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QTRTYDGDGYKKRAACLCFRSESEEEVLLVSSSRHPDRW14 R】Y DEEGFRRRAACI CVRSDAETEVLLVTSSRRPEKWI
 TRTYDEDGFRRRAACLCVRRE ETEILLVSSSSAPDRWI F S Y E E A DKVLLVSSSRNREKWI HVLLVSSSRHPDQWI VY D Y P R P A LT A D C IVIT K EAKPRVLLI QRGRDPGCWA

 YRNPAPTVDII DETEGGIVLI ERKNPPHGWA HYRNPVPTVIVI YDPVRGVVLIERKNPPDGWA YRNPAPTVIVI YDPIRGVVLIERANEPHGWA Q N DLY D Y P R P A | V | $A$ | $V$ | $D$ | $C$ | $V$ | $V$ | $F$ |
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 DENDVVRQVA GCVPIDVENQARVLLI SSRKNKDAWV YKYPRPSVTADCDVI TKGDGGRMVLIRRANPPVGWA QTRTYDREGYKKRAACL CFRSEREDEVLLVSSSRYPDQWI HRNPVPTVDVIVEREGGVVLI KRKNPPYGWA LQRYE QGCRQVVGCI PYRYKKNGEVLLI SAQKGSGM Q ENRVYTYKHPHPSVDCVIFGFNGSLQVLLIERGSEPGCWA Y P Y P HAAA $R I V A V G A V L T D G E G R V L L I Q R R N P P G K W T$ $V D$ VI FVVSDENLKVVLLI ERKSPPNQWA

 TRRYPSPS LTVDAVWU ARAGRVLLI RRARPPGSWA VVVLV PGATSEDDGVVLI ERTNPPPGWA TADAVVF SESDQCILLI KRANEPGMWA

$P E T P K L T V D A V T G L N G K G V L V K K N P P G K F A$ $P T V D \| I \quad \operatorname{LIIDQPNRPIILIERKNEPYGWA}$ IVL: K R K N DPDFWA V VA LA GQKK N N LQ L L L I K R K H P P D M WA $A \vee G G V V V \quad S K G Q V L L V K R A H P P G L W A$ $V$ VA GAFVFDKENRVLM QRRTDNGQWG
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 V I I D L GRRGIVLI ERKNPPF GWA ELQRYNNMGGRQVVGCVPYRYKEDELEVLVVSSQKGHADMA
 $R G Y V K D N P I I L N G V S V L I G N E K N K I L L Q R R T Y P K K N W G$

 PRLAVDLVI HHPAQPGRVLVIERRNPPHGWA


 VSAGGLVVDTTGK LGLLI GRRDQKDLWS LTVDLVI LYREG VVLI KRKHEPDHFA
 TYYKNNPKFFVGCIIFGGEKE QLLLLLQRNFEPGQWS ENQRYDGD VRLIVCDVPF SPAGQVLLISSSKHKDCWU $K A A G A V L L W R R S P A G S E V A V V H R P H Y D D W S$
$V V Y A L I Q N E E G N V L D V M N T D G G G G W S$


$K V A V D A D V F G S N N A L H V L L V K Q K F G K N N W V$


 RE L K V ML I KRRRRW G GWA TE Y Y D D P N A PMVVAASAVVTD DQGRILL Q Q R R R DNDLWA V D C VI F FDE GE L K LL L IER NQDP DWF A
 $E L Q R Y N$ MGRRQVVGCIPYRTESKE LEFLVITSSQKGNAFM PKHII I SAA TVVMKNDKSSVVLLMKRAADNGLWG NRVPLEQTERRVPCVGAIIMNAAGALLLVQRAREPGRWS VVYALI QNEDGQVLLVHNTDGGG WS $V V P S V V A G V Q D R G E L L L I H K T D N D K W A$ QF QRYNK GRRQVVGCVPYRFKSDEVEVLVISSQKGHADM


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 DKHHRTNVYTLTVTEVLEQWEDSENI GRKREWFKVEDA
 EKKHRTWLYVFIVTELLDDWEDKKSMGE WWTLA KRDARQHTAASTVVIATAS GQPVAADDARRAGVFVEAAELPE


 D R D P R E RVVIT T I A Y Y A L V VK M A E K G G D D A A K A H WF S Y N E I P S


A R DPRFHT $\square$ T TVF $\square$ GK GE GEPRAAD DAQE LK $\square L K R N T L P N$ PTMHEGYMFPLLVSKELDNWPEMN DRRRKWLTVDEAKE D R D P R E RVITI A HYALVRTSDRPGDDAARVCWFSLDDVP T RRDARGHTI TVYRAEATGGTMRAGDDAARAEDFPLDTRLE DRDPRERVIVVVHFAFEALAEVVKGSD DAAEA QWFDIDDNLPV GPDDVVFEVHDFAARIVSGTLCAGDDADDAGWFTAEDLTE

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S K LT G T I L V M GF IVVEKWN G I IR A G S DVVEAEFF QYD QLP P

 ARDPRHHTVSVVFTAAGVGEPRAAD DARSLAVFAA GSLPA G $\square$ Y Y E GYMFPLVVKE QLDHWPEKN LRRR IWMTVAQARE

 $N C S \square C N T L F L A K P V G G E L A T S P E S D E V G F F P I M K E A L E$ SRQGKKCRFYGFRVSARQEFSKWAES DRQRKWVSVDEGKR YRDPRGRTIGVAFVG』LKNLDRAND DAKEVQWFSIDNLPE GRDPRGHTVSAVYIARGQGQAQAADDAADCAWLAPDDPGQ ARDPRGHTVSAVYVAKGRGEPRAAD DARNLRCVDRDTGLP F M R DH K T V H H Y L F K E T G G K L A P Q L T E V D DV G WF P L S E VVD WAFPSNLMVGF AD YAS GDLNPDYEELTDDARWFSADNLD $K F Q D E Q H V F A G N I T G G G Q A I E N G M E T A G L K W F S P E R L P B L D$
 ARDPRKHTMSTVFIAHCDGDPEGSDDAADAFTVSAEQLLE GKPCRFYGFRLEVRQVFEDWAENT RRRKWVS LDEARE


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 RKPDE Y H F Y E ME VE NL A D V W P
 Y T QNRTYWYTMSCTDDSQMTPQLEEGDDDIRWFGIEEA DTNRRHYVVLCDYAADWT D GEP IAAGD DAA DAR WF P L A D DA S FPSNM M MMGF LLA E Y E S G E V VK P D Y Q E L S D A R WF D

 HRDPRGWVSVVYMARVVPQTPKAGDDAAEVSWFRLDNLP P SKRHDTYMF PLGVKEQLDLWP EKN VVRQRVWMTAAKARE
 GPD GAVYDI A DYVCDIGGG\|LRAGDDAADVRWCP
 $R H V M R Q Q F S L A F R A R L V G G E A R T S S E S D Q V E W V P V A D L G A$ SK SRGTYMFPMLVTEQLELWPEQH VRQRDWMNVTEARE $\square G D E H V H F D T F R G E D L Q R P E T D P D S E L L E V K W V D L A A B A D R$

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GHEKVIDMVVAFVFDKENRVLMOKRTDNGQWG YPRISPAVIVLIRKGSKILLARSPNPPDMYS GAFVIIQNDGRDILLVKRKDVP LDWD QSFYANVPRHLVACTIFGFQNGKLKLLIQRKVDPGEWS DPDAPKLVPACGVLAVDDQGALLL QRRRDTGQWA RDYENDPHAPAAAASAIVVDDSGRVLLGQRRRDNDMWA DCVIFGFDEGLKVLLTQRNDPPNWWA QFQRYN QGCRQVVGCTPYRYKTDKEEVLVVSSQKGKGMLD $P D Y V Q P G V A G \| I L D E G Q R V L L M K R A D N G L W G$ AVVIMAVTNESGDKVLLGRNKKWPGKYS AGVAGI DKESNSVLLMKRA DNGQWG YEKSCGGIVYRKFHGNTEILLIKHDKSGYWS KRVDVVYSFAEENGQVLMVKNRKNQ SWT LrRLVGKETVILVGALVIMAENDEGRDLEQERTNPPGSWS GCGGLVINEKNE:LLITMKKRPDKWK AAGAVLWRHTGE SSVALVHRPKYDD WS RQQGGCLPIRDDGKLRVLLIQSLSHPREWI VAVAVVHDDRGHVLLAERTARQGFWE NQRYAPNGDRLVAGVVPIVSPDKSKVLEIQSAR PGGWVV
$V G A C V L V I D H E Q R V L Q L A K M N G C W G$ EHTKP $\square A V V G V L A R R P D G R V L L V Q T T K W R G A W G$ LQRY SKGRRLVVGCTPYRYEKQELEVVVVSSQKGKGML

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KHSLSAGAVVL NERGKILLIKRPQRG WE VGCGVFFNDGELSLLLLKRNFEPGEWS GVSVVVFNEKDELLMKEMRYTVGWE WPQLATAIIVLIHNKDKVLLVHANNFKGYYG MPRPETPLIAADLLILIDRPERPIVLIERRFPPHGWA NKYYKGEPKLLVVDCIVLGFENKKLQLLVGKRKYSGKLS RRRSGDRIVYAAGAVLWRPGKAKEIALIHRPRYDD WS YPRLSPAVIMTVERGHEILLGRSPRFPGMYS $A G G V V F K E D Q D Q I Y I L L D G N K D R Y G$ VAVALILRADGQLLLGQRPEGKGWWE ELRALVGNRPLIVGSVVIVRNEEGKILLQQRRSPHGVWG KNQRYGPKGERLVAGVVPLSSADKTKVLMIQSSAGRGGWV EDYPRTDPAVI CLVHDGGDRVLLARQPSWPGRYS YPRDSPAVMVLDRDGRRLLLARSPHKPGVYS HRVSVGAFIMNDKREVLAVQEKRGLGVWK DERCAALI GRVDRRGRWS DFYRMSSHAVIF NEQQQVLLLKATYAGCAWG TQDDSPRPLIAHGASI I CRKENRFLLVKRGKEPGSLA LRRLVGPRPLFAPGANVLITDDAGRLLLRHA GTGLWT $K L V F V S A V A L D D V E G R V L L A Q R P E G K G L W E$
$R T V P V A T G I I E D A G G R L L I S L A P E G P G F W E$ KQRATVIC KRDGQVLYVRKPKS RWA DMQGKK VLVAACALVDSDGR1LLAQRPEGKGLWE MTTYYNEHSKVSVDCITFGFEDKKLKLLLGRHMDPGRWS MKAEPSKGKRLLLVVACALVDADGRVLIAQRPEGKGMWE VSSSRHPDQWI
HRVGVGAFVFNDKREVLVVQETSGTGVWK HYPRIVVCIIVISVRGDNEILLAQHARHGGMYT
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 WPFPHSLMAGFIADYAGGAI RCQPHEDEEAAWFSVTELPE P Y E K F H L L M P F F V C H C F E G I P Q S C E GQQ Q Q W W A L D D L

 FPSSM MVAFLADFDS GELNPDYTELSDAQWFDVNELP NGEVVHF ITTSCFLLAEDTGGESCNEEESSLEDKFFDVVDDLPN
 WP Y P N S L MI A FTA D Y ES GEEI EVD GKE IT DARWFDPDEELPR WPFPNSLMI GFTAEYDS A F E D T Q H V FIG A VT G $\qquad$ GTPLMNGPKTAALRWFSPNRLB






 RKDAKKEVVYFVARARNYDYTPQLEEDSE\|RWVGDGQAHN

 N Y A F D R I Y F V CA L R A L S S E I N M D P S E DA K CK WY P V E E F V K
 K K Q A S $\quad$ D D L F V L F VR G D Q D A V F E E R D E R D Q R WV S NYQVALVKIGTCQDYHGTLDKE NE ESLLK L E F F S V D D DLPE

 S K F HE GHMFP LRRVTE E LDD WP EK S
 DTHYE GYMFPLLVVQE QLDDWPEKN VRQREWMSVVDARK




 D R D P GE R VIDSVA Y Y A L V N V N E Y Y D R K L V R K A Y WV N I N E L P P




 THRVVHKLVHHFALRYVSGDLSDPDHEAEDABWVNFKELNA WPFPHSLMVGFNAEYAGGEVVPDPTE DEDARWFSRAAM P K



 F PRS L ML GY H A L A D PA Q P I I P EP G E I E E A R WF S L T E V
 K S F F D K L F F V V C L L R P L S Y D I T K Q D S E I EA C Q WM P V E E FA A

 S Y D D F H L M M PL F A CR K WN Gl P H P R E GQV L K WVVK V S E L R D





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| UniRef90＿UPIO002BC7F14 VCWH P WM |  |
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PAAGAVLYRMDGDSPLLCAVVHRPRYDDWS $R$ VGVGIY YNQEHQVLL GQRKHGF GCWC EHYPHIHPCIIVLVKRGDEFLLARKS DWPGRYG YPRVDPVVIVIUPDGNHCLLGRQKRPPGMFT PRHPQLAVSAATFRDDGQLK RLLVRRNVGPGKWA GVAIVIFNDKKQVLLQKRS DVCLWG
 QRYGKDGSRLLSAGVVTRTNEQGQLILLISSSNPNKFL QRY ADGSRLVAGCIPFRYLNSEHVLMLSSSSGPGLL LRRHVGHDLLMLYGVSGVVTDDAGRVLLARRGBDNGRWS GCVC NEKGEVLLQKRGDNEG WG $A A G G V V W R V D E K G R V L L D H R T K Y R C V$ RPRAAAGALVFDEEGRVLLVEPSYKPGGWD KVIVGGI I EKEGKYLLVQEAKKKEKWN
 WPQLATAII VLVRRGDSILLVHAHNDRGKYG LAAGAVLWRGDPESVEVAVDHRPHYDDWS $K R V E V A A G V I F R R D G R F L A G Q R A P D T G Y W E$
$E S S C G A V V Y R D I K G E V R Y L I M N K R S A H W G$ $Y E S S C G A V V Y R D Q K G E V R Y L L I K N K R S A H W G$
$Q Q A G A I C Y R R N G S G Q L I L L V G S R R N G R W G$ $R D G R V L L A R R G R A P G L W T$
$E Q L K K L L I$ TYEAPSLTVDMVLLCYRQEEQLKLLLI QRKSHPFRWA
 KRVVVAVGVVFDEQEQQLLLAKRPDHGGKWE TRTPEPEGVRVAVSTVIFRDAHDEPVLLVRRTRDPGRWA

YDPHAFEPFAVAVFTVRAGAGRLLLQKRGDF GKWG QRQRYE DNMRLVSGCIPYRWKKGKEVLMISSPKRDDDVV PRVGVGVFVINPKGQIVLGQRSHGAGTWA YPPVTAPAVIVADDEKDGKLLLARNANPPTRYG KHVVGC VLR N GEE LLVCRSRERGRWS PEKTRKQFTVVSLVVNKKGEVLFVKRKKEDNKWE VGVGAVII NEKNQILLLLRNKEPGCWS GSVVLI LNDKNELLLQHRTDDG WG
 YESSAGAVVYRS $\quad$ KGKLRFLLIKNKRSANWG RPEYDKPSLTAGAVLWRGDHKDIQYAVIHRPHYNDWS DNPRIVAGTワAGEHAGKILLCRRADEPGYWT DGDRF LQVGGLVYRDNENNVEYLTDTSRGTGRWD


 KHYLAVDCVIVGYEDEGKLLLHRRPDEPGGWS
 FRHPVGTTVVPIPDGRIVLVRR RDTGEWG $P H S V S V A G V V L N D A G Q V L M V K R$ HDNGHWE RDYEDDPAAPAAAASAVVVDGSGRILLGRRRDNGMWA $P R \square G V G V L I I R R N D G K I L L G K R S H G A G C W S$ QRYEA GCRLVPVNVFVVNHRDEVLMIRRT DNDNWA

 LAA G AVL WRRGDN GEVVAVI HRPRYD D WS
RAAGAVVWRTESAPEVALVHRPKYDDDWT RA GVGVFVGYEPHRVLLERRS DC GLWG
R DAT TCY $\square$ DNGKELLLLKRNKKHEGKY QRYADDGSRLLSANVVWRLNGEKQLLLDSSSNKKGDFL $\square R G \square H N T S Y P R V D P V V I V V H P D E N Q C L L G R K R V F P G M F S$ A G GL I F DER GYVA, AR H SRS GHWC



$K R \bigvee H V A A A V I R G T D G K I L I A R R A H Q G G L W E$
 LETY DPARFPTVVSVLETVHDQALCVVLVQRARQPGRWA

I Q RKNH P G WWA
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$R \ P \nabla R G A I L L N Q D M D E V V L V K G W K K G A N W S$

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 EGLCKAAMYALYVKEELETWPEQKT KAWIRYGITGQIVGGSLKTPDREDKES R WWFPEEAV NGDACEYLNDWFRCRAVGGAPAADDESLAVAWFAPDALPD FQTYQTYGMFFKCSILGGSKKIDDEETLDLKFFPDDQMPV MPSKRTKIVHYWAAEATDDADRASEEIAAIEWVTPKKAIS MHTGDMLLFVFDGGLLEPSDWRERIDEGANCAFTPGSDVGE L EDDGFDMIVFNAKLI NENDEFDKEEILDVKWFDYDEIVN GPRNRLYVI RDYQAQAVGGSLTAGDDASDARFVSREEFEN WPYPHSLMI GFTADYDSGEIPVVDGNEVVDARWFGPDELPR WPYPCGLMIGFYADYVEGDLHLQRSEVAYGGWF SRDKLPD VAGRTKVVYYWTAQVLAGDFAPN DEVDELRWASIEEEAKR YEHAHVRLHFFEVADWEGEDHDHVHSALSWERVEAPEVGP QNK PHHYHVTVHLLHVVEAQLDFPEKGT QRDEAHFVVVSHAARWTGGEPAVGPEAAEVGWFDPSVLPE

RKQKWFP LIKVAl R NRDPRGWVVTVSYLAFDGEEPDAGDDASQVRWFNDN ERKYHFVILVYLLEVADGAQPKASDDAEDAAFVPVEKADE CYPNGDEVHVIDIVYASNDFTGQESEVLDAKWFPFDQLPE
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 KGKRLKRVDYWAARMVSGDRYTAVDEVDEVVWLPVKEARR HRDEFHYTILDFAARYAGGEAKAQDDVLEVAWATRDEFDR TPEHDWYTYVFRVTEFSGELIDSPEGTRYEWVPYNQVLS EDGKKY MYQAFMVKTVYDDWAES RNGRYRLWVSMDDAME FHKLVHHFALRRDGGTLTVEGDPDHEAEDADWVRFDDLDK VGGRPKDVFYWAAEGPDGARADADEEVDEARWVTTDVARA WAFPNSAMVGFLADYESGEDNDQEDEICDAKWFHYSAMLP FKRVHKTVHHFLDRATGGELSDEDVEVTEVAWVPDDELDS
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LS R Y D WMCKA L

GLT
LPMHPTQRDRHFLE
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LEMHHTQRLR
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RLT Y
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MVTFKND
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$R$ GVLVAVAVRDENGKMLIDRRLLEEGGGWE RLVLVSAAALIDKEGRLLLARRPEGKGLWE DGAVPVEVVAGVITDARGRVLLTRRTEGRGLWE VMAVIFNNQGEVLLMQEAKRSGQWY PPTYGALPWRIGGKGEVLLDHRPAHGDWS HFPRTDAAVIVIVEHDGACLLGRQANWPGRYS RLIGRRPPDMQVAALCL NESTGEVLLVTSRGTGRWI GVVAVVSADGTKVLLGRNKRWPKYWS ENQLYSARGARVAGCVCLNRDKDLDVLMVSSADQNKWII DIQRYPLLSPSMIVLVTRGDELLLARSPRFPGMYS DVVAAlIERDGKILLAQRSPDPGMWE VVGAVIV GDGLILCAQRGPGPGMWE
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 VDGSPKGVFVWHMRLDEERPFVSDDEVDARAWLQPTAALD WPYPSALMVGFFAEYDSGD DRLQRSEDAAGGWYKKDQUPE ERKHRTYVYVLIVTEVLEDWEDSVNIGRKRDWFKDEDAIK VEQGIKKVRYWAARRVDGEFSPNA EVDDLKWLPVTEALK EAEGKHYVTHFVGARVVDGKQEAVEKCEEWQWVTLDDV
 ELYYKYVVAAYDCKEYSGII KGDEAEVQDIRFFDLNKI PN GRRDHKVVHHYLLEATGGAITDPDHEAEAAAWVPLDMVSK
 GRDPRGWIVSNAFI GADDCNLRADSDAWEAKWFNLSE GRDPRGRVVTVAYLA LGPDTPVAGTDAADAVWTPVEEADG
 $Y R$
$G V R \square H K T V H H H \square L R F V D G H L N D E D P E V T E V T W D P V N Q L D E$ GARKYHVVSDGFLCEPMYGQLSPGPEVLEI AYFDPEQLSE VAA GLKVVRYWAVKVNGAQLRPDGKEVDSVMWCSPDRAAS WPFPHQLMLGFFADYAGGELVLQEDEIAEAD WFLPGDMPP
RSKCRGYMFALEVTEELEAWPEQKNCARQ WLNIKEAF R
 HHVMRQQFSLCFTARPVGGNLRTSSESRQVRWVDPAELDQ



 WP L N ERAAMRVWFAEVTRGEPRPLEDHDQLRWLPLADPAA
 EFTPGHDWYTYVFRARHFEGQVIDCNEGTDEWVPYDQVLS GKDEQHF VLLAVLCEWQSGEPVAADDAADAGWFRDQALQD QGERVIRLHAWRVVDFSGELQQRC HSALVWVTPQQAQE WPYP $\quad$ GLMVGFTVAYKSGSLCLQEEELSAGGWFHRDKLPE
 PAKGVTKDVVFFVAEDTGGTLRQPEEVRAVCLLPLEEAQR TAT YHFYELDAVSLETNWLEQGQ R RREWVDYAEAAIR PGPHHHY IMMSAARWIGGEPK LINEEDDDFRWIAPEAVAE YTH HK DTL NVYFCRHLAGE PQT DECQEDRWVTDDEIDK SYRAFNLLMPLYLCRRWSGTPTP REGQALAWVAPKDL DNDMRQEFSVCCACTDVGGEDRVSHESLAVEFVAPA SRAVVALVFRCSPAGAAVQYTE EAAEVRWMTREEVRA YPHKRLRLDVRRDDGWRG VPKGREGQAMAWVPQDKLAR KAWFRFILTGD VVGGDLKTPAQADSESDQAKWVDDKELA DSKRR K K I RYWA A A A GPGRFTPNEEVDAVRWLSLPAALR WP LDPASLMVGFTATAHDRADQLRDGELEEARWFTPAQUAE DKDQDVRVFPLYVDKLERNFPEAHE RTRRWFPPEDAAR WPFPGSLMI
$G D T C Q Y M A Q A$
G RPPKNWHDFEDE
 VSGRLIHLHAWHVPSFQGEL NAYEHQDMVWCSPEEARR YDFGIVALTTFYCGLLSGT PVLTEHAEVRWDAPAELSS YPDKSVTLSVWLVDAFA GADAVSGDVGREVRWWPDQDLVT AR GIVALVFRCRPVGGALRVSEESSEVMWLTADEVRE DRDPRVHVA ADEAQVSGQFAVQDTEDSQVAAFAPDQVPQ
 WPFPHS $\backslash M\|G F S A R Y A G G E \square R\| D D K E \square D A A G W F G V H E A P L D$ GDQCQFMDVCLRCRAVGGEARVNDEESLDVGWFPVDTLPE HPYRYGKSNLYFVCQLEAKTQQDPNEDAEVRWDDUDEFIQ
$M D A G K K H Y I T L F V F V D S F S G E P Q L L E P D K C E W F E W E N L P S$
 HAYSDFHLLMPLLFATESWDGELVPREGQSLAWVKSSDL KDGRDKRVDYWAARFFGEAQPDGNDEVDEEVWLPDPEAGR QVRYHK QVRHFLLEAVGGDTSFHDCEYDMVEWFPLHEACR DQKGRPKVVRYWLMTVDGGTFAANDEVDELRWLSFDDAAA KYMREQHMRLYVFRGVPMDEPRTRKEISKKIEWYNLNDLPT YVDKKVLLDIWWQVDAFSGNA QGKEGQQCRWLSLEQLDA WPFPHSLMLGFHAEYASGEVVMQPEEDEDAGWFSGHDLDA A YEGFHLLMPLFACRKWNGIPHP KEGQTLA WAHARELRD Y VRFHKFVHFFLLAYESGD IGQHDWEVNEARWVDGQAAKE
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LLH LT HPEHDS $\square$
K L T W
R LT Y ENE
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LAFDHHE
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LS F DHGRILADAVE
MKRFSYLRI EKAL $K \mathrm{~V}$ S $\square$ SRRLI D DWL
$R \square A Y A R R L A R Q A F D S$
F L S N P S DVEPEYLE V P P
LT R Y D WM
LD $\square$ H P S MR L R
L
A L K
$\angle A F N H D A L V L A Q L Q$
RLAYADE
K !
$\underset{A L}{V} \underset{K}{G} \square P W P \square V R A L L D T$
ALK
R PSW
$A \square E L S Q D V L A$
LAPADVPLLADY
RLAWKAEL
K L S L LARKL $\quad$ D HWL
LI T Y
LNSYTRILIENY\|E
RLQ WK P EVVQALMLSS
$\stackrel{M}{\mathrm{M}} \mathrm{P}$ F

H M
MP P A D R P VVA A L H Q
TVTEPRD
G $\mathrm{L} A D$
LVA
ALS
L
LLNAKRPELLEALN

| L ${ }_{\text {L }}$ A P A D $\square$ P L L E A F $\square$ |
| :---: |
| L |
| RVA |
| P I T |
| LI KK DKR\LKGFLQT |
| LP S | D F

L
RLT Y E WD
$R \mathrm{~L}$ T Y Q NEV $\mathrm{V} \| \mathrm{L} \mathrm{Y}$
LLTY
L
VDGLAE IIRRAFN
PAAD

| $L P A A$ |
| :--- |
| $Y$ |
| $Y$ |

YPMPPAPGLRDWL
LLSFKSERQA L

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$V V Q V L L R S G E R F L L D Q R P E H G L L D W E$ $V G A V V L V V G B D G D L L E Q R N E T Q A R F G$




 QVLLVQGYLAK S GWG
PARFPVTVDVVALVTDDVLKVLLITRLIEPGRLAA
 $R$ VID EAGFRPNVGLIVVGNQSGQVLVGKRVKGRDS WQ FR H P I GA SI I S LMP D GRIVLIM R DD S GQ W G HPRIVCGAVPI DYDSK QILLISSRKHQGNWV $M R K Y \square G H E T L L T V G C G A I D E D D S G R M L L Q Q K R \quad D D W G$ YPRISSCIIVLVLRDDECLLAHAPHYAGRYS

 $L A A$ GMLP WR RVV G G L E EV MVI H R P R Y D D WS Y QPGNYKRPSVTVVLRRLEGMEILLIDQKNHPDTWA KR DDVASAL 1 HDENGKILLVKNVKDSFYWS
 $P D G R K V T E V A V G V M V Q H D G R Y L L A Q R P E G K G Y W E$ $P T V L V A A A A L I D V D G R V L I C Q R P Q G K G L W E$
 VILERDGRYLLVRRANPPDMYA
 PKMVVGCLI EHEGKVLLCKKRNDQP GLDWT HILLIKRSMEGGKWA M $\square$ D F D GYRPNVG VVIC NDKGQVLWAKR YGQNSWQ
 $V \vee A C V \frac{1}{1}$ I NEFNEVLLMMQEAKES GK WY GYPTPKVAVSSAVFQENKILLVKQRSD GFWS YPRDSPAMMVLIRK GDAVLL AMHTNSSPKRYS $E \square R N L I G T R P L I L V G S T V I V V N Q E G K I L L Q Q R S D D T B E W G$ VILTLREHKLSVLLIQRDDEPGAWA $V V G V G V L I T N K Y$ GQILIGKRSKHAPYWS VAGVIV DDQDRALLI KR RDNGHWE AIA CSAYVEDDQERVLMI RRT DNNLYS
 VVACVIV NDANEVLMMQEAKESGKWY RCVVGAVI HDPQGRLLLVKRAREPGRWS PS AAVI AIVDRAGEHV L MSY R HRDA WGWE $P R V G M G V F V L \quad K D G K F L L G K R K H G A G H W Q$ P QLA T I C Y I D N G E A L L L L HR N K K HE G K W I $P R \square D P A V I \quad C L V H D G G D R A V L A R Q A V W P E R F S$ $P R K R M G A G V L V R D G G D R I L L V E P T Y K P E W E$ VA GAVI $\quad$ REDGRILAI QRA DNGHWE $P R N V V G T V Y V W N D$ T $\square$ NVE N Y K L N $\square$ R A A G $\square$ I E H N G K $\quad \square \mathrm{L}$ V H K E $\square$ S K D H Y A NNGKVLLVKRASEPGYWS $H R V C V G A V V L \quad N D K R E V L V V Q E K Q G K G V W K$ $P R N V V G V V P I L D D R V L L C R R A \square E P G K W T$



 LK Q Y K P SK Y ERPVDMLILRYLDNLKVLLIQRKNHPNCWA
 R Y D P $R V \vee L I G R T D R R G R W S$ NGRVL MASRKNYPGLWS K GDEVLVVKK TYGK GKWS



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FPG GK LE P GEGPEEALLTRE｜L｜REELG\｜JETKSACLAPTFASH VPS G GI EPGETPEECCIREVVEEETGCKVR\｜IDKLQVKDTV

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 EHVRRQEFNITFYGAFSGEGSLAVSSESTATVWVLPEQARD VPGKRGEVWYWAAEVDGQRALPDGDEVDEVRWVGPDEARR

 YPHAYVR LFFCKVTDWKGT PRGREGQADAWQTLPEVAP HGYESFHLLMPLYLLRRWEGLVTAKEHEALKWVKPDQLAD WPFPGQLMLGFFAQYAGGELRPDGDELLEAGWFDAHNLPP
AYESQSFIFRCELAEPAP IRLSESSEYRYFSLDELND GKESEGRHFFLSVFKAQADAKAVAVASDDLGWFTPDKUFA ПKYQKWFMLKLTKKVETSFINDPDNEFDEYKWVSY DIPDLGQTYVIFLAKLKNLHFAPGPESDECRLFALDEDP LRYK PPHVFLGTPKRLLRHDSKPMCDGQKQRWF KRDPRGWSATHCFYALIPAQAMQLRGGAEVAWFEVDAAKR GSWYRFVLTGE\|IGGELKTPARADKESLQAKWDSLEED NNKHGHTPFLCFQCEIGGKATTSTETEEVGFFAEDNDPP
 DRDPRGRVVSVAFMALGADEPEPGEGVADARWWAVEDLTE
 KGLIVSMVFR HHEVRQEFSRCFRATAGGGEDRTSSESKEARWLTKTELND VESPNGFFTVVFATHDWTGQPENREPHAQVRWADVNAAPE GSWFRFVLTGNVVGGTLKTPSQADQESDQAKWCALNELSL AP NGTFEILDYSCWSSGSSLSAGDDAADARW
DGTVRHHVFVGRDADLVADPTEFDEGVYE WVPDAEDRG FKKEGKHYUTDFMDSDWQKGTPKTMEPDKCEWVTKETAPK TPNLDWYTYVFKVTA FEGELIADQDCRELEWVPYNQLLN FKEKKHFDMNDFVADLDPGYSKDDYEAENYGWVSDEEAKK
FPRSLMMGGHA VADPAQDNAENDGEDAEAAWFTRDEVRA ARDGRTVVFDGGVLADPGR回LQESELARWAWSTPAEAAA R R
 NVPHVHQVHLFYLAKWNDGDFAPGEESLDEVGLNEADUP FEEKGQKYHEILFVHKAEFDNEEDKKIDQ MCTNYMFLHIVFWGRMSSSQPRASSDAEDARWFGWGEDTR KSFFEKLVFLCMLRPLSFDIQKQDLEDEAAQWMPFEEYAA SVNQ $\quad V H L Y Y L A D V L G P H L A P G P E T L E A A F F G L D E T P$ WPFPHSLMVGFLADYESGEDTVDGEETVHADWFEPGNIPP KAYSKSYFLSVYRAFDVSGEEQAGDDAAADHWLSDEEMA DRDPRLLSSCVVVEARVMGNLQAQDEIVAAAAFSPDETPE GRRVHKTVHHYLMRCLGGELSDADVEVTKVAWVPLSELDS
 DRDPRMRVI DVAY TGMREQPVAGDDAKKALWFDIDDILE YRYDTFHMIMPLYLCQKWKGTPYGAEGQALAWV'YTDAAD YGDKQVELFFYKVTGFDGD PVGKEGQEVRWVADGDLD RRRDHKTVHHFLIRYVGGELTTSDYEVDEVAWVPLDEELAS



| UniRef90_A0A024KBZ5 | $\text { M P P A D E P L I }{ }^{130}$ |
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| UniRef90_A4X6E2 | L |
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| UniRef90-R5RSL3 | F L K N T Y P Silk EVF |
| UniRef90-K2NYG1 |  |
| UniRef90-F3P6L7 | R L A Y P N E |
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| UniRef90-A3TGU7 | W $L$ P A D L P $\square$ VA A $\square$ AE |
| UniRef90-F6II39 | ALE |
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| UniRef90-A1RC99 | KLS F P N E |
| UniRef90_R5QP70 | NL F |
| UniRef90-UPI00037B1ABB | LV S D H R LMLEE Y F |
| UniRef90-H2MXS9 |  |
| UniRef90_UPI00036B5027 | LA F D HER\LVDALE |
| UniRef90_S2KV61 | $L P$ P |
| UniRef90-M4DU90 | AVS F |
| UniRef90-H3NUS3 | LDCDEK P EFK D W |
| UniRef90-UPI000348F531 | LAHDHDRQLQDYF |
| UniRef90-R9AX32 | RVS WRDEQRAALLL |
| UniRef90-UPI0003648E70 | NLNPHQPFILDWL |
| UniRef90-UPI00037E0314 | LP P |
| UniRef90_UPI0002F22319 | AD S $\square$ A R R L I E D WLE |
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| UniRef90 ${ }^{-}$C5CC89 | L LT |
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| UniRef90-F9Q6R5 |  |
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| UniRef90_UPI00036FB49B | L D D A $\square \mathrm{H}$ P S $\square$ R L R L D |
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| UniRef90-B9GFM3 | QPVA Q N HELLFTY $\square$ |
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| UniRef90-UPI00046F2B84 |  |
| UniRef90-M3JRL4 |  |
| UniRef90-B8HPL9 | $\square \mathrm{A} H \mathrm{DHARQLQD}$ Y F |
| UniRef90_W8AGJ0 | RLA Y A D E |
| UniRef90-A4BCL1 | $\square \mathrm{P} P$ |
| UniRef90_B1YHX0 | YL R DVLEPLQD Y L N |
| UniRef90-R5E7X1 | LKNEEENINIKY |
| UniRef90-K2EV87 | $\square \mathrm{L}$ P A H R LA DVLK |
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| UniRef90-W5TKH1 | WLA H P |
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| UniRef90_UPI0004787CE4 | V A Y H D $\quad$ D Y L E |

# 20 

V|DCV 20 L E R K V 30
40 FKVGVDNVIFSVDNRLMVLSGS
 VA V GV I ID A E GEILLLA QRPDV K G WWE A GGVVYRRDGGRRK QLIQDRY GKVS

 PRTVPADI TVVHDGGDRILLGRQKQWPDRWS DHFPRTDPVAIMLTVSRERCLLGRGPHFPGMYS $H \triangle V A G I I M N S D K S Q\|F\| T K R P S H K G G G W E$ K HKE SAGA I WRK K L NK L E F L L S K S Q F P S Y WS YK Q TVP G AI L L D D DLLS HV L L V Q S Y WT K A S W G VA TLLCY I ENDNKI L L L HR VK HE GKWI Y A P QPTSRTPSASVLARRPD GRIL L L RRPD DNGDWT $A Q R P R \square A V A A G C L V D G A G R V L I A Q R P H G K G Q W E$ $E L R R L V G T R P L I D P G T S V L I D D E E G R V L L V E R T D D P G G W G$ GAAGIVMNGNGEWLVVKKTYGKGKWS

 $M \square D K K K L H M A A G V I C C D V Q N N V F I T Q R S H M G G Y W E$
 $P K \square V A G C I P$ E WEDKILLDRRADDP GHWT $G L R V R V A A L I \quad R N R K G E I L L L Q Q K K K E S Y Y W L$
 E D R F RLLS S S GVVI PRYRPNVTVACIVQCQDKYLDVEELIDGQTRYN


 R DPA $I V V H D G A D R I L L G R Q A \| W P D G W S$

 YPSIAPAVIVGVINKDRILLTRYSRGNRKYA
$R \vee R A G A \cap \vee I R$ D GHVLLI HFREPDHYE HAAGAVLWRPGAGPEVAVIHRPRYDDWS A A GGVVED GTGR LMMRRR GWWD RAA GAVLWRDA SEHEV AVIHRPRYD D WS
EMRKLVGHKT IQQCA GSVICVDEHGRLLLGKRT DNHLWG K R F A T E GYRVYVACTLLGFHDNK LVKLLLDRWGLDKWS EHYPRTDPAVIVVAVTD GPRALLLGRNA GWPHRYS YPVICPS IVAVRRGHEILLANHKRHGGDYT VY DPAD YPPFAVVTVDLVVEQGLDSVAVRRGEPPDRWA VA A GII A KNNKVEAARRKPGAGFWE TYDYPRPAFTADAVVYCAE VHKILLINRKNPPQKWA MAAGAVLWRPQDGPEI AI IHRPRYDD WS $P R V G V V V F L L K D K T V L G R R R S S D G A F A$ QLPRGT T WHRQVAALCCKKGKSGLKILLITSRDTGRWD $R R D A A D G V Q Q Q I V A A V I D A G G Q V L L V R R R A R G G E W E$

RHPGGAAAVALDEQDRVCLLRQFRHGWLWE

RE Y P D R P W $\square$ G $\square G V \square A F R G D D$ E EYPRTDPAVI CLVHDTEGHVLLATGANWPGRYS


 H TVGA GAL I Q N D Q Q E I L V Q A P N GA WF A A GAVLWRRPGGPVELAIVHRPKYDDWS $H P G A V A I D A D T D E G K I V L V E Q Y R E K A D I E$
 GGEHFPRTDPAVIVLIEHEDRVLLGSNAWESGRFS $R F Q V A A L C T D G E G D D L R V L L D T S R G T G R W D$ PSIAVVAVIARPVDGRIVLVRRRVPEGKWQ $I L K K D N L I L V$
$G R Q R P E N A G G L$
$G$ V V VT T T D GYVLL DERGWDPGQWA
 E R R D F Y S V



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StR RTVTHAFYFEFPSGELPPGADDAARARWUPDSEVAS YVPVETHVFKANVVELSDDYPESDE RTRRWVRPQEASE Q TGRHTVY円ACDVVSAVADVAAPREDADTAWIPPS HSYSDVGITILFYEVLFWKGEPKTQHHDNLKWVKPSELPQ FRRDHKTVHHFLLEALGGELSDEDVEVTEVAWVPLAELET DPARDPRGRYVTVAYQLTVIPEAGDDAVNVRWWPLADLPP YNADEPLFMYLYTSSDFSGlUQKECDEGDDKWISKDEVGE YGSSDQLFWTWLIRDLYVGMDEDQDEVMETGWFTFAEISQ YGDRH ЏLLDVHRVETYSG LPVGMEGQPLAWLAPEDPAR


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1 MQRMDKRKY 10 VVAAl $D C^{20}$

GPA LRFVAAALIVR
। L A YPRISPCVIVLVTKGDEMLLVRHAREGKMHT VAAFI LNSKGELLVTRRKLDPGRLD PRPTASLLILNDRDELLLDKRARDPGMWE VAGALI DAQGRVLIVRRPHQGGRWE VAGAVL DRDGRVLI AQRPEHAGLWE LVRRDREPGRWA DPVTLRKNVCYVVIFNSKEEVLMVQEAKREGRWY ATICYIIDNGREFLMLHRNKKHAGKWI RPVDPAA A IGGVVDKDDRVLLGANVNKPKRYS PSAATAAFILNDNNELLVLTRKKEPGTGD
PLVEVVVAILIRPDSSFLLTCRPTGKGYWE AVSLIVVNQSNDKILLIQQYGRPRK GK EDKFRLSVHAVILNTDGE LLLLKANYANHSWG VGAFVYNKESD EILVIKEKYNKATWK PRFQVAALCYRETGPGLEVLLDTSLETKRWI MVVSTLCYLEKDNKYLMLLRNKKENGKWL KRRVHVAAAAIISADQQQVLIARRPDHGGLWE YPVICPAIIVAVTRGEEILLAHNKFKNNMYS GVGGLLINSNNQVLMVKEKYFSDFYK GARAVVFDDASRVLLGQRA DNGRWG DADGYPGRYAARIIAFDSSQRILLISGHDFSDWWF PTHPDPRDGVGVFVTNAEGKFVLGKRSHGADTWA DKKRЏHЏAAGIILNQDRSKIFITQRPHKGGFWE GVTAl VFDDRGRVLLGRRS DTGRWS ELREHDGHAPLWLMGVSAYVVDDSGLLLLEQRADDTGKWA VAD ELGRLLL TDHYENPRNRVAAYAVCADSNGRVLLVRRSGTPGTWS GVSAVVVDDEGRVLLGRRA DTGLWS QAADP LVVAGDGADRKILLDRRDDUGAWA
M $\square \mathrm{DGDGYRPNVGUVCNQRGQKVVLQYRSPEKNHWS}$ RSCAAVV
FSPGASVIVYENNK SNDSVLMVRKPRRSGWWV

AVGVI V DGKILLL NRREFDAPLLTVVGVLVTYHQQQQQVLLSKRHHQGGLWE QQQQLLTKRHAHGGLWE
 KVVAAVICDSLQTKTRIFATARGYGKGMWE HYNRVAAYAVILDPDQRLLLAHWNEGRRAWT PRTDPALIVGRVDDRDRYLLGSNAMENNRWS RAAGCVLWRRAPDGEVCLVHRPRWDD WS VAAALV DGDGRVLMASRPTGKGLIWE MDDKDGYRPNVGIVICNRNGQSEV KRIEVVAAIIEKDGKTLI CRRAENKTRWE FKVGVDNVIFSVDTEQLVLLVCREQDPGWWC
KHQPAAGVIAINDQKQMLLVKQWREPGKLEE A VAVCALTNAENKVVFVKQYRKPVLLE PTADVVIYSPDRGGVVIIKRYRHANSWE VVRRDDEILLVRRA DNGRWT NGELVLI LR RDTREWG NDQQQl LLQERADTGGWC AVIISKDDPEPSVLLLKADYGSGAWG KKP\SVLVLLHDAHGQLLLERTDRAGF VAVGVRQDPQGRMEABRRPEMGGLWE RRAAAYGVCRDTGGRVLLTRGSDFPGVWS RAAGFLIFRПSNQDEYLLLQTSYGGHHWT VAAVITR EDGKILMMREAKESGKWY T DHYQNPKMVVGSIPVWREGETRVLLCKRADEPGFWT ■K HYDPGRYRTPDG』AVFTDRQDKQIMLTKRAAEGGKWA DDKFRLLSSHAVILKQGSEPSVLLLKANYGECAWG YKTRYGVYAVIPNKDKK1 L V VAPN GSWF
$\qquad$ PEGYRRNVG ICLINDSK KII FAASRLDUPDSWQ TKPIDAPGSAIVVMDEDKILLQLRSDTLD WG
$E G D A E R C V V C A I E D E R G R I F L A R R A P D P G Y W E ~$


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 T D P T R QVVI L T Y L C R S N N R DVV L S K E H I D Y R W S T K E Q L R L





 S R SPD R VV SIVVYWALVVRSDEA ERASSVGENVRWWPA D DLLP P PRWVVRFIVFLAEETGGSLKTTAEADDESLQQAHWWDR


 YPHATVQLRFYRVTSWQGE PAPREQQQLAWQTADNVSP R R F E H T C RLYY VVVGVLLETTPRTRNEDMACSWFK DKELP PSNT LMCNFTVGVKDDSDF KANHE DDAYYWYSPEEARQ A H TS QA F DF RCELSE GLDD DK LSS SEHSQWAYHR IEN LS E

 SEGWEDEYIFVYTS DKFS GHDTECNEG E LDA WIDKD K IMMD Y P DKH LLLDVVWQVHEFAGE PF GREGQAVRWVPMS EL
 ERNDCNMWWL GTP DNGRLKTSKESLEVGFFSME EALLK


 FVAENKHYVTIFMGATLENEQDQPQULEPWEWTSWVDLKA WPFPNS LMVGGTAKYA GGE $\square K D D G K E D V D A K W F D A N E V$


 F P GALMLGFEADAEA DTPTVNGEDEHARWFTADEVGA
 G D R C Q Y M D $\quad$ T F R C R A V G G EAR RVN D DE S L E V G WFAVVDA P E
 $L E D G T R Y$ V VF CYK A TEF T G Q L LR S S E E G E V S WV E K D QL E K L R Y K $\quad$ L P K RLI RWD SPPDV $\square G Q K Q K W F$ DE E Y P VF L Y Y E V R A K T K I E DD D F T N DE T LQQLK F F S $\$ A E L E S
 H FVIN Y VVMAF L V T K T Q G K L S P Q D D E V A E L K WF D E A S L P A $T G A G R H F I L L P F A A R W V S G E \square N L N D E L D D A K W L T$ Y G DK QVLLDDVHSVTAFAGE PQARE GQPMRWVSDP QLVD HD Y GD K QV CL QVVYVIPAFTGKPE GREGQPLRWVAKA ELLTT
 Y R H E DKEVVHYYLVEATGGT L HA QVEE DVGVD WFE PE E A

 YPDFSITMTAFLCTPKGDANGFKRREHADSKWCSKDELKG
 HDYDTFHLLMP LY LVRVWKGNPSAREGQELRWI RVPR LGD

 D PRCI NRDPRYLSVSYFALVRYEEAQLIAERGRGM DWVCVVEKVAD VGFSDELLMYLFYCTKVQQKRPLDEDEFDEAEWYSLA DLLKK



 F Y T Y P Q I I S T L F V V K E A G GLLD Q V T N E T TAAV R F F D L D S A P A
 YPDKSVLLQVCRVT DF SGEA RGNE GQPVRWVVEPAALPR



 VY D S Q A FIF LCEELDDP Y N DCLSE EHSEYQYTPVSK LSE FYS SHR E TY F Y N P A Y LY E V V T Q F PL E D F N H L A WF SIIE E A K S TP H WLTY DFPPEVRAKLQKQWGS DWK GQAQK WF H GDEIF NATVIFKAENVMGELGKKDDESGELTYYALDS LPN D S
E D K R I LL D V V WQV HA F

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LS S K H RLMLA E Y F D
LR L R A R DIL
KFT $\square$ ARKLVDLI $\square$
$L A F$
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Q P F
LAF D H Q L I VE Y A L
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E L A
ELLI F G M R S
$N \square F \quad P N S \square A A A F \square N$
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LVEEDKTLLRDF
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KFTDARK I IDEFVE
L I R
SVSDHN
LMPGH
L A Q
FPEANEPVLAK पLE
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PMT $\quad$ AQY KDMA
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HPEVSRIL
MMEIDKTFLKDF $\square Q$

LA F
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R LT QPRDREQL
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LAFDHQQ\| L E
LLAA GKQVDAK
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MPSEDRARIDAVVLK
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$\mathrm{C} V \mathrm{~F}$
F P E A N R P
HLS Y P R M L R R
LLP FTASVLGVPFET
YAEYPDQQQDEY LKA
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LNYT TRK I LEK
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$\square A K G K M E \square G E T \square E Q T A D R E \| R E E T G L I N G R \square 1 Q Q H V M I A Y T$ FPGGK LEANETPVEALVREFKE ETGLIDTE GWQALDSYP WT
 I PKGVIEKHMSPEDSAAKEAYEEAGVIGSVRKKRFSYVKW LPGGWADVGYTPFEVAVKEAFEETGLRTEAVRLLAVFDHP LPKGKLDPGESSRMGAAREVREETGVVKVSVNQRICTTWHT


LP G G GVAF GERAADAALRREFEETGARAESVGMADVVVED



 H H LP K G S L QVVYYVTEQA S GELDTAP E GHAFEWCPLAD LRR

D
 E E P WY V Y K F F I L C E V T G G E I L R Q T T E T S D V A WV K F E DVA G YT LDNRTKWY QMGVLDDSRMAPQFDED DEKL A WF NR R D GPPEASVTFHVYRI DQWHGYPRVD DEHTEL RWFNLAADEG ARDPRQHTVSTVFLAEATGTPKAADDAKNLGLFAAWELPP HS Y GF H L L M M LYVCRRRWQGRAQP DEGGAL K WVRS H QL R D
 A D DY H WV AI TYAVESFEGEPLDQEAHHEWGWFALDA LPS GAPVRHAVILAFAGRVVSGEPGPSEEAEAVAWVRPENL EHGTH HHWFLMHGSSGEE LVPQTE ED DTA I K WVDPS


D
DFAWSY ILAAIFFAAAVVGGEQQAGHENVNVGFFAPDHDPP


 F D D WN H I NHYFVVCELI E DTGK QHLTE AEERA WMP VDEALDD

 $R \square S Q V Q V M F R A R L A S S I A A G P E S E E V G$ WPFPSSVMDGFEAT TRATELT DDPVEMAEARWVSREEYRD KRHKVTHWYEMKTNFS GVLEEGQENE GDTKVAWLNPE QIK E
 $\mathrm{H} \square \mathrm{NQ}$
 K S DERTY YDD WW EA E RF D GVP DN QEPDK CA G WS DVQN LPE FPASLMLGFMASVAGFSGSGTPDGTEILDLRWFSRGELAA WPFPHSLMMAY IA E YADGK L RHDPSELRRDAAWFRYD KL P WPFPQSLMVGFRATALGGEVVRLLDGELEHARWFTRAEL GGQDR V F HAD WDGAERDLVLGEGQALRFCDPDRLPA LR I N D QLAR L Y I I P G VP K D T P K T R R E IR NI E WF S $\square D K L P$


 EAEAYTEFMHIDFRARKFSGELKSDCDEGDLEWWVPLAK L K E DA GA GYHWDS PVY LVVTSWQGAPTDMEPDKHEWYAPDACP YPNFHLSMMCFRCT,LNGGTVQLLEHEAGRWLKREELGE
 P GF TNEILLHVYAAVGLHEGEACADEEGI STKKFPDINKLVE


 WP Y P A N L M I G A I G Q A I P T G E T I I N D P E L


 T A P $\square R L T Y Y$ V C
 SYEKFHLLMP LFVCRKWE GY VQGLEGQRTKWVK R D L





 GARPDVLVHVFRAGPADAGPAGEPATGCLPRWWPPQELPD

 WP LPP R SLMMLGGFAAEAVSEQLLVPDGAEDMDDRWFTRAELREE PGFCTEEKM IFSAENEFEEQKLDEDEFIDDLEDVPFDRALK G V R GADRR LVAALAAELIEGEPTAAEHSALRWVDAT EL A A
 WP MP H T LMIGGCYAEAQS RNI HRDEQELEDCRWFSRRE TAA GDVCEFLDVVFLCRYMS GDARVNDDESLDAVGWFGLDELPE DRDAHGQ】RFHYL
RHPHQHYYKLF $\square E C E D I G G E A Q V S H E T S E \square G F F S R D A L P P$ HHHRDDHVYLAHTRTTTPTLAPEHTSNEKARWWNPHDLMA S GETS K AV H FWRMEADPAPSRA LMD DVK A VD WLP LEA AVQ WP YPS GLMVGF DADYAGGE $\square N L Q D E E L S S$ GDFYTRDELPR LR $\quad Y R L P R R L V R D K E P K C V G Q K Q K W Y$
$D R S P G G R V V S I V Y W A L V R A D E V A S A D G E N V Q W F V A D E V P Q$

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UniRef90_F2TYY4
UniRef90_K4ZFV1
UniRef90-C4SJ20
UniRef90-R3WPQ6
UniRef90_K9R5V5
UniRef90-W7VML9
UniRef90-B9QSP1
UniRef90 UPI0003B3E309
UniRef90_E1VXK1
UniRef90-D7N7A8
UniRef90-UPI000377632F
UniRef90-UPI00037D25DF
UniRef90-G8WKX0
UniRef90_D9VDL5
UniRef90 UPI00037D1C57
UniRef90-UPI00036024E8
UniRef90_G21507
UniRef90-S3FZV3
UniRef90 W7IPL2
UniRef90-Q07105
UniRef90-D6D536
UniRef90 Q21NW8
UniRef90_UPI0003C8006C
UniRef90_J9JUB5


EAELAPPQL GEML LCFDHAQILHDY YPMPDAD $1 \quad \square A A \square Q$
$\mathrm{P} \quad \mathrm{\square} \mathrm{~T}$
LLS A YK P L L

L NVHTTPLVERYDE
$L \stackrel{L}{L} N R T R R M L V D A \frac{L}{F}$
$\frac{\mathrm{L}}{\mathrm{F}} \mathrm{L} \mathrm{A} \mathrm{T}$

| M KT F R N |
| :--- |
| K VPAS VLE |

MFKFHDNNTADY
LA Y D HN K I D S S $\square$ E
LRQEHKELLE

L L R D
A K K S Y E N $\square$ K LLIFE RI

LAFDHYQL YLQA
L IDAKRPELLEALN
S $\square$ N D H S S $\square \mathrm{ARA}$ A IE

P V P P H

LAFDHNQ L E
LP H WQDEIIFYDFL
V
DLIFSHHR
M V
SARARSPGVIKAVQ
E $\square$ AFRREALEHFFE
MPAAHRKL
$A \square Q F$
$H P Q V H R K \square V R K C L E$
LP M WF RERFPLYFE

K L K

VL
A M R D

V LT
MPAADEP LIPH MMDA
FDSYTLPLLR LLLE
A L
MI K $\square \mathrm{GE} \square \mathrm{MDAKT} \square$
HLAYADE
L
LAFDHQK I D A GL
I IA P ERPIVEDY
MLA
LMP G H LT S $\square R Q A$
L
R L S
KLS S $\square$ A R K M $\square$ D WW $\square \square E$

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UniRef90 N9E8G8 UniRef90_UPIO00471959E UniRef90_D4HUS3 UniRef90_U4W054
UniRef90_D8LPS9
UniRef90_W7TQW UniRef90_N1JB65 UniRef90_C3C1W5 UniRef90 S4MN60 UniRef90_UPI000362FAB4 UniRef90_J7LM50
UniRef90_R4LE38 UniRef90_D5UJP9
UniRef90_R4JUW9 UniRef90 J2MQ17 UniRef90 UPI0002629A1F UniRef90_UPI00041077AC UniRef90_Q0BXE5
UniRef90 R5Y7K4 UniRef90_UPI00037B0BD5 UniRef90_UPI0001E89B59 UniRef90_B2GJM4
UniRef90_F8JVG6
UniRef90-E8V560
UniRef90_Q043X1
UniRef90_U2WMU4
UniRef90_UPI000479D310 UniRef90_U1WKC7 UniRef90_UPI0003EA840C UniRef90-14D146 UniRef90_B7QXV1 UniRef90_C9QDK5 UniRef90 UPI000373C5C2 UniRef90_S5U8Y9 UniRef90_A8LV68 UniRef90 UPI000289D96A UniRef90_F4L132 UniRef90_Q4V6M1 UniRef90_D3R603 UniRef90_Q1YZE3 UniRef90_D4K8B6 UniRef90_UPI0003B4CFA4 UniRef90 B8J1Y9 UniRef90_L1QBU9 UniRef90_R6PU42 UniRef90_UPI0003617D09 UniRef90_U7G0J1 UniRef90_W9ACK0 UniRef90_M3AWY8 UniRef90 Q4KCA4 UniRef90_D7A3W3 UniRef90_S2WA31 UniRef90_UPI0002629ECB UniRef90 F4KNY6 UniRef90_UPI0004780C7E UniRef90_X1LGI4 UniRef90 B7FS99 UniRef90_UPI00039DABEF UniRef90_Q1BIW8 UniRef90_UPI00036EB011 UniRef90 A0A011UEA4 UniRef90_Q6C2F8 UniRef90_UPI000309CE4C UniRef90 U5EQK4 UniRef90_A0A023F7P2 UniRef90_C1MIF5 UniRef90_E4MZQ3 UniRef90 N2ARE4 UniRef90_UPI00046CB57B UniRef90_U7V1D4 UniRef90_A0M3B5 UniRef90_F2NNS3 UniRef90_C4L1X2 UniRef90_A3IX58 UniRef90 X5JDW0 UniRef90-UPI0003781886 UniRef90_G2PIN7 UniRef90_G7H433 UniRef90_UPI0003600A7E

VAAAVILINNQNQ
Q R Y
R Y D G D T
L L L VRKK N T Q F F M
 $R Q R V$ CVVVIQNE GKYLLCKRGVFPGQWA

 $E L R K V V G S R P L N L A G V A I A V F N E Q G Q I L L Q Q R Q N \quad G \square W G$
 PRKRMAAGALLTDEQGRVLLVEPTYKP SFE

 RF D RE YVRHP GAVAVGVVFD D DGRVVLLGQRA DTGEWA
 $M V V A G A V Y$ DQGRLLAARRSAPPGRWE LA $A \mathcal{A} G I V V A$ ED GKWLVVKKRYGKGKWS RVGAYALIT RDEHLLLTHWNPRHPGAWT RKRVAADVLLRDPNGRVLLVRPTYKPG WD
 $R H G N Q L L L V Q D I K T K L W A$
V V G T VP Y W
$V \vee G A V I V N E K G D L C A L R S Q R M S M P G L D E$
HQIGVGAFVMNDKNEVLVVKEGKCPGIWK KEVSAAI I L KDRKVLI AQRAPGEGKWE E ERTYERMKPSGRNAVVMVPITARGGDILLVREAAGTERYE EHHPRMDPAVIMLVRDDADRVLLARGPQWPDRRS FKPHVTVACIVHANNKFLVVEETVNGKATWN
 $R$ S CGGIL F R R N N K KEFLLVKS $\square$ GRR GYWG K A A G F V I F RRRC G E M Q Y K D DKI LLCKHHDDRGFWY
 PVNAVTGVLRRGEKIEVQKRPAWGNLWE Y P N V CP A I IV $V$ GI T N G D K I L L A N N K N F P G L H S EMRKY $\square G H A P M A A V G A T V V V L G D N K I L L N L R S$ DTKTWG A A GAVLWRQVGKKKLLAI I HRPRYDDWS




 $\square R V A A Y A V V E R R G K I L L T H W R R G H L H G W T$ P S A A V A L L V R D L R GRLL V A T R GKEPGT LD
 A V DF VLLA S GEE HL WVVRRKD TN QLAA
 M $\square$ D E D GFRANVGI ILCCNCD GK F PRTDCCVIV VNKEGD KI LL GR SKRPPGMYS
$H V V A G V I \quad T D V R G R I L L T Q R G K D S G L W E$ V GALVVNDKNQVLVVSEKYALIKNSWK RAAGFLLFRRKENLEFLLLQASYRNHHWS
 Q D GRVLMVQRRVK EGE WQ
$R \square P R C A M T L V L N D N R E L L L M Y R H R D Q W V W E$ PAVMALIMSEDNSRVLLANNRLWPNRFA DCII FGFHEGKLKLLVKRRVEPGEWS
 E DFKDGVDNVIVSIDS QKLVLLVKRTEDPNQWG T $\square E N T$ QVPHKL DGVAVLWNQQGQILI DRRPPKGGLWE
 $R G V V A G A I I R T T G E T G R E L L L A Q R D Y P G L D E$ $N Q V Y T G \square P W D V I S T$ TVDALVTVNGHVLLGQRKNYPGKWA

[^2]


[^3]


|  | 90100 90, 1100 |
| :---: | :---: |
| UniRef90_N9E8G8 |  |
| UniRef90_UPI000471959E | FP HYRHRYAPGVTHNQEHWPVTLTEHLSCQWLPAEQAAA |
| UniRef90_D4HUS3 |  |
| UniRef90_U4W054 |  |
| UniRef90_D8LPS9 | GNKS RAAMFALLVVSDVLDEWPEKH |
| UniRef90_W7TQW3 | T DKY HFVIS HMVCWA A P E A A PVA A D D A K D $\quad$ R WM T L P Q L R T |
| UniRef90_N1JB65 |  |
| UniRef90_C3C1W5 | D F F C |
| UniRef90_S4MN60 |  |
| UniRef90_UPI000362FAB4 | HEYPERSVLL EVVWQTQQAFDGEP |
| UniRef90_J7LM50 | WT L N ERA SMRVWF A ELTA GEPRPLEDHDELRWVSLVEHDE |
| UniRef90_R4LE38 |  |
| UniRef90_D5UJP9 | NGDRSSY L DLTTFRCRWVSGEPPADGENTDARWCDVD D L P P |
| UniRef90_R4JUW9 |  |
| UniRef90-J2MQ17 | DVPHDS QVMVFFRAELVDEDFA A GPESLEVKLFEEADIP |
| UniRef90_UPI0002629 | P GGSDEVLRVY LIA T DVLD F A REHEEAELLQRWVDLE E AVA |
| UniRef90_UPI00041077AC | G DVICDFLNIVFRCRYL G G E A RVNDDESLLDVRWFALDE LPA |
| UniRef90_Q0BXE5 | F TYPDFHLLMP LYY G E S WTGVI HPREGQAI A WVEPARLRD |
| UniRef90_R5Y7K4 | NNDDVEVYYF LIAFTNGLTKRKIKEKDKECLKWINYDDVEK |
| UniRef90_UPI00037B0BD5 |  |
| UniRef90_UPI0001E89B59 | DKETDS DNMLLF LDCTPLNSEVVQESELSDAAFKSLEEL |
| UniRef90_B2GJM4 | $\overline{M S P E Q H A C R V L Y T A ~ H V T G G E L V V V E Q D G D D A A ~ W V P F A R L G G S ~}$ |
| UniRef90_F8JVG6 | G P WD D Q $~$ S F I F DA G TL GEDIR P R D E VAEVAFLFPERAGE |
| UniRef90_E8V560 |  |
| UniRef90-Q043X1 |  |
| UniRef90_U2WMU4 | $\square P \mathrm{QPF}$ Q Y YKLVF DCEDTD GHFEPNDEVAQ T A Y F T LD NLPP |
| UniRef90_UPI000479D310 | SVPRVGQVYLVYLARLLS D R F D P G HESLLEARLFA ESEI P |
| UniRef90_U1WKC7 | YPALI VRLL LTY Y AVLAD K D A VP CATE HEK I I WVE HE KL K E |
| UniRef90_UPI0003EA8 |  |
| UniRef90_I4D146 | YPNGT I KLL LA Y T C R WL S GVFFT, LK V H S L I E WV P P E L |
| UniRef90_B7QXV1 | WPFPMSLLMFGCAGEAL GRD\KDDPNEDEDALVWVSRQDMM T |
| UniRef90_C9QDK5 |  |
| UniRef90_UPI000373C5C2 | LP Q S LMLGFFFARA D D P S A L R P D A E EIV DAA WY T R D |
| UniRef90_S5L |  |
| UniRef90_A8LV68 | VGTA DAENLLVFLA EREYIGAPVDVNEAEQVAWIPLDEAYG |
| UniRef90_A5UL18 |  |
| UniRef90_UPI000289D96A |  |
| UniRef90_F4L132 | $M L E R F I S V A Y Y A L I N Y Q D V V P Q P D A L S S D S C W M N I D A L P P$ |
| UniRef90_Q4V6M1 | Q DKPKIVI Y WLA ELR NPCQEP ILLSEE H T DLK WLP KE E AK Q |
| UniRef90_D3R603 | M R M V S V CYWALLLDHA DLLGTEPGTAGNA HNVRWFPVD DLPE |
| UniRef90_Q1YZE3 |  |
| UniRef90_D4K8B6 | PSNTLMCNFTAFVRTA AKALLINHEVDRCKWFTPQEARE |
| UniRef90_UPI0003B4CFA4 | Y P T F HLS MKC Y F CK VVKE G DLI L K E HQ A K WLTVD Q |
| UniRef90_B8J1Y9 | YTTYRLT L CHCFDCTPETCPAPPVLTAATQYRWASPQELLA |
| UniRef90_L1QBU9 | WP YPNSIMMIGFTAEYES GEDKVDGDEDVHAA WYK K D N L P |
| UniRef90_R6PU42 | DF YFK Y V I ALLY LAAEDVS GKMK】T DGESNALKFFGK DEIP T |
| UniRef90_UPI0003617D09 | VD GVKKIVKYWSA Q A I GET GT T DLQQEVD QLLLWLS PA DAKK |
| UniRef90_U7G0J1 | $L S Y R L P R R F L R R P L N R P D S R P \quad H C \\| G Q R Q K W F L L E E A I D$ |
| UniRef90_W9ACK0 | TF $\square$ QEWMMFTF TVAYAYNGELT DSSPEGEELEWVPLEE QLP |
| UniRef90_M3AWY8 | YPANLM |
| UniRef90-Q4KCA4 | D PQRQEHWVSPVYLASAPAMPARNCEHSDVA WFELDRLLPQ |
| UniRef90_D7A3W3 | WPFPMSVMI GTHAQATSREDT |
| UniRef90_S2WA31 |  |
| UniRef90_UPI0002629ECB | MVREEHT\\|RIVYRATVVDGPLRNEVDGDEARWVALDRDI K S |
| UniRef90-F4KNY6 | NS Y L Y S D F L VFY IVVQLPSEMPRAMDDVA QLS WLT PA E |
| UniRef90-UPI0004780C7E | K QPS GKIVTAF GVEGDLDEWPKGSPEIDKHEWFTS D D A A K |
| UniRef90-X1LGI4 |  |
| UniRef90_B7FS99 |  |
| UniRef90_UPI00039DABEF | GETRPPLVSY LTV GGVLDA ITRLQEEELLSSWRLVPWDEAET |
| UniRef90-Q1BIW8 |  |
| UniRef90_UPI00036EB011 | LR Y R I P HYMIRRRA K K L C $\quad$ GGQKQRWF |
| UniRef90_A0A011UEA4 | QASRRDHVGLY LVEEFS QPAPKPDSEIA EA GFFP L H A LP E |
| UniRef90_Q6C2F8 | FPGNDMVGCIA QADPD DPTSEEDDPELADAQWFSIDEDAK G |
| UniRef90_UPI000309CE4C | Y P SKHLRRLEVFR\ARWKGS P P WREGQAMTWVEPERLPR |
| UniRef90-U5EQK4 |  |
| UniRef90_A0A023F7P2 | VD GKPKIVTYWLA ELIDDKEFEDCSHE AQQYKWAEIDEACR |
| UniRef90_C1MIF5 | 1 P P S D E Y C Y LA |
| UniRef90_E4MZQ3 | KT GRQMSYTACEVVSGTATVVDT E E L A E L A WII Y D Q V V |
| UniRef90-N2ARE4 | NGMSDCICHVFATRVDTECMDFDENEVKMKKWVSRDKVL E |
| UniRef90-UPI00046CB57B |  |
| UniRef90_U7V1D4 | WP F P R S LMV CYRVTVDAS QPVTHLDEDHSARWFTAPELAQ |
| UniRef90-A0M3B5 | DRDPGYRCI SVA QYALIDDEYDEKLLVEEHGAHWYEDDLLP T |
| UniRef90_F2NNS3 |  |
| UniRef90_C4L1X2 | S S Y QVE THYFLA T C DER M A T A T D S DIVDEVNWWSIM E I E R |
| UniRef90-A3IX58 | NRDPREY L S V S Y F ALVVRFEEAKLITN H H Q T T WYMI EK TP S |
| UniRef90-X5JDW0 | Y THDLRVTLNVHHCRTI G G G T P Q T LECDEVRWVHLNEL |
| UniRef90_UPI0003781886 | DPGSPFSAYIVFGGDVIGGEAGGDHETDGVGFYTRDQLPP |
| UniRef90_G2PIN7 | D RHPLK R V I TVVCFY ALVKKPENHPDDN |
| UniRef90-G7H433 |  |
| UniRef90_UPI0003600A7E |  |

[^4] ${ }_{B} B_{B}$

| UniRef90_N9E8G8 | L L A 130 |
| :---: | :---: |
| UniRef90-UPI000471959E | L |
| UniRef90-D4HUS3 | L P P |
| UniRef90-U4W054 |  |
| UniRef90-D8LPS9 |  |
| UniRef90-W7TQW3 | L |
| UniRef90-N1JB65 |  |
| UniRef90-C3C1W5 |  |
| UniRef90-S4MN60 | PFT H |
| UniRef90_UPIO00362FAB4 | $\square F P E A N R A \square I Q A L Q S$ |
| UniRef90-J7LM50 | A L S L P W |
| UniRef90-R4LE38 | R L T |
| UniRef90_D5UJP9 |  |
| UniRef90-R4JUW9 | LLA E G K V V A K T I |
| UniRef90-J2MQ17 |  |
| UniRef90-UPI0002629A1F | A V |
| UniRef90-UPI00041077AC | M R P G H |
| UniRef90-Q0BXE5 |  |
| UniRef90-R5Y7K4 | ILS YPNLI |
| UniRef90-UPI00037B0BD5 | WLD Q R P AVAEA |
| UniRef90_UPI0001E89B59 |  |
| UniRef90-B2GJM4 |  |
| UniRef90-F8JVG6 | L LP |
| UniRef90-E8V560 | M 1 |
| UniRef90_Q043X1 |  |
| UniRef90_U2WMU4 | L |
| UniRef90-UPI000479D310 |  |
| UniRef90-U1WKC7 | L |
| UniRef90-UPI0003EA840C |  |
| UniRef90-I4D146 |  |
| UniRef90-B7QXV1 | VFA G D H P T $\square$ R |
| UniRef90-C9QDK5 | L LT H |
| UniRef90-UPI000373C5C2 |  |
| UniRef90-S5U8Y9 | SQQLRS P L VKES |
| UniRef90-A8LV68 | LV S |
| UniRef90-A5UL18 | L N W LP A D $\square$ D A N Y LK |
| UniRef90_UPI000289D96A | $V \mathrm{~L}$ T F |
| UniRef90-F4L132 | LMMDHQLIVEKALET |
| UniRef90-Q4V6M1 | CVKDNQVMI DKFHQM |
| UniRef90-D3R603 | LAFDHTT\VEYAL |
| UniRef90-Q1YZE3 | LL F F P |
| UniRef90-D4K8B6 | NIR PNSLDAEFLNA |
| UniRef90-UPI0003B4CFA4 |  |
| UniRef90-B8J1Y9 | MPAAHRKLADSLE |
| UniRef90-L1QBU9 | M ${ }^{\text {PP D E T T I A R R I D S }}$ |
| UniRef90-R6PU42 |  |
| UniRef90-UPI0003617D09 | KLT D D K S L V P F L E |
| UniRef90-U7G0J1 | LFASDSPEFKAW |
| UniRef90-W9ACK0 | MAEGDRK】FQH |
| UniRef90_M3AWY8 | A L R |
| UniRef90-Q4KCA4 | PLT Q A T R V Q M A A L E S |
| UniRef90-D7A3W3 | LLTRTHP |
| UniRef90-S2WA31 | M NERFKHT $\square$ S $\square$ A $\square$ |
| UniRef90_UPI0002629ECB |  |
| UniRef90-F4KNY6 |  |
| UniRef90-UPI0004780C7E |  |
| UniRef90_X1LG14 |  |
| UniRef90-B7FS99 | FFADHKT L L ${ }^{\text {F }}$ Y |
| UniRef90_UPI00039DABEF | LLA |
| UniRef90_Q1BIW8 | L L P Y P K D L |
| UniRef90-UPI00036EB011 |  |
| UniRef90_A0A011UEA4 | MTT P A R R R $\square$ A EVVF E |
| UniRef90-Q6C2F8 | W $\mathrm{L}^{\text {K }}$ |
| UniRef90-UPI000309CE4C |  |
| UniRef90-U5EQK4 | HPNV] |
| UniRef90-A0A023F7P2 | LA H Y P D M |
| UniRef90-C1MIF5 |  |
| UniRef90-E4MZQ3 | F V P Y F G PVQA Y LDD A |
| UniRef90-N2ARE4 | MLK D N E |
| UniRef90_UPI00046CB57B | MI ERGE I VGAATL |
| UniRef90_U7V1D4 | AI AEQR |
| UniRef90-A0M3B5 | LI LD HNEMVQDAL |
| UniRef90-F2NNS3 | RLSTHTPLLLYYLET |
| UniRef90-C4L1X2 |  |
| UniRef90-A3IX58 | LAF D H NVIL |
| UniRef90-X5JDW0 |  |
| UniRef90-UPI0003781886 | L SHRRTPDRVIEA |
| UniRef90-G2PIN7 | NLGYDHEKLI |
| UniRef90-G7H433 | LVANGKVVPADA |
| UniRef90_UPI0003600A7E | LVEDHFA! LFDFL |


| lupas_21 |  |
| :---: | :---: |
| lupas_14 |  |
| lupas_28 |  |
| jnet | - |
| conf | 135866899998608 |
| sol25 | $\begin{array}{ll}B & B\end{array}$ |
| sol5 | B |
| sol0 |  |
| jhmm | Є |

1

| jpssm | 90 | 100 | 110 |  | 20 |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | $t+$ | - |  |


[^0]:    

[^1]:    

[^2]:    lupas_21
    lupas_14
    jnet
    conf
    sol25
    sol5
    sol0
    jhmm

[^3]:    lupas_21
    lupas_14
    lupas_28
    jnet
    conf
    sol25
    sol5
    sol0

[^4]:    lupas 21
    lupas_14 14
    lupas 28
    jnet
    cont
    sol2 5
    sol|
    solo

