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ARASLQNTLI ${ }^{90}$ SAS QARLRDDKELRQRAFTS QASATMHLP ARETI QKLL SADEPTLRDNNQELRAAALVPQADVTMHLP
 ARAFL QKLLLSAGEPTLRRDSTELRRRAAFVPRAAATMHLP A R T T L Q QL L S A Q E P L L S N N K D L R A R A FVVP Q S D A DM H L P


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A R R YL Q K L L A A NESTLLRD DVTTLRTRAAFVDQRSAAMH L P

VRARLSELLREDHPELRDNAVLRQAALYPMDKVEMHLP




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 A R H T L Q N L L S V E N Q TLL Q Q P DAAR S K V F V A Q N K A T M H L P A R A T I K R L L SVVD E P T L R D N A D L R S R A L V N Q A D V I M H L P



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 TRAR T S L R A B

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 ARETLQKLLDVSSPALQNNAELREKAFVKQTNVQMHVP I RAELQQLLAADNPTLRDNHELRNQVFFKQVDVSLHELP VRKY QTVFSDDTPHLKDNKDLQEQALVPLKDIVRAHLP
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 L D L N VLARRNGFSKCA GLQDVVGLDTTGNRFAALGRPVHRE

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L L S GVA H L Y PA KVQDALK S S T L N L L MN LGGHDA WHV






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UniRef90-Q2KYD2 UniRef90-UPIIO0047AA993 UniRef90-UPIO00349A3B9 UniRef90-R7Z520 UniRef90-E6PDS7 UniRef90_UPIo0036BB445 UniRef90-E6RP94 UniRef90-UPI0002E75C32 UniRef90_UPIOOO479F194 UniRef90-W9WF31 UniRef90_W9VYE5 UniRef90-K5Y3T5 UniRef90_D9UHC7
UniRef90-S6GMN7 UniRef90-A0A037ZIZ9 UniRef90-C1C2Q6 UniRet90-E3H143 UniRef90-UPIOOO3755981 UniRef90-A9BTB1 Unikef90-HHV2
UniRef9-
D2SEE


 MSWLSUSQDSHFSLANIPFGlDSTSADTKRPAIAAGOYA SWVASANDSPFPLNNLPYGVFSTADTDPRCGVAIGDM| MSWVEGADGSPYGI NHLPYGLFSTAEDPTPRVGVRIADRV
 SFVPVPAGSDFPLENLPYAVFSTKSKTVHRLCVAIGEHV MTWVTSANGHDFPLQNLPGGVFSHADSGPRGGVAVGDSIV
 SWLSIPEDSDFSLANDPFGMTRSKFSDGHRPAIPGGNHVS WV E SAA H D T E F P I Q N L P F G V F R R A G D E A P R V G V A I G D Q I
S WV E S A N S A D F P L N NLPCGVFAPGDD D

| $S$ | $W V$ | $T$ | $S$ | $A$ | $N$ | $G$ | $H$ | $D$ | $F$ | $P$ | $I$ | $Q$ | $N$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $S$ | $L$ | $P$ |  |  |  |  |  |  |  |  |  |  |  |
| $S$ | $K$ | $S$ | $A$ | $E$ | $G$ | $T$ | $D$ | $F$ | $P$ | $I$ | $Q$ | $N$ | $L$ |



S W W V T S A A N N S S D F P
WL D IP E E S D F S L Q N L P Y GI F CRP S S DP VL G V A





S WV E SANGCDFPI QNLPFAEFRTKNNEKFRGGVAAIGDQV



S WV E S A N S T D F P L N N L P C G V $\underset{F}{ }$ F S V



V
M




MTWIDIPDNSPF GPDNLPDGVFRIGGDEEPRIGAAI GDHL
SWI NSAN GHDF P L Q N L
都


SWVVSANGHDFPLQNLPFGIFST EQFGPRGGVAIGDHV



S WV P V P K G S D F P L Q N L P Y G A F S A D G G S PR I GV A I G D H V

S WV A S A NDSDFPI QNLIP FAAFRRRGS


S Wi S S A N G H D F P L Q $N$ L
S W $V$ V A S A N D C C D F P
S WII E I P E N S D F T L L A N






S WV D GA D G H D F P L Q N L P M GVVFR H D G GTPPRIVGVA I G E Q V



## UniRef90 U5EWS6 <br> UniRef90 S6IDP5 UniRef90-UPI00046F0E85 UniRef90_UPI00037E515C UniRef90_Q21AX4

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UniRef90 M7T4Z9
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UniRef90_K9VZF2
UniRef90_UPI0003B339D0 UniRef90_UPI0003658C7C UniRef90 U1KEE3
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UniRef90_F2ID26
UniRef90_Q2KYD2 UniRef90_UPI00047AA993 UniRef90_UPI000349A3B9 UniRef90_R7Z520 UniRef90 E6PDS7 UniRef90_UPIO0036BB445 UniRef90_E6RP94 UniRef90_UPI0002E75C32 UniRef90_UPI000479F194 UniRef90_W9WF31 UniRef90_W9VYE5 UniRef90_K5Y3T5 UniRef90_S6GMN7 UniRef90_A0A037ZIZ9 UniRef90_C1C2Q6 UniRef90_E3HI43 UniRef90_UPI0003755981 UniRef90_A9BTB1 Unireaio- -Hoture
UniRef90_D2SEE7

LDLTVVKHL ${ }^{50}$ YPTSVQNALTAEVLNPLMELGFDSWNV
LDLQAALEAGFFNGAARAAAEAARDQLNDFFALGVGARQA
LDLAAALEAGFFNGAARAAAEAARDQLNDLEALGVGARQA
LQLDQLWSLGLLAELDTEESVFLSAYLNDYiALGKPVWSG
L DAALADAGLLDVPGDNVFAQGAVNGFMALGGEVWSA
LDLKSAGGFSSSSDIQKHVSVFNHEFLNSFAALGRPFHRL
LDLQAAEEADMITKDEGOPVFDVPFWNEVMELGPEAWKK
LDLRKLATGTFF LPWDRPAFQEHSLNAFMAMGRPAWRL
DLLVLDEEGLFDGLLKDQFVFQDSSLNYFLSLGQAAWTE
VDLKALAASGLFRELAEALEAASDTYLNRFMGLGQAHWSA LDLKVVSHLFAVPL QAALQAETLNLLMSLGHEAWDA LDLQAVVQAGLFDGAAEVAD\|ASRNQLNDFFALGAPARRT LDLKLVVTSGTC ANCETCTALSSSTLNDFMALGPEVWSK DLSICYNAGLLQELPEQQAACAAPNLNQLMAMGNEAASM LDLKAFSSAGGFAELKEHILSVFDSTTLNDFAALGQKTHEN LLDVVFSEYDGFSGDPDTQPVFDESTLNSFAALGRPLHKI LDLAAVAELDVF

F NTAVLERSDLNDFTALGKEITSK LDLCACLAEGLLEDVGPAAlACAAPSLNVMSLGRAHATA LDLHEFARHQGFDFASAHDATFSQPTLNDFAALGQDVHAK VDVALAEAGL THVADEPVFEVPFWNEFMELGPDVWSL LDLTAAKALF
LDUHALTEAGVLAGLDDAVAACRQTTLNALMALCRTALRT LDASAVAADGGDPGDGPHAAAWAHPSLNPFLALGPDAWAT LDLAAVSQTSVASGKDEALEACCDETLNRFMGLGDEHWSS LDMNMACQKGVFQDFPLDQNVFERSTLNDFDAMGRPYWTY D A P VF G A PAFGE LDLKAVSQLFPFQVQKSLQA ETLNELMGLDFEAWDV LDLAAAANGVFNDLPLTALACAGPDLNPFMAMGRDAWSA LDLGAALALGLDDGAAREAAQAAAGTLNAFFALGAGPRRA LLLAVFALHDGFSQLAAHVGVFDKQSLNGLAALGRSLSGA VDLAALTSLHLEDAQSAHARLFAQPTLNDYDSLPSATHRA
 LDLAITTANSGFSNLASHLNVFAQKTLNDFAALGRPIHRE VDLKAACEAGLFDGALDAATAASASSLNSFFALGAPARKA VDLAADSDDGL DTVDASYFRQKTLNEFTALGKK DTNK LDAECEARGLVD AGGFAOPRLNDFIALGRAKWDE I DiAASRAGLNGDAGEGARVCAQPVLNEFFSMGPSAWRA LDLFACCQLGLFQELPEPLTLACRSSLNELMALGTWASST LDVAALEAEGLLRLGADHPVFDVPFWNELMELGPDAWAD LDLSAlKHEFTGPVLSQHQDVFDEPTLNSFMGLGQAAWKE
LDLSAVAQAGLEPVLSSSSQCFQQPTLNSFMSLGRPAWLEE LDLAAVGEVGLLAELSEDQAACGASNLNSMMALGRESALL I DLSGERTLLDDACLSGAPVFQDGDLSKFASLRAVTRRA LDIKAAVELGLFEGEAATAAKAASEALNHFFSLSAATRKA I DLFRVANRGALDYADGAQDDFREPTLNRFAALPRPVRSK LDLDAALAAGLFEGAAGEAAEARGGALNAFFALGKPARVA VDLAALHDAGLLPGLSADAAVLAAATLNAFMAAGRDVWRS LDLSRCYGAGLLQELPEQQTACLAPNLNSLMAMGRGAGSLL LNLSSSCQAGLFQGLPQEQEADLASNLNLLMGLGQUAWST LDLAACEERGLLD AKGSFARPQLNEFDALGRPTWDR VDLAASRCGLLPAVSALLAACEQGHLNALMAAGRSVRVA
 LDLSGAASSLLGDVKAAAEAASGPVLNDFLALGAHARRA VDVTALEADGVIE PSPGARVFAQGVLNPFMALGPAAWSA VDVFAAYKLGIFKKDKDKKRVLKNNFLNDFDALGKEKTTK VDMAKLAELGAFGGLDFEKAVFEKEFLNDFMAAGKTARVG LDIRATLDRHLFPDVIETATAAARAPLNDFMALPRSHRSA I DLAPVASAQMLDGSQL FAQPTLNAFLALGRPAWRA LDLAA VDLKTLHVLGYMENDPFELSDFDTDSLNPMMKKGKKAVRD VDLGALRLARPFDGDAQALDACADTHLNALMALGPTAWSA LDLWS CASESLFASLPDAVDACTAGVLNPLMALGPEAWSA VDLAACGKVGLLEGLPEPQAACVAPTLNPLMALGSWASSA VDLRALAEAGLFDGIV DRATLSAETLNALMAAGRPVWRA FDLKVACDAGLFGAAADAALAACTSQLNELFALGAGPRRA DDAKVNELALFSGDAQVAAAASNPTLNEFMGLGEQYWSA LDVALEGYFEYGDPVFDAGCWNGFMELGSDIWAE VDLDMLHKAGYFGLMEDPSNDFKNRFLNPFDALGKEKTNA IDVNLLARQGAFDNLSNQDTALLGQTLNHFASLPRSVRSS FDLAAACDAGLFAGAALEAARSAGSSLNAFFARGASARMA LDVAAV I DLAALAK DEDFSGVQQALDACSQSQLNDFMAMPATTWSA LDLASAEAAGVVTAGTLQTGRWNAFMALGQAAWAD LDLSKLWSRFKGPLMSGVSKAVEAESLNPGMALSPGHWSE LDVRAAVELGLLDELEPVARALSTHRLNDWMALPAAARKA LDMVAVAELELFD FDVSVFYEDKLNPFDALGKSVTNK LDLARASAKALGDAVQPQLEAASQQHLNGFMAMGPAAWSA FDLVQAVRAGLFDEETEAVAVCAAPSLNAGQLGAGPRRA

UniRef90_U5EWS6
UniRef90 ${ }^{-}$S6IDP5
UniRef90_UPIOOO46FOE85 UniRef90_UPI00037E515C UniRef90_Q21AX4 UniRef90-M1W255 UniRef90-U4V4P9 UniRef90 ${ }^{\text {N1MKI3 }}$ UniRef90-UPIOOO4283449 UniRef90-UPIOOO380EA80 UniRef90-L8D0B4 UniRef90-B41Y X4 UniRef90_UPIO0042473DA UniRef90-D3Q5M5 UniRef90_UPIOOO3023654 UniRef90-S3CTN3 UniRef90_UPI00037EE8E6 UniRef90-U7PLM3 UniRef90_UPI000255B1E1 UniRet90_WORGG1 UniRef90-R7YU16 UniRef90-UPI0003189789 UniRef90-V4NXEO
UniRef90_UPIO00364C678 UniRet90-A3VJ×
UniRef90-W9G822
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UniRef9-
D2SEE
 KRRELLHLLDENSPQRARDQATAALLHPMSECQMHLP LRQHLSALLRHDAPA GQTLAADILTPQAQAELLLP LLRKRLQELLCDEAPODOQDVEKALVKMDQVKMLMP VREYLQSVFSAETQVLKDNVQLRETALVKRSEIVQHMP LRKQUTALLKNASA $\quad$ HQGRADDMLTPQSEATMHLP VRLQLTELLSDARYREQS VRLQLTELLSARYREQS ATLFTPVHKTRMHLP ARETLQALLHKDNPRLRDDDLLHSRVFKGREEVEMVLP LR RUALSRALRENA $\quad$ NEQANDEPLLIAQAEAEYDLP L RAALQQLLLDGS EVVEQNVDLIRSVAVVHQSEDSLHLP VRTQLQDALTDET MGABPMSRMLTPVADVTTHLP LRRHLSQLL QWNKQPPSAQAMLIPISNAQLLLP VRKYI QDVFSESTSHLKKNSELQKAALLPKHETKNLLP LRKALSRALRAGSPLLKDQDKMEPALVARQADAQYGMP VRSYLHDVFVKDGPRLQDNAHLRSACLVPLASVRNHLP LRAGVSRVLRAGGAPTRYDRERAERLLVPMADAELFLP VRKYLQNLEAKERPVLRGNDETRRASLYRRDQVTMHLP LRLRLVEVLRDGSP HRALAEACLHKASDCTLHLP LRERLSALLEEARVETMRHRAVLEAALKPQSAVEMLVP FRVWLIESLGEGS EKAVTFADYLVARADATMHLP
ARWWLTEGLD hRRALSRALSKGAAE EAELSRCLVDMDTVEYQL IRTVLQEQLCNRDSTLAQWASLO TLVKQAEVHMLLP VVKYLQEVFKEDTQLLKDNEEVQKECLLKEGEWKNHLP V RSQTQKLLTKGS ELLDHNVDLKAVSUVPQSEEVKLHEP LRLALSQTLRAGALABRESALTNCLVPQAQAEYKLP VRRYLQD FRGDTPLLKDNRELRNQCLVPLTQQRMHLP FRSFLQHLESSHCALLRDDPSARHQVLVPRDDVTLHLP LRLALSKALREGAQQQKEMQST

LIPQADTEFSLP
VRNY RKVFQHNGPVLETNATLQULALLPQSTVQNHLP LRGALQDLGGEGSAHRERLQGMGESLLQPMNRCQMHELP I RARLTALLAEEG VRHALFAALHERAP SDDRAALEACLIPQSEVEEYGLP
 ARALLQNLLSAGHARLRDDQELRARAFTSQADATMHLP ARHTVQRLL
VRAAI QDLLSASTSHLRDNEALRSRALIPTSQVTMHDP LRRQI SQLLRYNS DSSPPESKILLPISEAQLLLP VRQRITELLTDPAHR AABEPLLVSLEQVRMELP FRNTLDGWLSDEMSPDFDNASRTERIFVPMADATMHLP FRAALTNLLQDGSTDKPRDEQSQASLLHPQDKCTMHLP IRKDIQALVNADSPLYYNQDQAKLLDPRAAVSMHLP LRQRLLELGEGAAE QWQGERPELLHPAAECQMHLP VR TQLSDLLARDNAALRDAAALRERVLVRMADATLHLP LRRYLSQLERDDRQPPVPETELAERGVPMSGAELLLP R RLALSEALRTDSPD QSADASTLVAQADDELGMP MRARLTELLAQGAET DTPALPASLVAMPDATMHLP LRRALSOGLRRGSAQ EGAALSSCLVPQAQAEYALP LRGRLFELLASDSA HQEALKPLLYRQFDVEGHLP俭 VREMLQQELCNENSILKENNA RAMVFLPQNEAVQMHLP
 TREWLLEVVRNAER MADAVEPHLIPRSAVTLQLP VRARITDLLTDPA QKAAARPSLIPRDAVRLHLP LRNRLSKLFDVNQPDLQQNEQHVAQVLIPLEHVKMCMP LRNRLTEALUQESSADEETQHRVSAMLVPQRDAEMHVP LRDRLSELLRWDERQSPPEANDNAMLVADAEAEMLLP LRGRVSDLLRVGG DRALLEQALASAEEATMHLP LREQLQALLAEDSPARERDQAMGQALLPTMSSCVLHLP LRLIASKALREGS EHQEQLTHALDAQSEIEFALP VRDKLTEMLKEGSAY VRRYLQDVFAEDTPLLKHNGESQRACLFQQDQVKMHLP TRQRMIDLLEEPSSILFKDKEDNSSAFTNEKEAKLHLP LRTGLCELLEHSAQRTRLQAMGETLLKPMSQCRLHLP VRAELTALLTD ARHRAAVTPHLHPQDAVTLHLP LRAALSSALASDSPD QAQLDDTLDAQSDDEFDLP TRSTVKALLSAQDP DS $\square K K E K D A F L V S M K G V Q M H L P$ VRHALFALLDAAHPASARHASLAARLLHPQAQCELLLP ARTQVQGWLKSKDSPLAGKPELQQEVVPQAEATMHLP RARLSALLSEENATLGG


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UniRef90_UPI0003723E87 UniRef90_UPI0003723E87
UniRef90_UPI00047BC2C7 UniRef90-H6RII5 UniRef90-J2UN11 UniRef90-K1LWB6 UniRef90-D4Z7Q3 UniRef90_X1XLN8
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UniRef90 UniRef90-B2AQH6
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UniRef9O-W9XHV3 UniRef90_UPI000471F729 UniRef90_UPI0002EF96DA UniRef90-I4N1E1 UniRef90-A5VD42 UniRef90-M2WSR6 UniRef90-E4TBJ8
 LDLGGAEQAG LVFAAGTLSRPRLNDFMALGRPQWTA LDLKVLSAQPGFPALVDHPDVFSQPTLNAFAALGRPVHRE LDVAALEREGVLDLAAGAPLFAEPAWNAAMAAGPRTWRA FDIFAGCSSGLFDQAAEAAEAASGPLLNTFLKLGQGPRRA

 LL DRALSQSGFFQDAS VADALSQATLNTFAGLPAKTRTA LDVTAMEEAGLLDDPAK AVFARGTWNDFMALGADVWRS
 LDLA QLSKLN LLGDAQUAADAASESTLNSFMSLGQQYWSAA



## 

 LDLKYSKNVFDHPDC A AASAVFGEPTLNALMEAGBABVTNA LDAGAVRDAGLVGDGPDDASVAWQQPSSLQSLMASNKNTWSQ L DMAALSARQLLDGALDAARAAALPALNDFFALGGTAWRADATLEDVGVLSFGGTLQSA SWNAFMALGPRAWGK L $L$ GVLL GTAGDDAVFAAPALNPFMAQGPARWAQ L DLRALSGGGFFSDASVT DALAATASLNAFAAQLESKFRTA VDLKKLSEAHVLTDLAQKGAVACASTLNEFMAMGKEAWGA LDLAALQAAGVADGAAEALALAAGETLNPLMAAGRGHWQA LDLHAADDAFDGDARRAVEATA GGQLNAFFELGRGPRVA L DVAACLAAGLFDEQSEAARTCASPALNALMALGADARRA
 $V$ D A A LQQA GCMDGLALDARAATATTLNALLDEMGPTAWQA LDLAGLAGAGLVEG $\operatorname{L}$ G GWFASGTLNGFMAAGRAAWTA
 $\checkmark$ DLA ALAAERPFGDASVALQAAASDSLNGLMALGPTAWSA V DLSAAADAFSDSPFSADQAAFSQSTLNAYLAQPRHDHQA V DLA A LAAAAKPFEGAAAEADAACQDSSLNALMA LGGHAHWSA LDLGSLARALDAPF T A A AVSGSDLDP PLLAAGRPVWDQ


 $L D L S$ I A LGBAVFAEPTLNAFMAQGYDRWVE LDLTEALAAGLFGAAAKAAEAASGSALNAFLALGAGARQA V DVAA LEEAGLLDLPGGPLLDV PFWNELMEAGPEAWAA

 | 1 |  |
| ---: | :--- |
| $L$ | $L$ |
| $D$ | $D$ |
| $L$ | $A$ |

 $V D L G A W A S Q G R L S G V A E A A R A C A Q P V L N A F F S L G P A A W G A$ $L D M A A V R D A A L G G D V Q A Q V D A A A Q A Q L N S D M A M G P A S W S A$



 $L D A T G A E R A G L L B R L A D S P L L A E P S W N A L M A A G P A T W A A$ $L$ L L T V A R L E L F D E Q A QQAVVEAAA GNDNAFMAMGQAHWSA $L D$ A A A A RAGLLP H
$L$ DLGAAARAQGAPF
L D L GAAARAAGSPF
$L$ D L R E A A T Q G F L L S S L L S

| $L$ | $D$ | $L$ | $D$ | $A$ | $L$ | $S$ | $R$ | $S$ | $S$ | $H$ | $F$ | $K$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $L$ | $D$ | $S$ |  |  |  |  |  |  |  |  |  |  |
| $L$ | $L$ | $A$ | $A$ | $V$ | $A$ | $A$ | $S$ | $S$ | $V$ | $F$ | $T$ | $G$ |
| $L$ | $L$ |  |  |  |  |  |  |  |  |  |  |  |

$V$ D LA A A A S S VF T GLA A

 $L$ DCRAAE EAGLIDDLGADPIFDVPFWNEVMEAGHDTWTT $V$ D L A V A RLLDD G VVA DA ARAGSESS LN A L M A Q G S A A WS A $L$ DVQ GAF E H K L L N I E N Y P N L D D N A K R L N SLLMTGGR K QVR S
 $V$ DLAA ALGDEVFAEPSLNAFMRQGRSRWVA
 LDAGAAARALGSPYATLLAA HPTLNPLLAAGRTAWSD LDVGAVDHR LD PALLFAAPSWNAVMAAGPEVWAA L D L S A CAK A GLLPD DAASSAA GSDS LNAFMALPE GDRKA I E L H V L A D Y GVVF G A S P Q T S E DF LDE PVL N S FA A L P A E D R K R $V$ D G AL R QARPFE GAAADALLQACADTLNALMALGPKAWSA $V$ DLAALAKS GVLGEAAAAAQAGAQDKLNALMALGTPAWSA $L$ D L H A L L A T G L L Q G D A A S A Q A C E G G H L N GF F A L G R P A R I A

V DLAA ALGDDVFAQPTLNAFMAQGRDRWID




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ALL ${ }^{60}$
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 ANLSALEEVGLFAELDPLREAVKQNALNQLMGLGHTQWHA







 I D L G L L E Q H G LIF D GLE K D S HVVFSH Q H L




 $L$ D A HAADLLALGSAQQAADQAAS QGELNAFMAMGPAAWSG L D L E A VLAA A GLF E GQAKAAEATRGGALNAFFALGRAA
$L$ D L N A L A A T S G S P
$L D A G A V A V A L G S P Y$ L D L R A L A A L QP F CGAA DA GVLA Q GS L NP LLAA GRTAWR D
 $L D A G A A A L A L G S P Y A D L L G R P S L N P L L A A G R T V W R D$



 $V$ D LA A L H G S GCCLQDLAA A QAAHAAMP T L N ALMMGLGP GA WQA



 L D L R A AGLLA G SDDMNALMAMPPA QRRA $L$ D L R A L E Q C P WA D DVY P LL G P LAA A G DVN S FMAM GR SA WR R
 $V$ DAAT G GDDVFAQPSLNPFMAOGKARWGA
 V DLA A

 $L$ D L S V L A R H QR L P Q A GAFTNTTMNEFFMGMDKSEWSR


 I D L S A L E K D G Y F K S I M P G F K E V F S M P T L N K F A S L P K E A H V Q | $L$ | $D$ | $L$ | $A$ | $L$ | $V$ | $R$ | $Q$ | $Q L$ | $D$ | $G$ | $L$ | $A$ | $L$ | $D$ | $A$ | $A$ | $R$ | $A$ | $A$ | $A$ | $L$ | $P$ | $A$ | $N$ | $D$ | $F$ | $F$ | $A$ | $L$ | $G$ | $R$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $V$ | $A$ | $W$ | $W$ | $A$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| $D$ | $L$ | $K$ | $I$ | $E$ | $K$ | $A$ | $G$ | $L$ | $L$ | $D$ | $A$ | $L$ | $G$ | $S$ | $D$ | $S$ | $D$ | $V$ | $F$ | $S$ | $Q$ | $P$ | $T$ | $L$ | $N$ | $A$ | $F$ | $A$ | $T$ | $L$ | $F$ |
| $P$ | $S$ | $V$ | $R$ | $S$ | $N$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | $V D L V Q L P S A F S E Q P V S A A S S L F S$ QPTLNAYLAQSRQVHKT $V$ DLL KAKET DLF G GLAALGDE AC G G D S L NAFMALDGKECWSA

 $V$ D LA GLAA A D GAVLP A GLLATALA QPT L N A L F RLAA EA D RVA LDLRGLHQARLIDG DAAAFGARTLNALFARPAPERRA $V$ D $\quad \mathrm{L}$ R $A$ $L D L G A V A R A Q N A P F \quad A D A V S G P N L D A L M A A G R P V W E Q$ $L D L A G L$


 $\begin{array}{lllll}L & D & R & L A\end{array}$




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T M M W SWVPSALGHDFPVVNLPY $M$ WAPMPPGSGFGL ENLPPYGVFAPPGR MT WAD
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## s WI

VKGADE
$M T R\|D\| P G N S D F P G D$


M S
M
 TWAEDAAGSAYDVDNLPYAVFSTADGA PRVGVRIGDHV SWVPGANEADFPIQNLPFAVARRRDSQEFRVMVAVGPYA



D
PDD
S WVVAS APDSDFP|I QN|L|PFGRFRDDGQP WRIGG|V|A|IGDQ|V SWVESAADGGFGI GNLPYGVFARP RELPRVGVAIGDRV


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 $\mathrm{G} V \mathrm{~F}$ T S F SMA
F R R A F S $\frac{\square}{P}$ G

 G | A |
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| A |
| A |
| A | $\begin{array}{lll}\text { G D } & R \\ G & D & A \\ G & D & R \\ G & N & 0\end{array}$ SWI A SAANGHDF

SWV SSAN DGD
SWV ASAN GCDDF
SWV A GAN $\mathrm{F} P$
F
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F T | $Y$ |
| :---: |
| $\frac{L}{F}$ |
| $F$ |
| $\frac{L}{F}$ | GSF TT T

PDRDRRIGVA ADSV T P D A
 SWDDSAPDADFPIQNLPFGAFER DGTARAGVAI GEHA $\square S$


 WWVESANGHPFPI QNLPFGI FSS G G GERRAGVA I GDD

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 F LLVPKDSDFTDKNIPFGVAS KADGLPFPATIIGDSV

 S WVESANQTDFPI QNLPFGIFRPRNDEKPHIGIADGEQI SWVESAPDTDFPI QNLPFGRFRSTSTAPWRVGVAI GDQI SWVESANGHDFPIQNLPDGVFSRPGEAARGGVAIGDSV
 SWI S SANSSAFGLQNLPYGVATAGNNAEPVIVVAIGDQA



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ーゥг-বггく SYLYNEDYFGDFDQLENVFE LDVGAAARAAGAGTASABAEAVLRA
 IVDLCQLSACGLLPEEDF AGLAPTVNPLLAAGRSAWTA I DLGALSEAGAFSGLDDAAQACAQPALNAFFDMOPEDDSH LDLRA乌SHLL I DTALEGAAAAAVGSPHAALLGHPTLNPLMAAGRPVWQA VDLAALAAQAPFDGTAAAALAACQGRLNALMADDQAHWAS LDLGALAAARLIPLTALTEACSDASMARLLALDAQDRRA VDLA LQQAGVLDGLADAVRAATATTLNALLDMGPGAWQA VD LDLTA VQALHDDVFDAASLNPFMAQGRARWIED LDLCAVGALLPPEVLPLLEL LDMAKVAALNLLHGDAKRATAASETSLNTLMGLGATQNSA LDLRA ALGEEEFARPALNDFLARGREFWTA LDLAAAEGESFGRLLGA FDVGAWVRDQG KSSAEFKLLTEKRLNRFLAAGPQTWSA LDVDAALARNDFPAEAREAAQAAARPLNDYSLSPVKRSA LDAGAAAEAMG SAHAELLRQPVLNPLMAAGRPTWQA FDLGKA SAGSDRFGEATRAALQAPVLNPLFSLGRKALRE LDLHKAVESGDCQTCPSCTALRDPALNRFLMMGKSVWQT LDLQALALTKFFPV DVVAAEPTLNAFMALDRRTWLA VDLSALERDGYFKTVPGFEAVFSQPTLNTFAALPKSTHRQ LDLA A DADLP DEV REALAGTTLNAPFALPSPDRLA LDLLAAA GALDPEHAGLFTAGSLDRLLAAGPTVWSQ FDLKAAADAGLFGEAKHAAAAASGASLNAFFALGAGPRRA LDLKA 1 DLLAAVQAGVLTGAAADAQGTEAGTLNPLMDRGAAGRRA II DLSALERVGSFSDDPGDEGVFSQPTLNAFAAMPKEDHRK LDMRVACEAGLFSSTAQAAEYAAGTTLNAFFALDATERRA LDAAAEAAGLVLAAGALG RPTLNAFLALGRPQWTA LDLAGAARAQLLPGVINASRLMGSNLNTLMAFAPEQRLT IVDLVQYASTGKLDRGQSGQTIFAQPTLNQFASLSWETMK LDLAABARLDASRMNRLMRLPPETRHD
VDLA ATR
LDLGAAATAR －PDWAPLLDAPALNPLMAAGATVWAE LDDLGLCDTPWHGKAADADAACVKPALNDLMAGGQEYWSA LDTAAVAAALGSPHAALLAAPTLAPL MAAGRPVWQA LLDHALGKHGVFTDGAVVNAFAQPDLSMFAALPRATRTA DLLAAVHQALKLDASLAAALTLCREDLNALMALGPAAWSG IV MRAKAEADLLPDESWQAVFRADALNPYFALAVEEQRAD VDLHALADSGLLASGSDAADACEAGTLNRLMSMPPRYASA LDLEACVRHGLLEGAPSVRDACSQSTLNDLLAAGPEAWQA
 VDLAALAQSGALDAALEAAHAASGDTLAPLLACAPPAVSA LDLEAVIAAGLFEGQAKAAEASLGGALNAYFALGRSARVA d A ALAAAGVLAGPAQVAAQAAASDLNALMALGQGAWSA LDLRR ARLIDSADMNRLMRLAPEPRHA FDLHAATESGVFQGQAADADVASRDQLNDFLALGAAARQA LDLGAAARALDASFAEQVQ
 LLAA A A PLLEGQ A ATAAALGGQGTLNALLSAGGEALRA

 $L D L G A L P D A L P D V V P A A B A A L L T A G T L N P L L A A G R P V W Q E$ I NLAKLEELGYFNGPLLGSKVFDNGNLNKFVSLSRPYWKE

 $V$ D L A G
 $L$ DLA A Y KAP DA D M M R V M S L P S HA R TA $L$ D LAA A LA G S G L L E E ALLEA A GAAS G D T L N P L LAA L GA G P R RA

 IL N L S A C A A A GLL LDE DFGVDACLLCRDDLNALMARSPAEWRA

 | $V$ | $D$ | $L$ | $T$ | $L$ |
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| $V$ | $D$ | $L$ | $V$ |  |

$L \begin{array}{lll}L & L & L \\ R & V \\ R & A\end{array}$

$L$ D L R A C LD L G Y LD Q L S P $\square R D A C B$
 $L$ D P A A LAA A GLVFAGEAARAAGAASAT LNS FAFA LGAGPARA






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AYSHHFSDNNLPFGVASSSQHPRPQCVTRLSNTV S WFASANDTDFPI QNLPFGLFRSAG RTRGGVALGDAI SWIESAPDTDFPI QNLPFGVFER DGVARGAVA GEHA
 MS WVPGADGPWGVHNLPYGV

 SWVA S A P D S D F P P L VS PLLDA GA A SWAESA

TD GRWRRPGETAWHLGVA I GDQV SWVPGTADHPFPLENLP SWVASAADTDFPI QNLIMVGVV R $S W L V E L T T$ S DP F G V V Q NL M SWVGNAPN RTA
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    SWVGSAN
    

SWVDSANDHPFPI QNLPYGVASSESHPMPQCVTRLENKV


S PWLDLA GDDPFGPHNLPYGVFTTADEPGRRVGVRDGNHV
TWLDIAPDARFGPSCLPYGVFSTPDRSERRVGVALGGH



SWVSSANGHDFPTQNTPYGLVSPP NEAPRAAVATGEST SWVKGANDHGFGLTHLPYGAF HANGSTRLCVRIGEWL
 SWLESANDTVFPPIQNLPFGRFRDAGESAWRIGVAVGDQV SHFGINNIPYGVASSSKRSSPQCATRIGGEV】EVPADSVFGPDNLPYGVFAPPGGPBPRVGVRLGEHV HHFSQKNVPFGDASSPSRQRPRAATRIGNTV M S F S E SHFGlNNIPYGVASSSKRTTPQCVTRIGDEVV HFSLANIPYGIASTAKHPK GVATRIGDLV $V E V A P D S L F G P E N M P Y G L F A P P G G D$ FRAGVRLGDTV T WLELPEDSPFGPDNLPYGCFTTDDAPTPRVGIRI GDRV S WVA SANDTDFPDQNLPFADFRRKGSQEWRGGVAIGDQU F GLDNLP Y GVFSGPGGERRIIGVRLGDSV FVPGADGHDFP NQNLPDGMFSPRDGAMPRAGVA GDHL MSWI DDPADRPFGPQTLPYGVVETADGPS VAVRVGDHA

UniRef90_G8SG62 UniRef90_M3FWU3
UniRef90_UPIO004637E82 UniRef90-N1Q0X5 UniRef90-UPI00035D3E61 UniRef90_IOH926 UniRef90_UPI0003697E7C UniRef90_Q4ZR65 UniRef90-UPIO00379C609 UniRef90-U5BSX6 UniRef90_UPI000345BDF2 UniRef90_UPI000376F8E7 UniRef90-A1DCJ6 UniRef90_F6II04 UniRef90-E1THG4 UniRef90-U6ZNZ1 UniRef90-R7QEG5 UniRef90_UPI0003AAE1F7 UniRef90-Q13GC1 UniRef90-D2QTZ4 UniRef90-A7T3Q3 UniRef90_UPI0003484F3C UniRef90-F8JNW7 UniRef90-Q01SD0 UniRef90-TOHT18 UniRef90-D5GNG6 UniRef90-M9LN95 UniRef90-B0UJN4 UniRef90_UPI00037398B9 UniRef90-N0E5A4 UniRef90-B1XX61
UniRef90 ${ }^{-1}$ M3BN97
UniRef90_M3BN97
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UniRef90_B5GWG1
UniRef90_UPIO00349130A
UniRef90-UPIO0036CA5CA
UniRef90_D3D8W9
UniRef90-A8LTH4
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UniRef90- X5KVL4
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UniRef90-I3CXW2
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UniRef90-C1N7D9
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UniRef90-G2XHQ5
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UniRef90-L2FNN0
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UniRef90-Q0V4X9
UniRef90-B8IKJO
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UniRef90-TOMK31
UniRef90-19WK31
UniRef90 ${ }^{\text {Q }}$ AUC2
UniRef90-Q5AUC2
UniRef90_Q2H194
UniRef9_W2RT28
UniRef90_T1ISQ9

L D|L|A G|L|T
50


LDAGAAAHAVGAPV

$\stackrel{L}{\mathrm{~L}}$
F D L R A A

$\overline{\mathrm{V}} \mathrm{D}^{\mathrm{L}} \mathrm{S}$
L D L G
LDLEVVGAAARAAGAPFADLVQGPSLDTLMGAGRPVWDQ L

 $V$ DLAALSRTRCVSGLAAAVQAAAGASLNPLMELGPEAWRT
 V Di RASLAAGSFNGAAEAARAAAADALN RLMMELGHAAWSA
 L DLA A T LDAGAAARAVGSP L DLRVTAAAGLLKADP DAGLLGHPTLGPLLAAGRPAWRR
 L DLGKYAAALGAKDMEGAPGLANDSTGMAALGGAGNDTLRA LDLALAPHAFASGPLSDQHELFSQPTLNAYLAEPRQVHRD LDLPALLAANLLSGEAALAAEAAGGTTNRLLAGGAGPRRA LDAA LHERPLDSGAAQALQAASLPRLNALMALGPAAWRA LDVCSVPDAPF


LN A FLDALGRESWTT



 60 T 70

80 GDPVHATGSLNAFMAQGPDTWAA LGDDVFARPSLNAFMAQGHTRWVE


 LDLCALAETDLLEACSAAADVFGQESLNRFIKLGEQCCSE LDLHAT AGAGSPY A GLLDGN

 $V$ DLALL $\quad$ LGDVFARPSLANFMATGHAEWVR


 $V H L Q G L V A S G L D D E P A Q A A D A A A G G A L N E L F A L G A E P R D A$ LDLAALGDAGAGEMARAAAALGARDSLNALMAAGQGSW LDLPAAQAAGAFSGFDEATRACSGSRLNALMALEPAAWSAA
 L D S WL A S E DL HVVS PWL LDV PGAGTLTPDMRAGAKTWRA




## I DLA

l DLas VT a G A LGGSPYVS $\bar{T}$
L H S Ghars GL GEARAAAEAGDQPTLGPLLAAGRRTWSD L D S G
 V DLLSYLANEGFFDDFDIPRPVFSQPYLNDFISSGKKKTGA
 TDLQALVAAGLMHDPDTLDA\|LATPAL RKS LDLAACADSPVSESLPIDRRAMAQPTLNALLALGPPSWQT LDVAA SAEGLADVCAGGALDGLLAAGPEAWAQ L DLRR A ALDEHGDMARLMSASASVRRA I FLCKLYEQGLLSSVP LPAGVFKYSTLNAFAALPKTVHSA
 I DLAV
LDLNAVKH DFDGPVLSKQHHVFEQSTLNAFMGLGWEAWTE I WLEALHQNGFFSDI E LPDDAWSHETLNSFASLPKSVQSS



 V DMAAVAAGVFAGDALAPAQAAAESTLNHLMEMGGKPAS I

 L DLLSVI KHLLFTGPVLSKHQDVVFDQES V DLA AL K
 YFLSDLISHNLI GPPFPDTAALTNESTLNAFAAGLSTSTHQE

|  |  |
| :---: | :---: |
| UniRef90 G8SG62 |  |
| UniRef90-UPI0004637E82 | LRKQLFAMLSEGTPEQRQ DEGF |
| UniRef90-N1Q0X5 | VREQLQTELKDG KVPSSCL |
| UniRef90 UPI00035D3E61 | VRASLTTWLTDP DLRASVEP |
| UniRef90-10H | LRaQLTTWVT |
| UniRef90-UPIOO | VRarvithlsipa |
| UniRef90_Q4ZR65 |  |
| UniRef90 UPIOOO379C609 | VRASVRDL |
| UniRe990_U5BSX6 | 1 RERVQDL |
| UniRet90-UPIOC |  |
|  |  |
|  | A |
| UniRef90-F61104 | RARLSDLFRRGGG GDPNILQNMLVPMAEAELLLP |
| UniRef90 E1THC | LRAALSDLLKSDAPQRARVQQMADALLPRUDTLELRMP |
| UniRef90-U6ZNZ1 | LRHGLFALLEAGS QDEPTVRQVLVSQEEVAYRMP |
| UniRef90-R7QEG5 | $V R V A L Q D A L S A A P K R ~ Q N M Q A E L M P L Q S D V T M H L P ~$ |
| UniRef90-UP10003AAE1F7 | $V R E R$ VELLSSEEHR AEVEQHLSPLAGKTMS |
| UniRef90-Q1 | ELSRSLRHDA RHATRHADV |
|  | DKDVLALAD VHD |
| UniRef90-A7T3Q3 | ALREGA DQALESALVPMASAEYAVP |
| UniRef90-UPI0003484F3C | LRQALFEGLREGSPR QAAWAGALHPVAGLELGVP |
| UniRef90-F8JNW7 | VRAAVADWLTGAAHR DAVAPHL |
| UniRef90_O01SD0 |  |
| Ret90-TOHT |  |
| 5G | VRQRIREDVQGN HVKESCFVEASRTKMHLP |
|  | FRSFLQHMLSSDSHVFSDSQAVLQAALVPVEQAKLHLP |
| UniRef90-B0UJN4 | GSP DRDRVAPL |
| UniRef9-UPIOOO3 | A WR |
|  |  |
| B1× 1 61 |  |
| 338N97 |  |
| UPIO | D $T$ |
|  | LRRAISRGLIAGS EQQQA |
| UniRet90_B2WB28 | VRFAIQEAYKAKSH GTCSENVSNVTMHMP |
| UniRef90-UPIO003483 | VRARVSGMLTDEGARPQ VEPHLIPLESVEMTAP |
|  |  |
| P10003 |  |
|  |  |
|  |  |
| M1 | N |
| UniRef90-C9Y613 | GLREGSAL QKI |
| UniRe990-B5C | VRRALTAWVTVPAHR ATVEPLLIPLIPAV |
| UniRef90-UPIOOO: | VRAAVQEWLADPA REGDIRPHLADRAGVM |
| Uni | TRRRVTDLVSGD |
|  |  |
|  | VREALTELLRAGAET APVRAALHD |
| UniRef90-Q0CAP9 | VRQTLQSMLQDGTG SALPPSST |
|  |  |
| UniRef90-X5KVL4 | QSLIEGSPRQR A AVAEFL |
| UniRef90-UPIO003 |  |
|  |  |
| UniRef90 V4F | LRQQMSQLLRDP RHADSAEPYLHSATDCTLHLP |
| UniRef90-C1N | ALLA LIHPMPGVRNLRAPCLYKME |
| UniRef90-G7XBD1 | S L Q S S S SLPES TAD |
| UniRef90-12GP74 UniRef90-UPI000467A6C3 |  |
| UniRef90-H6R557 | VRERVRELVDGG |
| UniRef90_UP1000255EA97 |  |
|  | WV |
| UniRef90_UPIO0035F4057 | LRRALHALLAEGAPQ QQQAVSAL |
| UniRef90_UP10003775E69 | 1 GQR NALLANDAVALADVQD Q |
| UniRef90-E4RZ33 | VRNLLQTLLKNPTPEVME |
|  | LRETVTT |
| M2L |  |
| UniRet90-G3PLC | ARRTLQMLLS |
| $\begin{aligned} & \text { UniRef90-V4NX } \\ & \text { UniRef90-EETTM } \end{aligned}$ | K T |
| UniRef90-E9UYQ8 | VTRLLSDPGS EAEV |
| UniRet90_B1Y | LRRALSAGLIREGSAQ RATFSEALLPQAAV |
| UniRef90-G4NFLO UniRef90-ROI802 |  |
| UniRef90_R01802 |  |
| UniRef90 - V8NXI | Q |
| ef90-G2XHQ5 | AFPVSATEDTG |
| UniRef90 M2UNT1 | Al QEAYKNN $\square Y K \mathrm{CFSEH}$ |
| niref90-L2FNNO | LRKNQTTLSNNA DQSVVSKHGVPI ENVHLHLP |
| UniRet90 UPIO0036 | VRARLRDLLANNEALLRADTELPDQAV\|HPLNAVRVALP |
| UniRet90_U5EE84 |  |
| UniRef90-UPIO0041451CB | R |
|  | L |
| UniRei90-B8IKJ0 |  |
| UniRef90-UPIooo36C100E | RARLRELVTATAAPD G GAVLLPLADAQVRLP |
|  |  |
| UniRet90-19W |  |
| UniRef90 Q5AUC2 | VRATLQSVLGEGLINGLPENSKA P D D T TVKLIHLP |
| UniRet90-Q2H194 | VRGA QSACQNGNSPODOSKLDGCVED TE EMHMP |
| niRef90_T1ISQ9 | VRHLIQKLLSGDDARMRDDPELRANAFVYQSDAT |

UniRef90_UPI000288779D UniRef90_C7YY60 UniRef90 W2S2P7
UniRef90 U5WEX0 UniRef90_UPIO0047C46A9 UniRef90-B6HOJ4 UniRef90-W5TS18 UniRef90-G2R513 UniRef90_U7PQQ5 UniRef90-UPIO003FE7690 UniRef90_W6JT08 UniRef90-V4QAC1
UniRef90 W1JFD3 UniRef90-A0A016PUS3 UniRef90-A0A052J7J5 UniRef90_UPIO00370E905 UniRef90_UPI00035EF686 UniRef90_N1RWZ4 UniRef90-M3BSP0 UniRef90-C7QBNO UniRef90-UPI000303574C UniRef90-N4VCY7 UniRef90-E6V1Z0 UniRef90-W2EGL2 UniRef90 E3QBA3 UniRef90-X5L8R3 UniRef90-C7MUD2 UniRef90_H1VH91 UniRef90-B6UMU0 UniRef90-W5W5L9
UniRef90 UniRef90-J9NDK6 UniRef90-R1EAU1
UniRef90 C8X778
 UniRef90-UPIO0037DA3B0 UniRef90_UPI00036269AF UniRef90-UPI0004744A99 UniRef90_W2RWM5 UniRet90_HOA219 UniRef90_S3E963
UniRef90_A4F615 UniRef90-K0F875 UniRef90 UPI000464B20E UniRef90-H6RQA3 UniRef90-K3W458 UniRef90_G3Y939 UniRef90_UPIO002379BEC UniRef90-C6WDR9 UniRef90_X6P758 UniRef90 K1E9J1 UniRef90-D5RH29 UniRef90-X5EB70


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[^1]


[^0]:    lupas_21
    lupas_14
    lupas 28
    jnet
    conf
    sol25
    sol5
    jhmm
    jpssm

[^1]:    lupas 21
    lupas_14
    lupas_28
    jnet
    conf
    sol25
    sol5
    sol0
    jhmm
    jpssm

