEVVALVFPK
 GAHIDQYDVII-RMNNAPVSGFERDAGSRTTIRLLYPEGAPHSNEYRE-TTVALVFPK
 GPHIDQYDVII-RMNNAPVVGFERDAGSRTTIRLMYPEGAPHSANEYRK-TSMIALVFPK
 -----RLNSAPIHGFTQDVGNKTTIRMTYPEGAPVSEQEYQH-SSLFVTVLPK
 GQMDVQDFI-RLNNAPVHGYAQDVGNKTTIRMTYPEGAPVSEQEYQH-SSLFVTVLPK
 GQAVDQDFI-RLNNAPVKGFEKDVGNKTTIRMTYPEGAPVSEHEYHH-NGLFVAVLPK
 GHLINQPDVVI-RLNSAPVQGYTDHVGNTTIRMTYPEGAPLSDEYY-NDLFVTVLPK
 GPALNQDFI-RLNNAPVQGYADHVGNTTIRMTYPEGAPLSDEYY-NGLFVAVLPK
 GHTLNQPDVVI-RLNSAPVEGYSEHVGNTTIRMTYPEGAPLSDEYY-NDLFVAVLPK
 GHALNQPDVVI-RLNSAPVEGYSEHVGNTTIRMTYPEGAPLSDEYY-NDLFVTVLPK
 GYVLNQDFI-RLNSAPVQGYTDDVGNKTTIRMTYPEGAPLSQHEYYP-DSLFAVLPK
 GHLLNQDFI-RLNDAPVQGYTDHVGNTTIRMTYPEGAPLSHEYYP-ASLFVAVLPK
 GHLLNQDFI-RLNDAPVQGYTDHVGNTTIRMTYPEGAPLSHEYYP-ASLFVAVLPK
 GHLLNQDFI-RLNSGPLQDFSDVGNRTTIRMSYPESCPKVVEDTDP-DLKYVAVIFK
 GSLINRFDVVI-RLNSGPLGEYTDVGNRTTIRMSYPESGTPHWWSDP-DITFVAVVYK
 GKIDSHHVI-RLNDAPVKEYKDVGERTSIRLFFPESALPDPLENSDNNTLMVFPK
 GQKIDSDFI-RLNDAPVKGFEQEDVGEKTTIRLFFPESALPNPLDNNEEDTLMVFPK
 GNQIDSHDFIM-RLNSGPVIGYENDVGNKTTFRLCYPESISDPSQYDA-NTILVFPFK
 GEKIDSDVVI-RMNNGPVLGHEEEVGRRTTFRLFYPESVSDPIHNDP-NTTAVLVFPK
 GATIDSDVVI-RMNNGPVLGHEEEVGRRTTFRLFYPESVSDSSHYP-NTTAVLVFPK
 GETIDSDVVI-RMNNGPVVGEEEDVGRRTTYRLFYPESVSDPIHYDP-NTTAVLVFPK
 GEKIDSDVVI-RMNNGPVIGYEDVGRRTTFRLSYPESIFSDPIHYDP-NTTAVLVFPK

[illegible]

[illegible]

[illegible]

GLPFNNGL-----MGRGNIPTLGSAITMALHNCDEVAVAGLGY-DMSSPNAPLHYEY
 GLPFNNGL-----MGRGNIPTLGSAITMALHNCDEVAVAGFGY-DMSSPNAPLHYEY
 GLPFNNGL-----MGRGNIPTLGSAITMALHNCDEVAVAGFGY-DMSSPNAPLHYEY
 GLPHNRQ-----MGRGNIPTLGSAITMALHNCDEVAVAGFGY-NMSTPHAPLHYEY
 GLPHNNGL-----MGRGNIPTLGSAITMALHNCDEVAVAGFGY-DMSTPHAPLHYEY
 NISSDTKSGKV---GTRLRCPTTGVIAITLALHLCDEVHLAGFGY-EVNSPGSPVHYYG
 NVSVKPS-----KKVTQKPTSGLLAITFALHFCDVVHIAGFGYPKELSNKKMPIHYEY
 KSKKMI-----PKMIPKPTTGLLAITFALHFCDMVHIAGFGYPALTNKKQPIHYEY
 GLPNKPS-----QKVRQKPTTGLVAITLALHLCNMVHIAGFGYPDSNKNQSIHYEY
 SLPMQQP-----RKIKQKPTTGLLAITLALHLCDLVHIAGFGYPDAYNKKQTIHYEY
 SLPIQQP-----RKIKQKPTTGLLAITLALHLCDLVHIAGFGYPDASNKKQTIHYEY
 SLPMKQP-----RKVKQKPTTGLLAITLALHFCDLVHIAGFGYPDSANKKQTIHYEY
 SLPMKQP-----RKVKQKPTTGLLAITLALHFCDLVHIAGFGYPDSANKKQTIHYEY
 NIPMKQL-----RKFKQKPTTGLVAITLALHFCDMVDIAGFGYPDSANKKQSIHYEY
 NIPMKQL-----RKFKQKPTTGLVAITLALHFCDMVDIAGFGYPDSANKKQSIHYEY
 GSSLEVSLKVLSTFTHQRPTTRPTIGFLAITAALHYCDVVHIAGFGYPKQHDKQLVHYEY
 SLPL-----SQRGHQPTTGLAITMALNYCDQVHIAGFGY-PFNDLNGLIHYEY
 QFPLAPK-----GQNHFPHTTGLLAVFVALNYCDMVHIAGFGYPKSDKRQPIHYEY
 Q-----IPVQVHPTTGLLAVFVALNYCDVVHVAGFGYPASRNQNPPIHYEY
 HMRQIKG-----RPNLVHPTTGLLAVI VALNYCDEVHIAGFGYPNSKRESQPIHYEY
 KFSSK-----EKDPFRR-----TGVDANIEE-----
 VNDGS-----RNSAFK-----THVHDSVHEFEVIEKKLADEKIIIT-MFQGV-----
 THYSG-----AAHRS-----TGVDSEFERVLEKLQSEGIK-----IHRGNAANK-----
 DLPPH-----IAGAFRQ-----TGVDSDKESSMINQLHIHRLLT-----LHVPKDL-----
 DLPPH-----VAGAFRK-----TGVDSAQENIEIDQLHIHGLLR-----VHRSEQSS-----
 PPVEPSLEKDSAFKL-----TGVDNAEFETDVIKQLEEIGKIT-----VYGRSRV-----
 YNRYA-----GAFRK-----TGVDNADFETEIIRLSAEGKIK-----LYR-----
 NTKTP-----SGFRK-----SGVHDADFQANITENLSSINKIN-----FFTGR-----
 NNASA-----GAFRL-----TGVDGDFEASILANLTSINKVL-----MFRGR-----
 NNASA-----GAFRL-----TGVDGDFEASILANLTSINKVL-----MFRGR-----
 NNPSA-----GAFRK-----TGVDGDFESNVTSTLASLNKIR-----IFKGR-----
 NNPSA-----GAFRK-----TGVDGDFESNVTATLASIHKIR-----IFKGR-----
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 NNASA-----GAFRQ-----TGVDGDFEFNVTTLASIEKIK-----FFKGR-----
 NNTSG-----GAFRK-----TGVDGDFEFNITTLASIEKIK-----FFKGR-----
 NNPSA-----GAFRQ-----TGVDGDFESNVTTLASIAKVR-----LFKGR-----
 NNASG-----GAFRK-----TMVHDGDFESNITTLASIDKIR-----FFKGR-----
 NNPSA-----GAFRQ-----TGVDGDFESNITTLASIDKIR-----FFKGR-----
 NNRRNG-----GAFRR-----TGVDHSGDFESQIIEKKLADEGKII-----FYK-----
 ENHYA-----GAFRK-----TGVDHANFELGLIERLADEGKVL-----FYK-----
 DNRYG-----GAFRK-----TGVDNATFELQLIERLAIEGKLS-----FYK-----
 ANRYP-----GAFRK-----TGVDNAGFELTLIEKLADEGKIS-----FYN-----
 ENRWS-----GAFRR-----TRVHDADVEFSLIQLAAEGRIL-----FYQ-----
 KNRWS-----GAFRR-----TGVDADTEFSLIERLADEGRIL-----FHR-----
 NNRYA-----GEFRK-----TGVDADFEAHIIDSLVQIGKIR-----VYRGK-----
 NNQHA-----GAFRA-----TMVHDGDFEANITRALASIKKVN-----IFKG-----
 QNRYS-----GEFRK-----TGVDADYEAQIIDKLAKAGKIS-----VFPKG-----
 QNRYS-----GEFRK-----TGVDADYEAQIIQLAKAGKIT-----VFPKG-----
 NNRYA-----GEFRK-----TGVDADHEEKIIEKQLEAGKIS-----VHR-----
 NNRYA-----GEFRK-----TGVDADFEAHIIDSLVQIGKIR-----VYRGK-----
 NNRYA-----GEFRK-----TGVDADFEAQIIDNLAKEGKIK-----VYRST-----
 NNRYA-----GEFRK-----TGVDADFEAQIISLLAASGKIQ-----VYSGK-----
 NNRYA-----GEFRK-----TGVDADFEAHVVGVLKTKGID-----VYRGN-----
 NNRYA-----GEFRK-----TGVDADFEAHIIDLEKTNKIS-----VYRGN-----
 NNRYA-----GEFRK-----TGVDADFEAHIIDMLAKTSRIE-----GVPGQ-----
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 NNRYA-----GEFRK-----TGVDADFEAHIIDMLAKTSKIQ-----VYRGN-----
 NNRYA-----GEFRK-----TGVDADFEAHIIDMLAKASKIE-----VYRGN-----
 NNRYA-----GEFRK-----TGVDADFEAHIIDMLAKASKIE-----VYRGN-----
 NNRYA-----GEFRK-----TGVDADFEAHIIDMLAKASKIE-----VYRGN-----
 NNRYA-----GEFRK-----TGVDADFEAHIIDMLAKASKIE-----VYRGN-----
 RNRFA-----GAFRW-----TGVDNAEFESDLIAKLAEEGRK-----LYK-----
 RNRFA-----GAFRW-----TGVDNADFESELITKLAEEGRK-----LYK-----
 RNRFA-----GAFRW-----TGVDNAEFESELITELVEEGRK-----LYK-----
 RNRFA-----GAFRW-----TRVDNAEFELDLIRQLAYEGKVT-----YH-----
 NNKHA-----GAFQK-----TGVDKAFEMEIERKLVEEGKIT-----FYNETKVYK-----
 KTSSR-----VR-----TGAHSGSFEFDTMMQLYLESKIR-----VFRGR-----
 HNQLA-----GAFRH-----TGVDGDYEYNLTTLADKHKIQ-----MFRGR-----
 ENSLA-----GAFRH-----TGVDGDYEYNVTLTLADKHKIQ-----MFKGR-----
 ENSLA-----GAFRH-----TGVDGDYEYNVTLTLADKHKIQ-----MFKGR-----
 HKKHP-----RN-----AGNHGGSYEYLIALKLHEKQGI-----LYKGW-----
 ESLAH-----FNR-----GRHGGDYENRTIHKLLLMNKIA-----LHKGL-----
 DSMTS-----F-----SNLHGGDFENQTIHFLHQNKIS-----LHKGT-----
 KFSSK-----EKDPFRR-----TGVDANIEETVRMELHKEKIIIR-----FHPGNPA-----
 KFSSK-----EKDPFRR-----TGVDANIEETVRMELHKEKIIIR-----FHPGNPA-----
 RDKTG-----GLPAG-----GTQHNVTVEKEYLIRLLDEGVI SHDLTG VYKNSKTRSS
 NKTIE-----GEFEG-LFSYFTLIHDFAKEKEYIKDLVRNAVVN-DLTHGYED-----
 NKTIQ-----GEFEG-LFSYFTVIHDFAKEKEYIKDLVRNAVIN-DLTHGYED-----
 SLRMD-----AMKT-----QVVHDSVAETVFLKELVKAGAVR-DLTGAL-----
 AVPMD-----AMKA-----QVVHDI GAELFLRDLVAAGATT-DLTGAL-----
 AIRMD-----AMKA-----QVVHDSVAELFLRDLVAAGAVT-DLTGAL-----
 NVRME-----AMKA-----QTMHNVETERKFLAGLVEKGVV-DLSGGI-----
 NRCMN-----SMND-----QPMHVDVTEKKMLRRTLVEKGVV-DLSGGIHCAFCDTQH
 DLCMS-----EMKA-----QKMHVDVTEKTLKQLIKEGVVK-DITGGI-----
 NLCSA-----AMNI-----QTMHNLTTETFLQKLVEKGIIV-DLSGGIHCEF-----
 TLMCA-----AMNG-----QTMHNVTRTELFLQKLVEEVEVK-DLSGGIHCFCKES
 SQCSA-----AMNF-----QTMHNVTTETKFLKLVEKGVVK-DLSGGIDREF-----
 SQCMG-----AMHW-----QVMHNVTTETKFLKLKEGVVE-DLSGGI-----

NLCMA-----AMNE-----QTMHNVTTETKFLQKLIKEGVVK-DLSSGIGFCTYCKKSS
 NLCMA-----AMKE-----QTMHNVTSKFLQKLIKEKIVK-DLTGGIYCEF-----
 NLCMA-----AMNR-----QTMHNVGTETKLLQKLVKEKVVK-DLTGGIH-----
 SVPM-----TILK-----EAMHNVQKETVFLKRLVASGSIT-DLTGGIHCSFC-----
 KLPMR-----VMQQ-----QTSNHNVEETAFLQKLIQDGAVT-DLTGGIHCSFCPR--
 TGLSR-----KNE-----LFQHNLTAERNWLLKMI EWGVIA-DLTSH-----
 NDVVS-----SL-R-----LMPHDIPTEQMWWLLKLVKGLIS-DLSLT-----
 NDTMS-----SMGK-----
 NATMS-----LMNK-----NAYHNVTAEQFLKDIIEKNLVI-NLTQD-----
 NATMS-----LMKQ-----NAYHNLTAEQFLNDIIEKKMVI-NLTQN-----
 NDTMS-----QMMK-----NAYHDI AVEQRFLKELIDLKILI-NLT-----
 NETMS-----QMMQ-----NEYHNITAEQKFLKLLIDKNFVV-NLT-----
 NETMS-----QMMQ-----NEYHDI SAEQKFLKLLIDKNFVV-NLT-----
 NETMS-----QMMQ-----NEYHDI SAEQKFLKLLIDKNFVV-NLT-----
 NDTMF-----SMTK-----TEYHNITAE-QMLLFIEKNNTIV-----
 NETMS-----VMAQ-----NEYHNISAEQMFIRDLEHKTIK-NLT-----
 SLPMR-----EIWK-----SWTHDIHHERGILRLLLKQQGIIT-DLSSGI-----
 SQKTK-----AALS-----SFTHDIDHETKFLHKLVEQGVIN-DITGGLRTKL-----
 SQKTK-----AALS-----SFTHDIDHETKFLHKLVEQGVI-----
 DAKMS-----SIK-----SWTHDINKEKEFLKTLVRNGVIT-DLTGGIIGHV-----
 DAKMS-----SIK-----SWTHDINKEKEFLKTLVRNGVIT-DLTGGIIGHV-----
 KVKMK-----IITS-----LFTHDINHETAFLKLLVEF-----
 SIKML-----AIKE-----SWTHNIGREKEFLRKLVKQGVIS-DLTNGI-----
 TVRMS-----TIKE-----SWTHNIPKEKEFLRKLVKANVIT-DLTNGI-----
 SVKMS-----AIKE-----SWTHNISKEKEFLRKLVKANIIT-DLTNGI-----
 TFKMS-----AIKE-----SWTHNIAKEKEFLRKLVRANVIT-DLTNGI-----
 TIKMS-----AIKE-----
 TIKMA-----AIKE-----SWTHNIQKEKEFLKLLVKARVIN-DLTNGI-----
 TIKMA-----AIKE-----SWTHNIQKEKEFLKLLVKARVIN-DLTNGI-----
 TVRMA-----AIKE-----SWTHNIQREKEFLRKLVKARVIT-DLSSGI-----
 TVRMA-----AIKE-----SWTHSIQREKEFLRKLVKARVIT-DLSSGI-----
 NIKMS-----AIKE-----SWTHNIQREKEFLRKLVKARVIT-DLTSGI-----
 TIKMS-----AIKE-----SWTHNIQREKEFLRKLVKARVIT-DLTSGI-----
 TIKMS-----AIKE-----SWTHNIQREKEFLRKLVKARVIT-DLTSGI-----
 NIKMS-----AIKE-----SWTHNIQREKEFLRKLVKARVIT-DLTSGI-----
 NIKMS-----AIKE-----SWTHNIQREKEFLRKLVKARVIT-DLTSGI-----
 NIKMS-----AIKE-----SWTHNIQREKEFLRKLVKARVIT-DLTSGI-----
 KIRMA-----AIKE-----SWTHNIRKEKEFLKLLVKAGVIO-DLTNGI-----
 KLRMS-----AIKE-----SWTHNISREKEFLRKLVKAGVIE-DLTHGI-----
 QDTMS-----SIK-----STYHNITIERTFLLKLLKEGEAIV-DLTQLAGT-----
 KATLK-----SM-A-----VSDHNIS-----
 KVTLK-----SMF-----ASEHNITVEAQAIKNLFQQNIH-NLTYF-----
 KVMKL-----TMRP-----SG-HNISQEAALAKRLLDIKAIK-NLTYF-----
 QITLK-----SMAG-----SG-HNVSQEAALAKRMLMGAIK-NLTSF-----
 QITLK-----SMAG-----SG-HNVSQEAALAKRMLMGAIVK-NLTYF-----
 QITLK-----SM-A-----ASEHNISHEAVALAKRMLLGLVK-NLTYF-----
 QITLK-----SM-A-----ASEHNISHEAVALAKRMLLGLVK-NLTYF-----
 QITVK-----SMAT-----SG-HNVSHEASAIKKMLVMGLIK-NLTYF-----
 QITVK-----SMAV-----SG-HNVSHEAFAIKKMLLGLVK-NLTYF-----
 SSTML-----
 QRNMK-----
 YHTMK-----SM-K-----NSPHDVSREGALKRLED SGAVM-YLH-----
 QQTMK-----SMFQ-----NSYHDLNQAQILHRLLEE QGVIL-YLPHPS-----
 RDTMK-----SM-Q-----NSYHDLGHEAEALKRLQDSGAIL-KLH-----

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Skow_ST6GAL_02430	VCTLR-TA-A----	LKILDRQTSPPFNKLG-LSRYLPN----	GSAFLEM-----	KTYKWC
Skow_ST6GAL_02428	VCKFKLSA-N----	ASVLDKSTRPYQDLG-LSKYFPK----	KNIFNAH----	EKRYNTC
Skow_ST6GAL_02427	LCDLKRRR-K----	YDVLKRDTPPFKEIG-ISKYFPE----	ISLYEKF----	KGFESC
Skow_ST6GAL_02429		MMGYDTPPFKEMG-ISKYFPG----	RNIYEKY-----	N-YSRC
Dsim_ST6GAL_02400	TCLVMEA--G----	VRVLRKRDAPFNKLP-FGRLFPR----	QKLFRN----	VKDIKTC
Dsec_ST6GAL_02401	TCLVMEA--G----	VRVLRKRDAPFNKLP-FGRLFPR----	QKLFRN----	VKDIKTC
Aaeg_ST6GAL_02407	LCRLKRA--D----	VRTLSDWRDPPFNWNE-IGSYFPL----	NPLFKE-----	R-NASC
Cqui_ST6GAL_02409	LCRLTRA--D----	VRTVTWRDSPFDWNE-IGRYIPP----	GPLFRE-----	R-NATC
Bflo_ST6GAL_02425	LCELKNRV-W----	FKTLPTSTEGPFKALN-YSLLEPK----	NTLYQLH----	HDGFKTC
Bflo_ST6GAL_02426	LCSLQSA-AR----	FRTLPADESPWKQLG-YGDIEAR----	PGLLQLY----	AGGFRTC
Phumcor_ST6GAL_02412	KCRLKSEL-----	RLLTCKDL SFKTLN-NLRNDKN----	EKEEFLE-----	GMQYKTC
Apis_ST6GAL_02408	TCDMASSVEK----	FRTLEKND--IDHM-LTKNIPD----	VPLFDD-----	NEVFGTC
Tcas_ST6GAL_02413	MCELEKI--Q----	VKTLLKRGDVAGGPHN-LGDFLPK----	RGLFE-----	NRNFNSC
Bmor_ST6GAL_02414	MCALKRI--K----	VNTVTKRDEPFAR--YDFQIPE----	GPLQD-----	GTFFNTC
Dpul_ST6GAL_02410	TPSMLENL-----	QNSLEKSHFHTITS-LTTFVPKEKQLLKNSQAF----		QKRYKSC
Isca_ST6GAL_02411	VCSLSRLFP-----	TPRDTPEPFKRMG-YSRYFPT----	TNLY-----	ESCYNSC
Lpol_ST6GAL_02415	VCSAKHDVPV----	SMLSADDTFFKEIG-LAPLFPN----	KNFNQV----	LGLYNCS
Pmar_ST6GAL_02423	LCLVAERV-TALRSTLT	LGSGEPF SAMGAWREALDA----	GGLEA--VSGGSLERC	
Cmil_ST6Gal2	LCELKKRV-R----	LRTLDGNETPFSLLG-WKKYVPK----	IPLSKI KLK--RVFRKC	
Stro_ST6Gal2	LCVLKDRR-Q----	VKTLDGKDAPFSSLG-WEKYFPK----	IALNKL--YP--HGFSTC	
Oana_ST6Gal2	LCQLRDRV-H----	VRTLDGKEAPFSALG-WDKHVPR----	TPLAKL--YP--RGFGSC	
Mdom_ST6Gal2	LCELRDRV-S----	VRTLDGKEAPFSDLG-WEKHVPQ----	EPLSKL--YP--QGLGSC	
Acar_ST6Gal2	FCELKARV-N----	IRTIDGKEAPFSILG-WEKHVPQ----	ISLNKL--YP--NGFGSC	
Cpichel_ST6GAL2	ICELKDRV-H----	VKTIDGKEDPFSALG-WEKHVPQ----	IPLGKL--YP--HGFSGC	
Ggal_ST6Gal2	FCELKERV-D----	VKTIDGKEAPFSTLG-WEKHVPQ----	IPLGKL--YT--HGFSGC	
Tgut_ST6Gal2	FCELKERV-N----	VKTIDGKEAPFSTLG-WEKHVPQ----	IPLVKL--YT--HGFSGC	
Btau_ST6Gal2	LCALGRV-Q----	VRTLDGTEPPFSALG-WRALVPP----	VPLSRL--LP--RRLRTC	
Hsap_ST6Gal2	LCQLRSRA-R----	VRTLDGTEAPFSALG-WRLVPA----	VPLSQL--HP--RGLRSC	
Ocuu_ST6Gal2	LCELRRRA-Q----	VRTLNGTEAPFAALG-WRLVPA----	VPLSQL--HP--RGLRTC	
Drer_ST6Gal2	LCQMKEQA-Q----	IRTLNGTEQPFADLG-FKQLVSP-----		PLQKYRTC
Olat_ST6Gal2	LCELKKRE-K----	IRTLGDAEMPFSSKLG-WQKIVPA----	LPLSQIHR----	PGLKTC
Alim_ST6Gal2	LCQMKNQS-Q----	LRTVDGSEQPFSSLG-WADFVPL----	VPLQRWNKQRGGRSFRTC	
Trub_ST6Gal2	LCQMKAAQ-Q----	LRTLDGSEEPFSSLG-WVDFVPP----	LPLERLSRRQEKSSSLKTC	
Tnig_ST6Gal2	LCEMKAQA-R----	LQMVDTGQPFSSLG-WASLVPS----	LPLEQLHKRPDQGSFKSC	
	LCELQAQA-R----	LQTVDTGTEPPFSSLG-WARLVPA----	LPLDQLHQPPARGSFNSC	

Locu_ST6GAL1	LCELKDKV-A-----VTSLTPLDPFSELS-WGSQLPP-----HLVTAH-----LGPYKSC
Pbiv_ST6GAL1	LCQKKNRV-N-----VSTVLNNEGPFABPE-WGRMLPQ-----RSLAED-----LGHLETC
Stro_ST6GAL1	LCAIKTKV-N-----ISTVLTDLPQNADS-WSQLPR-----LTQEE-----VKSJLGC
Acar_ST6GAL1	LCQLNRNL-D-----FRMITATDSPFDISE-WEPYVPK-----GNISI-----KLGRCL
Gfor_ST6GAL1	LCQLRDRV-N-----VTMIQRSDBGFGTSE-WLQYLPG-----KSFSEA-----VGHJLGR
Tgut_ST6GAL1	LCQLRDRV-N-----VTMIQRSDBGFGTSE-WQYLPG-----KSLSEA-----VGHJLGC
Svul_ST6GAL1	LCQLRDRV-N-----VTMIQRSDBGFGTSE-WQYLPG-----KSLSET-----VGHJLGH
Falb_ST6GAL1	LCQLRDRV-N-----VTMIQRSDBGFGTSE-WQYLPG-----KSLSET-----VGHJLGR
Ggal_ST6GAL1	LCRLRDRV-N-----VTMIRGSDGPFNSE-WQHLYPD-----KSLNET-----VGRJLGR
Fche_ST6GAL1	LCQLRDRV-N-----VTMIQSGSDGFGTSE-WQYLPG-----KSLNET-----VGSJLGR
Cliv_ST6GAL1	LCQLRDRV-N-----VTMIEGSDGFPDTS-WQYIPG-----KSLNET-----VGRJLGR
Mdom_ST6GAL1	LCQLANRV-K-----VTMIQGTDFPNTSE-WEKSLPP-----KNIRES-----FGRJLGT
Btau_ST6Gall	LCHLRDHF-N-----ISMIEASDFFPNTSD-WEGYLPQ-----EDIRSK-----AGPWGR
Hsap_ST6Gall	RCHLRDHF-N-----VSMVEVTDFFPNTSE-WEGYLPK-----ESIRTK-----AGPWGR
Cfam_ST6Gall	HCHLRDHF-N-----VSMVEATDFFPNTSE-WEGFLPK-----ENIRTK-----AGPWGR
Skow_ST6GAL_02430	AVIGSSYFLLGSKLGEID--SHDAVLRFNDAVL-TGFERDVGSKTTIRILNSQMLVK--
Skow_ST6GAL_02428	AIVSSSSFMTDGLGEEID--SHEAVRMFNAPT-VGFERDVGNKTTMRVNLMDIML-P
Skow_ST6GAL_02427	AIVASAAYFKNATLGEID--SHDAVLRFNAPT-EGFEENVGRKTTIRILNMTLIFE-E
Skow_ST6GAL_02429	AVVLSSFYMMNETGFGDEID--SHEAVLRLNDAPT-VGYEKSVGKTTIRILNLSKCFND-S
Dsim_ST6GAL_02400	AIVSSSAGSLAGSLGRFID--THDIVMRFNAPT-QGHEVDVGSKTTIRVNSQVVT-K
Dsec_ST6GAL_02401	AIVSSSAGSLAGSLGRFID--THDIVMRFNAPT-QGHEVDVGSKTTIRVNSQVVT-K
Aaeg_ST6GAL_02407	AVIASAGSLKGSRLGDFID--DHDVVMRFNAPT-KGFEVDVGSKTTTRVVNSQVVT-K
Cqui_ST6GAL_02409	AIVSSSAGSLKGSLSGSPID--GHDIVMRFNAPT-VGYEHDVGSKTSRVVNSQVVK-P
Bflo_ST6GAL_02425	AAVMNSAAILGSLNGLEEID--SHDAVMRFNAPLSEBYRADIGVKTTLRLMNSQLAD-P
Bflo_ST6GAL_02426	AAVMSSGAMLGSRLGKDIL-DSHDAVLRVNSAPT-KRYQSDVGSKTTTLRLMNSQVVKQS
Phumcor_ST6GAL_02412	AIVSSSAGSLNLSKLGHILD--QHEIIVRFNAPT-VTYEEDVGSKTTVRLVNSQVSK-K
Apis_ST6GAL_02408	AITSNAAATLRNSNLGYFID--QHDVLVRFNAPT-KGYEKDVGSKTTIRILNSQVVT-K
Tcas_ST6GAL_02413	AIVASSGALKDSNLGKKID--AHDVLVRFNAPT-KGFEVDVGKTTIRILVNSQVVT-K
Bmor_ST6GAL_02414	AVVSSAGALLGSLRGDFID--SDHMLVRFNAPT-DNYTDDVGSKTTFRLNSQVSK-P
Dpul_ST6GAL_02410	AIVSSAGAILNSDLGTID--GHDVVRFNAPT-LGFEVDVGKTSRLIRLSQILSK-S
Isca_ST6GAL_02411	ALVSSAGSLGSLRGSLGNEIGKYAHQAVLRFNDAPT-QGFEQDVGSRTTVRLNLSQLLR-P
Lpol_ST6GAL_02415	AIVSSSGSMYKSLGLKEID--THDVLVRFNDAPT-KGYEKDVGNKTTVRLNSQVSK-P
Pmar_ST6GAL_02423	AVVSSAGSLNLSGLGEEID--AHDVLRFNAPT-EHFEKDVGTKTTIRILNSQILAR-P
Cmil_ST6Gal2	AVVASAGAILNSSLGDEID--SHDAVMRFNAPT-KLYEQDVGSKTTIRILNSQILAN-S
Stro_ST6Gal2	AVVSSAGAILNSSLGAEID--SHDAVLRFNAPT-RNYEKDVGNKTTIRILNSQILT-N
Oana_ST6Gal2	AVVMSAGAILNSSLGAEID--AHDVLRFNAPT-RGYEKDVGNKTSRLIRLSQILT-N
Mdom_ST6Gal2	AVVMSAGAILNSSLGEEID--SHDAVLRFNAPT-HGYERDVGNKTTMIRILNSQILT-N
Acar_ST6Gal2	AVVMSAGAILNSSLGKEID--SHEAVLRFNAPT-RGYEKDVGNKTTMIRILNSQILT-N
Cpichel_ST6GAL2	AVVMSAGAILNSSLGDEID--SHDAVLRFNAPT-RGYEKDVGNKTTMIRILNSQILT-N
Ggal_ST6Gal2	AVVMSAGAILNSSLGDEID--SHDAVLRFNAPT-RGYEKDVGNKTTMIRILNSQILT-N
Tgut_ST6Gal2	AVVMSAGAILNSSLGDEID--SHDAVLRFNAPT-RGYEKDVGNKTTMIRILNSQILT-N
Btau_ST6Gal2	AVVMSAGAILNSSLGDEID--SHDAVLRFNAPT-RGYEKDVGNKTTMIRILNSQILT-N
Hsap_ST6Gal2	AVVMSAGAILNSSLGEEID--SHDAVLRFNAPT-RGYEKDVGNKTTIRILNSQILT-N
Ocum_ST6Gal2	AVVMSAGAILNSSLGEEID--SHDAVLRFNAPT-RGYEKDVGNRTMIRILNSQILT-N
Drer_ST6Gal2-r	AVVASAGAILNSSLGDEID--SHDAVLRFNAPS-EGYERDVGSKTTIRIMNSQILAN-P
Drer_ST6Gal2	AVVTSAGAMLHSLGLKEID--SHDAVLRFNAPT-VGYERDVGNKTTIRILNSQILAN-P
Olat_ST6Gal2	AVVSSAGAILHSLGLGKEID--SHDAVLRFNAPT-EGYEQDVGTKTTIRILNSQILAN-P
Alim_ST6GAL2	AVVTSAGAMLHSLGLKEID--SHDAVLRFNAPT-DGYERDVGNTTIRILNSQILAN-P
Trub_ST6Gal2	AVVTSAGAILRSLGLGKEID--AHDVLRFNAPT-EGYERDVGNKTTIRILNSQILAN-P
Tnig_ST6Gal2	AVVTSAGAILRSLGLGKEID--SHDAVLRFNAPT-EGYERDVGNKTTIRILNSQILAN-P
Locu_ST6GAL1	AVVSSAGSLKNSLGLGKEID--SHDAVLRFNAPT-RGYEKDVGTKTTVRLNSQVMS-E
Pbiv_ST6GAL1	AVVSSAGSLKNSLGLGKEID--SHDAVLRFNAPT-RGYEKDVGTKTTTLRLVNSQLMAS-P
Stro_ST6Gall	AVVSSAGSLKNSLGLGKEID--THDAVLRFNAPV-LGYQDDVGKTTTFRLNSQLVSR-P
Acar_ST6Gall	AVVSSAGSMKSSHLGDEID--SHDAVLRFNAPT-RGFQDDVGKTTIRILVNSQLVT-E
Gfor_ST6GAL1	AVVSSAGSLKSSRLGQDEID--SHDAVLRFNAPV-RGFQDDVGKTTIRILVNSQLVTV-E
Tgut_ST6Gall	AVVSSAGSLKSSHLGQDEID--SHDAVLRFNAPV-RGFQDDVGKTTIRILVNSQLVTV-E
Svul_ST6GAL1	AVVSSAGSLKSSRLGQDEID--SHDAVLRFNAPV-RGFQDDVGKTTIRILVNSQLVTV-E
Falb_ST6GAL1	AVVSSAGSLKSSRLGHEID--SHDAVLRFNAPV-RGFQDDVGKTTIRILVNSQLVTV-E
Ggal_ST6Gall	AVVSSAGSLKSSHLGPEID--SHDAVLRFNAPV-KGFQEDVGKTTIRILVNSQLVTV-E
Fche_ST6GAL1	AVVSSAGSLKSSHLGQDEID--THDAVLRFNAPT-RGFQEDVGKTTIRILVNSQLVTV-E
Cliv_ST6GAL1	AVVSSAGSLKSSHLGQDEID--SHDAVLRFNAPT-RGFQEDVGKTTIRILVNSQLVTV-E
Mdom_ST6Gall	AVVSSAGSLKASYLTGDEID--NHDAVLRFNAPT-KKYEEHVGTKTTFRLVNSQLVTT-D
Btau_ST6Gall	AVVSSAGSLKSSRLGKEID--SHDAVLRFNAPT-RGFQDDVGKTTIRILVNSQLVTT-E
Hsap_ST6Gall	AVVSSAGSLKSSQLGKEID--DHDVLRFNAPT-RNFQDDVGKTTIRILMNSQLVTT-E
Cfam_ST6Gall	AVVSSAGSLKSSQLGKEID--DHDVLRFNAPT-RNFQDDVGKTTIRILMNSQLVTT-E
Skow_ST6GAL_02430	KKNASLLKALNVNSTLFLVWADPGKGRDEN-LMKWYTV--SKDMFNMYIKWCHIRPQCPVY
Skow_ST6GAL_02428	DF--YSNYIFNVNSVLVWYQAPYTFTP-DKWYEH--NGAAFYEKYIERRISRPBEKMYV
Skow_ST6GAL_02427	RF-GFTTKDIFRNTILVWKSGBPYNGL-YRFYSLYKDSKPFDDKYIQWRAHPWESQFY
Skow_ST6GAL_02429	TF-IDNIEAMFVNTTLVWKSGBPYNGL-YKWYQR-ESVKELLARIQRWHPWQSDFFVY
Dsim_ST6GAL_02400	EF-DFTRAPIFRNVTLIAAWDPGKYNGTL-EDWLTS--ADYDLFTNYELRYRRYPKSRAPL
Dsec_ST6GAL_02401	EF-DFTRAPIFRNVTLIAAWDPGKYNGTL-EDWLTS--ADYDLFTNYELRYRRYPKSRAPL
Aaeg_ST6GAL_02407	EF-KLLTAKHFHRVSLIAAWDPGKFQSL-EDEWKS--PDFNLFNFKYRKYRKPNSFRAPL
Cqui_ST6GAL_02409	EF-ELLTASLFRNVSLIAAWDPGKFNQSL-KEWIET--PDFNLFNFKQYHQKYPGANPHL
Bflo_ST6GAL_02425	SF-NFTTDPYIRNITMIVWDPAPYATGDM-EWYQGN--PDANFFSSYEQRRMFPRENLYI
Bflo_ST6GAL_02426	KY-HWFTDPRYRNVMTLVWDPAPYINL-KQWYKH--PDYNLFTPYLRYRRNPQAPFYI
Phumcor_ST6GAL_02412	EF-NFTTSSLYKNVTLLVWDPSPNYSATL-QEWYEK--PDFNFFFERSEI-----
Apis_ST6GAL_02408</	

Tgut_ST6Gal2	NH-HFVDDSSLYKDVILVAWDPAPYSANL-SQWYKK--PDYNLFTPPYVQHRKNPQTQPFYI
Btau_ST6Gal2	SY-HFMDSSLYKDVILVAWDPAPYSANL-NLRYKK--PDYNLFTPPYVQHRQRNPQPFFYI
Hsap_ST6Gal2	SH-HFIDSSLYKDVILVAWDPAPYSANL-NLWYKK--PDYNLFTPPYIQHRQRNPQPFFYI
Ocun_ST6Gal2	NH-HFVDDSSLYKDVILVAWDPAPYSANL-NLWYKK--PDYNLFTPPYIQHRQRNPNPQPFYI
Drer_ST6Gal2-r	KY-RFGSSSLYKKNITLVAWDPAPYINIDL-HKWFLH--PDYDLFTPTTYITHRKAFFPQPFFYI
Drer_ST6Gal2	MH-RFNRSSLYKKNITLVAWDPAPYITLNL-HQWYSN--PDYNLFTPPYMEYMRHFPSPQPFYI
Olat_ST6Gal2	KH-EFKTSSYKKNITLVAWDPAPYITLNL-DEWFAS--PDYDLFGPYVEHRKNHABQLFYI
Alim_ST6Gal2	TY-QFTNSSYKKNITLVAWDPPTYSVNL-HKWYTS--PDYDLFGPYVDEHRKHVPDQPFFYI
Trub_ST6Gal2	NH-RFTNSSLYKDVVLVAWDPAPYITDL-HKWYAS--PDYNLFGPYMEHRRHAPDQPFFYI
Tnig_ST6Gal2	NH-RFNSSSLYKDVVLVAWDPAPYITVDL-HQWFAS--PDYNLFGPYVEHRRHPHPQPFFYI
Locu_ST6Gal1	DH-HFLSSSLYSAGTLVAWDPAPSSNL-AEWYKN--TDYPIFKQYQYRLLHHPQPFYI
Pbiv_ST6Gal1	EQ-HFLDQGLQYLAQGTILVAWDPAPYDGL-EWYKTY--PDYPLFEPFTRLRANRPQWLFHL
Stro_ST6Gal1	EL-KFLEDPLYKEGSLIMWDPAPYANV-EEWHKN--PDYKFFERYSEYRRRNPEQMFFYV
Acar_ST6Gal1	EK-KFLADPQYNGFTLLWDPAPYHSSI-KEWYKK--PDYNFYGSGFKHYKRYKPPQPFYI
Gfor_ST6Gal1	EQ-QFLSEPLYNTGILIVWDPAPYHAEI-HEWYRK--PDYNFYESKYARRAHBPQPFFYI
Tgut_ST6Gal1	EQ-QFLREPLYNTGILIVWDPAPYHAEI-REWYRK--PDYNFFESYKAYRRHBPQPFFYI
Svul_ST6Gal1	EQ-QFLRESLYNTGILIVWDPAPYHAEI-HEWYRK--PDYNFFESYKAYRRTHBPQPFFYI
Falb_ST6Gal1	EQ-QFLREPLYNTGILIVWDPAPYHAEI-HEWYRK--PDYNFFESYKAYRRTHBPQPFFYI
Ggal_ST6Gal1	EQ-QFLKDALYNTGILIVWDPAPYHAEI-HEWYRK--PDYKFFEAYKSYRIRHBPQPFFYI
Fche_ST6Gal1	EQ-QFLREALYNTGILIVWDPAPYHAEI-HEWYRK--PDYNFFESYKYSRAHBPQPFFYI
Cliv_ST6Gal1	EQ-QFLREELYNTGILIVWDPAPYHAEI-HEWYRK--PDYDFESYKLYRSIHBPQPFFYI
Mdom_ST6Gal1	-K-NFFDDSLYKNGILIMWDPSPYHSEI-PEWYKK--PDYNFFHNYKLYRKLNPNPQPFYI
Btau_ST6Gal1	-A-GFLKDSLYNEGILIVWDPSPVHSDI-PKWYRN--PDYSFFNNFKSYRKLHPDQPFFYI
Hsap_ST6Gal1	-K-RFLKDSLYNEGILIVWDPSPVHSDI-PKWYQN--PDYNFFNNYKTYRKLHPDQPFFYI
Cfam_ST6Gal1	-G-RFLKDSLYNEGILIVWDPSPVHSDI-PKWYQS--PDYSFFENYKSYRKLHPDQPFFYI
Skow_ST6GAL_02430	INPSVLKQKWDIIQRYTK-ERMKNIVPTTGTGTGIHLMHHCESIDVYGVFTP--TNTNCH
Skow_ST6GAL_02428	INPAWHNIWDIIQYESE-ENINKHPVSSGFTGIILMQQICDQVNVYGVFTP--KTRLRLH
Skow_ST6GAL_02427	MDPTPIWRTWDDIIQENTPNITIRKTLPSGGIMGISLMQRMCDTVNVYGYLIPNGDPPLCH
Skow_ST6GAL_02429	INPTSLWLDIWDIMYFNKGKPIKKIVSSGFTGLLMLLGLCDKVDVYGVFGIN--DVSSCH
Dsim_ST6GAL_02400	IDPHSVWRLQWLSLQMFAGNRPISRNPSSSGFIGLALLPHCPQVDVFEYVVPSTRNLGRCH
Dsec_ST6GAL_02401	IDPHSVWRLQWLSLQMFAGNRPISRNPSSSGFIGLALLPHCPQVDVFEYVVPSTRNLGRCH
Aaeg_ST6GAL_02407	VDRPSIWRATLQDQKT-HVKIMRNPTSGFIGLGLLIPACRYIDMIEYIPSSRMNGLCH
Cqui_ST6GAL_02409	VDRPSIWRASALQDQKT-KVGIIRNPPTSGFIGLGLLIPACRYVHMIYIPSSRMNGLCH
Bflo_ST6GAL_02425	TDPRFYWELWDVLQENT-EAMIHNPNPSSSGFIGIAVMLSLCDQLDVYEFVPSERISMKCH
Bflo_ST6GAL_02426	MDPRYLWELVEVLRNT-REKIVRNVPSSSGFIGLHLLSLCDTVDVYEFVPSKRETQRCH
Phumcor_ST6GAL_02412	----HMESLGFFTKLT-SMRIRKNPSSSGFIGLALLMPYCDTIDFEBFVPTSLTKKCH
Apis_ST6GAL_02408	VHPQYLWRLWDYIQDHT-TAHIRRNPNSSSGFIGLGLAMLLPRACTVNMFEFIPSERMTHRCH
Tcas_ST6GAL_02413	INPQSLWELWDFLQDNS-PSRLRRNPSSSGFIGLGLLIPLCNFIDVFEYVPSVTRTKRCH
Bmor_ST6GAL_02414	LNQOVLWNLWAVLQNVIS-PYRLRRNPSSSGFIGLWFLSNRCRRVRYEYVPSRTRASRCH
Dpul_ST6GAL_02410	MDPRGLWNLWDYLSLHS-PLPIPNPNSSSGFIGLALTLSFCDYVDMIEFVPSLRMTKRCH
Isca_ST6GAL_02411	LHPDSVVEAHVFLDREN-PGCVRNPNSSSGFIGLGLLLGLCRRDLDAVYEFVPSMRITKRCH
Lpol_ST6GAL_02415	VHPTPIWAKWNFIQENT-AVPIKKNPSSSGFIGLGLLLQHCNTDIEYIIPSMRLTKRCH
Pmar_ST6GAL_02423	LHPAYLWRIWELLQDSA-SEHIQPNPNSSSGFIGLVVLMMWLCEVNVYEFVPSRRRTDLCH
Cmil_ST6Gal2	LHPRFLWQLWDIIQENT-QEKIQPNPNSSSGFIGIVIMMALCDSINIEYIIPSIQRTDLCH
Stro_ST6Gal2	LHPKFTWLWIKIIQENS-NEKIQPNPNSSSGFIGILIMSMCRTHVHYEIPSVRQTDLCH
Oana_ST6Gal2	LHPKFIWQLWDIIQENT-REKIQPNPNSSSGFIGILIMSMCREVHVHYEIPSVRQTDLCH
Mdom_ST6Gal2	LHPKFIWQLWDIIQENT-KEKIQPNPNSSSGFIGILIMSLCKEVHVHYEIPSVRQTDLCH
Acar_ST6Gal2	LHPKFIWQLWDIIQENT-KEEIQPNPNSSSGFIGILIMSMCEVHVHYEIPSVRQTDLCH
Cpicbel_ST6GAL2	LHPKFIWQLWDIIQENT-KEKIQPNPNSSSGFIGILIMSMCEVHVHYEIPSVRQTDLCH
Ggal_ST6Gal2	LHPKFIWQLWDIIQENT-KEKIQPNPNSSSGFIGILIMSMCEVHVHYEIPSVRQTDLCH
Tgut_ST6Gal2	LHPKFIWQLWDIIQENT-KEEIQPNPNSSSGFIGILIMSMCEVHVHYEIPSVRQTDLCH
Btau_ST6Gal2	LHPKFIWQLWDIIQENT-KEKIQPNPNSSSGFIGILIMMNLCEVHVHYEIPSVRQTDLCH
Hsap_ST6Gal2	LHPKFIWQLWDIIQENT-KEKIQPNPNSSSGFIGILIMSMCREVHVHYEIPSVRQTELCH
Ocun_ST6Gal2	LHPKFIWQLWDIIQENT-KEEIQPNPNSSSGFIGILIMSMCEVHVHYEIPSVRQTDLCH
Drer_ST6Gal2-r	LHPSFIWKLWDIVQSIT-EENIQPNPNSSSGFIGIILMMNLCEKIHVHYEIPSMRQTDLCH
Drer_ST6Gal2	LHPKYIWLQWLDVIQANN-LENIQPNPNSSSGFIGILMMSLCEEVHVHYEIPSLRQTDLCH
Olat_ST6Gal2	LHPSYLWQLWDLIQSNT-QEKIQPNPNSSSGFIGILTMALCDKHVHYEIPSMRQTDLCH
Alim_ST6Gal2	LHPSYVWKLWDLIQSNT-QENIQPNPNSSSGFIGILMMALCEQVHVHYEIPSMRQTDLCH
Trub_ST6Gal2	LHPRYVWRLWDVIQENT-QENIQPNPNSSSGFIGILMMTLCEQVHVHYEIPSMRQSDLCH
Tnig_ST6Gal2	LHPSYVWRLWNVIQNT-QENIQPNPNSSSGFIGILLMMTLCEQVHVHYEIPSVRQSDLCH
Locu_ST6Gal1	LHPKVEWQLWERIQENM-AEPIQKNPNSSGGLGTVLMMSVCEVHVLYEFLPSRRKTELCH
Pbiv_ST6Gal1	LHPRLQWELWQLVQEGA-DEQVQRNPSSGGLGTVLMMSLCELVHVYEFVPSRQSQHCH
Stro_ST6Gal1	LNPHAQWLWDIIQONA-PEDINPGPSSGGLGLTLLMMNLCDQNVNVEYFLPSRQSDLCH
Acar_ST6Gal1	LNPHMQWLWDLIQENS-PEDIQPNPNSSGMLGKILMMNFCDEVDVYEFVPSKRQTNICH
Gfor_ST6Gal1	LNPKMQWLWDLIQENS-LEHIQPNPNSSGMLGIVLMMTLCDQVDVYEFVPSKRQTDICH
Tgut_ST6Gal1	LNPKMQWLWDLIQENS-LEHIQPNPNSSGMPGIVLMMTLCDQVDVYEFVPSKRQTDICH
Svul_ST6Gal1	LNPKMQWLWDLIQENS-LEHIQPNPNSSGMLGIVLMMTLCDQVDVYEFVPSKRQTDICH
Falb_ST6Gal1	LNPKMQWLWDLIQENS-LEHIQPNPNSSGMLGIVLMMTLCDQVDVYEFVPSKRQTDICH
Ggal_ST6Gal1	LNPKMQWLWDLIQENS-LEHIQPNPNSSGMLGIVIMMTLCEVDVYEFVPSKRQTDICH
Fche_ST6Gal1	LNPKMQWLWDLIQENS-LEHIQPNPNSSGMLGIVIMMTLCEVDVYEFVPSKRQTDICH
Cliv_ST6Gal1	LNPKMQWLWDLIQENS-LEPIQPNPNSSGMLGIVIMMTLCEVHVYEFVPSKRQTDICH
Mdom_ST6Gal1	LNPKMPWELWDIIQENS-PEDIQPNPNSSGMLGIVIMMNFCDTVIYEFVPSKRRTDICH
Btau_ST6Gal1	LKPQMPWELWDIIQEIS-SELIQPNPNSSGMLGIAIMMSLCDQVDIYEFVPSKRRTDVCY
Hsap_ST6Gal1	LKPQMPWELWDIIQEIS-PEEIQPNPNSSGML

Isca_ST6GAL_02411 YFEV-HEDLGCTLGDWHPPLAAEKLALLAHMAAP--EVLQVFAQGRPLPLGGSSA--AP--
 Lpol_ST6GAL_02415 YYDV-HENLGCTLGDWHPPLASEKLLSLAMNAA--SDL-QVFVNGKISIKGDVVK-----
 Pmar_ST6GAL_02423 YHED-YTDRACTEGAYHPLLYEKNFVKRLSTS--SDH-DLFWAGRATPLGLRRAMESCPP
 Cmil_ST6Gal2 YHER-YYDSACTLGAYHPLLYEKLVLQRMNKG--TEA-DLYSGKRVLPGFHSI--KCAG
 Stro_ST6Gal2 YHEQ-YYDAACTLGAYHPLLYEKLMLIQRINQG--TED-NLLRKGKVLPGFSSI--HCPI
 Oana_ST6Gal2 YHEL-YYDAACTLGAYHPLLYEKLVLQRMNKG--ERD-DLYRKGKVLPGFRAL--RCPA
 Mdom_ST6Gal2 YHEL-YYDAACTLGAYHPLLYEKLVLQRMNQG--IRD-DLYRKGKAILPGFRAL--SCPA
 Acar_ST6Gal2 YHEL-YYDAACTLGAYHPLLYEKLVLQRMNKG--FQD-DLYRKGKVLPGFRSV--KCPG
 Cpichel_ST6GAL2 YHEL-YYDAACTLGAYHPLLYEKLVLQRMNKG--LQD-DLYRKGKVLPGFRSV--KCPG
 Ggal_ST6Gal2 YHEL-YYDAACTLGAYHPLLYEKLVLQRMNKG--LQD-DLYRKGKVLPGFKSV--KCPE
 Tgut_ST6Gal2 YHEL-YYDAACTLGAYHPLLYEKLVLQRMNKG--LQD-DLYRKGKVLPGFKAI--KCPK
 Btau_ST6Gal2 YHEP-YHDAACTLGAYHPLLYEKLVLQRLNVG--THG-DLHRKGKVLPGQAV--RCPP
 Hsap_ST6Gal2 YHEL-YYDAACTLGAYHPLLYEKLVLQRLNMG--TQG-DLHRKGKVLPGFQAV--HCPA
 Ocun_ST6Gal2 YHEL-YYDAACTLGAYHPLLYEKLVLQRLNMG--TQG-DLHRKGKVLPGFQAV--QCPA
 Drer_ST6Gal2-r YHEL-QYDMACTFGAYHPLLYEKLVLKRMSTA--SEE-DLRRKGKVLPGFSKI--KCLL
 Drer_ST6Gal2 YHER-YYDAACTLGAYHPLLYEKLMLIQRMNIG--SED-ELRRKGKVLPGFNKV--HCEP
 Olat_ST6Gal2 YHEN-YYDAACTLGAYHPLLYEKNLIRINLG--SEK-DLLKKGRVTLPGFSTL--TCGA
 Alim_ST6GAL2 YHER-YYDAACTLGAYHPLLYEKSILQIRINTG--PEN-DLRRKGKVLPGFSTV--DCDI
 Trub_ST6Gal2 YHER-YYDAACTLGAYHPLLYEKSILQIRINTG--PGS-DLRRKGKVLPGFSTV--DCDI
 Tnig_ST6Gal2 YHER-YYDAACTLGAYHPLLYEKSILQIRINTG--PES-DLRRKGKVLPGFSAV--NCDI
 Locu_ST6GAL1 YYQR-FFDAACTLGAYHPLMYEKNLVKRMNKG--TDK-EIYQYGRVTLPGLATL--NCTA
 Phiv_ST6GAL1 YYQD-FSDDACTLGAYHPLFEKNLVRRMNRG--TQA-DLAQRGRVTLPGFQVL--NCTQ
 Stro_ST6Gal1 YYER-YQDRACLTGAYHPLMYEKNLVKRLNLG--DDN-SIFHFGRITLPGRLGL--QC--
 Acar_ST6Gal1 YYQK-IFDQACTMGAYHPLLFKEKNI IKHLNIG--KDE-DIYNYGKATLPGLRNV--QC--
 Gfor_ST6GAL1 YYQK-FHDHACTMGAYHPLLFKEKNLVKHMNQG--TDE-DIYTLGKVTLPGFRKV--Q--
 Tgut_ST6Gal1 YYQK-FHDHACTMGAYHPLLFKEKNLVKHMNQG--TDE-DIYTHGKVTLPGFRKV--HC--
 Vul_ST6GAL1 YYQK-FHDHACTMGAYHPLLFKEKNLVKHMNQG--TDE-DIYTHGKVTLPGFRKV--HC--
 Falb_ST6GAL1 YYQK-FHDHACTMGAYHPLLFKEKNLVKHMNQG--TDE-DIYTHGKVTLPGFRQV--QC--
 Ggal_ST6Gal1 YYQK-FHDHACTMGAYHPLLFKEKNLVKHLNQG--TDE-DIYTHGKVTLPGFRNV--HC--
 Fche_ST6GAL1 YYQK-FHDRACTMGAYHPLLFKEKNLVKHINQG--TDE-DIYTHGKVTLPGFRKV--HC--
 Cliv_ST6GAL1 YYQK-FHDRACTMGAYHPLLFKEKNLVKHINQG--TDE-DIYMHGKVTLPGFRNV--HC--
 Mdom_ST6Gal1 YYQK-FFDSACTMGAYHPLLFKEKNLVKHLNQG--TDE-DIYLLGKVTLPGLQGV--RC--
 Btau_ST6Gal1 YYQR-YFDSACTMGAYHPLLFKEKNLVKHLNQG--TDE-DIYLLGKATLPGFRTI--RCGA
 Hsap_ST6Gal1 YYQK-FFDSACTMGAYHPLLYEKNLVKHLNQG--TDE-DIYLLGKATLPGFRTI--HC--
 Cfam_ST6Gal1 YYQK-FFDSACTMGAYHPLLFKEKNLVKHLNQG--TDE-DIYLLGKATLPGFRRI--RC--

Data S2. 27 vertebrate ST6Gal sequences used in Figure 5: poorly aligned regions in the N-terminal part of ST6Gal sequences were manually removed and multiple sequence alignment obtained with clustal Omega at the <http://www.ebi.ac.uk/Tools/msa/clustalo/> web site. Output format is Phylip/interleaved. 91 vertebrate ST3Gal sequences used in Figure 5: N-terminal part were manually removed and multiple sequence alignment obtained with clustal omega at the <http://www.ebi.ac.uk/Tools/msa/clustalo/> web site. Output format is Phylip/interleaved.

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ST6Gal2_Daniorerio CAVVTSAGAM LHSGLGKEID SHDAVLRFNPT APTVGYERDV GNKTTIRIIN SQILANPMHR FNRSSLYKNV TLVAWDPAPY
 ST6Gal2_Olatipes CAVVSSAGAI LHSGLGKEID SHDAVLRFNPA APTGEYQDV GTKTTIRIIN SQILANPKHE FKTSSYIKNI TLVAWDPAPY
 ST6Gal2_Alligmissi CAVVTSAGAM LRSRLGKEID SHDAVLRFNPS APTDGYERDV GNTTTIRIIN SQILANPTYQ FNTSSYIKNV TLVAWDPTPY
 ST6Gal2_Takirubri CAVVTSAGAI LRSGLGREID AHDAVLRFNPA APTGEYERDV GNKTTIRIIN SQILANPNHR FNTSSLYKDV TLVAWDPAPY
 ST6Gal2_Calomili CAVVASAGAI LNSSLGDEID SHDAVMRFNA APTKLYEQDV GSKTTIRILN SQILANSKHN FINNALYKNI ILVVWDPAPY
 ST6Gal2_Silutropi CAVVSSAGAI LNSSLGAEID SHDAVLRFNPS APTRNYEKDV GNKTTIRIIN SQILTNPNNH FTDSSLYKDV TLIAWDPSPY
 ST6Gal2_Monodomes CAVVMSAGAI LNSSLGEEID SHDAVLRFNPS APTHGYERDV GNKTTMIRIIN SQILTNPNNH FIDSSLYKDV ILVAWDPAPY
 ST6Gal2_Amolcarol CAVVMSAGAI LNSSLGKEID SHEAVLRFNPS APTRGYEKDV GNKTTMIRIIN SQILTNPNNH FIENSLYKDV ILVAWDPAPY
 ST6Gal2_Chryspecta CAVVMSAGAI LNSSLGDEID SHDAVLRFNPS APTRGYEKDV GNKTTMIRIIN SQILTNPNNH FIDSSLYKDV ILVAWDPAPY
 ST6Gal2_Taenopgut CAVVMSAGAI LNSSLGDEID SHDAVLRFNPS APTRGYEKDV GNKTTMIRIIN SQILTNPNNH FVDSSLYKDV ILVAWDPAPY
 ST6Gal2_Gallusgal CAVVMSAGAI LNSSLGDEID SHDAVLRFNPS APTRGYEKDV GNKTTMIRIIN SQILTNPNNH FVDSSLYKDV ILVAWDPAPY
 ST6Gal2_Struthcam CAVVMSAGAI LNSSLGSEID SHDAVLRFNPS APTRGYEKDV GNKTTMIRIIN SQILTNPNNH FVDSSLYKDV ILVAWDPAPY
 ST6Gal2_Bostaurus CAVVTSAGAI LNSSLGEEID SHDAVLRFNPS APTRGYEKDV GNKTTVIRIIN SQILTNPNNH FMDALYKDV ILVAWDPAPY
 ST6Gal2_Homosap CAVVMSAGAI LNSSLGEEID SHDAVLRFNPS APTRGYEKDV GNKTTIRIIN SQILTNPNNH FIDSSLYKDV ILVAWDPAPY
 ST6Gal2_Musmusc CAVVMSAGAI LNSSLGEEID SHDAVLRFNPS APTRGYEKDV GNKTTVIRIIN SQILANPSHH FIDALYKDV ILVAWDPAPY
 ST6Gal1_Oryzlatip CAVVSSAGSL RHSGGLGKEID SHDAVMRFNA APTSGFEKDV GSKTTMRLIN SQVMASEEYR FLSSSLYSSG VLVWADPAPF
 ST6Gal1_Gasterost CAVVSSAGSL RNSGLGKEID SHDAVLRFNPA APTTGYEKDV GSKTTIRILN SQVMASDDHR FLSSSLYSSG TLVAWADPAPF
 ST6Gal1_Takirubri CAVVTSAGSM RSSGLGKEID SHDAVLRFNPA APTSGYENDV GSKTTIRLVN SQVMASEAHR FLSSSLYSSG TLVAWADPAPF
 ST6Gal1_Amblymexi CAVVSSAGSL RNSGLGKEID SHDAVVRFNPA APTAGFEKDV GSKTTVRLIN SQVMASEDHH FLSSSLYSIG TLVAWADPAPY
 ST6Gal1_Daniorerio CAVVSSAGSL KNSGLGKEID SHDAVIRFNA APTAGFETDV GSKTTVRLIN SQLMASEDHH FLSSSLYSAG ILVSWDPSPY
 ST6Gal1_Silutropi CAVVSSAGSI KHSRLGQEID THDAVLRFNPA APVLGYQADV GTKTTFRLLN SQLVSRPELK FLEDPLYKEG SLIMWDPAPY
 ST6Gal1_Alligmissi CAVVSSAGSL KSSHLGPEID SHDAVLRFNPG APTKGQFQDV GEKTTIRLVN SQLVTVEEHN FLTESLYNTG ILIWDVDPAPY
 ST6Gal1_Taenopgut CAVVSSAGSL KSSHLGQEID SHDAVLRFNPG APVRGFGQDV GEKTTIRLVN SQLVTVEEQQ FLREPLYNTG ILIWDVDPAPY
 ST6Gal1_Gallusgal CAVVSSAGSL KSSHLGPEID SHDAVLRFNPG APVKGFQEDV GEKTTIRLVN SQLVTVEEQQ FLKDALYNTG ILIWDVDPAPY
 ST6Gal1_Struthcam CAVVSSAGSL KSSHLGPEID SHDAVLRFNPG APTRGFKEDV GEKTTVRLVN SQLVTVEEQQ FLTDALYNTG ILIWDVDPAPY
 ST6Gal1_Amolcarol CAVVSSAGSM KSSHLGDEID SHDAVLRFNPG APTKGQADV GEKTTIRLVN SQLITVEEKK FLADPQYNG FLIWDVDPAPY
 ST6Gal1_Pythonmor CAVVSSAGSM KQSHLGAEID SHDAVLRFNPG APTKGQFQDV GEKTTIRLVN SQLITVEEKK FITDVQYNG TIIWVDPSPY
 ST6Gal1_Monodomes CAVVSSAGSL KASYLGTEID NHDAVLRFNPG APTKYEHEV GKTTTFRLVN SQLVTDD-KN FPDSSLYKNG ILIMWDPSPY
 ST6Gal1_Musmuscul CAVVSSAGSL KNSQLGREID NHDAVLRFNPG APTDNFQDV GTKTTIRLVN SQLVTTE-KR FLKDSLYTEG ILIWDVDPYV
 ST6Gal1_Homosap CAVVSSAGSL KSSQLGREID DHDVLRFNPG APTANFQDV GTKTTIRLMN SQLVTTE-KR FLKDSLYNEG ILIWDVDPYV
 ST6Gal1_Ovisaries CAVVSSAGSL KSSRLGREID DHDVLRFNPG APTVFKQDV GTKTTIRLVN SQLVTTE-AG FLKDSLYNEG ILIWDVDPYV
 TLNLHQWYSN PDYNLFTPYM EYMRFPSPQ FYILHPKYIW QLWDVIQANN LENIQPNPPS SGFIGILLMM SLCEEVHVVE
 TLNLDEWFPAS PDYDLFGPYV EHRKNHAEQL FYILHPSYLW QLWDLIQSNQ QEKIQPNPPS SGFIGILTMM ALCDQKHVVE
 SVNLHKWYTS PDYDLFGPYV DHRKVHPDQP FYILHPSYVW KLWDLIQSNQ QENIQPNPPS SGFIGILLMM ALCEQHVHVE
 TLDLHKWYAS PDYNLFGPYM EHRRAHPDQP FYILHPRYVW RLWDVIQGNQ QENIQPNPPS SGFIGILLMM TLCEQHVHVE
 SINLIKWKYK PDYNLFTPYL RYRRRNPAQP FYILHPRFLW QLWDIIQENT QEKIQPNPPS SGFIGIVIMM ALCDISINIYE
 YADLLHMYHK PDYNLFPPEY KHRKRNPDQP FYILHPKFTW ELWKIIQENS NEKIQPNPPS SGFIGILIMM SMCRTHVHVE
 SANLHMWYKK PDYNLFTPYI QHRRKNPNQP FYILHPKFIW QLWDIIQENT KEKIQPNPPS SGFIGILIMM SLCKEVHVVE
 SANLNVWPKK PDYNLFTPYV QHRRKNPNQP FYILHPKFIW QLWDIIQENT KEKIQPNPPS SGFIGILIMM SMCNEHVHVE
 SANLNVWYKK PDYNLFTPYV QHRRKNPNQP FYILHPKFIW QLWDIIQENT KEKIQPNPPS SGFIGILIMM SMCNEHVHVE
 SANLSQWYKK PDYNLFTPYV QHRRKNPTQP FYILHPKFIW QLWDIIQENT KEKIQPNPPS SGFIGSLIMM SMCNEHVHVE

	SANLN-WYKK	PDYNLFTPYV	QHRKKNPNQP	FYILHPKFIW	QLWDIIQENT	KEKIQPNPPS	SGFIGILIMM	SMCNEVHVYE
	SANLNVWYKK	PDYNLFTPYV	QHRKKNPNQP	FYILHPKFIW	QLWDIIQENT	KEKIQPNPPS	SGFIGILIMM	SMCSEVHVVE
	SANLNLRYKK	PDYNLFTPYV	QHRQRNPNQP	FYILHPKFIW	QLWDIIQENT	KEKIQPNPPS	SGFIGILIMM	NLCGEVHVVE
	SANLNLWYKK	PDYNLFTPYI	QHRQRNPNQP	FYILHPKFIW	QLWDIIQENT	KEKIQPNPPS	SGFIGILIMM	SMCREVHVVE
	SANLNLWYKK	PDYNLFTPYI	QHRRKYPTQP	FYILHPKFIW	QLWDIIQENT	REKIQPNPPS	SGFIGILIMM	SMCKEVHVVE
	SSDLTQWLNR	TDYPIFAQYQ	RYRRLHPQQP	FFILHPRFEW	QVWQVQENM	AESIQKNPPS	SGFLGTVLMM	SLCEVVHVVE
	SADLTQWYNR	TDYPIFTQYQ	RYRRLHPMQP	FYILHPRFEW	QVWQRIQDNM	AEPIQKNPPS	SGLLGTVLMM	SLCEVVHVVE
	SADLTQWFNR	TDYPIFTQYQ	RYRMLHPMQP	FYILHPRFEW	QVWQRIQDNM	AEPIQKNPPS	SGLLGTVMVM	SLCEVVHVVE
	SSDLNEWYKN	TDYPIFKQYQ	RYRRLHPQQP	FYILHPSVEW	QLWKRIQDNM	AEPIQKNPPS	SGLLGTVLMM	SLCDVVHVVE
	SSDLNEWYKN	TDYPIFKQYQ	RYRRLHPQQP	FYIVHPRMEW	QLWKRIQDNM	AEPIQKNPPS	SGLLGTVLMM	SLCEVVHVVE
	NANVEEWHKN	PDYKFFBERYS	EYRRRNPEQM	FVVLNPHAZW	QLWDIIQONA	PEDINPGPPS	SGLLGILLMM	NLCDQVNVVE
	HAIEIHEWYRK	LDYNFLETYK	KYRSQHPEQL	FYILNPKMEW	ELWDILQENS	LEHIQPNPPS	SGMLGIIIMM	TICDEVNVVE
	HAETREWYRK	PDYNFFESYK	AYRAAHEPEQ	FYILNPKMQW	QLWDILQENS	LEHIQPNPPS	SGMPGIVIMM	TLCDQVDVVE
	HAETIHEWYRK	PDYKFFBAYK	SYRIRHPEQP	FYILNPKMQW	QLWDILQENS	LEHIQPNPPS	SGMLGIVIMM	TLCDQVDVVE
	HADIHEWYRK	PDYKFFENYK	LYRKHPEPEQ	FYILNPKMQW	QLWDILQENS	LEHIQPNPPS	SGMLGIVIMM	TLCDQVDVVE
	HSSIKEWYKK	PDYNFYGSFK	HYRKHYPKQP	FYILNPHMQW	QLWDILQENS	PEDIQPNPPS	SGMLGKILMM	NFCDQVDVVE
	HANIDEFWRK	PDYFYFBSYK	HYRKRHPKQP	FYILNPFMQW	QLWDILQENS	PEDIQPNPPS	SGMLGIVLMM	NFCDQVDVVE
	HSEIPEWYKK	PDYNFFHNYK	LYRKLNPQNP	FYILNPKMPW	ELWDILQENS	PEDIQPNPPS	SGMIGIVIMM	NFCDTVDIYE
	HADIPQWYQK	PDYNFFETYK	SYRRLHPSQP	FYILKPQMPW	ELWDIIQBSI	PDLIQPNPPS	SGMLGIIIMM	TLCDQVDIYE
	HSDIPKWYQN	PDYNFFNNYK	TYRKLHPNPQ	FYILKPQMPW	ELWDILQBSI	PEETQPNPPS	SGMLGIIIMM	TLCDQVDIYE
	HSDIPKWYRN	PDYSFFNNFY	SYRKLHPDQP	FYILKPQMPW	ELWDIIQBSI	SELIQPNPPS	SGMLGIAIMM	SLCDQVDIYE
	YIPSLRQTDL	CHYHERYYDA	ACTLGAYHPL	LYEKMILQRM	NTGSDEBLKR	KGKVTLPGFN	KVHCEP----	-----
	YIPSMRQTDL	CHYHENYYDA	ACTLGAYHPL	IYEKNLIRRI	NLGSEKDLLK	KGRVTLPGFS	TLTFCG----	-----
	YIPSMRQTDL	CHYHERYYDA	ACTLGAYHPL	LYEKSIIQRI	NTGPENDLRR	KGRVTLPGFS	TVDCDI----	-----
	YIPSMRQSDL	CHYHERYYDA	ACTLGAYHPL	LYEKSIIQRI	NTGPSDDLRR	KGRVTLPGFS	TVDCDI----	-----
	YIPSIHQTDL	CHYHERYYDS	ACTLGAYHPL	LYEKLIVQRM	NKGTEADLYS	KGRVSLPGFH	SIKCAGBK--	-----
	YIPSYRQTDL	CHYHEQYYDA	ACTLGAYHPL	LYEKMIIQRI	NOGTEDNLLR	KGKVLPGFS	SHICPIKDHI	T-----
	YIPSVRQTDL	CHYHELYYDA	ACTLGAYHPL	LYEKLIVQRM	NOGIRDDLYR	KGKAILPGFR	AISCPAPNHF	PNP----
	YIPSVRQTDL	CHYHELYYDA	ACTLGAYHPL	LYEKLIVQRM	NKGFODDLRY	KGKVLPGFR	SVKCPGHNRF	PYT----
	YIPSVRQTDL	CHYHELYYDA	ACTLGAYHPL	LYEKLIVQRM	NKGLQDDLRY	KGKVLPGFR	SVKCPGNRNF	PHL----
	YIPSVRQTDL	CHYHELYYDA	ACTLGAYHPL	LYEKLIVQRM	NKGLQDDLRY	KGKVLPGFR	AIKCPKRNHF	PHL----
	YIPSVRQTDL	CHYHELYYDA	ACTLGAYHPL	LYEKLIVQRM	NKGLQDDLRY	KGKVLPGFK	SVKCPERNNF	PPL----
	YIPSVRQTDL	CHYHELYYDA	ACTLGAYHPL	LYEKLIVQRM	NKGLQDDLRY	KGKVLPGFK	SVKCPERNNF	PHL----
	YIPSVRQTDL	CHYHEPYHDA	ACTLGAYHPL	LYEKLIVQRL	NVGTGDLHYR	KGKVVPLPGLQ	AVRCPPGA--	-----
	YIPSVRQTEL	CHYHELYYDA	ACTLGAYHPL	LYEKLIVQRL	NMGTQGDHLR	KGKVVPLPGFQ	AVHCPAPSPV	IPHS----
	YIPSVRQTEL	CHYHELYYDA	ACTLGAYHPL	LYEKLIVQRL	NTGTQADLHH	KGKVVPLPGFQ	TLRCPTVTPN	NTHS----
	FLPSKRKTEL	CHYYQHIFYDA	ACTLGAYHPL	LYEKNLVKRM	NOGADRDIYT	HGRVTLPGFN	AINCTRAAQE	PEGM----
	FLPSRRKTEL	CHYYQRFHDA	ACTLGAYHPL	LYEKNLVKRM	NRGPDRDIYT	HGRVTLPGFG	KMNCTEAGDG	STSR----
	FLPSRRKTEL	CHYYQRFDDA	ACTLGAYHPL	LYEKNLVKRM	NOGPERDIYT	HGRITLPGFN	TLNCTGADGG	ALVDMRHH
	FLPSRRKTEL	CHYYQRFSDA	ACTLGAYHPL	LYEKNLVKRM	NOGSDRDIYT	HGRVTLPGFS	TYNCTASILS	KP-----
	FLPSRRKTEL	CHYYQRFSDA	ACTLGAYHPL	LYEKNLVKRM	NOGSDRDIYT	LGRVTLPGFA	TFNCTSSSTHS	KT-----
	FLPSRRQSDL	CHYYERYQDR	ACTLGAYHPL	MYEKNLVKKL	NGTGDNSIFH	GRITLPLGLR	GLQC-----	-----
	FIPSKRQTDI	CHYYQKFHDD	ACTMGAYHPL	MFEKNLVKYL	NOGTDYNIYA	HGKVTLPGFR	NLRC-----	-----
	FLPSKRQTDI	CHYYQKFHDD	ACTMGAYHPL	LFEKNLVKHH	NOGTDEDIYT	HGKVTLPGFR	KVHC-----	-----
	FLPSKRQTDV	CHYYQKFHDD	ACTMGAYHPL	LFEKNLVKHI	NOGTDKDIYT	HGKVTLPGFR	NVHC-----	-----
	YLPSPKRQTDI	CHYYQKIFDQ	ACTMGAYHPL	LFEKNIIKHL	NIGKDEDIYN	YGKATLPGLR	NVQC-----	-----
	FLPSKRQTDI	CHYYQKFFDQ	ACTLGAYHPL	LFEKNMVKHL	NOGTDEDIYN	YGKVTLPGLR	KAQC-----	-----
	FLPSKRKTDI	CHYYQQFFDS	ACTMGAYHPL	LFEKNMVKHL	NOGTDEDIYL	KGKVTVPLGLQ	GVR-----	-----
	FLPSKRKTDV	CYYHQKFFDS	ACTMGAYHPL	LFEKNMVKHL	NEGTDEDIYL	LGKATLSGFR	NNRC-----	-----
	FLPSKRKTDV	CYYHQKFFDS	ACTMGAYHPL	LFEKNMVKHL	NOGTDEDIYL	FGKATLPGFR	TIHC-----	-----
	FLPSKRKTDV	CYYYQRYFDS	ACTMGAYHPL	LFEKNMVKHL	NLGTDEDIYL	LGKATLPGFR	TIRCGA----	-----
91 276								
Oscarcarm	CRRCAVVGTA	GRLGKARQGK	LIDSFDIVI-	RMNRSFVKGY	EVDVGSKTS-	-----YHLV	YPESAVGYRG	AE--SSGKLV
Cionint12	CRSCAVVGNS	GNILNSNYGN	VIDGHDFVI-	RMNKGPTYNY	ENDVGSKTT-	-----HRFM	YPTTASSLPQ	GKLFSGVSLV
BfloridA	CLRCAVVGNS	GNLRQSNYGE	EIDGYDLIF-	RMNDAPTKGW	EKDVGHRITT-	-----HHFM	YPEATDDL-	----DDVSFV
BfloridB	CLRCAVVGNS	GNLRQANYGE	EIDGYDLIF-	RMNDAPTKGW	EKDVGHRTT-	-----HHFM	YPEATDDL-	----DDVSFV
Saccogl12	CLQCAVVGNS	GNLRDSRYGQ	LIDSHDYIM-	RMNATAKTGVF	EKDVGSRTT-	-----HHFM	YVESFVEVI-	----GETKVF
Tgutta3g1	CRRCAVVGNS	GNLRQSQYGP	DIDSHDFVL-	RMNRAPTATY	ESDVGGKTT-	-----HHFV	YVESYRELA-	----ANVSMI
Gallus3g1	CRRCAVVGNS	GNLRQSQYGP	DIDSHDFVL-	RMNRAPTATY	ESDVGSKTT-	-----HHFV	YVESYKELA-	----ENVSMI
Strcamelg1	CRRCAVVGNS	GNLRQSQYGH	DIDSHDFVL-	RMNRAPTATY	ESDVGSKTT-	-----HHFV	YVESYKELA-	----ENVSMI
Chrysemg1	CRRCAVVGNS	GNLRQSQYQG	DIDSHDFVL-	RMNRAPTATY	ESDVGSKTT-	-----HHFV	YVESYKELA-	----ENVSMI
Acarolgal1	CRRCAVVGNS	GNLRQSQYQG	DIDSHDFVL-	RMNRAPTATY	ESDVGSKTT-	-----HHFV	YVESYKELG-	----ENVSVM
Pythongal1	CRRCAVVGNS	GNLRRSQYQG	EI-----	RMNKAPTGVF	EPDVGSKTT-	-----HHFV	YVESYRELG-	----EEVSMI
Hsapiensg1	CRRCAVVGNS	GNLRRSSYGP	EIDSHDFVL-	RMNKAPTATY	EADVGTKTT-	-----HHLV	YVESYRELG-	----DNVSMI
Oanatilgal1	CRRCAVVGNS	GNLRSSRYGS	DIDSHDFVL-	RMNRAPTATY	EADVGSKTT-	-----HHFM	YVESFTELA-	----ENVSMI
Trubrigal1	CHTCAVVGNS	GNLRQSGNGK	IIDSHDSVI-	RMNKAVTRGF	AKDVGNRTT-	-----HHFL	YVESAVDVD-	----HGVSLV
Olatipgal1	CRRCAVVGNS	GNLRSSGNGK	EIDSHDSVI-	RMNKALTRGF	EKDVGNRTT-	-----HHFL	YVESAVDVD-	----GGVSLV
Xenlaegal1	CRTCAVVGNS	GNLRSSNYGE	EIDSHDFVL-	RMNHAPTARF	EKDVGGKTT-	-----HHFV	YVESVRDL-	----ANVSMI
Acarolgal8	CGTCAVVGNS	GNLRKGSYGE	NIDSHHFLV-	RINTAPTATY	EEDVGAKTT-	-----HHFM	YVESAMNLH-	----AGVHLM
Pythongal2	CGTCAVVGNS	GNLRKGSYQG	KIDSHQFVM-	RMNTAQIAGF	EDVGTRTT-	-----HHFM	YVESAVNLH-	----PGIHLV
Stropgal2A	CRRCAVVGNS	GNLRKGSYHG	NIDSHGLIF-	RMNAGARTYF	EKDVGSKTT-	-----HHFM	YVESAVHVQ-	----PGVHLV
Chrysgal8	CRTCAVVGNS	GNLRGSHYGR	EIDSHHVLV-	RMNRAQTATY	EEDVGTRTT-	-----HRFM	YVESAVDLQ-	----PGVHLV
Drerigal2A	CRKCAVVGNS	GNLLKSKYGA	LIDSHSTVI-	RMNKAVTVGY	DEDVGYRTT-	-----HHFL	YVESATHLR-	----PGVHLV
Pmargal2	CRRCAVVGNS	GNLLGAGGGK	EIDQHDVFM-	RINQAPTATY	ETDVGARTT-	-----HHFM	YVESAKNLP-	----ANVSFV
Olatigal2B	CLRCAVVGNS	GNLRGSGYGY	IIDEHNFIM-	RINLAPTATY	EEDVGSRTT-	-----HQQM	YVESAKNLA-	----PNISFV
Drerigal2B	CLRCAVVGNS	GNLRGAGYGP	VIDGHDFIM-	RMNLAPTATY	EEDAGSRTT-	-----HHFM	YVESAKNLA-	----ANVSFV
Acarogal2B	CLRCAVVGNS	GNLRGSGYGR	EINGHDVFM-	RMNQAPTATY	EADVGSRTT-	-----HHFM	YVESAKNLP-	----ANVSFV
Stropgal2B	CRRCAVVGNS	GNLRGSSYGY	DIDGHEFIM-	RMNQAPTATY	EMDVGSRTT-	-----HHFM	YVESAKNLP-	----ANVSFV
Pythongal2	CRRCAVVGNS	GNLRGSSYGY	EINGHDVFM-	RMNQAPTATY	EADVGSRTT-	-----HHFM	YVESAKNLP-	----ANVSFV
Oanatgal2	QCRCAVVGNS	GNLRGSSYGR	DIDGHNFIM-	RMNQAPTATY	EQDVGSRTT-	-----HHFM	YVESAKNLP-	----ANVSFV
Chrysegal2	CRRCAVVGNS	GNLRGSGYGR	EIDGHNFIM-	RMNQAPTATY	EADVGGRTT-	-----HHFM	YVESAKNLP-	----ANVSFV
Ggallusga2	CRRCAVVGNS	GNLRGSGYGH	EIDGHDFIM-	RMNQAPTATY	EGDVGSRTT-	-----HHFM	YVESAKNLP-	----ANVSFV
Hsapiegala2	CRRCAVVGNS	GNLRGSGYGH	DVDGHNFIM-	RMNQAPTATY	EQDVGSRTT-	-----HHFM	YVESAKNLP-	----ANVSFV
Tguttagal2	CRRCAVVGNS	GNLRGSGYGP	EIDGHDFVM-	RMNQAPTATY	EGDVGGRTT-	-----HHFM	YVESAKNLP-	----ANVSFV
Strcamgal2	-----	-----	-----MCLTDLV-	RMNQAPTATY	EGDVGSRTT-	-----HHFM	YVESAKNLP-	----ANVSFV
Olatigal1A	CRTCSVVGNS	GNLKGSNYGA	LIDTSDLVI-	RMNKAPTATY	EKDVGAKTT-	-----HHFM	YVESAVDLS-	----NTTSLV
Tnigrgal1A	CRTCAVVGNS	GNLKGSGYGR	LIDSSDFII-	RMNQAPTATY	EEDVGTKTT-	-----HHFM	YVESAKDLD-	----NGTSLV
Trubrigal1A	CRTCAVVGNS	GNLKGSGYGR	LIDSSDFII-	RMNQAPTATY	EEDVGTKTT-	-----HHFM	YVESAKDLD-	----NGTSLV
Drerigal1C	CRTCAIIGNS	GNLKGSGRYGR	LIDAHNFVI-	RINMGPTKGY	EDDVGSKTT-	-----HRFI	YVESADDFD-	-----NSTYLV

Drerigall1D	CRTCAVVGNS	GNLNGSHYG	LIDAHDLVI-	RINKGPTGEG	ERDVGLKTT-	-----HRMI	YPESA	VDMD-	----	NSTYLV
Drerigall1A	CRICAVVGNS	GNILGSHYGQ	LIDSHDFVI-	RINKGPTKGY	ETDVGSKTT-	-----HRIM	YPESA	MDLD-	----	NSTHLV
Drerigall1B	CRTCAVVGNS	GNLLRSNYGR	LIDLHDFVL-	RINKGPTKGF	EKDVGSKTT-	-----HRIM	YPESA	VDLD-	----	NSTHLV
Sarcopgal3	CRCCIIIGNG	GVLANKSLGA	RIDDDYDIVV-	RLNSAPVKGF	EKDVGGKTT-	-----LRIT	YPEGAMQR-	P	----	EYEKDSLFV
Hsapiegag13	CRRCIIIVGNG	GVLANKSLGS	RIDDYDIVV-	RLNSAPVKGF	EKDVGSKTT-	-----LRIT	YPEGAMQR-	P	----	EQYERDSLFV
Oanatgal3	CRRCIIIVGNG	GVLANKSLGA	KIDDYDVVV-	RLNSAPVKGF	EKDVGSKTT-	-----LRIT	YPEGAIQK-	P	----	EQYERDSLFV
Btaurugag13	CRRCIIIVGNG	GVLANKSLGS	RIDDYDIVV-	RLNSAPVKGF	EKDVGSKTT-	-----LRIT	YPEGAMQR-	P	----	EQYERDSLFV
Xlaevigag13	CRRCIIIVGNG	GVLANKSLGS	KIDEYEVVV-	RLNSAPVKGF	EKDVGSKTT-	-----LRIT	YPEGAIQK-	L	----	EQYEKDSIFV
Stropigal3	CRRCIIIVGNG	GVLANKSLGS	KIDEYEVVV-	RLNSAPVKGF	EKDVGSKTT-	-----LRIT	YPEGAIQK-	L	----	EQYEKDSIFV
Pythongal3	CRRCVIVGNG	GILANKSLGL	KIDDYDIVI-	RLNSAPVKGF	EKDVGGKTT-	-----MRIT	YPEGAIQK-	M	----	EQYEKDSIFV
Acarolgal3	CRRCIIIVGNG	GILANKSLGV	KIDDYDIVI-	RLNSAPVKGF	EKDVGGKTT-	-----MRIT	YPEGAIQK-	P	----	EQYEKDSLFV
Chrysegag13	CRRCIIIVGNG	GVLANKSLGL	KIDDYDVVV-	RLNSAPVKGF	EKDVGGKTT-	-----LRIT	YPEGAIQK-	L	----	EQYEKDSFFV
Ggallugag13	CRRCIIIVGNG	GVLANKSLGL	KIDDYDVVV-	RLNSAPVKGF	EKDVGGKTT-	-----LRIT	YPEGAIQK-	L	----	EQYEKDSLFV
Streamgal3	CRRCIIIVGNG	GVLANKSLGL	KIDDYDVVV-	RLNSAPVKGF	EKDVGGKTT-	-----LRIT	YPEGAIQK-	M	----	EQYEKDSLFV
Tguttagal3	CRRCIIIVGNG	GVLANKSLGL	KIDDYDVVV-	RLNSAPVKGF	EKDVGGKTT-	-----LRIT	YPEGAIQK-	M	----	EQYEKDSLFV
Drerigall3a	CKKCIIGNG	GILFNKSLGT	KIDDYDVVV-	RLNSAPVAGF	EKDVGSKTT-	-----MRIT	YPEGAIQK-	A	----	EYEKDSLFV
Oryzlagal3	CKRCIIIVGNG	GILSNKSLGS	RIDQYDVVI-	RLNEAPVKGY	SKDVGSKTT-	-----MRIT	YPEGAIQK-	P	----	ENYEDNSLFV
Tnigrogal3	CKRCIIIVGNG	GILSNKSLGS	RIDEYDVVV-	RLNEAPVFGY	KDVGSKTT-	-----LRIT	YPEGAIQK-	P	----	DVYERDSLFV
Dreriogal3	CKRCIIIVGNG	GILSNKSLGS	RIDEYDVVV-	RLNEAPVSGY	TRDVGSKTT-	-----MRIT	YPEGAIQK-	P	----	EYERDSLFV
Dreriogal7	CRRCVVVGSR	GILHGSKNLGA	HIDHANI II-	RVNNAPVFGF	ESDAGSRTT-	-----IRLI	YPEGAPSH-	I	----	QEYERTEVVA
Tnigrogal5	CRRCVVVGS	GVLHGSQQLTG	HIDQYDVII-	RMNNAPVAGF	ERDAGSRTT-	-----VRLM	YPEGAPRS-	T	----	NEYQDTTMA
Oryzlagal5	CRRCVVVGN	GVLQGSHLGP	HIDQYDVII-	RLNNAPVFGF	ERDVSRTT-	-----IRLM	YPEGAPHS-	P	----	EYRKDSLFV
Trubrigal5	CRRCVVVGN	GILRGLLEGS	LINRFDVVI-	RLNSGPLGEY	TADVGNRTT-	-----IRMS	YPEGTPLH-	W	----	VDSDDPITFV
Dreriogal5	CRRCVVVGN	GILKGLGLGH	LLNRFDIII-	RLNSGPLQDF	SADVGNRTT-	-----IRMS	YPESCPKV-	M	----	EDTDPDLKYV
Pmaringal5	CRRCVVVGS	GNLRGTGTGLP	LIDNFDVVIR	RLNNAPIKF	ENDVGSKTT-	-----VRIT	YPEGAPKS-	P	----	EYKPDSTIFA
Stropigal5	CKRCIVIGSG	GILHGLLELQ	MVDQDFDVI-	RLNNAPVHGY	AQDVGNKTT-	-----IRMT	YPEGAPVS-	E	----	QEYQHSSLFV
Hsapiegag15	CRRCVIVGSG	GILHGLLELGH	TLNQDFDVI-	RLNSAPVEGY	SEHVGNKTT-	-----IRMT	YPEGAPLS-	D	----	LEYYSNDFV
Oanatgal5	CKRCIVIGSG	GILHGLLELGP	ALNQDFDVI-	RLNNAPVQGY	ADHVGNKTT-	-----IRMT	YPEGAIQK-	P	----	HEYYKDSLFV
Acarolgal5	CKHCVVVGSG	GVLHGLLELGY	VLNQDFDVI-	RLNSAPVOGY	TDDVGNKTT-	-----IRMT	YPEGAPLS-	Q	----	HEYYPDSLFV
Chrysegag15	CKRCVVVGS	GILHGLLELGH	VLNEFDIVI-	RLNDAPVQGY	TDHVGNKTT-	-----IRMT	YPEGAPLS-	E	----	NEYNPQSLFV
Ggallugag15	CKRCVVIGSG	GILYGSELGH	VLNQYDIVI-	RLNDAPVQGY	TDHVGNKTT-	-----IRMT	YPEGAPLS-	E	----	HEYYPPASLFV
Streamgal5	CKRCVVIGSG	GILHGLSELGH	VLNQDFDVI-	RLNDAPVQGY	TDHVGNKTT-	-----IRMT	YPEGAPLS-	E	----	REYHPASLFV
Tguttagal5	CKRCVVVGS	GILHGSSELGH	VLNQDFDVI-	RLNDAPVQGY	TDHVGNKTT-	-----IRMT	YPEGAPLS-	E	----	HEYYPPASLFV
Stropigal6	CKKCVVVGNG	GVLNRNSTLKG	ILNDDYDII-	RMNNGPVLGY	EEDVGRKTT-	-----FRLC	YPESIFSN-	S	----	LHYDPNSTTV
Sarcopgal6	-----	-----	-----	RINDGPVRGH	EEDVGTKTT-	-----FRIF	YVESVTN-	P	----	EDSDPESVAI
Hsapiegag16	CKKCVVVGNG	GVLKNKTLGE	KIDSYDVII-	RMNNGPVLGH	EEBVGRTT-	-----FRLF	YVESVFS-	P	----	IHNDDPNTTV
Acarolgal6	CKKCVVVGNG	GVLNRNKSLE	TIDSPDVVI-	RMNNGPVVGY	EEDVGRRTT-	-----YRLF	YVESVFS-	P	----	IHYDPNTTAV
Chrysegag16	CRRCVVVGN	GVLNRNKTLE	KIDSYDVVI-	RMNNGPVRGY	EEDVGRKTT-	-----FRLF	YVESVFS-	P	----	IHYDPDTTVV
Ggallugag16	CRRCVVVGN	GVLNRNKTLLG	KIDSYDVII-	RMNNGPVIGY	EEDVGRRTT-	-----FRLS	YVESIFS-	P	----	IHYDPNTTVV
Streamgal6	CRRCVVVGN	GVLNRNKTLE	KIDSYDVII-	RMNNGPVIGY	EEDVGRRTT-	-----FRLS	YVESIFS-	P	----	IHYDPNTTVV
Tguttagal6	CRRCVVVGN	GVLNRN								

LSPXVLIDIE	WLISSTFTTKN	ITR----	TY	KKVRASIN--	ANRHKVMILH	PAFIKYVHEI	WLVKH----	-----
LIPPKTLDLQ	WLISVFTTKH	IDR----	TY	IPVKPTIK--	ANRNKVMVLH	PSFLKYVQEH	WLQKH----	-----
LLPFKVKDMQ	WLISVFTTKH	ITS----	TY	LKVRPTIN--	ADREKVMIIH	PAFIKYVQEH	WLKRH----	-----
LFPYKILDMQ	WLISIFTTKH	ITR----	TY	MSVPSTIN--	ADRDKVMILH	PEFIKYVNDK	WAEGH----	-----
LAGFKWQDFK	WLKYIVYKEK	VSA--SDGFW	KSVATLVP--	KEPPEIRILN	PYFIQEAAFS	FIGLPPNNHGL	MGRGPLQAGM	-----
LAGFKWQDFK	WLKYIVYKER	VSA--SDGFW	KSVATRVP--	KEPPEIRILN	PYFIQEAAFS	FIGLPPNNHGL	MGRG-----	-----
LAGFKWQDFK	WLKYIVYKEK	VSA--TDGFW	KSVATRVP--	KEPHEIRILN	PYFIQEAAFS	FIGLPPNNHGL	MGRG-----	-----
LAGFKWQDFK	WLKYIVYKER	VSA--SDGFW	KSVATRVP--	KEPPEIRILN	PYFIQEAAFS	LIGLPPNNHGL	MGRG-----	-----
LAGFKWQDFK	WLKYIVYKEK	VSA--SDGFW	KSVATRVP--	REPHEIRILN	PYFIQEAAFS	FIGLPPNNHGL	MGRG-----	-----
LAGFKWQDFK	WLKYIVYKEK	VSA--ADGFW	KSVATRVP--	REPHEIRILN	PYFIQEAAFS	FIGLPPNNHGL	MGRG-----	-----
LAGFKWQDFK	WLKYIVYKEK	VSA--SDGFW	KSVATHVP--	REPHEIRILN	PYFIQEAAFS	FIGLPPNNHGL	MGRG-----	-----
LAGFKWQDFK	WLKYIVYKEK	VSA--SDGFW	KSVATRVP--	REPHEIRILN	PYFIQEAAFS	FIGLPPNNHGL	MGRG-----	-----
LAGFKWQDFK	WLKYIVYKEK	VSA--SDGFW	KSVATRVP--	REPHEIRILN	PYFIQEAAFS	FIGLPPNNHGL	MGRG-----	-----
LAFKSNDFK	WLRHMVYKDR	LWR--MDGFW	KSVARVVP--	RAPQDMRILN	PYFIQEASFR	LIGLPPNNHGL	MGRG-----	-----
PSAFKPLDFK	WLKQMVYKEK	VRG--MEGFW	KSVARVVP--	RAPADMRLN	PYFIQEAAFO	FIGLPPNNHGL	MKGK-----	-----
PSAFKPLDFK	WLKQMVPEKEK	LKG--TEGFW	KSAVHHVP--	REATEIRILN	PFFIQEAAFO	FIGLPPNNHGL	MKGK-----	-----
PSAFKPLDFK	WLKQMVYKEK	LVR--LEGFW	KSVARVVP--	REPSEIRILN	PYFIQEAAFO	FIGLPPNNHGL	MKGK-----	-----
LUVFKSLDLA	WMTSVVTKEP	LWNVWSKLWF	KVDIDISP--	LQPENVRILN	PEIMYRTQV	LQTYABEQQR	-----	-----
LUVFKSLDLA	WLTSSVVTQKP	LGFWSKLWF	REVVDIP--	LKPESFRILH	PEIIHRTQGV	LKRYTMTQG--	-----	-----
LUVFKSLDLA	WLTSSVTKPK	LSPWSKMFW	REVVDIP--	LSPEFSKILH	PEIIHKTQGV	LQKYTLKQG--	-----	-----
AVVYKSGVDV	WTTAMINRS	VLPLWDLFFW	KQVPDHIP--	LDSHRFRILN	PGVIRETALD	LQFPPPRSQ	LWGN-----	-----
AVIFKSVDFH	WLRAMISRTF	VSLWDLRFFW	QNVPMSPV--	VKTSQFHLLN	PQIIREMALD	LLNYPEPKKR	LWSW-----	-----
AVMYKGVDFQ	WLESIIKKEH	LVG--SVSFG	KKVADGVP--	LGPSQFRILN	LEIGETESMD	LLGYPYLLLI	VFWF-----	-----
TVLFKHADF	WLEAVLKNQK	LSZANRFFFW	KRVTDKIP--	LNSSQFRILN	LIPIKETALD	ILQFPKKPKR	WLGW-----	-----
AVLFKSVDFN	WLQAMVKKET	LPFWVRLFFW	KQVAEKIP--	LQPKHFRILN	PVIIKETAFD	ILQYSEFQSR	FWGR-----	-----
AVLFKSVDFN	WLQAMVKNES	PLPWVRLFFW	KQVAEKIP--	LQSQQFRILN	PVIIKETALD	ILQYPEPRSK	IWGW-----	-----
AVLFKSVDFG	WIQAVVKNET	LPLWMRLFFW	KQVAEKIP--	VMPKQFRILN	PAIIKETALD	ILEYBEPERP	FWGW-----	-----
VVLFKSVDFN	WLQAMVKNEA	LPLWVRLFFW	KQVAEKIP--	VTPKQFRILN	PIIIKETALD	ILQYPEPRSK	FWGW-----	-----
AVLFKSVDFN	WLQAMVKNET	LSLWIRLFFW	KEVAKKIP--	FTSKQFRILN	PVIVKETALD	ILEFPKPRSI	FWGW-----	-----
AVLFKSVDFN	WLQAMVKNET	LPLWVRLFFW	KEVAKKIP--	FTSKQFRILN	PIIVKETALD	ILQFPPEPRSK	FWGW-----	-----
AVLFKGVDFN	WLQAMVKNET	LHLWVRLFFW	KQVAEKIP--	FTPKQFRILN	PVIIKETALD	ILHFPPEPRSK	FWGW-----	-----
LLMPKPHVDK	WLSLELHMKR	VS--TYGFW	RKPAMNLIY--	-KPHQLRVLN	PFIIRQASQN	LLNFPSPFSK	TEK-----	-----
LAVFKPHDLK	WLWELLSGK--	----VDHFW	RKPALNLIY--	-KPEKIRILD	PIITRIAAFN	MLHPTFTFPK	KEK-----	-----
LTAFKPHDLR	WLELLMGDK	IN--TNGFW	KKPALNLIY--	-KPYQIRILD	PFIIRTAAYE	LLHFPKVPFK	NQK-----	-----
LVPFKPYDLK	WLWDLSSGQR	IK--TSAFV	KKPALQLIY--	-NAQQIRILD	PAITRRTAHD	MLHLPTKFSR	HER-----	-----
LLVFKPHDLK	WLNLLNGHK	IN--TNGFW	KKPALKMIY--	-KVNQIRILD	PIIRKTAHE	WLQPTTKFPR	KEK-----	-----
IIVFKPRDLK	WLWEILGGQK	IS--AKGFW	KKPALNMIY--	-KSNQIRILD	PSITRKTAYD	WLHFPTRFPK	KEK-----	-----
LIVFKPRDLK	WLWEILGGQK	IS--AKGFW	KKPALNMIY--	-KSSQIRILD	PSITRKTAYE	WLHFPTRFPK	KEK-----	-----
LIVFKPRDLK	WLWEILGGQK	IS--AKGFW	KKPALNMIY--	-KSSQIRILD	PSITRKTAYE	WLHFPTRFPK	KEK-----	-----
FVPFKTRDLQ	WLLGVLNHRH	VVG--RPGFW	KKVPTELQPS	AHVRRIRILN	PAFVREAATE	FLINW-----	-----S	-----
LVPFKQDRLR	WLKEILYDEK	RV--SKGFW	KPPQK--IWL	GRASQIRVLD	PYFLRITARK	FLQIPV-----	-----	-----
LVPFKPDRLR	WLKEILYDEK	RV--RKGFW	KEPPL--IWL	QSQKSVRVL	PYFMQQTANF	LQFPPLAPKK	QGN-----	-----
-----GP	WRKMTGSFSF	WV--RKGFW	RQPPL--IWE	ADPTQVRVLN	PFFMEVTAAK	LLSLPMRQTR	KV-----	-----
LVPFKPLDIQ	WMKILLNKE	RV--RKGFW	KMPPI--IWE	VEPENIRILN	PYMSVSTATQ	ILKSK-KMIP	KM-----	-----
LVPFKQLDIQ	WMKILLNKE	RV--RKGFW	KMPPI--IWE	VEPENIRILN	PYMAVATATQ	ILKSK-KM--	-----	-----
LVAFKPMDFM	WMETILHDKK	RI--RKGFW	KQPPL--IWN	ANPKQVRILN	PYFMEVTAAK	VLKLPVKQLW	KL-----	-----
LVPFAIDFH	WIETILRDKN	RV--LKGFW	KQPPL--IWD	VNPKQVRILN	PFFMEVTAAK	LLSLPIRPSR	KI-----	-----
LVAFAKMDFH	WIETILSDKK	RV--RKGFW	KQPPL--IWD	VNPKQIRILN	PFFMEIAADK	LLSLPMQQPR	KI-----	-----
LVAFAKMDFH	WIESILSDKK	RV--RKGFW	KQPPL--IWD	VNPKQIRILN	PFFMEIAADK	LLSLPIHQPH	KI-----	-----
LVPFKPMDFQ	WMEAILNDKK	RV--RKGFW	KQPPL--IWD	ANPEQVRILN	PYFMEVTAAK	LLNLPMKQLR	KV-----	-----
LVPFKPMDFQ	WLEMILNDKK	RV--RKGFW	KQPPL--IWD	ANPEQVRILN	PFFMEITAAK	LLNLMSKQPR	KI-----	-----
LVPFKPVDFQ	WMEAILSDRK	RV--RKGFW	KQPPL--IWD	ANPEQVRILN	PYFMEVTAAK	LLSLPMKQPR	KV-----	-----
-----GRW	ASAGALSVMV	ALHIC--DE	VDVYFGGANK	YGN--WDHY	YEKFS--SK	EKDPFRRTGV	HDANIEE--	-----
-----GRY	PSTGLLALIY	ALHEC--DE	VDVYFGGANR	AGN--WHYH	WEDLP--PH	YAGAFRKTGV	HDSEFELNII	-----
-----GRY	SSTGSLVILF	AVHVC--DE	VDVYGYGADK	LGN--WNHY	WTHY--	SGAAHRSTGV	HDSEFERVLL	-----
-----GRY	SSTGSLVILF	AVHVC--DE	VDVYGYGADK	LGN--WNHY	WTHY--	SGAAHRSTGV	HDSEFERVLL	-----
-----GRY	PSTGMLVLFF	AMHIC--DQ	VNVVFGGATS	KGH--WDHY	YQPPVEPSLE	KDSAFKLTGV	HNAEFEDLIV	-----
-----GRY	PSTGLLSLMF	ALHVC--DE	VNVYFGGADS	KGH--WHYH	WENNT--	SGGAFRKTGV	HDGDFEFNIT	-----
-----GRY	PSTGLLSVIF	ALHVC--DE	VNVYFGGADS	KGH--WHYH	WENNA--	SAGAFRQTGV	HDGDFEFNVT	-----
-----GRY	PSTGLLSLIF	ALHVC--DE	VNVYFGGADS	RGH--WHYH	WENNL--	SAGAFRQTGV	HDGDFEFNIT	-----
-----GRY	PSTGILSVIF	ALHLC--DE	VDVYFGGADS	NGN--WHYH	WENNA--	SGGAFRKTGV	HDGDFESNIT	-----
-----GRY	PSTGFLSVIF	ALHLC--DE	VDLYFGGADS	KGH--WHYH	WENNP--	SAGAFRQTGV	HDGDFESNIT	-----
-----GRY	PSTGFLSLIF	ALHLC--DE	VDLYFGGADS	KGH--WHYH	WENNP--	SAGAFRQTGV	HDGDFESNVT	-----
-----GRY	PSTGILSVIF	SMHVC--DE	VDLYFGGADS	KGH--WHYH	WENNP--	SAGAFRKTGV	HDADFESNVT	-----
-----GRY	PSTGILSVIF	ALHVC--DE	VDLYFGGADS	KGH--WHYH	WENNP--	SAGAFRKTGV	HDGDFESNIT	-----
-----GRY	PSTGMLAIF	ALHIC--DQ	VSFVGYGADR	QGN--WHYH	WEENR--	YAGAFRKTGV	HSAEFETQII	-----
-----GRY	PSTGMLAIVF	ALHVC--DQ	VSFVGYGADR	EGN--WHYH	WEKNR--	HAGAFRKTGV	HNADFETETI	-----
-----GRY	PSTGLLAVIF	ALHVC--DQ	VDLYFGGADS	KGH--WHYH	WENNA--	SAGAFRLTGV	HDGDFEASIL	-----
-----GRY	PSTGFTALIF	AIHTC--KK	VSAFGFGADN	NGN--WHYH	WEENH--	YAGAFRKTGV	HDANFELGLI	-----
-----GRY	PSTGLIALIF	AIHTC--TQ	VSAFGFGANS	NGN--WHYH	WEDNR--	YAGAFRKTGV	HNATFELQLI	-----
-----GKY	PSTGMLALVF	ALHIC--DE	ISVFGFGADQ	HGN--WHYH	WERNR--	FAGAFRWTGV	HNAEFESDLI	-----
-----GRY	PSTGLTALLF	ALHIC--DQ	VSFVGYGADN	NGN--WHYH	WEANR--	YPGAFRKTGV	HNAGFELTLI	-----
-----GRY	PSTGIVAIIF	ALHLC--DE	VSFVGYGADA	QGN--WHYH	WEYNR--	YAGAFRKTGV	HNADFETETI	-----
-----GRY	PSTGMVALVF	ALHVC--DE	VDVYFGGADS	RGN--WHYH	WENNR--	YSGEFRKTGV	HDADHEEKII	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WEQNR--	YSGEFRKTGV	HDADYEAQII	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WEQNR--	YSGEFRKTGV	HDADYEAQII	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHVV	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHIV	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGMLVLFF	ALHVC--DE	VNVVFGGADS	RGN--WHYH	WENNR--	YAGFRKTGV	HDADFEAHI	-----
-----GRY	PSTGML							

```

-----GRY PSTGFLSLLL AIHIC---DQ VSVFGFGADH YGN---WHHY WEENS----- LAGAFRHTGV HDGDYEYNVT
-----GKY PSTGFLAIIF ALHIC---DQ VSTFGFGADQ YGN---WYHY FEKTS----- S---RVRTGA HSGSFEFDTM
-----GRY PSTGFITLIF ALHIC---DQ VSVFGFGADK DGN---WHHY FEHKK----- H---PRNAGN HGGSYEYLIA
-----GSY PSTGFITLIF ALHIC---DQ VSVFGFGAKL DGN---WHHY PDES----- A---HFNRGR HGGDYENRTI
-----GGY PSTGFLTLLF ALHIC---DE VNVFGFGATS EQQ---WHHY FDDSM----- T---SFS-NL HGGDFENQTI
LAGPLPLQNI PTLGTVAVTM ALHSC---DQ VAVAGFGYDM SSP-NAPLHY YESVR----- MAAI-KE-----
-----NI PTLGSAVATM ALHGC---DE VAVAGFGYDM STP-NAPLHY YETVR----- MAAI-KESWT HNIQREKEFL
-----NI PTLGSAVTM ALHNC---DE VAVAGFGYDM NSP-NTPLHY YEAIK----- MSAI-KET-----
-----NI PTLGSAVTM ALHGC---DE VAVAGFGYDM STP-NAPLHY YEAVR----- MAAI-RESWT HNIQREKEFL
-----NI PTLGSAVTM ALHNC---DE VAVAGFGYDM NLP-NAPLHY YETIK----- MAAI-KESWT HNIQREKEFL
-----NI PTLGSAVTM ALHNC---DE VAVAGFGYDM NLP-NAPLHY YETIK----- MAAI-KESWT HNIQREKEFL
-----NI PTLGSAVTM VLHNC---DE VAVAGFGYDM NSP-NAPLHY YENIK----- MSAI-KESWT HNIQREKEFL
-----NI PTLGSAVTM VLHNC---DE VAVAGFGYDM NSP-NAPLHY YETIK----- MSAI-KESWT HNIQREKEFL
-----NI PTLGSAVTM ALHNC---DE VAVAGFGYDM NSP-NAPLHY YESIK----- MSAI-KESWT HNIQREKEFL
-----NI PTLGSAVTM ALHNC---DE VAVAGLGYDM SSP-NAPLHY YENIK----- MSAI-KESWT HNIQREKEFL
-----NI PTLGSAVTM ALHNC---DE VAVAGFGYDM SSP-NAPLHY YENIK----- MSAI-KESWT HNIQREKEFL
-----NI PTLGSAVTM ALHNC---DE VAVAGFGYDM SSP-NAPLHY YENIK----- MSAI-KESWT HNIQREKEFL
-----NI PTLGSAVTM ALHNC---DE VAVAGFGYDM NTP-HAPLHY YEKLR----- MSAI-KESWT HNIQREKEFL
-----NI PTLGSAVTM ALHNC---DE VAVAGFGYDM NMP-YAPLHY YETVR----- MSTI-KESWT HNIQREKEFL
-----NI PTLGSAVTM ALHNC---DE VAVAGFGYDM NTP-HAPLHY YETVK----- MSAI-KEQWT HNIQREKEFL
-----NI PTLGSAVTM ALHNC---DE VAVAGFGYDM NTP-HAPLHY YESVK----- MSAI-KESWT HNIQREKEFL
-----VMV PTLGITAVVV ALQVC---DE VSIAGFGYDL QHP-GAPLHY YGSLR----- MDAM-KTQVV HDVSAETVFL
-----NMV PTLGASAVVM ALQVC---DQ VSLAGFGYDM RHP-ESRLHY YETIP----- MGAM-KAQVV HDISAEKFL
-----NMN PTLGASALVM AMQLC---DQ VSLAGFGYDM QHP-EARLHY YEAIR----- MDAM-KAQVV HDVSAEKFL
-----QQNV PTIGMSALNL ASLLC---DE VSLAGFGYDN SVN-SARLHY YDKLP----- MRVM-QOQTS HNVKEETAF
-----DQNI PTLGLTALNL ATYIC---DE VSLAGFGYDL SQK-EAPLHY YDSVP----- MTTI-LKEAM HNVQKETVFL
-----WQNI PTLGVSAAVVM ATHLC---DE VSLAGFGYDL SRP-DAPLHY YENVR----- MDAM-KAQPM HNVGDEKFL
-----DKNV PTIGMTAVIL ATHLC---DE VNLAGFGYDL SQP-DASLHY YDNRC----- MNSM-NDQPM HDVTKEKFL
-----DKNV PTIGMTAVIL ATHLC---DE VSLAGFGYDL NQP-RTPLHY PDSQC----- MAAM-NFQTM HNVTTETKFL
-----DKNV PTIGVTAVVL ATHLC---DE VSLVFGYDL SQP-NTPLHY FDTLC----- MAAM-NQQTM HNVTRTELFL
-----DKNI PTIGVTAVVL ATHLC---DE VSLAGFGYDL SQP-NTPLHY YDNLC----- MAAM-NQQTM HNVTTETKFL
-----DKNV PTIGVTAVVL ATHLC---DE VSLAGFGYDL RQP-NTPLHY YDNLC----- MAAM-EGQTM HNVTTETKFL
-----DKNV PTIGVTAVVL ATHLC---DE VSIAGFGYDL NQP-STPLHY YNNLC----- MAAM-NRQTM HNVGTETKFL
-----DKNV PTIGVTAVVL ATHLC---DE VSLAGFGYDL DQP-STPLHY YNNLC----- MAAM-NQQTM HNVTTETKFL
-----DKNV PTIGVTAVVL ATHLC---DE VSLAGFGYDL DQP-STPLHY YNNLC----- MAAM-NQQTM HNVTTETKFL
-----PKH PTTGLIAITL AFHIC---NE VHIAGFKYNL TS-LNSSLHY YGNET----- MSVMAQN-EY HNISAEQMF
-----PKH PTTGLIAITL AFYIC---HE VHLAGFKYNF TD-KDGPLHY YGNTT----- MSFMS---KY HNIATAEQIFL
-----PKH PTTGLIAITL AFYIC---HE VHLAGFKYNF SD-LKSPLHY YGNAT----- MSLMKN-KY HNVTAEQFL
-----PRH PTTGLIAITL ALQIC---SE VHLAGFKYNL ND-RNSSLHY YGNDT----- MSQMMKN-AY HDIAVEQRF
-----PKH PTTGLIAITL AFHIC---NE VHVAGFKYNF AD-RNSSLHY YGNET----- MSEMIE-NY HNIATAEQKFL
-----PKH PTTGLIAITL AFHIC---HE VHLAGFKYDF TD-RNSSLHY YGNET----- MSQMMQN-EY HDISAEQKFL
-----PKH PTTGLIAITL AFHIC---HE VHLAGFKYDF TD-RNSSLHY YGNDT----- MSQMMQN-EY HNIATAEQKFL
-----PKH PTTGLIAITL AFHIC---HE VHLAGFKYDF TD-RNSSLHY YGNET----- MSQMMQN-EY HNIATAEQKFL
-----QKN PTTGVIAITL ALHLC---DE VHLAGFGYEV NSP-GSPVHY YGQDT----- MSSIIKKSTY HNTIERTFL
-----QVH PTTGLLAVFV ALNYC---DV VHVAGFGYPA SRNQNPQIHY YGQQT----- MKSMFQN-SY HDLNQEAQIL
-----HFH PTTGLLAVFV ALNYC---DM VHIAGFGYPP KSDKRQPIHY YGYHT----- MKSM-KN-SP HDVSRREGAL
-----KQK PTTGLLAIITL ALHLC---DL VHIAGFGYPS SSNKKQTIHY YEQVT----- LKSM-AA-SE HNVSHALAI
-----IPK PTTGLLAIITL ALHFC---DM VHIAGFGYPA LTNKKQPIHY YEKVT----- LKSM-FA-SE HNTIATAEQAI
-----TPK PTTGMLAITF ALHFC---DT VHIAGFGYPA LTNKKQPIHY YEKVT----- LKSM-AV-SG HNTIATAEQAI
-----KQK PTTGLVAITL ALHFC---DV VHIAGFGYPS SDNKKQSIHY YEQIT----- VKSM-AV-SG HNVSHALAI
-----KQK PTTGLLAIITL ALHLC---DL VHIAGFGYPD SSNKKQTIHY YEQIT----- LKSM-SV-SE HNVSHALAI
-----KQK PTTGLLAIITL ALHLC---DL VHIAGFGYPD AYNKKQTIHY YEQIT----- LKSM-AG-SG HNVSHALAI
-----KQK PTTGLLAIITL ALHLC---DL VHIAGFGYPD AHQKKQSIHY YEYIT----- LKSM-MW-SG HNVSHALAI
-----KQV RVKDPAPPPR GRRVVRPRS LRLGPVGPV SPPVPFQ---F -----
-----KQK PTTGLLAIITL ALHFC---DL VHIAGFGYPD SANKKQTIHY YEQIT----- LKSM-AA-SE HNISHEALAI
-----KQK PTTGLLAIITL ALHFC---DL VHIAGFGYPD SANKKQTIHY YEQIT----- LKSM-AA-SE HNISHEALAI
-----
DQLHIHGLLR VHRSEQSS-----
EKLQSEGIK IHRGNAANK-----
EKLQSEGIK IHRGNAANK-----
KQLEEGKIT VYRGRS-----
LTLASIEKIK FFKGR-----
LTLASIEKIK FFKGR-----
LTLASIEKIN FFKGR-----
LTLASIDKIR FFKGR-----
LTLASIDKIR FFKGR-----
HTLASVAKVR LFKGR-----
ATLASINKIR IFKGR-----
ASLASEDKIR IFKGR-----
HNLAKEGKIR LYL-----
QQLAIEGKIT LHR-----
ANLTSINKVL MFRGR-----
ERLADEGKVL FYK-----
ERLAIEGKLS FYK-----
AKLAIEGRLK LYK-----
KKLAIEGKIS FYN-----
QLSAIEGKIK LYR-----
KQLTEAGKIS VHRGR-----
QDLAKAGKIT VFPKG-----
DKLAKAGKIS VFPKG-----
GVLEKTGKID VYRGN-----
DNLAKEGKIK VYRST-----
DILEKTNKIS VYRGN-----
DMLAKASKIE VYRGN-----
DMLAKTSKIQ VYRGN-----
DMLAKTSRIE VYRGN-----
DMLAKASKIE VYRGN-----
DMLAKTSKIE VYRGN-----
DMLAKTSKIE VYRGN-----
LTLADKHKIQ MFRGR-----

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LLLADKHKIQ	MFKGR	----	----	----
LLLADKHKIQ	MFKGR	----	----	----
MQLYLESKIR	VFRGR	----	----	----
LKLHEKQGIR	LYKGW	----	----	----
HKLLLMNKIA	LHKGL	----	----	----
HFLHQQNKIS	LHKGWT	----	----	----
-----	-----	-----	-----	-----
RKLVKARVIT	DLSSGI	----	----	----
-----	-----	-----	-----	-----
rklvkarvit	dltsgi	----	----	----
KKLVKARVIN	DLTNGI	----	----	----
KKLVKARVIN	DLTNGI	----	----	----
RKLVKARVIT	DLTSGI	----	----	----
RKLVKARVIT	DLTSGI	----	----	----
RKLVKARVIT	DLTSGI	----	----	----
RKLVKARVIT	DLTSGI	----	----	----
RKLVKARVIT	DLTSGI	----	----	----
RKLKAGVIE	DLTHGI	----	----	----
RKLVKANVIT	DLTNGI	----	----	----
RKLVRANVIA	DLTNGI	----	----	----
RKLKANIIIT	DLTNGI	----	----	----
KELVKAGAVR	DLTGAL	----	----	----
RDLVSAGAVT	DLTGAL	----	----	----
RDLVAAGAVT	DLTGAL	----	----	----
QKLIQDGAVT	DLTGGIHCSE	CPR	----	----
KRLVASGSIT	DLTGGIHCSE	C	----	----
AGLINAGVIS	DLTGGV	----	----	----
RTLKKEGVVR	DLSSGIIHCAF	CDTQHYTE	----	----
LKLKKEGVVK	DLSSGIDREF	----	----	----
QKLVEEUVK	DLSSGIIHCFD	CKKESEQSKR	KMPLGI	----
QKLIKEGVVK	DLSSGIFCTY	CKKSS	----	----
QKLIKDGIVK	DLSSGIIHCFE	CKKPS	----	----
QKLVEKEVVK	DLTGGIHCSE	----	----	----
QKLIKEKVVK	DLTGGIHCSE	CIKDS	----	----
QKLIKEKIVK	DLTGGIYCEP	----	----	----
RDLIEHKTIK	NLT	----	----	----
KNIEKNFVI	NLTQD	----	----	----
KDIEKNLVI	NLTQD	----	----	----
KELIDLKILI	NLT	----	----	----
KSLEKQFV	SLT	----	----	----
KKLIDKNFV	NLT	----	----	----
KKLIDKNFV	NLT	----	----	----
KKLIDKNFV	NLT	----	----	----
KKLIDKNFV	NLT	----	----	----
KKLKEGEAIV	DLTLQAGT	----	----	----
HRLEEQGVIL	YLPHPS	----	----	----
KRLBDSGAVM	YLHRLH	----	----	----
KRMLDIGAVK	NLKDF	----	----	----
KNLFQONIIH	NLTYF	----	----	----
KSLLQORII	NLTYF	----	----	----
KKMLELGLVK	NLTYF	----	----	----
KRMLEIGAII	NLTYF	----	----	----
KRMLEMGAIK	NLTFS	----	----	----
KRMLEIGAVK	NLTYF	----	----	----
-----	-----	-----	-----	-----
KRMLELGLVK	NLTHF	----	----	----
KRMLELGLVK	NLTYF	----	----	----

Data S3. 101 ST6Gal sequences used in Figures 8 and 9: (48 ST6Gal I and 53 ST6Gal II. The alignment was build using profile-profile mode with clustalX, one profile comprises ST6Gal I and the other ST6Gal II sequences. Output format is FASTA.

```

->Hsap_ST6Gall1
-----MIHTNLKKK-----FSCCVLVFLFLFAVICVWKE-
-----KKKGSYYDSFKLQ-----TKEFQV-----
-----LKSGLGLAMGSDSQSVSSSTQD-----PHRGQVTLGSLR-----
-----GLAKAKPEASFQVWNKDSSSKNLIPLRQKIWNK
YLSMNKYKVSYKGPPIKFSFSA---EALRCHLRDHVNSMVEVTDFFPNTSEWE-GYLPP
ESIR-----TKAGPWGRCVAVSSAGSLKSSQLGREIDDDHAVLRFNGAPTANFQQDVGT
KTTIRLMNSQLVTTTEKR-FLKDSLYNEGILIVWDPSPVYHSDIPKWYQNPDYFNFFNNYKTY
RKLHPNQPFYILPKMPWELWDLQEISPEEIQPNPSSGMLGIIIMMTLCQDVQDIYEFL
PSKRKTDVCYYIYQKFDFSACTMGAYHPLLEYEKNLVKHLNQGTDEDIYLLGKATLPGFRTI
HC-----
->Mdom_ST6Gall1
-----MVHINFRR-----IMYGLLAFLLFLTICLWNE-
-----SKKG-YSVSPFLD-----SKGFQL-----
-----PRTLENSRRLRTPKNITAMV-----PQRESE-----APR-----
-----PRPKVDK-FSYKVDKDKSSSKNLPARLQKVRKN
YLHMKNYVSVFEGTRQVEKLS---SGLLCQLANRVKVTMIQGTDFPNTSEWE-KSLPP
KNIR-----ESFGRLTGCAVSSAGSLKASYLGTEIDNDHAVLRFNGAPTANKYEEHVKG
KTTFLVNSQLVTTDDK-FDDDSLKYNGILIMWDPSPYHSEIPEWYKPDYFNFFNNYKTY
RKLHPNQPFYILNPKMPWELWDLQENSPEDIQPNPSSGMIGIVIMMNFCDTVDIYEFL
PSKRKTDICHYYIYQKFDFSACTMGAYHPLLEKNMKVHLNQGTDEDIYLLGKGVTVPLGLQV
RC-----
->Cfam_ST6Gall1

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```

-----MIHTNLKKK-----FSCCVLAFLLFAVICVWKE-
-----KKKGSYYDSLKLQ-----TKEFQM-----
-----VRG-----LEKQAATLSSTQN-----PPRASQALGSPR--
-----
-----GPVKAKSEASFQVWNKDSSSKNLI PRLQKIWRN
YLNMMNKYKVSYPGPGVKFSA---EALHCHLRDHVNVSMVEATDFPFNTSEWE-GFLPK
ENIR-----TKAGPWGRCAVSSAGSLKSSQLGREIDDHDAVLRFNAGAPTASFQQDVG
TTTIRLMNSQLVTTEGR-FLKDSLYNEGILIVWDPSVYHSDIPKWKYQSPDYSFFENYKSY
RKLHPDQPFYILKPMQMPWELWDIIQEVSPEEIQPNPPSSGMLGIIIMMTLCDQVDIYEFL
PSKRKTDVCYYYQKFSDACTMGAYHPLLFKKNLVKHLNQGTDEDIYLLGKATLPGFRRI
RC-----
>Mmul_ST6Gal1
-----MIHTNLKKK-----FSCCVLVFLLFAVICVWKE-
-----KKKGSYYDSFKLQ-----TKEFQV-----
-----LKSLGKLAMGSDSQSVSSSTQD-----PHRGRQALGSLR--
-----
-----DIPKAKPEAFFQVWNKDSSSKNLI PRLQKIWN
YLSMNKYKVSYPGPGVKFSA---EALRCHLRDHVNVSMVEATDFPFNTSEWE-GYLPK
DNIR-----TKAGPWGRCAVSSAGSLKSSQLGREIDDHDAVLRFNAGAPTANFQQDVG
TTTIRLMNSQLVTTEGR-FLKDSLYNEGILIVWDPSVYHSDIPKWKYQNPDPYNNFYKSY
RKLHPDQPFYILKPMQMPWELWDILQEISPEEIQPNPPSSGMLGIIIMMTLCDQVDIYEFL
PSKRKTDVCYYYQKFSDACTMGAYHPLLYEKNLVKHLNQGTDEDIYLLGKATLPGFRFI
HC-----
>Pabe_ST6Gal1
-----MIHTNLKKK-----FSCCVLVFLLFAVICVWKE-
-----KKKGSYYDSFKLQ-----TKEFQV-----
-----LKSLGKLAIGSDSQSVSSSTQD-----PHRGRQTLGSLR--
-----
-----GLAKAKPEASFQVWNKDSSSKNLI PRLQKIWN
YLSMNKYKVSYPGPGVKFSA---EALRCHLDYVNVSMVEATDFPFNTSEWE-GYLPK
ESIR-----TKAGPWGRCAVSSAGSLKSSQLGREIDDHDAVLRFNAGAPTANFQQDVG
TTTIRLMNSQLVTTEGR-FLKDSLYNEGILIVWDPSVYHSDIPKWKYQNPDPYNNFYKSY
RKLHPDQPFYILKPMQMPWELWDILQEISPEEIQPNPPSSGMLGIIIMMTLCDQVDIYEFL
PSKRKTDVCYYYQKFSDACTMGAYHPLLYEKNLVKHLNQGTDEDIYLLGKATLPGFRFI
HC-----
>Btau_ST6Gal1
-----MTRTSLKKKV-----FSCCVLIFLLFAIICVWKE-
-----KKKGNYYEFLKLQ-----NKEYQV-----
-----LQGLEKLAVSSSQPVSSSTHN-----PQRNIQALGGP--
-----
-----KAKLKATFQVWDKSSSKNLAPRLQTIRKN
YLNMMNKYKVSYPGPGVKFSA---EALLCHLRDHVNISMIEASDFPFNTSDWE-GYLPK
EDIR-----SKAGPWGRCAVSSAGSLKSSRLGREIDDHDAVLRFNAGAPTAKFQQDVG
TTTIRLMNSQLVTTEGR-FLKDSLYNEGILIVWDPSVYHSDIPKWKYRNPDPYNNFYKSY
RKLHPDQPFYILKPMQMPWELWDILQEISSELIQPNPPSSGMLGIIIMMTLCDQVDIYEFL
PSKRKTDVCYYYQKFSDACTMGAYHPLLFKKNMVKHLNLGTDEDIYLLGKATLPGFRFI
RCGA-----
>Mmus_ST6Gal1
-----MIHTNLKRR-----FSCFVLVFLFAIICVWK--
-----KGSYEAALTQ-----AKVFQM-----
-----PKSQEKVAVGPAPQAVFSNSKQD-----PKEGVQILSYPR--
-----
-----VTAKVKQPSLQVWDKDYSTYSLNPRLLKIWRN
YLNMMNKYKVSYPGPGVRFVS---EGLRCHLRDHVNVSMIEATDPPFNTTEWE-GYLPK
ETFR-----TKAGPCTKCAVSSAGSLKNSQLGREIDNHDVAVLRFNAGAPTDFNQDVG
TTTIRLMNSQLVTTEGR-FLKDSLYTEGILILWDPSVYHADIPKWKYQNPDPYNNFYKSY
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YFFVAGQPGLYHHRQAGLGLPSPGESSWQSGPGQPKQEKLRH--PR-----
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RCPVTRPNNTNT---
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S--RSTGV-SRNRERQ--EYNQDSQDEDEDEEEVIGGEEDEE-----GG
DEGRGRTTKRVA--RHG-SSDPHEYY--VPRYKISIVHGLWKGSLSMGMLSRLQKAMKD
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-----MKSWMRQGRRLVLVGLMAWVLLFLALLSYFLDARVN-E
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S--QSDPV-IQSRER--TSQNHGSI TRYRGEEEEEEEEEEER--QENEDEDVA
NGLRNTAARKPG--GDSSELEKYY--FSKISVVQRLWRGHVSADMLSPRLQKAMKD
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```

LPLEQLHKRPDQGS-FKSCAVVTSAGAILRSLGREIDAHDAVLRFNAAPTEGYERDVGN
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 -----APGTSGRFLPGDPGP-EGARPPRAAPGRRAKRGPR-----
 -----RQSL--ARGEDGERLY--SSMSRALLRLWKGDASARMLHPRQLQKAMGA
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 S---QSDPG-VQSRER---TSQDHGSVTRYRGEEVEEEEEEEVEVQGENEDGDMA
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 YVTANKHVSYSR--GRR-SPGQ-TAKELLCCELQAQARLQTVDTGTEPPFSALGWA-RLVPA
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 >Tgut_ST6Gal2
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 EVLLNEDLLGTFSKSTVNSKKWTVLEEAFFRNE-----EFFPQL--GRNSKASFYQVND
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 Y---QRRQVFLPPHAK-----EYFYFRKFDRRGLGVKKSIIIPPED-----
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 KCLL-----
 >Ocu_ST6Gal2

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SLFAAARPGWPSHTQGTGLGPSGAPGQ-----SPHREKRRHR-----
-----RQRRSR--APLDEGEDGDRLA--ASMSRAFLYRLWKGNVSSKMLNPRQLQKAMRD
YLAANKHGVFRF--GPR-AARR-SRAQLLCELRRAQVRTLNGTEAPFAALGWR-RLVPA
VPLS--QLHPR--GLRSCAVVMSAGAILNSSLGEEIDSHDAVLRFNAPSAPTRGYEKDVGN
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-VPSTF-----YVEPRLLPVQKQR-----AIMGAVPEPAFPEGEGARS
-----ETRCESLLCADLPDSLWPEPEDAGDIEE----EFFSPQVQGRGESPRAHDPALGD
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TALS--QLHP--GLRSCAVVMSAGAILNSSLGAEIDAHDAVLRFNAPSAPTRGYEKDVGN
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-----RQRR--HVLEVDDESR----PFMSRALLYQLWKGNVSSKMLSPRLQKAMKA
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VPLS--QLHPR--GLRSCAVVMSAGAILNSSLGEEIDSHDAVLRFNAPSAPTRGYEKDVGN
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-----MKPHLKQWRQRMFLGIFAWGLLFLIFIYFTDSNPAEP
-VPSSLS-----FLETRRLLPVQKQR-----AIMGAAHEPSPPGGLDAR
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VPLS--QLHPR--GLRSCAVVMSAGAILNSSLGEEIDSHDAVLRFNAPSAPTRGYEKDVGN
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>Ggor_ST6Gal2
-----MKPHLKQWXQRMFLGIFAWGLLFLIFIYFTDSNPAEP
-VPSSLS-----FLETRRLLPVQKQR-----AIMGAAHEPSPPGGLDAR
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EYILH-----KNIDSVSGKKAPAYGKRYHDTQRQHKKIRNMQ-----
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YLRANKLVGNFN--GKQNSRKL-NPQELLCVLKDRQVKTLDGKDAPFSSLGWE-KYFPK
IALN--KLYPH--GFSTCAVVSSAGAILNSSLGAEIDSHDAVLRFNAPSAPTRNYEKDVGN
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-----MRFSMRQWRKLVLAAILAWALLFLGLLSYFLDNRVE-E
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--VLSSETPGNMVNIHPSSSPYQTYGSQEAH--QNDLDPQS--LAAWSSFGTQNVDS
S--NFNIA-SQHRER--ASQSIFSNN--VEDEELPNEIS--
--PLVERRAD--ADN--VVQHMWRGTVSSGMLSPRLKRAMND
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```

```

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TCGA-----
>Gacu_ST6Gal2
-----MKSSMRQWRLVLGLMLAWVLLFLGLLSYFLDARVN-E
PLTSVGSLSFSQ---HPDTRRLASIQASHQ-QHANLGRPELASTLTTHPGVEPET---R
PSASSATPQLSLDMSHSPKSAHYAVYGSHTSR---PDYLD PQS---LAAWSSFGTENVG
S---HSDPS-VQSRER---TSQYENHISTSRYRGDEEEEEEDDERD-----NVDEE
LRKRTPAARRVG----DDSADLEYY--FSESGSVVQRLWRGRVSAGMLSPRLQRAMKD
YVSANKHRVSYT--GHR-RAAQ-SANELLCQMKEQARLRTVDGSEQPFSSLGWA-RLVPS
RPLERLHQRDRSS-FKTCVVTSAGAILRSLGKEIDAHDAVLRFNAAPTGEGYERDVGS
KTTIRIINSQILANPKHFRNTSSYKNTLVAVDPAPYTVDLHKWYAGPDYNLFGPYIEH
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PSIRQTDLCHYHERYDAACTLGAYHPLLYEKSILQRIHTGPKNDLRWKGRVTLPLGLSTV
NCDI-----

```

Data S4. SDP prediction results are shown below; MSA used is the one present in supplementary data C obtained with 101 ST6Gal sequences (48 ST6Gal I and 53 ST6Gal II). The header contains information about the parameters used in the server, followed by a table with the SDPs predictions sorted by scores. A detailed explanation of the output format can be found at Help section on the SPEER web server (<http://www.hpppi.iicb.res.in/ss/help.html>).

```

Number of columns in the alignment = 615
Number of sequences in the alignment = 101
Number of supplied subfamilies = 2
Subfamily 1 consists of 48 sequences
Subfamily 2 consists of 53 sequences
Gap percentage for each columns selected = 20%
SPEER-SERVER scoring term weights:-
Relative entropy term weight = 1
PC property distance term weight = 1
Evolutionary rate term weight = 0
SPEER-SERVER predicted scores for columns containing 20% gaps are shown below.
Columns are sorted based on SPEER-SERVER Score

```

```

SPEER-SERVER Result
#####
# Column  %ID      Score  Z-score  P-value  TYPE #
#####
307      47.7      5.892    3.104      0.001    TypeII
426      48.6      5.395    2.842      0.002    TypeII
539      49.7      5.328    2.807      0.003    TypeII
540      47.6      5.261    2.771      0.003    TypeII
553      49.7      5.120    2.697      0.004    TypeII
586      49.7      4.946    2.605      0.005    TypeII
448      38.9      4.803    2.530      0.006    TypeII
576      47.6      4.692    2.472      0.007    TypeII
387      49.5      4.655    2.452      0.007    TypeII
280      46.8      4.532    2.387      0.008    TypeII
522      48.8      4.453    2.346      0.010    TypeII
358      47.8      4.307    2.269      0.012    TypeII
555      47.9      4.262    2.245      0.012    TypeII
480      48.5      4.190    2.207      0.014    TypeII
41       33.7      3.966    2.089      0.018    TypeI
23       35.9      3.877    2.042      0.021    TypeI
389      39.9      3.850    2.028      0.021    TypeII
297      39.6      3.834    2.020      0.022    TypeII
55       31.6      3.780    1.991      0.023    TypeI
552      49.0      3.758    1.979      0.024    TypeII
24       32.6      3.636    1.915      0.028    TypeI
54       31.4      3.515    1.851      0.032    TypeI
431      38.9      3.514    1.851      0.032    TypeII
283      37.3      3.422    1.803      0.036    TypeI
304      28.3      3.296    1.736      0.041    TypeI
543      19.7      3.168    1.669      0.048    MC
432      36.5      3.123    1.645      0.050    TypeI
388      42.7      3.118    1.643      0.050    TypeII
435      37.0      3.097    1.631      0.051    TypeI
473      39.2      3.087    1.626      0.052    TypeI
573      33.4      3.061    1.612      0.053    TypeI
446      37.1      3.033    1.598      0.055    TypeI
282      27.4      3.030    1.596      0.055    MC
51       34.6      3.027    1.594      0.055    TypeI
300      36.5      2.933    1.545      0.061    TypeI
476      34.5      2.845    1.499      0.067    TypeI
478      18.1      2.841    1.497      0.067    MC
352      35.6      2.743    1.445      0.074    TypeI
383      35.2      2.659    1.401      0.081    TypeI
440      29.4      2.653    1.398      0.081    TypeI
80       28.8      2.590    1.364      0.086    TypeI
339      21.8      2.559    1.348      0.089    MC
29       33.7      2.538    1.337      0.091    TypeI
497      20.2      2.537    1.336      0.091    MC
521      40.7      2.534    1.335      0.091    TypeII
589      34.1      2.519    1.327      0.092    TypeI

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45	32.1	2.331	1.228	0.110	TypeI
583	30.9	2.289	1.206	0.114	TypeI
52	34.1	2.270	1.196	0.116	TypeI
588	25.5	2.179	1.148	0.125	MC
434	34.4	2.145	1.130	0.129	TypeI
56	17.5	2.048	1.079	0.140	
114	21.6	1.981	1.044	0.148	
285	26.7	1.939	1.021	0.154	MC
85	31.7	1.909	1.006	0.157	TypeI
26	20.4	1.814	0.956	0.170	MC
414	54.3	1.775	0.935	0.175	TypeII
317	31.7	1.738	0.915	0.180	
508	34.2	1.732	0.912	0.181	TypeI
298	31.8	1.676	0.883	0.189	TypeI
57	17.7	1.503	0.792	0.214	
525	37.8	1.465	0.772	0.220	TypeI
342	31.2	1.406	0.741	0.229	
50	25.0	1.380	0.727	0.234	MC
88	20.8	1.327	0.699	0.242	
111	21.8	1.300	0.685	0.247	
420	31.2	1.268	0.668	0.252	TypeI
509	15.2	1.240	0.653	0.257	MC
83	23.8	1.199	0.632	0.264	MC
273	32.9	1.143	0.602	0.274	
361	11.6	1.100	0.579	0.281	
77	18.6	1.085	0.572	0.284	
82	19.2	1.075	0.566	0.286	MC
461	41.2	1.010	0.532	0.297	TypeI
345	34.7	0.996	0.525	0.300	
48	22.6	0.989	0.521	0.301	MC
43	38.7	0.968	0.510	0.305	TypeI
362	28.9	0.931	0.490	0.312	TypeI
545	50.0	0.888	0.468	0.320	TypeI
279	22.0	0.769	0.405	0.343	MC
58	19.0	0.756	0.398	0.345	
496	32.2	0.744	0.392	0.348	MC
172	23.9	0.728	0.383	0.351	
447	19.8	0.667	0.351	0.363	MC
86	26.2	0.642	0.338	0.368	MC
479	16.4	0.590	0.311	0.378	MC
357	20.0	0.557	0.293	0.385	MC
408	31.4	0.544	0.287	0.387	MC
371	10.3	0.542	0.285	0.388	
291	20.4	0.533	0.281	0.389	MC
554	24.9	0.519	0.274	0.392	MC
127	11.7	0.509	0.268	0.394	
580	19.9	0.502	0.265	0.396	MC
322	16.1	0.443	0.233	0.408	
356	12.8	0.442	0.233	0.408	MC
320	11.4	0.410	0.216	0.415	
343	36.6	0.394	0.208	0.418	
168	15.4	0.357	0.188	0.425	
462	59.0	0.344	0.181	0.428	TypeI
511	17.1	0.306	0.161	0.436	MC
126	10.6	0.305	0.161	0.436	
562	57.1	0.298	0.157	0.438	TypeI
171	12.1	0.294	0.155	0.438	
141	12.0	0.283	0.149	0.441	
139	9.7	0.267	0.141	0.444	
336	50.7	0.251	0.132	0.447	TypeI
278	15.7	0.225	0.118	0.453	
146	13.7	0.219	0.115	0.454	
44	26.4	0.208	0.110	0.456	MC
284	23.2	0.204	0.108	0.457	MC
459	30.6	0.201	0.106	0.458	MC
275	22.9	0.197	0.104	0.459	
272	17.5	0.184	0.097	0.461	
587	41.5	0.158	0.083	0.467	TypeI
577	56.6	0.153	0.080	0.468	TypeI
25	30.0	0.150	0.079	0.469	MC
441	18.5	0.144	0.076	0.470	MC
351	48.5	0.136	0.072	0.471	
412	17.0	0.136	0.071	0.472	MC
467	19.7	0.085	0.045	0.482	MC
170	19.7	0.079	0.042	0.483	
415	59.9	0.060	0.032	0.487	TypeI
593	54.1	0.059	0.031	0.488	TypeI
289	53.3	0.033	0.017	0.493	TypeI
316	14.1	0.032	0.017	0.493	
140	13.4	0.013	0.007	0.497	
390	26.5	0.008	0.004	0.498	MC
364	15.0	-0.020	-0.011	0.504	MC
436	13.7	-0.040	-0.021	0.508	MC
178	13.7	-0.059	-0.031	0.512	
176	14.2	-0.074	-0.039	0.515	
271	22.4	-0.080	-0.042	0.517	
128	13.9	-0.080	-0.042	0.517	
442	51.1	-0.088	-0.046	0.519	TypeI
148	12.7	-0.089	-0.047	0.519	
143	10.6	-0.155	-0.082	0.533	

556	43.9	-0.164	-0.086	0.534	TypeI
131	17.0	-0.168	-0.088	0.535	
142	23.1	-0.174	-0.092	0.536	
460	32.6	-0.180	-0.095	0.538	MC
376	27.4	-0.182	-0.096	0.538	
42	18.3	-0.185	-0.098	0.539	MC
49	32.9	-0.207	-0.109	0.543	MC
337	19.8	-0.215	-0.113	0.545	MC
136	10.8	-0.216	-0.114	0.545	
584	17.5	-0.218	-0.115	0.546	MC
84	20.9	-0.250	-0.132	0.552	MC
475	21.6	-0.263	-0.139	0.555	MC
463	17.3	-0.313	-0.165	0.566	MC
169	15.4	-0.320	-0.169	0.567	
392	24.1	-0.327	-0.172	0.568	MC
340	53.3	-0.339	-0.178	0.571	TypeI
575	64.5	-0.342	-0.180	0.572	TypeI
452	53.4	-0.367	-0.193	0.577	TypeI
493	53.8	-0.374	-0.197	0.578	TypeI
147	11.3	-0.378	-0.199	0.579	
451	57.0	-0.380	-0.200	0.579	TypeI
112	17.7	-0.391	-0.206	0.582	
483	25.8	-0.401	-0.211	0.584	MC
79	34.1	-0.408	-0.215	0.585	MC
331	31.7	-0.438	-0.231	0.591	MC
302	36.3	-0.440	-0.232	0.592	MC
506	39.7	-0.449	-0.236	0.593	MC
344	18.2	-0.452	-0.238	0.594	
321	15.0	-0.458	-0.241	0.595	
138	14.7	-0.474	-0.250	0.599	
115	21.3	-0.477	-0.251	0.599	
495	28.2	-0.480	-0.253	0.600	MC
548	53.8	-0.492	-0.259	0.602	TypeI
133	9.4	-0.493	-0.260	0.603	
416	26.9	-0.498	-0.262	0.603	MC
535	56.7	-0.498	-0.262	0.603	TypeI
310	18.7	-0.518	-0.273	0.608	MC
110	11.0	-0.523	-0.275	0.609	
530	55.7	-0.551	-0.290	0.614	TypeI
346	15.4	-0.565	-0.297	0.617	
144	11.8	-0.573	-0.302	0.619	
175	15.3	-0.584	-0.307	0.621	
308	30.8	-0.609	-0.321	0.626	MC
464	24.5	-0.609	-0.321	0.626	
532	29.5	-0.610	-0.321	0.626	MC
87	33.4	-0.613	-0.323	0.627	MC
274	11.4	-0.629	-0.331	0.630	
378	32.3	-0.635	-0.335	0.631	MC
472	49.2	-0.638	-0.336	0.632	TypeI
276	18.3	-0.640	-0.337	0.632	MC
277	28.9	-0.664	-0.350	0.637	MC
132	14.2	-0.684	-0.360	0.641	
27	36.4	-0.692	-0.364	0.642	MC
349	45.4	-0.697	-0.367	0.643	
363	61.1	-0.702	-0.370	0.644	TypeI
28	43.9	-0.710	-0.374	0.646	MC
427	47.3	-0.712	-0.375	0.646	TypeI
113	20.1	-0.724	-0.381	0.648	
504	62.2	-0.726	-0.383	0.649	TypeI
533	28.9	-0.732	-0.386	0.650	MC
437	43.3	-0.751	-0.396	0.654	TypeI
395	21.7	-0.785	-0.413	0.660	MC
326	16.1	-0.786	-0.414	0.661	
312	23.4	-0.791	-0.417	0.662	MC
296	57.7	-0.793	-0.418	0.662	TypeI
129	27.6	-0.811	-0.427	0.665	
334	21.3	-0.818	-0.431	0.667	MC
335	26.3	-0.826	-0.435	0.668	MC
53	24.9	-0.829	-0.437	0.669	MC
78	45.7	-0.839	-0.442	0.671	
529	35.8	-0.844	-0.445	0.672	MC
145	21.3	-0.856	-0.451	0.674	
524	64.8	-0.877	-0.462	0.678	TypeI
503	39.3	-0.884	-0.466	0.679	MC
514	67.5	-0.893	-0.471	0.681	TypeI
130	14.0	-0.908	-0.478	0.684	
499	49.7	-0.930	-0.490	0.688	MC
137	15.9	-0.932	-0.491	0.688	
484	47.0	-0.938	-0.494	0.689	TypeI
469	69.1	-0.955	-0.503	0.692	TypeII
299	44.1	-0.976	-0.514	0.696	MC
46	51.9	-0.983	-0.518	0.698	TypeI
327	26.1	-1.008	-0.531	0.702	
338	53.8	-1.026	-0.540	0.705	TypeI
570	62.4	-1.028	-0.542	0.706	TypeI
550	71.7	-1.073	-0.565	0.714	TypeII
303	23.4	-1.094	-0.576	0.718	MC
332	66.6	-1.113	-0.586	0.721	TypeI
558	49.8	-1.114	-0.587	0.721	TypeI
287	57.7	-1.141	-0.601	0.726	TypeI

456	65.2	-1.146	-0.603	0.727	TypeI
598	26.4	-1.158	-0.610	0.729	MC
288	24.8	-1.159	-0.611	0.729	
502	63.7	-1.189	-0.627	0.735	TypeI
360	13.1	-1.195	-0.629	0.735	MC
468	27.9	-1.196	-0.630	0.736	MC
582	24.3	-1.198	-0.631	0.736	MC
458	71.4	-1.269	-0.668	0.748	TypeII
486	15.4	-1.311	-0.691	0.755	MC
444	69.5	-1.332	-0.702	0.759	TypeI
270	19.8	-1.335	-0.703	0.759	
457	70.8	-1.348	-0.710	0.761	TypeI
599	19.8	-1.406	-0.740	0.770	MC
319	22.3	-1.406	-0.741	0.771	
536	68.8	-1.409	-0.742	0.771	TypeI
399	40.2	-1.411	-0.743	0.771	MC
350	21.1	-1.418	-0.747	0.772	
134	11.3	-1.435	-0.756	0.775	
424	44.6	-1.452	-0.765	0.778	MC
600	32.0	-1.453	-0.766	0.778	MC
47	25.9	-1.461	-0.770	0.779	MC
601	21.4	-1.471	-0.775	0.781	MC
353	96.1	-1.479	-0.779	0.782	TypeII
301	98.0	-1.480	-0.779	0.782	TypeII
293	98.0	-1.485	-0.782	0.783	TypeII
359	98.0	-1.486	-0.783	0.783	TypeII
581	98.0	-1.486	-0.783	0.783	TypeII
347	98.0	-1.525	-0.804	0.789	
507	67.6	-1.527	-0.804	0.789	TypeI
579	96.1	-1.538	-0.810	0.791	TypeII
485	98.0	-1.549	-0.816	0.793	TypeII
292	54.4	-1.564	-0.824	0.795	TypeI
578	34.2	-1.577	-0.831	0.797	MC
413	64.7	-1.580	-0.832	0.797	TypeI
295	60.3	-1.596	-0.841	0.800	TypeI
329	55.2	-1.601	-0.843	0.800	MC
465	98.0	-1.603	-0.844	0.801	TypeII
423	98.0	-1.614	-0.850	0.802	TypeII
135	32.9	-1.628	-0.858	0.804	
449	40.1	-1.628	-0.858	0.804	MC
177	22.9	-1.633	-0.860	0.805	
534	90.4	-1.676	-0.883	0.811	TypeII
328	90.4	-1.744	-0.918	0.821	TypeII
592	59.6	-1.754	-0.924	0.822	TypeI
333	48.2	-1.776	-0.936	0.825	MC
377	29.2	-1.812	-0.954	0.830	
354	25.2	-1.818	-0.958	0.831	MC
315	69.8	-1.824	-0.961	0.832	
482	32.1	-1.863	-0.982	0.837	MC
348	96.1	-1.864	-0.982	0.837	
311	40.3	-1.891	-0.996	0.840	
421	94.1	-1.917	-1.010	0.844	TypeII
89	36.3	-1.939	-1.021	0.846	
411	79.7	-1.966	-1.036	0.850	TypeII
574	83.4	-1.967	-1.036	0.850	TypeII
341	33.3	-1.989	-1.048	0.853	
546	85.3	-2.042	-1.076	0.859	TypeII
500	81.4	-2.060	-1.085	0.861	TypeII
433	47.6	-2.069	-1.090	0.862	MC
443	71.2	-2.108	-1.110	0.867	TypeI
526	44.8	-2.137	-1.126	0.870	MC
591	50.5	-2.139	-1.127	0.870	MC
547	54.0	-2.155	-1.135	0.872	MC
294	88.7	-2.223	-1.171	0.879	TypeII
401	88.7	-2.244	-1.182	0.881	TypeII
404	83.1	-2.273	-1.197	0.884	TypeII
466	76.9	-2.276	-1.199	0.885	TypeII
597	83.6	-2.306	-1.215	0.888	TypeII
585	92.2	-2.307	-1.215	0.888	TypeII
286	92.3	-2.388	-1.258	0.896	TypeII
569	94.1	-2.388	-1.258	0.896	TypeII
488	90.4	-2.416	-1.273	0.898	TypeII
477	92.3	-2.423	-1.276	0.899	TypeII
595	90.4	-2.445	-1.288	0.901	TypeII
491	94.1	-2.530	-1.333	0.909	TypeII
510	96.1	-2.595	-1.367	0.914	TypeII
474	94.1	-2.605	-1.372	0.915	TypeII
418	98.0	-2.641	-1.391	0.918	TypeII
528	98.0	-2.647	-1.395	0.918	TypeII
397	98.0	-2.651	-1.396	0.919	TypeII
393	98.0	-2.652	-1.397	0.919	TypeII
602	98.0	-2.662	-1.402	0.920	
566	98.0	-2.667	-1.405	0.920	TypeII
492	98.0	-2.670	-1.407	0.920	TypeII
417	96.1	-2.671	-1.407	0.920	TypeII
490	96.1	-2.681	-1.412	0.921	TypeII
450	98.0	-2.700	-1.422	0.923	TypeII
594	98.0	-2.705	-1.425	0.923	TypeII
396	98.0	-2.732	-1.439	0.925	TypeII
513	98.0	-2.743	-1.445	0.926	TypeII

512	98.0	-2.744	-1.445	0.926	TypeII
290	98.0	-2.744	-1.446	0.926	TypeII
515	98.0	-2.746	-1.446	0.926	TypeII