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HGHDHAHDHEHSENDLRVRALETLLTQKGYLDPAAVDR
HDHAHSHLPSDPELRMKAL
PDHDHPHSLLPPAPALRVKALETLLTQKGLVDPAALDV DGHDHDHQAVPSDPALRVKALETLLTEKGLVDPAALDE H D HP S E L S E DE L R V R A L Q S L L V E K G Y V D P A A L D E
 EHAHGHDHDNHYSDMQARVKALIETLLTTEKGLIIDPAAAIDT

H D H D H G S E L S P VA L R V V K A L E S L L V E K G Y V D P A A L D A $\begin{array}{rl}D H A S H & D \\ H & P \\ H & D\end{array}$
 H H H $\square P D D T S E A A L R T K A L$

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PRSNE EI A A RVVKAMEAI LV DK GILI S T D A I D H E HPR L G ELE E LR V K A LLE S L L V E K G L V D PA A L D T
QP TVRT Q E E NELDPFAARVRALETILTQKGLIDPAAI DA


NESSRRE Y N A A R IV K A L E S L L I E K Gll I T S E T V D Q
T QEEDAARVKALESSILI E QNVI S TAMVDR

EHFKYDTDRE TYSAARVRAL
ALVKKGV, GATVDK


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 DGAHNHHHHAPPE $\qquad$
DPHAPDETTGEPD DVEARVRALESLLVERGLAESAAVDA
 PGFEHS PDREALSAAKVKALESLLDEKGVITSNTVDT D E Q F K Y S S N R E L GHPYDNDAP LS YWQRMEIA V RELLMIEKGHLTADQVSA PPDPALRVRALE TILTQKGLVDPAALDE
 P H A E $\square$ S H T E R P GY Y E I META A R E L L V
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E HVN K Y T E Y E A R TK A I E T L L Y E R Gll I T P A A V D R


 PHAP DETTEKPGYY D DMEQAFQELDM EK GYI GADEI R H DGFGYDSDREI Y S A A RIVRALESLLI EKGVI SGETVNK
 M N Q H T S N QQA T P D ERAR A L $H$ K K V L L DHLHEHSHDSEAIE F T I L E A AI REL CI EKGLFSADDHRR
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VT
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$\| V \operatorname{I} T Y E T K I G P R N G A Q V V A K A N T D P A Y K A R L L A D G S K A I A$
 LVETYEHKVGPRNGARVI AKAWRDPEYKQWLLDDATAAIAA I I DTYSHKI GPQNGAKVVAKAWVDPDFRAALDSDATAAVR LI DTYENRI GPKNGANVVAKAWVDPEYKKRLL DDATAAA R I VDTYETKI GPRNGARVVARAWADADFADWL KRDATAAI G I I DTYENWI GPRNGARVVARAWSDPSFAKALREDATAVLD I V DTYEHRVGPRNGARVVAKAWSDPAYLERLRTDATAAI A LVETYETRIGPRNGARVVAKAWSDPAFLEWLRRDASAAI H
 LI ETYETRVGPKNGARVVARAWSDPAFRTWLLEDATAAI R

 LIDTYETKVGPRNGARVVARAWVDPAYRARLLDDATAA R VVETYEHEIGPHRGAQVVARAWTDPDFREWLVRDATTAVVA LI DTYQTRI GPRNGARVVARAWVDPAFRQWLLADATAAI A
 I I EAYETKI GPRNGARVVANAWTDPTFKAALLSDATSVVS II ENYETRVGPRNGARVVAKAWTDPQYRQRLLEDATSAI A VVERYEKEVGPHNGAQVVAKAWAEPDYRRWLLEDADAAIA LIDTYEHRI GPRNGALVVAKAWSDPDYKARLLAHGTEAIA
 1 ETYEHQVGPRNGAAVVARAWTDPDFADWLRRDATAAI S IIGAYETNVGPHNGARVVARAWINPAFRQALLDDATNAVA
MSSVYENEVGPQLGAKVTARAWVDADFKARLLADATAACK DIDTYENKVGPQNGARVVARAWSDPAFRAALLEDADKMLD IVAHFEDNLGPMNGAKVVARAWSDPDYKQRLRADGTAABK IIATYEHDVGPRNGARVVARAWTDPGYRERLLADATAALA $M S S Y E N V G P Q L G A K I V A R A W V D P E F K Q R L L T D A T S A C R$
$F I D U Y T V G P R N G A A V V A R A W V D P A F R D W L L R D A S A A D K$ LAEIVENEVGPQLGAAVVAKAWTDPDFRERLLRDGTATCR IVDTYEHKVGPRNGARVVARAWCDPKFADWLKRDATEAI A | 1 DUFEHRLGPKNGASIVAKAWTDPAFKQYLLDDATAA: H VI DFFEKDMGPFNGAKIVAKAWVDPDFKQRLLEDTPSAI A MVEDYEEEVGPKLGAKVVAKAWTDSEFKARLLDDATEACK II DTYARDIGPQNGAAVVARAWTDPGFLGALRQDASAAIA VLKYFKTEMGPFNGAKIVARAWVDPAFKARLLQDANAAI A 1 IATYETQVGPLNGAKVVARAWTDPQYKRRLLQEGTAAIA LAE YENEVGPQLGAKVVARAWTDPVFKARLLENASTACA MVEYENVGPQLGAKVVARAWTDPEFKARLLDDASAACA VEDYENKVGPRNGCKVVATAWTDPAFKAWLKLKDGTAA FAELYENEIGPHLGAKVVARAWADPAFKARLLKDATAACK FIATYETAVGPLNGAKVVAKAWTDPEYKARLLAEGTAAlUK FAAVYENEVGPRLGASVVARAWTDPEFKARLLADASAACH MIEQYETRIGPHVGAAVVARAWSDPAFKARLLADANAALE ILETYETEIGPRNGAQVVARAWTDPAFAQALRDDATAAI H VVNAFENDMGPMNGAKVVARAWTEPDFKEWLLRDATSAI G MVETLDAHR PALGSALVARAWTDPAFKERLLADGTAAI E IVERYQTK I LGHFETKMGPFNGAKLVARAWVDPAFKERLLADCNAACQ VLEYFDSKMGPFNGAKLVAKAWVDPDFKELLINDCNAACE Q। DRMDAR SPANGAGVVARAWSDPAFKAQLVNNTDGALS QI DTYAHRVGPQEGARVVARAWADPAFREALLDDADPVLD MAETYENEVGPHLGAKVVVKAWTDPEFKKRLLADDGTEACK Q DVLDS R TPALGAKYVARAWLDEGFRARLVNDTDALLD Q EVLDSR TPALGAKVVARAWVDPGFRARLLANGRTACE LDFFETKMPFNGAKIVARAWLDPAFKDRLVANTPAA VVSYYENEDGPMGGAKVVAKSWVDPEYRKWLEEDATAAMA Q1DAMDAR SPANGAAVVARAWTDPDFKKRLLENGSDAAR M MADFATEMGPFNGAKLVAKAWVDPAFKKDLAEDTMAAVE VI ETYQHRVGPRNGAHVVARAWTDPGFAGRLAEDATSAVA QI EVLDSR NPALGAKVVARAWTDPEFKSRLLENGRTACE VLNYFETEMGPFNGAKIVAKAWSDPEFKAKLLEDCNAAIS VASTYEHDVGPDRGARVVARAWTDEAFRARLLEDGTAAMA FTKGMEHDWDPSNGARVVARAWVDPAYRKLLLEDGTAACA FVEWYES TGPMGGARVVARAWVDPEFKKRLLKDGVAACL WVEAYSEHI GPMRGAQVVARAWTDPAFRERLLANAAEATK FVRTYEQDVGPLNGATVVARAWTDPDYREWLLRDGTAAI A


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HTRVVENTDTV
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$E L G F Q G R E G U D M V V E N$ SLGYAGRQGEHMVAV | S L GFTGRQGEHMRAV F |
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| E |
| EGFTGRQGEDMVVL | E

ELGFQGROGEHTOVVVND

SLGHVGRQGEHMVAVEN ELGYSGAGGETIVAVENT ELGFSGVQGEDMMVV SLGYHSRQGEHDEAVFNS $\begin{array}{ll}E L G F S G V Q G E D M T V V E N T \\ S M G F V G R Q G E H M I V A V & F\end{array}$

E LG WDGRQGEHVV AVV



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S LGFTGRQGEHMQAVEN
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MGUGGLQQ SLGFGERRGTRMRAVF

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UniRef90 S9QNS7 UniRef90-I2QIL3 UniRef90_UPI0001FFEA07 UniRef90_UPI0003B5A749 UniRef90-S3HDK9 UniRef90_L8LZ30 UniRef90-B1G4Y1 UniRef90_A4ELE5 UniRef90_UPI00026C80B0 UniRef90-B9NVT2 UniRef90_UPIO001FFE15D UniRef90_L9XGK5 UniRef90-H6MWW1

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P PTWYKSAAYRSRAVDDPRGVLADFGVTLADGTR AV HDS
P P VWYK SAPFRSRAVIDPRGVLADFGTTLPQDVE RVWDS
PPNWYKGPQYRSRIVREPRKVLADFGLDLPESVEVRVWDS
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P PVWYKSAAYRSRAVSDPRGVLADFGVVLPEDTRI RVWDS
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PPDWYKTREYRSRAVREPRAVLREFGLDLPDSTTIRVHDS
PPAWYKSDEYRARVVREPRKVLAEFGLLTLPREQAVRVWDS
PPNWFKEPQYRSRVVREPRQLLKEFGFEVPPSKEVKVWDS
PPDWYK L K PYRSRAVSEPRAVLAEFGTIIPDDVEI RVSDS

P P Y WY K D P T F R S R A A R E P R A V L N E F G L P V P E T I

P P D WY K T R E Y R S R A V R E P R A V L R E F G V E L P E S T T L R V H D S
 $P$ PVWYK S P A Y R S R A VLDD P R G V L A D F GTVVL G D D VA I R V H D S P P Y W Y K D P S F R A R A A R E P R A V L K E F G V
P P D WY K A K P Y R A R A V V E P R K V L A E F G TIII P D D V E V R V S D $S$
P P Y WF K D P T F R A R A AR E P R A V L Q E F G V E L P E D V T I



 P P S W W Y K D P A Y R A R V V R E P R T V L G E M G L D L L P P E R R I E V





 PHDAYPTVDTTTPAQRAFALEAALKKKNLI PEGYI EG
 PHDHHDHPSPGSYWQVME $\square A V R E L L V E K G I T T A S E I A S$ IDD HT TEQAPVSDRAWALFRALDGKGLVPDGYVEG HS H LDP PEPA LRLKALETVLTEKGFLGADAVDA
 GHPYDNDVPLTYWQTMEI AVRELLI EKGVSTAAEDAG
 D HA A P HP H D GP L T E A Q L TTE I A L R E L L L I E K G V L T P A E V T A DDGHDHSGDHEGSDFEGLELAVRELAIEKGLFTPEDHRV EPEHDHDHDHAPAYWA QRTHAI ERI LEQKGYFTAAEVRK DKDVPKTYYQFLEVAVRELLIEKGVITADDI WR HAP DE HAHEMGEHEKRIRAI QALLIDEKGIVTGDELRR

DEHDHERTDEDT DFEV LEIALLRELCDIEKGLFTAEEHR R
HTPHHAPEEVTDFEVLEIALLRELAD EKGLFTAEDHRH
D QF Q Y P A D R E S S A S A A K
DHHGSSA DSEF E IL L E L A A V R E L A I E K G I F S A E D H R
 ERFSYPDDREAA SAAQVRALEALLDEKGVISGQTVDK DDGDPPSHPDPEVDPQARARALQQSLLTERGILSTDAVDE

## 

 I E K G VV I Tr
DEFDVDEHARQHDPEAR VRAALQS LLIDEQELLSSSAMVDD
 $P$ I A A R VR R L E E RVI A A G L VT D E Q L D
 S GHHRN GEL Q A R V N V L L A L A A E E R G I V D R E E D DETPDEEDDPPEARARALQSLLLI E E GLVVTTADAVDE S GEHTSAP VAA R V R R L



ED DA GNAEAAR TT T LLEG LVTK GLLAK GEAD Q
 R E A D S A T L L A G L R S L L A A K S I A S A D E I A A

P Y Q P WCEA LVQTLTRRGVVRSDELHA
A A LEAKGDT NAAELDA


VDHTTENAAPA QAPVSDRAWA LVRADDGKGLVPA GY VEG $L P P I K E R V L A L K K L L I E K K L I Q E Q A I Q G$

PHRPHETRSE LSPYE $\quad$ PCDAM $\square E V L I D R N G H M T M K E L R E$
$H P R P G S \quad A V H E A B R R L A V A K G Q V S A S Q Q R Q$ P R P GE A V Y Y A A L

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UniRef90_D8Job2

## UniRef90-UP10003

 UniRef90-A0A051UJD3 UniRef90-M9R6F8 UniRef90 P13448 UniRef90-UPIO0035FC996 UniRef90-S6NZ42 UniRef90-DGTIN9 UniRef90 C7DEE9 UniRef90-UPIO0046966BC UniRef90-O5 $\times 5 \mathrm{~V} 1$ UniRef90-A8LN78 UniRef90-B1ZDD UniRef90-K9SJ64 UniRef90_UPI00036F3E5D UniRef90 W4LBL2 UniRef90- N1MRB6 UniRef90-UPIOOO382084C UniRef90 H81NP6UniRef90-K0V7D5
UniRef90-G8RHKo UniRef90-UPIO00376623B UniRef90-UPI0003A86706 UniRef90-D2SH15 UniRef90-B4WPV6 UniRef90 F4CSM8 UniRef90 ${ }^{-}$V4Y3Y3 UniRef90_UPI00037F9CC0 UniRef90-L7LOR6 UniRef90-B3T8G8 UniRef90-UPIO0036DA408 UniRef90-J9PBS0 UniRef90-LOIRA9 UniRef90 L9W9G4 UniRef90-KOPHC3 UniRef90-V4YGH6 UniRef90-B6CWJ3
UniRef90 ${ }^{-12 J U 02}$
UniRef90-UPIO00477C7BA UniRef90-UPI0003742866 UniRef90 G2MIV9 UniRef90-J2JVQ9 UniRef90-V4YGI8 UniRef90-D5BMDO UniRef90_K2DLP8 UniRef90-E318A7
UniRef90-UPI000377DD3D UniRef90-Q83W01 UniRef90-B1Z8J3 UniRef90-F3JI91 UniRef90-A5FXG0 UniRef90_Q83W02 UniRef90-A9V2C1 UniRef90-x8CW24 UniRef90_UPI000474FB58 UniRef90-FoY7M8 UniRef90-F3JI40 UniRef90-F2U4X2 UniRef90_KOPZ22 UniRef90-E5DSY4 UniRef90_-14G893
UniRef90-Q70T67 UniRef90-X6N6S6
UniRef90-L3VR04 UniRef90-F7ZEM2 UniRef90-Q83W04 UniRef90-R1DAZ6 UniRef90_H8PGLO UniRef90 UPIIO0034C6A22 UniRef90-UPIO003715377 UniRef90-K9TYK9 UniRef90 UPI0002F50FE4 UniRef90-13TIB9 UniRef90_UPIO00369E2C2 UniRef90-UPI00035E5B12

LTDLLANKFDPANGARVVIAKAWSDPQYRE ${ }^{60}$ LLLRDGTAACE V LGHFETVAGPFNGAKIVARAWVDAEYKTELLADTPRA臬A FKDLLGRQFSPANGAQVVARAWTDPAYRELLLRDGTAACA IIEHYETNVGPLNGARVVARAWTDQAYRQRLLTDATRADA QIDLMDTR SPSNGAQVVARAWCDPKFHTALMNDSSAATR WLDNYAENVGPMNGAKVIAHAWTDQAFADRLAENADSAFA DTRLMEYEWKPENGARVVAKAWVDPAFRELLLRDGTAACA FTEWSE QVGPAGGSRLVAKAWVDPEFKARLLANGDEACK Q ПDAMDRRSPADGAQVVARAWTDPAFKDRLLADASEASR QUEVLDSR SPDLGSRLVARAWVDSAFKARLLADGNAAAE
$F T E W Y D N G Y Y G S R V A R A W V D P E K K R L L A D G N A C K$ QVTQMDAR SPANGAAVVARAWTDPAFRARLLADGAEACR FSEWNDAR SPAAGSRMVAKAWMDPAYKSRVFSDPLAASK EVERMESVTPMLGARLVARAWLDPEFKARALVDGKAACR QEEDMDA ПSPADGAKVVARAWVDAGFKERLLTDAKTAIT WQKVFEEDFSPRRGAELVARAWTDPDFRDLLLSDGTAAVG VIA HYEKDVGPLNGAKVVARAWTDDAFRERLLANGTKAVA YTE FVEQIGPAPGSRLVAKAWVDPDFK VLSYFESEMTPLNGRKIVVKAWTDPGFAARVVVDTPAATA VLDAFLAGASPVNGVRVVARAWTDDAYRARLLTDGTAAVQ RFAEWAEGVGPHGGSKLVAKAWSDPAFKQRLLENGTEACK R 1 DEFLAGGSPANGARITARAWTDPEFRDRLLADANAADR E ERQDS VTPMLGARLVARAWVDPDFKQRLLADGKAACQ VLGYFESEMTPLNGRRIVARAWVDPAFSDRLVADTPKAVS V ATYEGDVGPMNGARVVARAWTDPEYREWLLADGUEAVA
 MADKDDSR SPKDGAKILAHAWVDPEYKKRLLADAEAAFL VWTEYVHTLGPGPAARLVAKAWLDPEYKKLCEEDGVEASK
 I I ATYEDETGPKNGARVVARAWTDPDYRERLLJEGMSAAA
 ILEHNLSRATPFNGARLVARAWTSPDFRDLLLGEPAAALR VVHNAEENWVPENGAKVVARAWTDADFKRRLLENGKAAVT EI ERMDGR GEHLGARIVARAWADPGFRDRLAADGNAAAA RIETLGRSVSPVNGARMVVRAWGDPAYRERLLDDAGAAAG LVALYEEDVGPMVGAQVVAEAWTDPEYKERLLKDGDGAVA SLAAMLKGASPVNGARIAARAWTDAGFRERLLADANTALP FEHLAEEKWLPENGARVIARAWTDAAFKQKLLTNGREAVY YEHFVDEEWLPMNGGRLVAKAWTDAAFKDRLLTDGKAAAA AVEALDAGSPAYGARLIARAWVDPGFKARLEENANLAAR MNGAKAVARAWVDPAFRARLLADGTAAVA
EПEK TET PGLHLGARLVARAWVDPDFKNRLLADGKLAAA RMEMVGAASPRNGARLIAKAWLDPQFKKLLLSDAKAAVT $R \square R \square T D G G G P A Q G A R M V A K A W T D P D Y K A L M L A D G A R A A E ~$ A LVVAKAWTDPAYAKWLKEDATAADE TपASLDALQNSGAGPQLVARAWSDAAFAEWLLTDAAAAAE
 AVERTDADGVAAAGPRLVARAWVDDGFRRRLLEDATAAAA $R M A V A D S G T P R N G A L M V A R A W L D E D Y K A L L L R D G R A A A E$
$A V S D I E A M G A N M E G A R L V R A W K D A F K S L L A D G P S A E A$

WKKTFEEDFSPKRGAELVARAWTDPEFRQLLLTDGTAAVA FVDYYEKFVGPHLGAAVVAHAWTNPDWKAQLLAPPPELIR RVVAKAWTDPAYKQRLLSNATEAIIA QVEVTDASQTETLGSQ\|VLRAWKDSTFQKTLLDSSLQRNN
$Y \square N P A Y K R R L L D D G R A A D Q$
RSA
tVESLETAHQTLLGATLVATAWTDEAFKRRLLEDANAAAP MAEK

TDFGPYYEARLIDRVWHDEQLKNEGLADPKAVER


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UniRef90 UniRef90-Q70T67 UniRef90-X6N6S6 UniRef90_L3VR04 UniRef90-Q83W04 UniRef90-Q83W05 UniRef90-R1DAZ6 UniRef90 H8PGLO UniRef90_UPIO0034C6A22 UniRef90-UPIO003715377 UniRef90-K9TYK9 UniRef90-UPI0002F50FE4 UniRef90-I3TIB9 UniRef90-UPI000369E2C2 UniRef90_UPI00035E5B12

130
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PPEWYKGFEFRARLVV|REGRTVLVELGTE|L|PKDMTVVKVWDT PPYWYKDPVFRARGVREPRAVLREFGVPVSDETEVAVWDS PPEWYKGFEYRARLVREGRTVLRELGTELPDNVTVRVWDT PPAWYKSPQYRSRVVVEPRALLAEMGLELPGHVRIRVWDS PPDWYKSRAYRSRTVREPRSVLAEFGVTLPDTTQURVHDS PPTWYKSFEYRARVVREPRKVLSEMGTEI A SDI E I RVV D T

 PPDWYKSKPYRSRAVREPRAVLEEFGTRI PEHVEVRVNDS APAWYERPNYRRRLVRWPRQVLAEFGTVI P P DVEVVRVMDS SPYWYRSPNYRRRIVRWPRQVLAEFGLLLPPEVELRVEDS PPSWYKSTAYRNRVVDDPRGVLKEFGTIVPAEVEIVRVMD PPDWYK SREYRSRAVREPREVL REFGTEI PNEVEVRVHDS PPAWYKS LDEYRRVVSEPRQVLQEFGLELDPEVEVRVYDS PPTWYKSFEYRARICREPRKVLAEMGTVI PADVAI KVYDT PPNWYKSEAYRSRMVAEPRTVLAEELGLALDESVMU R VWDS



 P P Y WY K D P V F R A R A A RE P R VV L T E L G V P L D D DTEEV R V W D S P P T WYK S P A YRSRVVDEPRALLREFDTDLAD DVDVVVWDS PPDWYKSFEYRSRAVREPRVVLAEFGVRLSDSMAVRVHDS
 SPEWYRTPNYRRRLVRWPRQVLSEFGMQLPEDVEVRVADS APDWYKELEYRARIVRRARTVLKE PPYWYKDPTFRSRAAREPRKVLAEVGVDLPADTE: KVVDS PPVWYKAPEYRSRAVDDPRGVLAEFGDELSAEKKGTVRDS
 SPSWYKSDAYRARVVREPRAVLAEFGTVLDAEVDVRVWDA PPGWYKDFEYRSRLVRQSRTVLREMGLDLPYEIVDIKVWDT PPAWYKSLAYRSRAVREPRAVLAEFGLTVPDGVEVRVHDS PPAWYKSEAYRSRVVRDPRGVLAEFGTTLPDDVEVRVWDA P P T WYKS P A YRSRVVKEPRALLREFGTDLLEDVAVEVWDS SPSWYKSEAYRSRVVREPRAVLAEFGLVLPDDTAI TVWDS



 P P S W Y $\quad 1 \quad$ S K T Y
 P P V V W K S P P YR S R A V
 S P E WY R T P N Y Y R R R IV


 P P VWY K A PAYRSRAVDD P RGVLAAEFGMTLP DEKKI RVWDS PPTWYKSFEYRARVVREPRKVLSEMGTE』ASDTEV QPMWYK S Q QYRARSI S DPF GI LVEFAEDANRGTEEL R VWD S P P DWYK S L Y Y R T Q Ci SN P R QL L K E F G L D L P Q D



P $\quad$ LYRDQNFK T QLMMQNPKVADALLGESVPEDLEDRVYK N A Q VI R R D E A F K A K L L LiQ N P K A G I T WWK A RAYRERITTSNPKATFAEMGADVPPNLKIQQSLQE A A M WAT DPVFRA DL RVAAPVA TL RA Q GVVEMAA GLVVDVI DA

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UniRef90-L3VR04
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    lupas_14
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