## QUERY

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UniRef90 131069 UniRef90-P90838 UniRef90-UPIOOO3B3E218 UniRef90-LODKC5 UniRef90-14CB99 UniRef90_UPIOOO3741F55 UniRef90 EOSPW5 UniRef90 G4SW49 UniRef90-D3PDN1 UniRef90-×1S9S2 UniRef90-WOK562 UniRef90 H8GJP1 UniRef90_M1VFI7
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K K K V T E Y K W E L P K Y K Q G M R V P A Y F Y I N R K L M Q

$P$ LK KLIDSFRWEI PKYK PGMNVPGIIFASQHMIEQIEKD
K K $\operatorname{I}$ R D M E Y R I E D P S K G M K V P V T I Y A D Q N L L A K ML T D
LK K V S D T $\square$ Y E L L P D Y K E C M K V








L E KI D D NR WMI P K DEPGMRTNAVI Y SNE QLLA HVVQ D
KLLEKI DEYTWTVPDK P GEKRAPVVLYGTKELLRSMMDD
$\square T \mathrm{~L}$ E K V $V$ R D Y V VW
DEFTYEDP DEVPGMRVPGVLFSNEALLSGVEGD





MEY L K RIIT D QVWELTPS YKEGMLVVARDFASEKLLVREMBDA







M E A L L R R L



QLIRRRGETCWEI P P T A A M RVVPAVIVYADE GLI I RAM D P

M NFL K Q V
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UniRef90-D5MFV6 UniRef90-M1Y2U5 UniRef90-A3CW28 UniRef90_UPI000375E342 UniRef90-D5E9W7 UniRef90 LOA947 UniRef90-UPI000349911F UniRef90-E1YC30 UniRef90-H1YXW7 UniRef90-A8MB52 UniRef90-K9TJ95 UniRef90_UPI0003B72897 UniRef90_G2ML49 UniRef90-A8A9H4 UniRef90-HOAACO UniRef90-R9SH94 UniRef90_A2SPQ0 UniRef90-A0LLV2 UniRef90_UPI00035C682C UniRet90_S7TFY8 UniRef90-B8FJF2 UniRef90_Q54Y09 UniRef90_UPI000472D070 UniRef90-F8AE51 UniRef90-I3TD85 UniRef90-E7QQD9 UniRef90-A0B8X5 UniRef90-K1LAH5
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 ETIDQVANVASLPGIQKYSMAMPDAHLGYGFSIGGVAAFD NAPEQVANVATLPGI IKASMAMPDDHWGYGFPI GGVAAFD $R T D M Q A V N V S T L P G I \quad Q S H A V V L P D G H E G Y G F P V G G V A A M D$

 $G T V D Q V A N V A T L P G i V G H S M A M P D A H L G Y G F P I G G V A A F K$

 GALDQVSNVACLPGIQKFSIGLPDVHFGYGFSiGGVAAFD
 GALTQIANVACLPGILKHSFAMPDVHWGYGFPIGGVAAFS
NALTQVANVATL KALEQVVNVATL
LS L E QV A N GA A L

 EAVDQVANVATLPGUQKFSMAMPDAHVGYGFPDGGVAAMD $\begin{array}{ll}M T L N Q S V N V A C L Q G \mid Q K Y S L V M P D G H Q G Y G F P I G G V A A M A \\ L I \\ K & G A V N A C L P G L V G V V V M P D V H Q G Y G M P I G G V M A S R ~\end{array}$ EAVKQVANVATLPGIIKASLAMPDIHWGYGFPI GGVAAFD GAVRQLANVATMPGIVKYSLAMPDVHWGYGFPIGGVAAFN STLEQAANVACLPGVYKYS ALLPDAHQGYGFPVGGVAAVD AVADQUSNVATLPG\|TQSALCMPDGHFGYGFPIGGVAAMD DSLQQLRNAAHLPGMTKYALCMPDGHQGYGFPVGGVGADD
 GALTQLANVATLPGILKYSLGMPDIHWGYGFPIGGVGAFD

## 


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K S L
ssiogach dade

| $K$ | $V$ | $L$ | $E$ | $Q$ | $T$ | $N$ | $V$ | $A$ | $K$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $K$ | $L$ | $L$ | $Q$ | $Q$ | $L$ | $K$ | $N$ | $A$ | $T$ |
| $H$ | $L$ | $P$ |  |  |  |  |  |  |  |

R T I K QAA NVAA MP

$M T L R Q A V N V A C L P G V Q E S V Y V L P D G H Q G Y G F P I G G I A A T S$













 $R S L N Q L V N V A C L P G I W K A S L L V M P D V H E G Y G B P I G G V A A T S$



 $K$ V Y E Q I T N V A T L P G $\quad$ I V E A A Y A M P D A H W GY G F P I G G V A A F D




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UniRef90_D5MFV6 UniRef90-M1Y2U5 UniRef90 A3CW28 UniRef90_UPI000375E342 UniRef90_D5E9W7 UniRef90 L0A947 UniRef90_UPI000349911F UniRef90_E1YC30 UniRef90_H1YXW7 UniRef90_A8MB52 UniRef90_K9TJ95 UniRef90_UPI0003B72897 UniRef90_G2ML49 UniRef90_A8A9H4 UniRef90_H0AAC0 UniRef90_R9SH94 UniRef90_A2SPQ0 UniRef90_AOLLV2
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 S L F E A I P S GVVGS K S RMRLDTDEEVLDEVFIDNGVNWAVMN GYG TI F V V V P S GVGEKGK LRLTVQELNKVLDYGAKWAVENGYG



 ALF QAVPSGLGSTGRLHATDRQLTESTLRGAEWAVEEGYG TLLF K N V V P S G V G G S E G L I N L T T K S QI D E V L L E G GE WA V R N G Y G E L F K S I P P S GVVGS E G A V R L T T K A E L D E L L V V E GV R WA V R H G Y G A $\operatorname{I}$ Y E F F V P A G V G S T G D 1 V V G K K G L TLFKNVPS GVGSKGKI RLKEGEIDDVLVNGAQWAVENGYG
 ALFNTLPS GVGGYGMRRLTEREMLEVMKRGSAWAVEEGYG VL Y K EVV P S GVVGSE GFD K L SVVRE LDDKVLDEMGAKWAVV Q GY G AL F H E I P T G V G S R GR $\quad$ RL S K K EAE A P L L K GA A WA V K Q G Y G ALIFEAVPS GLGGGGVLEGDHGDLESALVRGVEWCLEAGYA


 II Y D N V P S GL G S T G KL L K LT NA E L D N I L N Y GA K WA V E K G Y G A L Y R N CP S G V G E K G S F S L S A K E L E E V V CER R G S R WA L A K G Y A
 TI F E L A P A GVVGETGKVLHLPVSELDKVEDEGVDWAI RNGYG $K L Y E R V P A G V G S K G F V K V S R N E F R Q V V Q E G A K W C I M N Q G Y G$ GMF R E V P A GVVGKGGVTRLDSRKADHEV CAK GAE WAVAK G Y G $V L F D A V P S G L G G G G V V N G T R D A V E A V L E H G V E W A V E E G Y A$ TL F R NV P S GLLGSTGKVRMSVSELDKVLEEGVVWAVERGYG IL DLFNAVPTGVGSKSPDRLSQNDLVSMLVYGAKNAVEMGYG $R$ L F E R V V P A G V G S T G L L K
 GL Y R N I PS GVVGSQGSVVKLTERDEKTVLRTGSRWAVENGFG AL Y Q GI P C GVVGSTGFVKLNQKEAKRVLEQGSRWAASRGLG
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 AL Y A QVPS GVGK G G N L L S E K E L D E V L R R GVQ WA L E K G Y A
 AL Y R N V V P S G L G S K G LTTRVT Q K D L S D I LDD DG S R WA I E N G Y G ELVYKTI P A GVVGEE GEIDKLSPKEVDRVLEGGAEWAVREGYG AL F A NVPS GL G G G GVVYE GS $\square D D V E A D L D R G M E W A L E E G V A$ D L F S S I P P S G VVGS K G A V R L D R A Q L D E V L T G G V G WA V K N GYG RLYRAVPS GVGSKGGRPLNPSEVDEVLAGGARWAVEHGLGG ELYRNVPSGVGSEGKVKLSQQELDNLLSEGVKWVTDKGYG LL F K E I P A GVVGS H G K V V L D K T E I D K M L E G GA K WA I A K G Y G
 A L A L F K Gi P A GVVGS T GMM RLLSK S K QR DVA V V R A A WA V K Q G Y G ALFD HI PVGVVGS Q GDIAATNTKDLDTILLEMGMDYSVREGYS ELFHAVPTGVGAKSARPVSSSDLTGILTDGAGWAVEQGFG A L F T T V V P T G V G A E S EMMRI S P H DLLE E I MVVE GVN WA V A A G Y G


 Al Y T SIP S GVGKGGDI LL SEAKLDEVLRHGAQKMVQKGYG



 E L N K E I $\quad$ P T T G L G K G G K 1 Y L F R N I P S GVVGAT GKI RLLTERE LDD QV L E E GA QWA YR Q GY G ELYR SVVPA GVGSRGLI HLNHDEMRAML TGGAQWAVDQGFG EI YKNVPCGVGGKK QDFIKMSDLNHVLVKGAKWAVENFYG HLYNNIPCGVGEGGNDKLKKKELKNVLKKGSYWAVEEGYG IL S F N I P K G V V G S K G K I R L S K N Q L M QL L K E G V G WA V V N GY G AL F DAVPCGLGGGGVHDGTH GDLEAAL ER GVVDWCVEE GYA ELYRAI PAGVGSRGKIHLNPHEMTAMLTGGARWAI DRGFG A L F D H L P V G V G S R G I I P T T S R D LIE E A L A S G M D WS L R E G Y S

 RLFAHIPAGVGSTGQLRLNANEMDAMLRGGARWAVEHGYG
 S I F D H I P V G V G S Q Gl I P CT N A A L N D I L E Y GM D WTV A Q G Y S



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V
K
V
 WDEDLLVVTEEE GRMKNADPSKVVSDKSRKRGDPQLGSSLGS G

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B3DY87 UniRef90_D3SNQ8 UniRef90-C6BY21 UniRef90-D3HQ87 UniRef90-D8F399 UniRef90-10Z813 UniRef90_B8GGW1 UniRef90-J1L2FO
UniRef90-B5EGE5
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保
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FNAMACAANYAWANRQl
LSAMAASANYAWANRQU
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| :--- |
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LRLVAPCRYD IS GFVPNMLAPGTFYVNEVLAPLVKAE
VKQVDGTCYRTDKFVDNMRVPGVFYVNQQTKELLFDE LQRLEALIAWELPPT GAMRARAVFFGSAEAAAALED QVQKSPFEWELPDHGGMRVPGAIFASESMLADMDDE VPFERLDRYTYR』PRHGKMWVDAVFYANDELLAQMEAE MELVREGQNRYRLKRSGNMRVDGFVYVNEYLLPLVVRD MQPKMDDKNKYVIERT GDMKVPAYIYINDELLSKUNDE
 KLQKINDFEWLLPKARKEMKVDGKI IANKA YOSMEND MN TKRLERFDYRI KGVNVDAVVFTDQETIDNPEFK MELTKISPYKYVLER RGDMRVNAVVYGSPRLLPLVYKD Q Der $\square R E H V W E P Q Q G E M D A P A R L L A S E A L L D Q \| G D D$ ELRRTGDSGKAPVSUYASDDLVDGMKED

MELVRDGKNRYRLVRT GKMRVDAVVYVNEVLLPLLRDD PLERDDETRWRIPKYKPGMRVDGIIFADDGLIEQURHD VRRREALVWEMPQTGSMRVPAMLFGTEAALAAMED LIRHDDFQWHLPMT GDMRVPATVYGSLELVRAM ED VR EREGGYRYRIPRHGGMRVDAIFYASPAIIARDLEAE MELVEESPYRFRIDRRDPMRVPGVIFASRALLPDPVAD ME VEETPYRFRMPVH GAMRVPGIVEASRELLPSAQED MFNLKLIDSGCYELP DEEGMRVPGLVIATDRLLQDAALD NRWCISRER LQRDDAHRWLLP PSFNKSMRTSGTVYVDEELVKPLRAD


MR\|VEETPYRFRTDRA GAMRVPGIVFAARSLLPVAED LKKLNDYLYYLPKT GKMQVEGLIIASEKLLPALYRD Y $\quad$ HK GPYRYRIAPT GSMRVPGVVFASPALLPSLSD MELVQEAPFRFRIERGRPMRVPGVVFASRDLEPGAED RKAENRWRI YP VGTMRVPVDIFASEALISVM DT MELVEETPYRFRIERYGSMRVPGVVFASRRLLPDADRD
A पD VEESPYRFR川ERTGP MRVPGIVEASRVLLPDPAAD MSKLEK $\square G P A T Y L V P K$ ERGMKVPGLLIATEPLIRSMDDE


## MWQQAES

 MDLVQEAPYRFRTEPA GAMRVPGVVFASRELVDAA D FTUPKHDEGMRSSASFYANKPLLKQVLKE

$K \square L Q \square S K Y \square W E F P K D S R D M R V P A R \square Y A S E K M L D D \square F K D$


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50
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 PAVKQ $\square A N V S S L P G U V A R S D A M P D V H S G Y G F A \square G N V A A F D$

PAMKQLANVAALPGTVGKSTALPDVHAGYGFATGNVAAFD GVLTALANVAGLPGVVAPVLAMPDAHPGFGFPI GAVAAFD EVLKQVRDVACLPGIVRASMAMPDAHAGYGFPI GGVAAFD KVFEQLSNVASLPGI QQAAYAMPDAHWGYGFPI GGVAAFD GSLKQLVNVATLPGUVGPALAMPDIHWGYGFPIGGVAAFD PALRQAANVAALPGIVKASLAMPDVHSGYGFCIGNVAAFD KSLEQLANAASLPGVVERVCGMPDIHEGFGLPIGGVMAT P LRQLMNVASLPGIVKAAYAMPDIHLGYGFPI GGVAAFD EPIKQVMHVASLPGIVKSSMAMPDIHLGYGFPIGGVAAFD
 EALQQIVNVTQLPGIIMAAlOMPDAHWGYGFPIGGVGVFD
 NTLDQITNATQLPGIIDHTLCMPDGHQGYGFPVGGVGATD $G T L E A R N M A D L P G A V D K V C V M P D G H R G Y G F P L G G V A A F D$
$E V F N Q A V N A S M P G D R Y S Y L S D A H G Y G V P G W A G A F D$ KS的QLAHAAMLPGVTNPVVGMPDTHEGFGDPTGGVGVYH QAPEQVANVAFLPG|QVASLAMPDIHWGYGFC| GGVCATD GVFAQLRNVASLPG|l AGQALAMPDAHTGYGFPIGCVAAFD ASLRQLMGVATLPGUVEPALSMPDIHWGYGFPIGGVAAFD QALQQLVNVATEPGUAAPAVALPDIHWGYGFPI GGVAAFD RSSLEQVANVATLPGUVAASYAMPDVHWGYGFPIGGGVAATD QPLQQVRNVAHLPGMIGYS AMPDIHWGYGFPIGGVAAMD


QELDMLKATGFTYDRVTAVKEVPYKGFVYDFTVP
KSLEQVMNVARLPG1IGASMAMPDTHWGYGFPI GGVAAFD KSLEQVVHVATLPGIVGASYAMPDIHWGYGFPI GGVAATD QTLTQLYNVACMPGLAGRVCAMPDAHSGYGFPI GGVAAFR SVLQQLCDAAALPGVFGPVVGMPDIHAGFGLPI GG\|MATR AMKQLGNVAALPG\|VHRSllGLPDVHSGYGFA! GNMAAFD EALTQVANVATLPGIVTASFAMPDVHWGYGFPI GGVAATD ESLKQLQNAASLPGVYRAVYGMPDLHEGFGLP: GGVMATV EADEQLKNVASLPTIVKAAYAMPDIHWGYGFPI GGVAAF GSLDQVANVASLPGIVTASFAMPDMHRGYGFPIGGVAATD QALQQVVNVATLPGUVEASYGMPDLHWGYGFPIGGVAATD ETHHQLTTAASLPGVAGSVICMPDAHSGYGFPIGCVAGFC HALEQVANVAALRGIVIASYAMPDVHRGYGFPUGGVAATD
RSLLQVANVATLPGIVRASLAMPDVHWGYGFPTGGVAATD RPLEQVRNVAHLPGIVGYSVAMPDIHWGYGFPI GGVAAMD SCVKQTANVATLPGVVKSLA MPDAHSGYGFSI GGVAAMR RSLLQVVNVATLPGIVVASFAMPDVHWGYGFPUGGVAATD KS $\square E Q L V N \square T T \square P G \square V K Y G \square A M P D \square H M G Y G P P \square G G \square G A M E$ $\square R N A C R G G G \quad K Y \square R V L H D V Q P V K$
 SA QQLSNVATLPGVVSSS $\square G M P D I H S G Y G F A \| G N V A A V D$
 TMA KS $\square D Q L V N \square T T \square S W \square N R Y S \square V M P D A H E W Y G S P \square W W V F A T R$ PALKQTANVAALPGTVGHSTGLPDAHSGYGFATGNVAAFD $S S L K Q L L D A S E L P G V I P P V I G M P D \square H E G F G L P I G G V L A T D$

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LD E G|VI|S P G G|V|GYD| |N C G|V|R ${ }^{100}$
110
120
LDEGVISPGGVGYDINCGVRLATTSLITLEE\|QPKDEPLDT AQGGVVSAGGVGFDISCGVRTLYTGLKREQIEPLKTVLAD
 PDQGVISPGGVGYDINCGVRLLRTPLQAEDLGAHLPRLMD

 D
A D S E A V V V
 MGDPVVSPGGVGFDINCGVRLLRTNLQEEDVADKKELLAQ

 EPEAVICPGGVGFDI NCGVRLI RTNLTKRDI EPHKVRLAD $M D D P V V S P G G V G F D I N C G V R L L R T N L M E Q D V Q P V K D V L A Q$


 PDEGGVVSGGGVFDi SCGVRTLHTGLTLDQLRPHKKALAD
 AADGVISAGAVGMDINCGVRLLATNIMAKELKPFLRRLIE YDEGIVSPGGVGYDI NCGVSLI KTNI SYNDAKSRIKDLI D


TETGGl $P D \quad G V I \quad$| $P$ | $A$ | $G$ | $G$ | $G$ | $G$ |
| :--- | :--- | :--- | :--- | :--- | :--- |
|  | $D$ | $D$ |  |  |  | MTDPVV

AEEGC



| $E$ | $D$ | $G$ | $V$ | $S$ | $A$ | $G$ | $A$ | $V$ | $G$ | $M$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $D$ | $N$ |  |  |  |  |  |  |  |  |  |
| $D$ | $E$ | $G$ | $V$ | $S$ | $P$ | $G$ | $G$ | $V$ | $G$ | $D$ |$| \begin{array}{ll}N\end{array}$

$P D E G V$
A R A G G V V S A G G V F D
$P E E G G V V S P G G V F D$
P R K G G V V

I E G G V V S P G GVVGF D I S




ETHNFVADGMlVSN
CGVRLVRTELEAKDVQPGDKDLIS
 DEGGVVSPGGVGFDISCGVRLLAADCDRAELRPALLAVVD PKDGVISAGGVGFDMACGVRTHLTDLAAEDITPRLAELAE

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 ADRGVVSPGGVGFDISCGVRLLTAEVGRDTFAPSRDAVMN

 VEGGVVSPGGVGFDISCGVRLLTADLDSVEFDHVSEVIMD VV H N C GVVRLVKTNLTMKDEVQPKMKELLDS DEGGVVSPGGVGFDISCGVRLLAADLDRAALAPGFGALMD AKEGVISPGGVGYDINCGVRLAI DPVPFRDFTPEKKKLDE DKGGCI CPGGI GFDI NCGVRLLRTNLKESDILPHKDELAD
 DEHNFVADGFVVSN CGVRMVKTNLTYDDVAGREEELVE LPD GIIS P GFVGYDENCGVRLLKTTFKEEEVRPHCEKLAS $N C G V R M M R T N L T Y D D V R G N E E E L V D$ KEHNFVAQSFVVSN CGVRLIATNDHTKDDADRDKELMQ
 MDDDDSVPGGVGFDINCGVRLLRTNLHERD RTNLTENDVRPKlRKLVD ANPGHSFDAEGVVVSNCGVRLMVTNLTVNDVRPRIVELVN MNDPVVSPDGVGFDVNCGVCLLRTNLDESDVQPGKEKLVX DAHNFVANGIIVSN PHHNFI ANNFVVSN PDHNFIAEGFVVSN C GVVRLLRTELDDEKDVRSKDKELVD C GIVRLI RTNLTQKEVKM KIELLVN VPD WII S P GAVVWYD $\square N C W V R L L D S T C D A D E I S H K D K G L A Q$ MRLL RS GLSRTDVEGQMRNLVE MDDPVVSPGGVGFDDNCGVRLLRTNLTEAAVADRREALAQ GND GIII SA G A V G M D I N C G|V|R|L I N T D|I D Y G D|I K D E L P P L L

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UniRef90 $\mathrm{WTTEQ9}$ UniRef90-WTTEQ9
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UniRef90_B2A440
$K|L| F Q N|I| P T G|V| G A S G A|I| K K D S K S D L K T L|E K G S| V|W A| V \mid E N N L G$

 RLFERIPAGMGRGGDTLLRNRDMRRLLREGAAWAVEVGLG RYYRQVPSGVGHGNQITFSSKQLDQVLRDGAPRMVEFGYG SLFDH|PLVGVGSKGVIPTSAADLEAALEMGMDWSLEREGYA SLESRIPTGVGCSGFI HCSRSEFRK KTEGSRWCLKNGFA SLEFDHIPVGVGSRGIIPTTPAAGEAVLEMGMDWSLREGYA RLFDYIPAGVGSEGKIPCKYKDLDDILGYGMDWTVGRGGG SLFDHIPVGVGSRGVI PTSSAHLDAALNMGMDWSIREGYS HLYKKIPCGVGEGGNKLSNKEMKKLLQEGSKWAVNSGYG LLYQNVPAGLGTKKGLKISGRDMDRMLAQGGKWAVGRGYG ALFDHIPVGVGSQGIIPCKGPELDEALELGIDDWSLREGYA ALFSDIPAGVGSRGAIHLNSEQMHDMLVGGAKWAVKRDWG SLFHQIPAGVGSESAVTLDAAEMEAMLARGAHWAVARGWG ALFNKIPVGVGSKGTIKCSDGDLFDTLTRGMEWAEESGFA ALFKKVPSGVGTKASI DFKEEDFDKLLTGGLEYMVEQGYA TLFDHIPVGVGSKGII PTTDQSDEAALELGMDWSL REGYA AVFDHIPVGVGSOGDIPTNSNDLEEAGEMGDDWSLREGYS AVFDHVPVGVGSQGTLPNSNDLEEALEMGIDWSLEREGYS TLFASVPAGVGRGGDVVLEGDELDEMLTRGATWAVQRGLG LLAVAIPAGLGSTGTIKLTHREMDQML DGGAAWAVEQGYG ALYRRVPAGVGSARRDRWSPKDLKTVLREGARALVAQGFG ALFRNIPVGVGVSGGDPCSDDDLDQLLRNGVDWAI EKGYA RIEEYVPTGVGKKGKHKAITGEIFEEVVHGSRG\|VKRGYG EI FKNVPAGI DLLKSSFRVNKNDMTDILSDGIKWAVSKGYG EINKTVPAGIDYKSSFRISDDDENEILSSGIEWAYNNGYA ELFNTIPCGVGSKGKLKLTNDQLDEVLVRGVNWALENGYG TLFERIPCGVGRTGPMRLRRKELDAMLSGGAEWAVSCGYG EI YRSVPAGVGASGAVKINKKDLRSICIVYGAQWAVDQGYG R EEEYVPTGTGKKSRHKITEKDFQEVVYTGAPGIVRHGYG ALFANIPTGI GHGGVVETDTETVTETLDRGLDWAVEAGYA ILYSKIPAGLGGGGIVDTSREELHRVLDEGVEWMVENGYG TLFNMVPAGVGSNNIKNLGKPALKEVAEEGMDWAIRNGYA TVEDYVPTGVGKKSKHELSRRLFERVARTGVRALVEQGVG ELFQQIPTGVGRTGKYHFDRKELRHLMAEGPRYLIQRGLC ALFHAVPSGVGQGGRILKGDEMAQMLEGGAAWAVGRGYG ELFRSVPSGVGRGRKDRI GRPDLRRLLVEGPSWLVERGYG ALFRLVPAGVGSERRERI GAADWPHLLTRGARWAVERGLG ALSAATPRGMGSGAVWQLTRDELDAVLRGGSRYAVQRGFG TLGRTVPRGMYRGSVWRLTPGQLERVLTGGAGYAVDSGHG AIFKRVPSGVGRGTKKELTESDYKQIVEKGSRWSVEQGFG DLARSIPTGFGRHGRLSLAPEQMDRVLTEGVPYLVDLGLG RIEYYVPTGMGKKGRHKITRVIFNDVVHNGVEAVIKAGFG


TLFKNVPAGVGSKGIVGAVEGQTDNILVEGAEWAVRSGYG KIFSKVPAGMSKSRDISLNNQEI EEVLQSGDKWAIDKGFA GLDRAIPRGAGPGGVWRLDPRQLERILQGGSRYAVEQGHG ALYAAVPSGVGS SAGPSGPQSLHDALAEGAAYAVRAGHG AIEKRIPAGVGGKSRHHLCREGLEDALTHGARGLVSKGYG AMFDHIPVGVGSKGVIPMNAKDLEEALEMGVDWSLREGYA RLGRVVPRGMETRGVWELDRTVLRQVLAGGARFAVEQGHG A $\backslash E Y V P A G V G K K N W E K E V R S L L P K V L L K G A R A L L E E G Y G ~$ SMEDHIPVGVGSKGVITPMTARDLEEALEMGMDWSLREGYA ELYDVIPVGVGATSKKFDKKSFKK TIEEGAKRAIEMGCG ALAREIPRGAGRGAVRPLNRRQLDRVLTGGARELVEQGHG LLDATIPRGAGPGGVWKLSRAQLDELLRKGARYAVEQGHG GLSRATPRGAGRGAVWELHREGLDRLLEEGCHYAVARGRG ALFRADPAGLKGSSHLSLNAEEIKQILHEGAAWAVRNGMG ALARAVPRGVGRGAVWRLSRRELEQALLGGARYAVEQGYG KIFKNVPSGLGSKGKIRINKNQIEEVLEGGVNWAINNNYG TLGHRIPRGMHRGAVWPLSPRQLREILTGGASYAVAAGHG KI YEIVPSGVGRGGKKALSQKDYQTLVKQGARYSIELGYG SLQKNIPSGVGTTSSLRLSVKELREVMNDGMEWLATHNYA ELGRAVPRGLGRRAVWPLGRAQLERVLAGGSRYAVEQGYG ALFKNVPSGVGSKINLGFTDQDLENVAIEGVGYIIGKGYG ALFDAVPTGLGGGGVVTGDAETMTGALERGMDWAYEAGYA EMQKQVPSGLGKGHKEKLSTKEDDKDLERGVPYLVEKGYG ELIEEAPTGLGGGGVVQPGIDAVEGALERGVEWAVENGFG AMFDHIPVGVGSKGVIPMSAKDLEEALIEMGVDWSLREGYA ElLKNVPAGVGSTGDKLSHSKMEEVLVKGARWAVEHGYG GLDPVIPRGMGRGAVWHLGRAEMTGVLVGGARWAVEHGYG LLFKNIPVGVGEGRELSLYAQELDDILRRGMAWAEERNLC ALFRSVPSGVGAKSKLKVSDSELRSVLEDGAGWAVEQGYG TVFRNVPAGLGSRRKDVVTHSDLDRVALEGARYVI EKGLG TVFRNVPAGLGSRRKDVVTHSDLDRVALEGARYVIEKGLG TVARNVPSGLGSEGKIKVTPTVLDEVLNRGVEWAVEHGFG ELARAIPSGVGSKGKVKISYNE:RDVLRRGSKWAVERGFG

 SLEDHIPVGVGSQGVIPSSSDSLQRALELGMDWSVREGYA

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| UniRef90_I0AJ03 | T Q S D\|I Q F TE E S G T L K N A D F S V V | $S E R A L E R G A D Q$ | G S G |
| UniRef90_UPI00042758DD | $R P$ E DLE R $\quad$ E E R G R M A G A R P E A V | S S HAKERQRAEMGT L | $G S G$ |
| UniRef90_A0A059LPX9 | WPEDKERCE EQGRMLGA D P S R V | $S$ E R A K R R G LP Q L G T L | $G A G$ |
| UniRef90_11G9G1 | WA E DKE HCE E Y GRMLQ A D P S K V | S Q R A K K R G L P Q L G T L | $G A G$ |
| UniRef90_A1WZK6 | $E P$ E D L A R I E D R GCLP GA D P E A V | $S$ D R A $\ Q R$ G R D Q V G T V | $G S G$ |
| UniRef90_B3QM85 | E P E DLG H $\quad$ E S G GVLD A A D A S K V | S E H A K Q R GRD Q L G T M | G A G |
| UniRef90_W7TEQ9 | WA EDNE CNE NGRMRQA DPTKV | GMRAKKR G L P Q L G T L | $G A G$ |
| UniRef90_UPI0004655106 | EP E D L D R I E E R G C M G A D P A V | S R EAKRR GRD EMGT L | G S G |
| UniRef90_A1AQY0 | WP E DLE LTE E G G C F E GA D P GA C | S D K A VE R GY D Q V G T L | G S G |
| UniRef90_Q00ZY2 | WA E DKE HTE EYGRMLNA D P S K V | S A R A KKR GLP Q M G T L | G A G |
| UniRef90_UPI00031A52EC | VP R D L A N M A N G R I P D A E P D Q V | S P H A VQR GSK Q C G T L | $G S G$ |
| UniRef90_L0B210 | WA EDKEHCEDFGRMIQA D S S K V | S Q R A K K R GLAA Q $\square$ T T L | $G A G$ |
| UniRef90_F0YHC8 | WAEDKD HCEEAGRMLQA DP TKV | S R R A K K R G L P Q M G T L | $G A G$ |
| UniRef90_F8E9F3 | NES DLY NTE S F G C L S E A D P S Q V | S K R A M E R G S D Q C G T L | $G S G$ |
| UniRef90_D6SR70 | TSS DLKK T T E G G T A S G A D P L A V | S D K A R K R L D R E L G T L | G S G |
| UniRef90_F0V7S4 | WA EDKEHCEEF GRMLHANP TKV | S A R A K K R GLP Q M G T L | G A G |
| UniRef90_UPI00047D8468 | TA A D L E R TE ER GQMLHAKP G F V | S D L A K K R Q R E EM G T L | $G S G$ |
| UniRef90_UPI0003F6C7F2 | E M R D L E R $\square$ E E Q GRMA GA R P D F V | S D R A K E RQRREMGT L | G S G |
| UniRef90_171 | WSEDRERCE ERGKMSQA DAT LV | S D R A K K R G $\mathrm{I}^{\text {P }}$ Q L G T L | G A G |
| UniRef90_UPI0002C3EC38 | WEEDLKHCEE G GK\A GA D P S L V | S KVA K S R G H Q QV G T L | G S G |
| UniRef90_R7QGD8 |  | S A R A K K R G L S QL G T L | G A G |
| UniRef90_D2RHU0 | Y EK DLE HCE E N GAMEGAKP EVV | S R T A R ER GKP QL G T L | G S G |
| UniRef90_L1JYR6 | WP EDKEHCEEY GRMLQADPRKV | S S R A K K R G LP Q L G T L | G A G |
| UniRef90_UPI000467E4F0 | EA G D L T R CEE GGTMD GA D P G A V | S A L A R Q R Q R D EL G T L | $G S G$ |
| UniRef90_UPI0003657403 | Q K A D L E R 】E D N G $\square$ S R GA N P S K V | S K E A K K R $\square$ R N Q $\ddagger$ G S L | G G G |
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| UniRef90_F2NNB4 | $E$ A A D L E R $\square E S$ S G G R L P L A D P D R V | S A R A LE R G GP Q L G T L | G S G |
| UniRef90_B8LBM8 | WEEDKDHCEENGCMETA DPNCV | S K R A K K R G L K Q L G T L | G A G |
| UniRef90_A5D1V8 |  | S GEAYKR GAVQL G T L | G G G |
| UniRef90_Q6L1G2 | TERDIE STEENGMSM N S P P M V | S E K A I S R G I N EVVG S L | G G G |
| UniRef90_S0AP49 | TREDIE R T E E N G K M L S D $\quad$ GS GV | S E K A I K R G K N ELLG T L | GA G |
| UniRef90_UPI00036DC64C | TREDIM N T E E N GCMEGA D P S K V | S A L A K Q R GKP Q L G T L | $G A G$ |
| UniRef90_A4BUG2 | $T R$ V L E R I E E R G C M R G A R A E EV | SA Q A K D R Q C E Q M G T L | $G S G$ |
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| UniRef90_UPI0003642DD8 |  | S P Q A R S R GAVVQL G T L | $G G G$ |
| UniRef90_W6UUK6 | WA D D K E H CEEYG GRMLQ A D P S K V | S A R A K K R G LP Q L G T L | GA G |
| UniRef90_U1NVM4 | T R E D MLH C E D E GR R P D A N S D CV | S D D A K N R GK D Q $\quad$ G S L | G S G |
| UniRef90-G0QB73 | $R E$ GDLRNCE E N GR LPG D H R K V | P D K A K E R G N GQl G S L | G S G |
| UniRef90_D2EGR5 | NRK DKERTE EKGGSIK S A D F S K V | S E D A F K R GKK QL G T L | G S G |
| UniRef90_Q8U0H4 | WER D LE R L E G G R M G A D P D A V | S Q R A K Q R GAP QL G S L | G S G |
| UniRef90_B1I1S1 | A A A DLE Y I E E G C LA GA D LD A V | S R E A Y K R G $\quad$ T Q L G T L | G G G |
| UniRef90_H5S894 | TEEDIE HTEAEGRLEGAKPENV | $S$ DRA LD R GA EQCGT L | G S G |
| UniRef90_G7Q444 | QTG DLP RCE EGGTMPGA DPA GV | S A K A R E R Q R D ELG T L | $G S G$ |
| UniRef90_E6VZ36 | LP A DLA R I E D H GRMP GA M P G H V | $S P$ RA R ERM R D Q L G T L | $G G G$ |
| UniRef90_Q1AYS4 | EP G D L D GI E S R GR LA GA D P D A V | S ERA A Q R G Q P Q L G T L | $G S G$ |
| UniRef90_E6SJL2 | $D P$ D DLEF I E S T GA LP GA EP D R V | S A R A L E R G G S QL G T L | G S G |
| UniRef90_F4F2N9 | I E R DL L R C E D Y G A V H D A D P A Q V | S D R A I E R GA H Q V G S L | G S G |
| UniRef90_H5X6S0 | $V A R D L D R C E D G G R V E D A D P S L V$ | S R R A F E R G L G Q V G S L | G S G |
| UniRef90_D6YUX0 | $L P$ Q DLE H TE S R GFil E G G E $\square$ D AV | S P LA K E R GRH Q L G S V | G S G |
| UniRef90_Q1D1A0 | TP E DV D Y L A A G CLD GA D TA K V | SVRA Q ER G H D Q L G T L | G G G |
| UniRef90_G2MW93 | K K S D L E Y I E E G R L S GA D L S A V | SKEARER GEEQLGT L | G G G |
| UniRef90_E1QGC5 | QA T DLEF CES NGQUP【LADP D Q V | S T HARNR GR D Q L G T L | $G A G$ |
| UniRef90_I6ZGX2 |  | $G Q K A K G R G L N Q L T L$ | $G S G$ |

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 I R A DLDRCEESGCLSSGAQTAAVSAKALQRAA QLESTLGGG WAEDKEHCEEYGRMLQADPNKVSSRAKKRGLPQLGTLGAG VARDLERCEDRGVLDGADPDSVSDRAVERGLGQLGSLGSG FAEDLNK DEEGGVLAGAEDKALSETALSRGAEGLGTGGGG WAEDKEHCEEFGRMLQADPNKVSPRAKKRGDPQLGTLGAG
$\qquad$ EKEDLWHTEENGCVAGA WEEDVGYGE
$\frac{V}{F}$ R TPRDFLYCE
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 HI I Y DVVSHNI A KVVE QHIV S GREKTLLVVHRKGSTRABPPH H ELVYDVVSHNI AKFERHRVDGEEREVGVHRKGATRAFPPGH $R V V Y D V A H N$ I A K VETHEIDDGQSRQLLVHRKGATRAFP H V I Y D V $V$ S H N I A K K V E E H M Y Q GRRPK T L L V H R K G S T R A F P P N H

 ELLYDVVAHNI A K LEEEHSVNGVVKKLLWVHRKGATRAFPA G H
 QVVYDVVSHNDAKTEEHFVDGKLRTLLVHRKGATRAFPPNH



 HI I Y DV SHNVAKI E EHMVDGKPKNLLVHRKGATRAYPPRH GLVVYVVCHNIA KVEEHEIEGKKVKCVIARKGATRAFPPNH
 HLI Y DVVSHNIA KVE E H MVVDGNDKKLLVMRKGSTRAFPPHH T L L F D D V PLLYDVVHNTCKVERHEGEHGTRKLVVHRKGATRAYPPGH TLLY DV SHNTCKRETHR DDGKEK QLEVVRKGATDALGPGH RVLYDLAHNNAKFEEYAGGRGVLHRKGATRAFGPGA H L V Y D V DLI Y DVAHNI A K WE DLVY S LA HNMAK DEEHNDDNKRLGLIVARKGATAAFPAGY ETLYSLAAHNMAKAEDHNVDGNKRKLDVHRKGATRADPAY HTIYA LA H NDTKKEKHTID GKKREVVYITRKGATRAPP






 GLVYDVVAHNIAKWERHGGBRKVLVHRKGATRADPPGB QVVYDVVCHNIA KFEE HE IVEGKKK WVWVHRKGATRAFPPGB ALLYDVVHNTCKVERHAVGKSVKTLHVHRKGATRALGPGH DLLYDVSHNTCRAERHLAEGKEQTLFVHRKGATRALLGPGH $R V L Y D L A H N N A K L E E H \quad G A R R V L V H R K G A T R A F G P G N$ $R V L Y D L A H N N A K W E E H G G \quad R R V L V H R K G A T R A F G P G H$
 DLVYDVSHNLATIETHEVNGRARRLCVHRKGATRALPPRB
 $R I V Y D V A H N I A K L E P H G G G R L C V H R K G A T R A F G P G H$
 AL V Y DVAHNDAK LETHTVHNRQRQLWVHRKGATRALGPNH
 H QVY DVAHNI A KVVE E HQVVDGRRREVVYVHRKGATRAFPR E H K T V V Y S L A H N I A K K I E E HVVV E G N K K K L I V S LVY DVVSHNLAKI ETHPVDGTRRRLCVHRKGATRAFPPGH P L L W D V S H N TACKV E E H MVVDGRSMRRLWV HRKGATARAFPP GH AVVYDVVAHNDAKFEEHFGE KLLLVHRKGATRADPPGH


 E IV Y D V A H NI A K V E K H D RLVYDVSHNLAKLERHAVTGASRRLCVHRKGATRAWPPGH



 DLVCDVVHNLATLESHHVEGRPRRLCVHRKGATKALPPGB RLI Y DVVCHNIA KFE THWI E GEQRKV CVVHRGATRAYGMGA GIV Y DVVCHNIAK LEKHVVNGEEVECVVMRKGATRAFPPHR
 E L L Y D V A H N I A K R E T H E I E GE E R E L F F V



 S TVVY DVV S H N I A K V E E H M V D G V K K K V L V H R K GA T R A F GP G S D LVVYDVAHNVAK L E E H T I D GKPRMVVYVHRKGATARAPAA GH
 EI I Y DVAHNI AKIE EHEVNGKRKRLVVHRKGATRAFPPGH KLI Y DVAHNIAKMEEHNLGGKKVKLCVHRKGATRAFPPLH


 GVVY DV S H NIIAKA

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EMIIPEKYKSVGQPVLI PG G M 38
390
400
EMIIPEKYKSVGQPVLIPGDMGRYSY\｜VAVGTEKAMEETFGS

 | $P L I$ | $P A E Q Q V G Q P V L V G G T M G T C S Y V L T G T H K A M E A T F G S$ |  |
| :---: | :--- | :--- |
| $P L I$ | $V$ | $V$ |

## P $\stackrel{+}{\mathrm{P}}$

PDLPVDYQFTGQP
ロー

| $P$ | $E$ |
| :--- | :--- |
| $P$ | $M$ |
| $P$ | $N$ |
| $P$ | $F$ |
| $P$ | $A$ |
| $P$ | $G$ |

K D

リエロ
 $P$ LI PVVDYQFTGQPVLLI G PAGMEETF GS $P$ ELP D F CRAAVGQPVI，GGS MGTASF LLSGGNQAAERSFAS



S TGKFKNTGHPVLIPGDMGTASYVLTGNKNNMEMSFGS ASS GYFNETGHPVI PGNMGGPSYVMVGMPGNEEDTESS
 $H L L P Q K F D E T G Q P V L I P G G M M G S A S Y I L V G A K K A E Q L S Y A S$


 EDNPRPYRETGHPALI PGSMMGTSSYVLAGTERAAA TF FS
 PELPDDTLRATGQPVLVGGSMGTASYILAGTAEGEARSFAS PELP ERYR GVGQPVLVPGDMGRYSFVLAGTEGSMRETFGS


 PQNPSFYKETGHPALIPGSMMGGSYVVVGTEKAAAETFYS PELPP RYA A $\square G Q P V L T P G B M G R A S Y V L K G S H L A E T L T F A S$


 $P S L P P E L A P H G Q P I P V G G S M G T A S Y V L A G U P G A L A D L S W G S$



P

P
 A A LP PGLRAAGQPVLIPGSMGTASYVLTGVPTGBDDAFFS
A A LFDATGQPVLVGGSMGTASWILCAAARGEASMYS





## 



## A

 P

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P D I I P E K Y R KI G Q PVLI P GDMGRCSYCLVGTEKAMEETK GS
 $P Q L P D A W R Y$ L G Q P $V$ V L V P G D M G R Y S Y V L D

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UniRef90 K2GVNO UniRef90-W4M241 UniRef90_B2A4AO
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TCHGAGRAWSRAKSRRNLDYHDVLSKLADQ
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 GIIAEEAPGAYKDIDEVIASAAGAGLADPVAR THPLICVKG



 $T$ I A E E M P D A Y K $\quad$ D V $V$ D A V V ELAA E E A P LA Y K D V D R V V D V V E A A G I A R K V A R L V P L A V L K G
 TLA E E M P D A Y K N V N N I A A I $\operatorname{L}$ M Q N S G V A P I V A K T R P L V C I








 $G L$ S E E A P T A Y K D I $\quad$ D A $G$ L A E LL A E E A P LLA Y K D V D H V T D T TA C A T G I A R K V A R L R P L I CI K G






GI A E E A P F AY K DVV D
$T$ I A E E A P G V Y K D I D E V V R V S D A L G I G D K VA R T F P V C N I K G
 TIIME E DP Q A Y K DVVSEVVVR VID D L GI A K V V A R L K P M G T L K G




 TLA E E MS DAYK DVVSEVVEVMHQT
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 PAEGEMQCDVRLFATELITYNEIED HVYANNALYQDLGAA



REVPGTHVPDRMWADP
DEVDE QTIEGGRVPIRMWTDPAS AS $E \frac{V}{T} E D$ $P G A R V P I R M W G E P P A H E P G V E E$
$P H T R A P V R V W T D P H T$
$V$



MSTFNYE LLEAGDK

TENY $\square \mathrm{E} \square \mathrm{KNENKAT}$

 GAKAPTLMWA HEHAVEP

ENEGM
RAPIRMWADPA A EAKYWTSKV E P

EYP $\square$ A $\square P$ GARA ${ }^{\text {D }}$ | $T L$ | M WA E P |
| :--- | :--- |
| $\square K$ | A WI | YANDFLD

WTKGVP
$\square K$ A WTKGVP

| $L$ | $E$ | $E$ |
| :--- | :--- | :--- |
| V | $E$ | $D$ |
| $F$ | $E$ | $D$ |
| $V$ | $E$ | $P$ |
| $I$ | $D$ | $L$ |
| $I$ | $D$ | $E$ |
| $I$ | $N$ | $D$ |
| $A V$ | $E$ | $P$ |
| $F$ | $E$ | $D$ |
| $F$ | $E$ | $E$ |
| $V$ | $E$ | $P$ |

H E E
$\qquad$ TE P $A \vee E D$


RYELLKTDKGR
YEVTNVEKG VPI KSWTDGVP

| VE E |
| :--- |
| F |

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UniRef90
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KADTQLQNTAKMPFVFKHDAVMPDVHVGKGSTTGSVI RVYQMADNNLRTPRNV YFSYTPDAHVGVGTCIGTTAVWN PAVKQLVNIAQLPFIHSHVAAMPDVHVGIG ATVGAVI PAMKQI GNVAALPGIVHRSIGLPDVHSGYGFATGNMAAFD GAMQQLHNVATLPWIKG LAVMPDVHYGKGATVGSVIAM AAKKQLGNMARMPFVFKHIAVMPDVHFGLGSTIGSVI EAREQLLNTAKMPFIFKHLAVMPDVHLGKGST|GSVI
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 QALRQLHNUASLPGVHPYVAAMPDVHAGGGATVGSVA ASKQQLDNTAGMPFIYKWLAVMPDVHYGKGSTVGSVI KVLEMANNNMQIPNIRYMSYTPDAHVGVGTCI GTTAVWG RVYEMADNNLRIPSSVGMSYTPDAHIGLGTCIGTTAVWG KALAQLKNLSQLSTIHSHIAAMPDVHAGTGATVGSVI GAMQQLRNLAQLEFVHSHIABMPDVHVGKGATVGSVI RSQAQLVNLSTLPFIHKHVAAMPDVHLGGGATVGSVIATD RVYDMADNNLRIPRNV YMSYTPDAHVGVGTCIGTTAVWN ASAEQQLVNLSAQMPIVFKHIAAMPDVHYGLGATVGSVV AALRQLQNTAALPWVFKQLCAMPDVHYGIGATVGSVIAMK AAMRQLRNDADLPWVHG VAVMPDVHLGKGATVGSVIAM


AA $\square E Q A K N \square R \square P F \prod H P H V A L M P D A H A G \square G S T V G S V I A$ EAREQLDNTAKMPFDFSHLAVMPDVHVGKGSTIGSVI GALTQLRNCALLPWTHGVAVMPDVHQGYGATVGSVVAM ASLTQLGNMAQLPFIHSHIAAMPDVHVGTGATVGSVI QAMQQLRNDSTLPLHG LAVMPDVHLGKGATVGSVIAM
 SAMRQLQNTAGAPW:|KG LLAVMPDVHYGKGATVGSV:AM


QVMGQLRNTSGVPWVHG LAVMPDVHFGKGATVGSVIAM VARDQLRNVSGLPWIEG LAVMPDVHYGKGATVGSVIAM QMAKNVASLPFVFKHVSLMPDVHLGKGALVVGSVI A NTLRQLANVATLPWIEG LAVMPDVHYGKGATVGSVIAM QAARQLRNIGTLPWVQGVAVMPDVHFGKGATVGSVIAM QAKQQLMNVAQMPFVFKWVAAMPDVHWGПGATI GSVI QSLEQVVNVAFLPGIVSYSLAMPDIHWGYGF DI GGVAAMR LKMAKNVASLPGVFKHVALMPDVHLGKGALVGSVAA AAREQLENVAGLPFVHSHLAVMPDVHFGRGATVGSVI GARAQLARAAQMPFVFKHVAVMPDVHTGDGATVGSVI KARQQLNNDASMDVVHSHIAVMPDVHLGMGATVGSVI K SiDDLKKNARLPFVFHHVAAMPDVHAGMGATIGSVIATK GSKAQLANLASLPFIHHHVAAMPDVHLGDGATVGSVIA A ALQQLRNI AALPWVEG VRVMPDVHGGKGATVGSVIAM KAREQLDNI AKMENIVHHI AVMPDVHMGKGATIGSVI
 EAKKQLDGVRNSGDIHGHIAVMPDVHMGKGCTVGTVI A AALDQLRNISKLPW VEKLRVMPDVHLGKGATVGSVIAM QARKQLDNIAAMPFI HKHVAIMPDVHWGMGATIGSVI KTLDQTNVACDDGVKHVIALSDAHQGYGFCI GGVAGTD KAHEQLRNLAALPGVGPWVAVMPDVHVGVGATVGSVA GALKQAINLSNLPFAFSHVAIMPDVHEGFGMPIGAVVADE
 KMAQNVASLPFVFKHVALMPDVHAGKGALVGSVVATK



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UniRef90－E5SZD3
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#### Abstract

   160 CLFDFIPVGVGSRGIIPDNGRDFEECLEMGMDWTLREGYS ALFAN PTGDGHGGVVETDIDDTVTEVLDRGMDWAVEAGYA AI YENVPSGLGSTGKVRLSVRELDNVLNEGVRWAVGKGYG ALETAVPHGRTTGRKRDKGAWENPPVNVDAKWAELEAGYQ DMEKAVPVGFGAHK KTQ A EKLVPGVDSHARGHFSDDRGEHVLVKGPKKYV PDSYT LI EAAVPVGFGQHRAPVVFHDRGWRSFGDLTPTLSE


ATEAAVPHGRTNRGGRDKGSWHRAPELVDQHWATDADGFK AI EAYVPT NERGNTHFTDDRLEEVVKHGLQGLPSNYDT AIIEAAVPVGFAMHPNGPGVPASAVHALSGGLDRIVHKHPG AMFDH｜PVGVGSKGVIPMNAKDLEEALEMGVD K TEQAIPVGMGMHK AI ERAVPHGLTFKGRDKGSWENPAANVDRQWA AI EQAVPHGRSSTRSKRDKGAW GEP THKYLPGMESQQRGHFSDDRDENVVSKGDHKYDPDGEPT KIEQAIPVGRGMH DDPVDPFRFHAFATGGWDGFWERFGG T：DKYLPMEAHQRGHYSDDRHVVRKGLHGLPNKYDPDSYT
 A 1 ERKVPVGFELGKKVKAKASSIDPLEKRLDPIDKKHPG A）EKAVPHGSVPKSRGRGRDPGAWENPPDLVD
SLFDHIPVGVGSKG\｜IPMNARDLEEALEMGMDWSLREGYV AI EADVPVGFEQHDWSRVRHARATRPLAGRLEHIVERHRG ALEKAVPHGRTSGGRDKGSWSDLPA
 A AKKYVPT NERKNSNYEDIDVMEVVQHGLQGLPERYVP A AI EQQVPVGFNMHKQIQAKNSTLSDPLGKRLKPLTDKHPG
 EMIESSIEKYVPVNERQSSSYSNVTEGUEDLPVSYDEKPSK A！EGAVPHGLTPRKMGRDKGSWDTPPNEADVAWAA
EI ERAIDPGFNMHRDPADDRADERD
TVDESNFRKGSARQTVKGHYSDPWHTATKGLGGVPSEFFF RIESAVPVGFG MHTHPVDVRRVAGTGDWDEFWRGFG RIEQAVPVGRG MHDAPVTPGRLHGFPTA RUEDAVPVGFHAHKSPVPAARVHGDGGWDAFW SGFG
Q TERDTP乌GPGGKHR ADSFDK $\square R Q S V W A Y \square D P T S D R N D$ A EQAVPHGRSNRGGRDKGAWHQPPPRVDAHWRQLDAGF QVERDVPVGRAGHRDGP EI EKRVPVGFNEHRKAT TQGAT K KMAKHLINVIADKHAG RI EQAI PVGRG S I E R GVV $\mathrm{P} V \mathrm{G}$ N GRGGEHGKPSDGUHAMLVES

RIEQAI PVGAGMHR
Qi ERDVPLGAGGAQKDS
RUEASIPHGRTDNGGANDRGAWGDEFAMGLDDVHREALLV
ADEAADPVGFA
RLENAIPVGRGSH
MHDDGVDPASTPLLEERD
D AK REPVDPSALPGLKKRG
RI EAA
AI EDAIPVGFAQRDK MHREPVDPARLHAFPAAR DIEATIPTGFDSNKKTAKSVYNWQ AVNPRRVRGLEQAG A ELAVPHGRTNNGRAGDRGAWSD $\square$ P
DLEAQIPVGFEENKE円SKD VTNWQG ALYRNVPSGLGSEGKLRDNRGEDDEVLVKGARWAVEKGYG DIEAEIPVGFNQNKEIU EKVVTNWQG El ERKVPVGNGPGGNHKDTPSRAASAR RRSG A ERAVPHGRDQGKRDPGSWGDPQPAIVEAWATRAERFGR AFESAIPHGRGRGKTDRGAWHNDPDVVAKEWKKLELDRE A ERAVPHGLSPRRQGRDRGAWETPPDEADAAWAG
El LSRVPVGFAQRSKENTR
Q T TRDVPGGDQHADGRVLVDAVRPFEPGLKALTDRHPQ E R EAATPVGFHAH
AFESAVPHGRTTGRGRK
AFEAAIPHGRTGNKRRQ
KLEQAVPVGFGHHKRP
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SEKVVGMPNSVVDLWDTQLHNGF DLEAAIPVGFNENKEI GVEGKAVTNWQG
EIEARIPHGRTDNGGANDRGAFGTPSQASDDAFSGLHGE SLEKNVPSGLGSKGKLNDNYNDLDKALENGVNWA VENGYG DI EAVVPVGFNENA DADKQARNWQG LI KEAIPLGFEKHKTAQDKN【MPKPKVKDPKHF TTFKEY A CQRTPTGAGKGQRSVTKARHVNRTLTEGASDDVCHALG D｜EAVIPTGFNENGRRDEGAWGKTPDQVDSVVKAVTNWQH
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WQQFWRGFE
TQKYPRFLNTNNYKHLGTLGTG
LKRMLKNFD
$D L T P A V R A R A D R A V N Q M G T L G G G$
NKND DSCEDNGF $\mathrm{D}_{\mathrm{K}} \mathrm{K}$ GADADAVPEKA DERAFNQLATLGSG PKKMTS LTHVEHSKFAFDAEMLNEMAWHRSHRQLGTLGGG $\square \mathrm{CA}$ $K H P R L K N T N N R K H L G T L G T G$ EKALDNMGTLGGG

C $\square$ T D
 FSRSFSHVEKYFEFDHSFLEQ DPQKSWSRAWGQLGTLGGG 1 LKMQKNSE RTWAQQLGTLGGGG
YEDLWKRFDWL
TDAVKPRRERAAKQTGTLGSG
 $P A T V N K Y W A T L A P R F K R L T D K Y P Q L L K T N N H L L H L G T$
$P K K S T S L T H V G E S R F K F D E N V V S D R A W H R G H R Q L G T G G G G$ VAD AVKRREE RATKQMGTLGGG
PKKSTSLTHVEHSKFSFDEELVEDRTWHRAHRQLGTLGGG $\square M K K$ AFEGATSKVENAQFEFDYLEMLPQQPQKTWVTQMGTLGGG LVRMLRKFD ATWQKQLGTLGGG WDEF ASLSPKVQGLFTRARCQLGTLGGG QKWAT $\square$ ADEFDA LCELHPRGLKTNNRKHLGGTGGSG WAEDKEHCEEYGRMLNADPSKVSMRAKKRGLPQLGTLGAG $\square A K M L R Q F E$ $R T W I C Q A G T L G G G$
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LNKMLRRPRE
L LKMLKKGE
TWDRQLGTLGS G
MTDKHPQ E LKAFGRFRTWAKQLGTLGGG


LKS GFDK DCAKYPVLKNTNNYRHMGTLGTG DRESRKMADRLFHEYADLARVAQGLREKATRQDGTLGGG NESD $\square E N V E D S G F D L E D D V K A Y L D K H F T S V R D Q L G T L G G G$
WGDF WTRFDG $D L H E G V Q N R R E R A L A Q M G S L G G G$
D LIGSVQQLR GRAEKQLGTLLGGG

 WTAFWTGFDRLHHLRDASWT SEDALRTKAHRQLGSLGSG LVKMLKNFD HSWGKQLGTLGGG WDDFWRRFD WDAFWGR RLAERLGADLHRGVRQLDTRAGRQLGTLGGG EAGFGDLWERFDFVADA VKYRRDRALRQMGTLGAG EAHCKRLWESGLFDTNNKK KVQDNRGKAMSQLGTLGSG LQQRL VA V VAKHPKLTKAAG

WD RF WA AFF D D
WY D F WA E F
D
La ERAH PSVHRARERGSRQLGTLGSG WRDFKDLHPGVKDLLE WADFWQRFEDVAEAVHFRA $\qquad$
HEGVTRLE $A A K Q M G S L G G G$ WDAFWQRFTGL

G WRHFKDL ERNLNTWGELKPRYDADLAKHPKLLERGNHASQMGSLGGG WQDFSE RTEDLET TEEQGEMAGADPACASSRAKQRGTPQQGGTLGSG
WKDFKE
LDERDE
A ILVKHKR $\mathrm{V}^{\mathrm{L}} \mathrm{QRT}$
$\begin{array}{cllllllll} & V & A & K & Y & P & K & L & A\end{array}$
LA DEFAELCRDHPRLEKTNHVNHLGTMGTG
NNHRHMGTLGS G WKS CEPFEEPLKE GLAHEPTMLDPMVKSEWHAQLGTLGGG LLKAFGRF

SKWANQMGTL G G G TPDNLEFTESNGNYKGC SRK SSQKSKGKGVNQFGSLGSG PAE VARGADAFWSRFSGLHGRVSDIEGRARRQLGTLGGG GE ARFERUCKLEARFERICDKHPADIRHSNNVTHLGTMGTG WA GFWKDFDTGA PAVRPKRER

WRDFK
R R DNFKD KOSYRDSDEESNAEVQMGTLGGG
$N L H P G V R D L E G K A L D R M G S L G G G$ LKREADR LFGSFDALRAPKIAEREGRMHAQCGSLGGG YPEDEKFCEENGCMK GADSSKVSRRAKERGDRQI GSLGSG
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 R पT D


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UniRef90_U1K874 UniRef90-U1K874
UniRef90_D2AU27 UniRef90-D2VLJ2 :3 UniRef90-M3UXG0 UniRef90-V4MW62 UniRef90-X1BH49 UniRef90_UPIO004129ED5 UniRef90_U5DN32 UniRef90_UPIO003B550964 UniRef90_Q7ULP9 UniRef90_UPIO0030C55BD UniRef90_Q46NS2 UniRef90_Q2SQ18
UniRef90_C0DB05




H Q|V|CTNYLRADEQEHADLLER|LIPETELIAAAPAGSR|LIADEY HQVATDALVEMDKAMLRNNIKLNDRQLACAPLKSKEGQNY HQVCKDYVSDDTDEHADFVADLNDDNGAAAPADSREAEAY GAVSQGSTAGFSRVMRELGLGTADPKLLFAPLDHPEGQRY HQVASDYLQIMERAMRRYGTVPPDRELASDPYNTPEAQDY


 HAVASQQCSKEMA WWMRSAGVGTADPRLVFAPGSEPGAERY NAI GNHFIELARKDMQKHFINLPNKDLAYLVEGTEHFDDY NQLAQHHIAIAKTDAHNDA LVDPDLAVFLAGTPEMTAY HQ I C T DY L QKMQNAMNRYSDKVPDRQLACADLDSPEGRGY NA G N LF GSGAQKDMQQHIANLPDRDLAYFEEGSRYFDDY

 NELAAHHT KYI QLPDRDLAYFPEG NAI GSLLITLAQQDMQQHIANLPDRNLAYFAEGSAHFEDY GGISQESNPAMDAAMHRLGLGTADPKLAFLPGSHPEARHY GAVSQTSSSAlAKAMSRQGLGTSDPRLVFAPLNHPEAAHY SAI GEHF DQLARRDMAGNMQNMPDRDLAYFSEGSSHFNDY AMLGREYTKLFKEAMEMWGDSNPDPALMYAPMKSDEGQTY
NVIGTYFDELAKKEAQHRFGHVPDKDLSYFAQGSNSFDDY
 HQVATDALVEMDKAMKRDNDEVNDRQLACARDHSEEGQNY NAI GRYFI AAAQKDMRRHQLQLPDADLAYLSAGSTVFDDY
 NAI GTHFIELAKKDAELHQRNLPDQDLAYFEEGAQYFGDY GAVNQYCGSQVAKTMRKLGLGTADPKLAYAPDDSEAGRTY AMLGREYTQVIRGAMQSWGVTNPDPNVIYAPIGSTEGRTY NELAKRHDEIAKSLPH NADLPDRDLAVFVTGTPEMEAY
 NALGHYFI ELARRDMERWMIQLPDRDLAYGPEGTEHFDDY GMMGKQYTRDFRNAMDLWG ENPDPTLVYAPDQSAEGQRY NATGSLFFELKKDAERNNVHLPDQNLAYFEEGSQYFQD
 KELAERHIEDAKGLAH NADLPDRDLAVFVAGTPQMRHY KELAEFHI GQAQRLPHNRG VDRDLAVFVADTPQMAAY


 NVLANLH:EKAKELPHNQ DLPDRDLAVFGSGTPQMDAY NAIGRYFIEKAKKDVGRELGQLPDQSLAYFTEGTQHFDDY KELAEHHMSUAQSLPHNQG LDDRDLAVFDADTPQMAAY NLLGSYFDERAREELAQRVLDLPDKDLAFFLEGEPLFDDY NQLAEHHTGIARGLAHNQG DDRDLAVFLAATPEMAAY
 HQVAT DYI NELAAHHI EQARSLPHNQ
 NKLAQCHI TTAKELGKLAEEKLPDLDLAYFVAGTPEFAAY KELADHHIGEAQRLPHNRGGVDRDLAVFVSDTPQMAAY KELAERHMAVARRLPHNAA LPDRDLAVFLAGTAEMDAY NMLAKNHDSTAKNLRKLATEKLPDPDLSYFVAGTAEFRSY

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UniRef90_V4Y4Y1
UniRef90-E5SZD3
UniRef90 U1QPZ1 UniRef90_UPIO00365653D UniRef90_V4LNE2 UniRef90-P46850
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UniRef90-D3UZ39
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UniRef90_C0DB05
 I EAVNWAQEYARLNRQEMMK LVLNS LGAYVPKFT $\square T$
L N L M S A LDNFAVSNRHMDAYGVQQGFRDIFGAEFEEM
 VRAVSWAQKFAMSNREVMMANLIDATVRQVIAKPFESHV LKAMAAAANFAWVNRSSMTFLTRQAFAKQFNTTPD DLDM VEAVDWAQDYALLNRSEMMRRVLDVLAKFAPPFQDDG



 VEAVGWAQDYALENRREMMRLVTKSLQSPQAGLPRFQLTK VAAVSWAQAYARENRDQMMRLVLAALARHLPEFTVT 1 NLMYSALNYAVVNRHMDAFGVRQGLKDVFGSAF VAAVSWA TYARVNREM
 RRDLEWAQRYAYLNRLVMLGLYSKALKRFFPR YTMLRASLNYAVANRHMIAYGVSQAFRDVMGE RRDLFWAQEYARRNRAVMVSLVQRAL A DTVA H TVRF $R N D L F W A Q E Y A T F N R A L M M G L L Q D V V R R E F R K$
$R R D L G W A Q E Y A R R N R A T M L A L L Q G V V R E A V P K$ AKPKF

 RA DLVGWAQEYARLNRHVMMRLFEAALARAALGRP

 RHDLYWAQEYAKYNRAVMMSLMKEALRKEFRK

 RRDLF WA QEYAKRNRDVMMALACRAVVEQUPRT
 RNDLFWAQEYAGYNRAVMMALLKDAVRREFGK AKPVF $R R D L W W A Q E Y A R R N R A V M L A L L C T V V R D R F P Q$
$W N D L Q W A Q A Y A L Q N R E E M M A R F K Q I I A K H L G G G K P F K V R Y$ VEAVEWAQDFARWNRHLMMQQIVDAVRRSGQVPEFFTAE WRDLQWAQNYARTNRDVMMAR
LAAMRCAANYAWANRQCIAHWVRQ
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 MGAVSWAQRFARTNRELMMTAALEALSVSVPKRFTCDC LSAMACAANFAWNNRHLITHWVRKSFKEILKKD
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 VFAVSWAQQFARRNRELMMANVLAAAQRVIRKPF V QAVGWAQDFAR DNRQAMMQRALNALAT TL NKPVDAEL

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ELLLYDVVAHNV|AKLEEHTVGRETKPLV|V|HRKGATRAFPAGR QVVYDVSHNI AK EEHMVEGKDKTLCVHRKGSTRAFPPHH
 HLVYDVAHNDA

## D

## D

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E $\square \mathrm{Y} \mathrm{V}$ TRKGAVSAR
EVLVTRKGAI RA
NVFVTRKGAI RA
EVLVHRKGACKDAK
RRMFVHRKGATRALDPHH EVMVTRKGAVRAR DVLVTRKGAISAR
EPPISAH HNYVSEERHFGE
V K V CVV HRKGATRAFAAGH
R N T PVLV
REAINCHHNYVTVERHFGE DLFITRKGADRA
HVIYDVSHNIAKVEQHVVDGKERTLLVHRKGSTRAFPPHH
D


| $M D L L V$ | $T$ |
| ---: | :--- | :--- | :--- | VWVTRKGAVSA


RTLYDLMHNYAWEESHSDHGS
SEADNCHHNYVVREHHF
QA 1 NCHHNYISRQENHFGE RNQAMYV HRKGA TSAADPKGH DLFI TRKGA $\square R A$ DVLVTRKGAI RA DVFVTRKGAVSAR HEAVNCHHNYVQKEHHFGEGKEMVGLVGHRKGATRARPPHH EADNCHHNYAK RETHVDGNTDLYVTRKGADSAR EAVNCHHNYVAREHHFGE NVLI TRKGAVRAAE
EAVNCHHNYVSRETHFGE EVLVTRKGAVRA
KEEALLVHRKGTTRALLPAGH RNQGMLVHRKGATRALLPPKH D LMVTRKGAlRAAK DVYVTRKGAI SARE QVYVTRKGAI SAY NVWVTRKGAIRARE

MDLFVTRKKGA 1 RA VFVHRKGATRALPAGH

 PVLYDLMHNYADQEFH

EAVDCHHNYVEREHHF
RNRAMLVHRKGTTRADDPAGH NVWVTRKGA $\operatorname{l}$ RAA
QQVFVTRKGAVSA

QERVICHHNYVAEEMHFGE
RNSPHIVHRKGATRADPAGH ELLVTRKGADRA
DEPI SCHHNYVAEETYDGV
$\square D M L V T R K G A I R A G G$ DVLVTRKGAIRA
 HLVYDVAHNIAK IEEEHEVDGKRR
 PVLVTRKGAVRARED
 EVYVTRKGAI SA DLLVTRKGAI RA ELLVTRKGAVSAR
LELLVTRKGAI RA DLLVTRKGAI RAGG RNLWVTRKGAIRARE DTNVLVTRKGAVRAR
RRLLVHRKGATRAFPAGR
TDLLVTRKGATRA
 ELLVTRKGAI RA EVLVTRKGAI RA
K DVYVTRKGAVRARTSD NI LVTRKGAVRAR EVYVTRKGAVRARE

> | $L L T V$ | N C H H N Y A E K |
| ---: | :--- | $E \nabla V \nabla T R K G A V R A T P$ $D \vee W V T R K G A V R A$

$Q N V L V T R K G A V R A A K$
 QEVFVTRKGAVRA T I WV T R K G A I R A DVWVTRKGAIRA $D L N S L V D R K G A S R \square L E P G N$

QELVVTRKGAIRA
K D C Y V T R K G A V R A R K
$\begin{array}{llllllll}K & A & C & F & V & T & R & K \\ G & A & V & R & V \\ V & R & & \end{array}$
 D L Y I T R K G A V S A K K $E V Y V T R K G A V R A R E$ D $V$ IV TRKGA $\operatorname{RA}$ $D V L V T R K G A V R \square T P$
TVADVNCHNYVEREQHHGES LLAVNCHHNYAEQE $\square H F G E$ LEEYDVIHNYAAKEKHFG NLVYY I SHNDARKE IVD
LLEVNCHHNYAEKEVHFGE
AEAVNCHHNYVQKERHFG
EAVNCHHNYVQKENHYG


LLVTRKGAVSAAE $E V 1 \vee T$ R K G A V R A R
 NQPAWVHRKGATRAMPGGH EVIVTRKGAVRA
Q DVLVTRKGAVSAR



UniRef90 V4Y4Y1 UniRef90_E5SZD3 UniRef90-U1QPZ1 UniRef90-UPI000365653D UniRef90_V4LNE2 UniRef90-P46850 UniRef90-W5WPZ4 UniRef90-UPI00047E9F21 UniRef90 E4RIS3 UniRef90-H3SHB2 UniRef90-A3M700 UniRef90-C6WAF9 UniRef90-UPIOO03736C91
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UniRef90_C0DB05
$\square$ CHGAGR $\square$ RSRSATKRVVSVEQFARAMNEDEVVVNHHS $\square E$
CSHGAGRVMSRTKAKK DFSVEDQ ASHGAGRRMSRNKARQRFS RDDLIAQTKGVECRKDT CSHGAGRKMSRSKAKRLFTPDD LSLQTEGIECRKDG TAHGAGRKMSRSQAKKDISQKDHFNSMGTVK LIFHSSR DCHGAGRVRSRSATKQLVTVDEFAASMQDDEVVVNQRMDE CSHGAGRVMSRTEAKRRFTVEDQDA QTEGVECRKDA ASHGAGRRMSRNKARKLFTAEDLAAAQTLGVECRKDS TCHGAGRVMSRSEADRTSRGRDDAAELEKQGULVMAESKA CSHGAGRVMSRTEAKKRFTVSDQK RATAKVECRKDS ICHGAGRVRSRKATKELVTIDQFEQAMQEDEDMVNHRSDA CSHGAGRRMSRGQAKKKFD QQDLIDQTVGVECRKDS TCHGAGRADSRAKSRRNDDFQDVLDKLADMGUAI RVASPK ASHGAGRKMSRTAAKKKFSARD LVEQTKGVECRKDS CSHGAGRAMSRTEAKKRFSDADQDA ATEGVECRKDA CSHGAGRVMSRTAAKKRFTVADQQQ ATAHVECRKDH DCHGAGRARSRSATKRLVKVDEFASSMKDDE VVNQRSDE ASHGAGRRMSRNAAKRRFTVRD LEQQTSGVECRKDS】CHGAGR】RSRSATKRLVSVDDFAGALRDDEIVVNQASDE
 $\square$ CHGAGRVRSRRATKELITDDQVAQSMRDDE LVNHRTDE



CSHGAGRSMSRSEAKRRYD RFD DAEQTAGDECRKDG CSHGAGRVMSRTEAKRRFTDEDHAA ATAGVECRKDA CSHGAGRKMSRTKAKKLFTIADQ $\square A$ A ATEGVECRKDA 1 CHGAGRDRSRNATKQLVTVDEFASSMQEDEVVLNHRALE ICHGAGRLRSRRATKQAVTVDQFEQSLKEDEILVNHRSLA ASHGAGRRMSRAKARRSFTAAD GAEQTRGVECRKDA CSHGAGRKMSRSAAVQRFSRQD LETQTRGVECRKDK पD E
CAHGAGRRMSRTAAEKQFKPAD
ICHGAGRVRSRKATKQVVTDDQFAQS $\square C H G A G R V R S R K A T K Q V V T D D Q$
$S A H G A G R V M S R T A A E K Q F T P A D$
CSHGAGRKMSRTAAKKTFSVDDH $\square$ A
ASHGAGRRMSRGEAKRRFSAAD
ICHGAGRVRSRRATREVVTVDEFAKS ASHGAGRRMSRTRARKSFTARD ASHGAGRRMSRSAAKRRFS
ASHGAGRRMSRTKARKTFTAAD
LAEQTAGVECRKDA ERDLVDQTRGVECRKDS TAH A A QTAGI ECRKDA AKVLKERGLLVKAASMK CSHGAGRRMSRTEAVKRFTVEEDADQVQQTQGVECPKTK
 $\begin{array}{ll}\text { ASHGAGRRMSRGAARRQFSVAD } \\ \text { CSHGAGRRMSRTEARRRFNTRD } & \text { LQAQTEGVECRKDA } \\ \text { LIA }\end{array}$ ASHGAGRKMSRTAAKKRFTTAD LAAQTAGVECRKDS CSHGAGRVMSRTAARQQDTDAQHR EATAHVECRKDA ASHGAGRRMSRSKARKLFT EEDLIAQTQGVESRKDR ASHGAGRRMSRAAAKRRYSTRD LVEQTRGVECRKDS CSHGAGRRMSRSKARKLFNLDD CSHGAGRLLSRSAAVKQFSLEDHDRDTV SCHGAGRRMSRHAAVRAFRFDQVTRELGERGDRVRSASRK ASRE ASHGAGRRMSRNKARRTFS
ASHGAGRRMSRNKARKAFTLEDRDLLEQTRGVECRKDT
LEAKTKGVECRKDG CSHGAGRQMSRTKAKKQFSLDD ASHGAGRRMSRGEARRQYTAAD ASHGAGRRMSRGQAKRSFTTDD
CSHGAGRVMSRSRAKDTYTLDD
CSHGAGRAMSRNEAKKRFTVEDHV
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SHGAGRKMSRTKAKKHFSVDD
 LVEQTKGTECRKDA ATAGVECRKDA TAGVACRKDE ATEGVECRKDA ATEGVECRKDE SHGAGRKMSRTEAKKRFSVND LKAQTKGVVCRKDA SAHGAGRRMSRTAATKHFT CHGSGR IIPRGESKK LFKHDE VVKDLAKRNDKIKSGSK L CSHGAGRVMSRTKAKKVYNIQDQD CSHGAGRVMSRTKAKKVYSVKDQU SHGAGRRMSRSKAKKTFTLADFKA CSHGAGRKLSRGQAKKTFTVQDLRA CSHGAGRLMSRNKAKNQFTLDD ASHGAGRRMSRTKAKKTFTVDD
CSHGAGRAMSRAEARRRFTVEDH


CSHGAGRVMSRGQAKQE $\square T$ TKQHR CAHGAGRQLSRTQAKKRFSVDD VVATAHVECRKDA CSHGAGRVLSRHKARKSLSLKEEVEKLNKLG\IHS HRSKR VNHGAGRTLGRRHAKRVLDQATVDSEFDSNDVLSNCR KK CSHGAGRLLSRNKAKNVYTLDDVS CSHGAGRTMSRTEAKRRFSVADQV CSHGAGRVMSRTEAKKRVSVEEHA $\square I$ K QTEGVECRKDE

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PVK ${ }^{1}$ WADEV
E D



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D T L E R LGAVVTGHEAA $\square$ SRVVLTPD DHKGAG $\square P \square G T V L$ $K C I A Q A E H L A K L P F A E K W I A L L P D T H A G K G M P I G G V I A C$


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110
120 MS HAVAPAAV|G|V|D|IGCGMTAVRTNLLSSDR|L|PDDGGRLRR


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 VSPTHIYPGPVGVDIKCSMSLLQLNIPDDADKAVRRALI N
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P
G

PTRGAVMPAAVGVDIGCGMDAARTEFTHADVDARLAALRE


$\qquad$ $\begin{array}{ll}\mathrm{I} & K \\ \mathrm{~L} \\ \mathrm{~K} \\ \mathrm{~T}\end{array}$ GTLLPTAAGYDI GCGMVQLQ $L K G G V V S P G G V G F D I N C G V R L L R T N L T E E E V R P K I K E L I A$
 L S A GV FV
 P T L G A I IP A AVVGVDI GCGMCAVRLSLNANDLPDSLRSLRLL $P T Q G A I I P S A V G V D I \quad G C G M V A T E T D L T A A D L P G G L A V L M P$
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## QLK D

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UniRef90 FOMBB7 UniRef90_UPIO003646094 UniRef90_UPIO0034D342D UniRef90-R3TKH2 UniRef90-U7HPX8 UniRef90_H6RJ69 UniRef90-R9K5U0
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NR1 250
260
270
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 KELADAHITAAKSL FNAGDLPDKNLAYFTGGSPEFDRY A Q KKVADYYNRLA INLNERYGPPVPEWQLAYLPDDTHEGQNY KQVADHYHRLARKLNQSMGYPVPESYLFFLSTKSQEGQMY


 NK AAQKH KTAQRLCKMWHVDLPBQDLAYLPAGTPEFSRY

 K SVCDYFHTKARELNRRWYSEVPDYRLAFLPVDTKEGKQY NKI AQKHDKVAQKLCRRWHDQLAHPDLAYLASGTPEFGDY
 NKI ARKHDERAQKQMVKWWDPI PNADLAYFVEGTAEGQDYY NMI GQYFNKI AHEMNDKYFSTVPEYNLPFLPVDTDEGQRY ASICTHFDKVAKAANEKWYSRLQDENLAFLPIQSEEGEAY



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290
300
310


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 $M V W M D L A D Q F A M E N R H R M M D Q V M D V L Q K H R P A$
$L A E M E F C M A F A S E N R R L L V A S A L E V M R Y F F P A$$\quad$ VTMF L YGAMACAANSAFANRQVI THRVREGFSRDFGKSP KDVGM
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370 $\qquad$
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$K G N$
A
K GNAESFCS
$K$ GNDD GN K antos
K GNPE KGSEES
ELIPKEYRRVGQPVI PGDMGTASYLMHGTEK
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GN A EETFFS
KGNAEARRS
haltrtpanetghpil PGLKEPFHETGHPI

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KEDYGL HADGTPYEN

${ }_{A}^{E}$ S
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KVIIPGAMGAPSYIVEGLGNAAPSFHS
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 CSHGAGRVMSRTEAKRRFTVADQE CSHGAGRVMSRTEARRR $\square S V D E H V K$ A P HGAGRRYSRSEARRRFTAAD APHGAGRRFSRTEARKRFT LEDLRARME
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 S SHGAGGRQYSRKGAMQAFTCEEVILDDLQKTGVILGKKNKS APHGAGRRFSRSKAKKLFTLDD LAEAMTGIEYRHGA CSHGAGRAMSRTEAKRRFTMADHAA ATAGVECRKDA
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 A P H GA GRRMSRNQAKKRFSTTD $\square D S R M A G G V V Y R P G G$ APHGAGRRRFSRTEARRRRTVDDLAARME
VNHGAGRAKGRKAA DREDDQKTVDDEFDTHDDGTNEREGE V NHGAGRCMGRKQAGRVLDQKLVDADFVTHDILTNCRTY SSHGAGRNYSRT GAMQTFSVVEQVMVDLKEQGIVLGKRKKN CSHGAGRRMSRSEAKRRFN R FDLAA ATEGVECRKD G APHGAGRRYSRTEARKRFTAED

L A S R M T G I VY R P G K CSHGAGRDMSRTKAKKAYTLDD LI LI Q TKGVECRKDE AS HGA GRRLLSRRGESMRRGFTP T DLRRRPDVRQRPDDILLEKK LD CSHGAGRLMSRSKAKKQFS IDDDVAQTQGVECRKDS VNHGAGRVLGRKAA $\square R A L D Q Q S \square D K S F D D H D \| L T N C R$
S SHGAGRQMSRS QARNTLSVE E EA GRLDNLGIVHS $\square R Q L R$ APHGAGRRFSRSEARKRFSADD
CSHGAGRVVSRTEAHRRFTLDDHL LA A R M A GIIE YR HGE AAHGAGRRMSRTRARKEFTTDD LVAQTTGVVCRKDP CSHGAGRVMSREEAKRRFSVEDHA SPHGAGRNHSRNAARRLFT A P H GA GRRFSRTEAKRRFT CSHGAGRRMSRTQAKKRFDLQD

LVK Q TQGI E CRKDS S SHGAGRRYSRKGAMNAFTCEDVINDLLKKQQVILGKKNKS CSHGAGRVMSRKMANKLITIRMADKAMEGIVHKGWR VNHGSGRRLSRAAARRQLQQEET DRRMAEAG\|LLNTRT

ASHGAGRKMSRRKANEVIT
EEMAQEAMKGIVFGRFN CSHGAGRLMSRTKAKKEFTVEDVI CSHGA GRLMSRTKAKMETGQGVECRKDS VNHGAGRSMSRTKAKK HLS QT TVVD N L L LD H D VVSNCRVV C H GA GRLLMSRSEAKRRYN
 CSHGAGRRYSRGEARRRFTHEQHRA TTEGVECRKDG CSHGAGRLMSRTAA INNLNLNEEVARLESLG\|VHMADCQ CSHGAGRLLDSRNKAKNVYTLDD CSHGAGRR MS R K K A T A T I PVVQKTMED L QQQLGVVLGKH K K S CSHGAGRVVGRHEAKRKLNFAEVKKDLDERNVVLMTPDKG
LAHGAGRKWMRTECKGRLSHRYTPLQLSRTDLGSRCANKQ TCHGAGR
ACHGAGRRVRRGAAFRVVTPDDHRDPAVNRRSDVMAAWRR S SHGAGRAYSRTAAMEKFSVESVMVDLKKQNVVLAKNKKS A SHGAGRQMSRTMA $\square K$ S $\square T K D D M R Q V L K D H G V S L D G A G R$ ASHGAGRDFSRAKCKSTFTQSEDKKVLKANDVTLIGGN

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UniRef90 $\mathrm{U} H \mathrm{HP} 8$ UniRef90-H6RJ69 UniRef90-R9K5U0 UniRet90-V5UC07 UniRef90-A7C2V0 UniRef90-H1KX77 UniRef90-FFZIF6
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UniRef90 - XOTG28 UniRef90- X1J8A9 UniRef90-R9SYD7
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 HILTECPQAYKDVDQII DSVVGAGLASVVAACRPMAVVKG


## A

## \section*{A} <br> G

D RDAE C CRQAYKDI DQVME DQRDLVEIKIRLQPLGVVKG
 GVIDE DPMAYKDI DAVMHAQRE LVDVVHTLKQVVCVKG A
N
H

## 

## 

D

## A

## 

 D V A E E S R F A Y K N


 GVVDElP
 SVI D E $\square P$ LA Y K

 DVAEECRMAYKDIDSVLE QERDLVRPVLKLVTVGVVKG


 A V I
E WI DEDPDAYKD ID QVMADA ADLVTDRHKWRQDVNVKG E F I D E I P P D A Y K D D D D

PKDEAPAA YK D F N E V L R S V E R A GL A A EV A R L R A R F VI K G

 AKLVEVKHELRQVLNVKG
 GVLDE DPGAYKPIDQVMEN QADLVEVVATMKGVLCVKG YPKDEAPAAYKDFEEVLRSVKGAGLGSEVARLKARFVI KD D LD E A P S A Y K D I E E V V M E








$D L K Q E A P W V Y K D \square G P V V S S L R R A G V A E P V V E L R P L L T V K G$ DVPEESRFAYKDI DDVMTNQQE LTEPVKRLFTVGVIKG D EAPMAYKDI NAVMAS QTDLVDVVAKFTPMKLVRMA

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| UniRef90-UPI000361C120 |  |
| UniRef90_B7JW10 |  |
| UniRef90_D2R2E1 | G D A |
| UniRef90_UPI000471B057 |  |
| UniRef90_F1YLZ5 | T |
| UniRef90-I3TX80 |  |
| UniRef90-A8L4E8 |  |
| UniRef90-Q08W43 |  |
| UniRef90 \|4F1D7 |  |
| UniRef90-M2X710 | T |
| UniRef90-K9XUB3 |  |
| UniRef90_E4WES7 | T |
| UniRef90_R6ZHD9 |  |
| UniRef90-M1YTZ9 |  |
| UniRef90-H8MTG5 | A |
| UniRef90- X0V6D7 |  |
| UniRef90-A1HQY1 |  |
| UniRef90-UPI0003490923 |  |
| UniRef90 M5TZN9 | G A |
| UniRef90_G0A427 |  |
| UniRef90_D2BC80 |  |
| UniRef90_UPI0004669E23 | T |
| UniRef90_G0UXW6 |  |
| UniRef90-R6A859 |  |
| UniRef90 UPI00034D2C5C |  |
| UniRef90_K8DZT2 |  |
| UniRef90 C5CHJ6 |  |
| UniRef90-K8WY01 | S G A |

UniRef90 K8WY01
UniRef90_X0XJJ2
UniRef90-D2AR1s
UniRef90 E6UC33
UniRef90_UPI0004775F94
UniRef90_A5FEA
$N \square T$ K K S E H LQ E Y K

$\square K R Q D E A Q Y E L K P E P$
ITNSKLINWASILDE
F G L P ETLPGTHAPAR I WAPLV



NAPVKMWTK ${ }^{A} V_{V}^{V}{ }_{P}^{F}$ H NTRAPFT\FG

A VF G S E Y
VEGVFYVNDALEKLDMFEE
WASILDD $P \square K M W$ W AP WR V Q WGKEK

■EA
VS F A S ${ }^{-1}$
WGEDLI

TERETPAPWKSWA
D L WI
K G DV
DT WI E G
PVLS WANHSLUASQET
F GREHDE E

| D T W | E |
| :--- | :--- | :--- |
| A E Y | G |


D H TE D

| $E$ | $T$ | $W$ | $E$ |
| :---: | :---: | :---: | :---: |
| $D$ | T WI | $E$ |  |


WASA $\square \mathrm{DE}$




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| :---: | :---: |
| UniRef90-H1H420 |  |
| Ref9 - | EAMQQLYNLSQMPFVHSHIAVM |
| Ref90-UP1 | KTRDQAVLASSMPFIHPYLALMPDAHLGMGAT |
| Ref90 ${ }^{\text {A0 }}$ | QAKYQLFDALKLDPVAT AGALM |
|  | QTVERVAEASDEPPGTTQVAITPDFHKAKGIPVGTVL |
|  | A PPVCPHVALMPDAHVGKMPDAH VGK |
| $\begin{aligned} & \text { UniRef90OUPIOOO472 } \\ & \text { UniRefooG4QO2 } \end{aligned}$ | EQIQAMSELP |
| UniRef90-H0QQE6 |  |
|  | AAQRQIRAVADLP WTHGVAIMPDVHVGAAVTIGSVIAM |
| UniRef90-UPIO0033B5 | QTRAQACQSATMDFTYPHLALMPDAHLGLLGATVGSVI |
| iRef9 |  |
| UniRet90 H3N8U6 | - ${ }^{\text {a }}$ T AKL |
|  | MQQLHTTAKL |
| UniRef90_UPI | A |
| UniRef90-B5R4R8 | SAIQQLYTTAKLTGM KRVIGMPDLHPGRGYPI GAAF |
| UniRef90-Q5DXZ0 |  |
| UniRef90 |  |
| Uniretgo-A0AO1 | DARQQLINTAKMPFIFKHIDAVMPDVHLIGKGSTIGSVI |
| UniRet90-G2Z1M2 ${ }^{\text {Uni }}$ | GAKHQMETAMK |
| UniRet90-UPIO003337462 |  |
| UniRet90 |  |
| UniRef90 |  |
| UniRef90-UPIO | QTVEQAKQTASMPFIYPHVALMPDAHFGKGSA |
| UniRet90 | VGAlvat |
| UniRef90 WOPCD2 |  |
| UniRef90_UPIooo36 |  |
| UniRef90-N9 |  |
| UniRef90-K2C | $\mathrm{A}_{\mathrm{R}}^{\mathrm{R}}$ |
| UniRef90 J1EQW1 1 |  |
| UniRet90-K9ZZV7 |  |
| UniRef90-UPI0003: | ESVKQMERACQLPISV QGALMPDAHLGYGLPIGGVLG |
| UniRef9c | R |
|  |  |
| UniRef90-A1ZHK0 |  |
| $\begin{aligned} & \text { UniRefo_M5RBZ5 } \\ & \text { UniRef90_UPI0003 } \end{aligned}$ | TAVQQMAHACQLPISVESGALMPDAHQGYGLPIVGGVLA |
|  | GAHRQMDVAMQLP |
| UniRef90 UP100030D2 |  |
| UniRef90-V5U2A2 | - |
| UniRef90 R714Q6 | AAFQQMANACR ${ }_{\text {a }}$ |
| UniRef90-F4CBB8 | GALSQMRTAVQLP |
| UniRef90-U1LM05 |  |
| UniRef90-U7QMN1 |  |
| UniRef90-F6GAF2 | QQMQTAA |
| UniRef90-UP100040F3E27 | GAVLQMETAMSLPTTV AGALMPDAHQGYGLPTGGVLA |
| UniRef90-UPIooo3736149 |  |
|  |  |
|  |  |
| UniRef90-UPI000423886F |  |
| UniRef90-UP100036DF2B6 |  |
| UniRef90-X1USH8 |  |
| UniRef90-M7MY00 |  |
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$R T V D Q A V A \square A R \square P \square I Y P H \square A \square M P D A H A G K G S A V G \quad T V I$

 ATADQAVRTASMPFIYPHLALMPDAHLGKGATVGSVIPTL
 $G T R D Q A L T T A R M P F I H P H L A L M P D A H L \quad G L G A T V G S G$



UniRef90 Q6XE66
UniRef90 H 1 H 420 UniRef90-UPI0003755F14 UniRef90_UPI00047B4385 UniRef90 A0A023BU80 UniRef90-D5SPU6 UniRef90-IOS2Z5 UniRef90 UPI0004747D1F UniRef90 G4Q0L2 UniRef90-H0QQE6 UniRef90 EODFG9 UniRef90 UPI0003B58309 UniRef90_UPI00047DB3D7 UniRef90-Q7NY50 UniRef90-H3N8U6 UniRef90-Q5C6U4 UniRef90_UPI000051043C UniRef90_B5R4R8 UniRef90 Q5DXZ0 UniRef90_D2QNT6
UniRef90_A0A017QU87 UniRef90-G2Z7M2 UniRef90-UPI0003B3D428 UniRef90_UPIO003337462 UniRef90-F5XJ30 UniRef90 L1MMB0 UniRef90-UPI0003029CA8 UniRef90-K2GPN0 UniRef90-UPI000395D1C5 UniRef90 W0PCD2 UniRef90-R6KK67 UniRef90_UPIO0036848B3 UniRef90-N9WYH8 UniRef90-K2GFC8 UniRef90-J1EQW1 UniRef90-R4MKS5 UniRef90_K9ZZV7 UniRef90_UPI00035EA918 UniRef90-A0A022LF81 UniRef90 W7YDQ8 UniRef90-A1ZHK0 UniRef90_M5RBZ5 UniRef90-UPI0003B6FCD2 UniRef90 Q9RX85 UniRef90_UPI00030D27DF UniRef90-V5U2A2 UniRef90_R714Q6 UniRef90-B1KFI6 UniRef90-F4CBB8 UniRef90-U1LM05 UniRef90-UPIO0037D97A6 UniRef90-F6GAF2 UniRef90 UPIO0040F3E27 UniRef90 UPIO003736149 UniRef90-X1R4L2 UniRef90-R5IMF0 UniRef90 UPI000423886F UniRef90-UPI00046985CE UniRef90-UPI00036DF2B6 UniRef90-X1USH8 UniRef90-M7MY00 UniRef90-R9JQU5
UniRef90-U2M2W1
UniRef90-S2W3K0
UniRef90-UPI00029B247B
UniRef90_K8BK20
UniRef90-H8ZCP1
UniRef90_B7V707
UniRef90-I3EGF8
UniRef90_A9BXK0
UniRef90-UPIO0035F3757
UniRef90-UPI0002EB1488
UniRef90_C0Z9V8
UniRef90-A6EE17
UniRef90-X1UDD7
UniRef90-X8DEK1
UniRef90-K9PEE8
UniRef90_UPI0003756B4E
UniRef90-R9CR13
UniRef90-B7XHH9
UniRef90_UPI000313287D
UniRef90-A0A016QN72
UniRef90_S9VRI2
UniRef90-R5TBV8
UniRef90-F8A2H3
UniRef90_A3ZWI3
UniRef90-H8KNX7
UniRef90_UPIO0036569C0
UniRef90_U3AVY4
UniRef90-A9DSB7
UniRef90_K9VK83

ILSEHTKFGMYDTHKVKAD
H ESA $\square$ PVGFAMHKQDRAREST $\square$ RALSGGMHA LLQKHP
CI EAVVPMSSGKNNKK LTDSARARVQELKD
$\square$ LSEHTKFGMYETHKVK
ACRR $\quad$ YYF EMMSRGQREA $D F K N G L S G L L E S V P K S Q T E G D W G$
S L E S A IPP L SPGNYNRS RLTQVLLQNERDVPLSARAFTALFDGGPADCMSALPSAGLD
SIERAI PLSAGHNNRRVAHTAE
AWEAAIPVGPNHHTTR AP LLKTHGLI
QDSKAVPLSAGAAN DRITDTAAT

$T$ LI D H DPVGVGSKGDIPMDAQA $\square$ E E A $\square E M G M D W S \square R Q G Y V$ A IERAVPTSAGAYNRK】VATA

VLVEQTKFGMGGETREKFDESVMDDPEWQ
AI EAAVPHGRTTRGRRDVGA WGNP PANVDEKWAQDEAGYQ
ILKNHTKFGMTEVHQNKADHADFSHHGFQDV
$L L L D N T R F G$
$A M F D H D P V G V G S K G V I P M N A K D L E E A L E M G V D W S L R E G Q G$
$V$
$L L L D N T R F G$
$A M F D H D P V G V G S K G V I P M N A K D L E E A L E M G V D W S L R E G Q G A$

AWENVVPVGFAKHKTHA $\quad A L L G$ S IESSIPLSPGRYNRRPDRFSFTAPRDETLERSATDQG
 KLKRAI LRSAGFRALFDDGPASFLELLPELGLWRAADRDQ QI ERDVPLGAGGGHKRESDRDANLR RLPVMPNERVQD\DA

 EFDETDPTKAYDGTKVAYSGIMDDCRKGMAPVKEFFKT R LLTASLL NNGRDVPVTTRAFRALFDEGPQAF DDRDWA RLDRA R R R R G VGTAGVWRLDRNTLQEVLTGGARFAVEQGHG A THAETRFGDGASFKKKRQHVVMDEDWE
Q ERADPLSAGASNRK VVATA
Q RKLI P VGFNWHK
LL LK NTCFGTGKGFEKPMH
A ERETQFGDGARFRKPREHEVMDADWS
AI EAAVPDSPGRYNRRDTASA
LKHTRFGAGVGFEKRDRLDHPVLAEATW
A $\square E A A V P L S A G V S N R R L T P S A$
ALEAETRFGVGAEFSKG
KFEHVE
LLVDHTYFGMGCTTKSYFDSSGFDSKTWGE
AI ERAVPLSAGHYNKRLTPSAG

 FLNDNTRFGAGNGFERPMDD PI
ELNEETLFGSGREFKQRTDHD LLYRKEFGE $\square P \mathrm{~L}$
ALFNNDPCGLGSTSSLK $L$ PF FHELK QVLKKGAKWAVGRGYG HIRKTIPGGF ELVAHSKFGAGHGFHGQYKSDHAVMESPDFQTNSLDKG

LERKLGNDDAP LDDRWQA
$R \square G N T D$
LPPEPEWI E E HL GSSLPPFATE
DLGVNDPSGLGSTGKLPVSEEKLVEKVGKGSHWADEKGYG LLVDNTRFGRATFQKPKEHAVI DRPEFRD DP
KLLRDIFFEGMTGRQREALFRYGLEGLLETYHDWRYYQPEV
A I E Q AVPHGSVPRHRGRDPGSWENPPVSVDQVWAT RVESAI PGSPGNYNRAVHYSHTRARVHELEA

RAFEQ G G I DRPCP DPKE DDADK LEERG DPY LIELGMA $L L T A S L L \quad G S G R D V P V T T A A F R A L F D H G P A A F V D R L N G$ QV GS GRDVPVTSAAFRALDDHGPAAFVDRELNG LMKGDYFFGTRDVTMTASSMRALFQDGVLGWVDAMWKAPT VRHVFFEGGRNDPMTRQMREKMFKEGLIGGLDSHKENGEG ML MDHTYFGMGCSTKSYFDS
 SVESAIPDSPGNYNRS $R M K G D Y F F G T R D V T M T A Q T M R A L F Q Y G V P G W V D A M L D Q P T$ AINEETRFGVGAEFRNRRAHGVLDEDWS
ALSDHTKFGMYETHKSHDD

RLGN
LLLKHTRFGAG
AI EAAVPHGRTHSGRRKVDAGSWCADワPERVQRVWK
 SI EA RVPLSAGVYNTSLTPTA
ALEGGTRFGVGKEYQKPQAHA VMDADWSDTR
A EQHTHFGMDGGLAEPQYHEVLDSPLFKETE LL
A I ERAVP
KFEH $\square E Q P \square N D S W N D \square V Q A R K E K N \square T T Q A Y D H A$
$M L Q E H T K F G G F E T H K R I N D$



## UniRef90 Q6XE66 <br> \section*{UniRef90-H1 H420}

 UniRef90-UPIOO03755F14 UniRef90_UPIO0047B4385 UniRef90-A0A023BU80 UniRef90-D5SPU6 UniRef90-Ios2z5 UniRef90-UPI0004747D1F UniRef90-G4Q0L2 UniRef90-HOQQE66 UniRef90-EODFG9 UniRef90-UPI0003B58309 UniRef90-UP100047DB3D7 UniRef90-Q7NY50UniRef90-H3N8U6 UniRef90-Q5C6U4 UniRef90-UPI000051043C UniRef90-B5R4R8
UniRef90-Q5DXZ0 UniRef90-D2QNT6 UniRef90-A0A017QU87 UniRef90-G2Z7M2 UniRef90-UPI0003B3D428 UniRef90-UPIo003337462 UniRef90-F5XJ30
UniRef90-L1MMBO UniRef90_UPIO003029CA8 UniRef90-K2GPNO UniRef90-UPIO00395D1C5 UniRef90-WOPCD2 UniRef90-R6KK67 UniRef90_UPIOOO36848B3 UniRef90-N9WYH8 UniRef90-K2GFC8 UniRef90-J1EQW1 UniRef90-R4MKS5 UniRef90-KgZZV UniRef90-UPIOOO35EA918 UniRef90-A0A022LF81 UniRef90-W7YDQ8 UniRef90-A1ZHK0 UniReffo-M5RBZ5 UniRef90-UP10003B6FCD2 UniRef90-Q9RX85 UniRef90-UP100030D27DF UniRet90-V5U2A2 UniRef90-R71406 UniRef90_B1KFIG UniRef90-F4CBB8
UniRef90 U1LMO5 UniRef90-U7QMN1 UniRet90_UPIO0037D97A6 UniRef90-F6GAF2 UniRef90-UPI00040F3E27 UniRef90_UP10003736149 UniRef90-X1R4L2 UniRef90-R5IMF0 UniRef90-UPI000423886F UniRef90-UPIOOO46985CE UniRef90-UPIO0036DF2B6 UniRef90-X1USH8 UniRef90-M7MYOO UniRef90-R9JQU5
UniRef90 U2M2W1 UniRef90-S2W3K0 UniRef90-UPIOOO29B247B UniRef90-K8BK20 UniRef90-H8ZCP1 UniRef90_B7V707 UniRef90-I3EGF8
UniRef90 A9BXK UniRef90-UPI00035F3757 UniRef90-UPIOOO2EB1488 UniRef90-C0Z9V8 UniRef90-A6EE17 UniRef90-X1UDD7 UniRef90- X8DEK1
UniRef90 K9PEE8 UniRef90-UPI0003756B4E UniRef90-R9CR13
UniRef90 B7XHM UniRef90-UPIOO0313287D UniRef90-A0A016QN72 UniRef90-S9VRI2 UniRefofo-R5TBV8 UniRef90-F8A2H3 UniRef90-A3ZWI3
UniRef90-H8KNX7 UniRef90_UPIO0036569C0 UniRef90-U3AVY4 UniRef90_A9DSB7
 ANIAKHYTYLA AKQCPLPSNAQHLA WLDLLNTHDGQEY NS:GEYF ALARKDMGRHLHHLPDKDLAY ASEGADHYDDY NKIAQRHUKTAQEQCHEEGTYLPDRDLAYLPERTPEFDKY HFCGGYYRDKVRATHPAGLKHPDNGIFWLPTG EEAHRE NKMATHHDEVAKRLCRRDGVELPNRDLAYLTEGTAEFDRY KSLAEVALSLARQEAEQRGDILGDKDLAWLTEGSSSFVAY
 KEI AHRHI GRAKTLDWNRHGPNHNLPVILRKDATTEWADY NRLAGSHUKAAQAQCNEAGVRLPHRDLAYLVEATPEFDSY KEIAERHMYRARNL EWNSGLPDRNLAVFLHRDEDWEDY FYVGKRWMNKARAAWPRQM KYPEHGLFGLSGADADEY QSILQRHI
HQVATDALCY
NKIATHHUKVAVQLNKKWWपDLPDPDLAYLVEGTPEFSAY QAILRRH VEAFSHNGLPEDSDDARHY QSIL L R R H DASFSHH G G L P EGS D DA LR Y ANIANTY SKLAMQKTRLPREAAHLAWLDLDTQEGQEY NAGGTYF DGQAQQEMQEQLETLPSRDLAYFNEGSEYFDDY ANIAKHYTYLA TKQCPLPKHVQHLAWLDLNTHDGQEY ASVANHYTKLAKDVCQ LPAEAQHLAWLSLDSEAGQEY HQVATDALVAMEKAMKRDKI LVNDRQLACARISS
NKIATHHIKIATRLCQQWWI QLPDPDLAYLVEGTREFDRY KEI AERHIYRAKHL EWNSDI PDRNLAVFLHEYKEWADY YKปAERHIRTAQRLARDRRDSLPNRDLAYLEEGTDEFDAYY FYVGRRWMDLAK QEWPQGLKHPSHGLYGLSGHLAAEY NMIGTHFDSKAKKTMEKYHПHLPDGDLAYIPEDTEDFQDY KMVGDYYNQMAETNTRWYSSVKPDTKLAFLPDRAPEFKQY NKIAQHHDKVAQKLCDQWWISLPDKDLAYLVEGTEEFSTY HQSGRDNQMITKGLLYKGIPHPDNGIYLLPERGREWRRF QYFKTDYKKEFKSLWRKDELEKDSPDYFSYNDQSVEGKLF FYVGQAWMDRAKAEWPHGQRHPASGLYGLS G GPLAEEY HQICTDHVRQMEQAMGRYGTAVPDRQLACVPVHSPDGQAY AQVAGHYTKVAQNDHPK LDLEARKLAWLDMSREEGQAY AQVCSRYSKLA MEAHPELPRSLRHLAWLDLDNEDGDEY NKIAQRHDRVAKKAMERWWLQLADPDLAYLVEGTPEFDRY ANIAGHYTNDA LMEKTKLPKHARHLAWLDLNTQEGQEY AAVCDYYSRVAKQLHPE KRGRELVNLA WLDLDSDPGAEY NKIAQHHDKVAREYCQRHRADCRNRLAYLVEGTEEFTRY AQUAGHFDNLAQRLARYALDKEAQKLAWLPLDSEAGQAY QQ| LRAH SAVADYYSEVARSLHP ELPDELRHLAWLDLDTKEGKEY QSILVEHDSKHNH MTKTKDPGENLLVEGADVGDSFQDY GA ANHY SRDAMTKTKDPGEAKHLAWLDDDKDEGQEY NKIAQRHDAAAQAYVKEQRIDVPDRDLAYLEEGTREFDRY AALANHYT KAGLAKKRRLPQDAKNLAWLNALDEAEGQEY QAILDE
ATI ANHYT KLAMSTRKL ANVANHYTKDAKEKRR YQVCDDYLARMRHVVDKYHIS SDP
 LLTVANYYNKQAEILCERWYAD TLPGLAFLPDEEQVGKDY GA) LQDHDQRH VQEGGAGLAQGSADCTAY QQLLAQHVLGEAVKKYGTNVQEFGHQGLYENTPEAVAY
 AA SGGHYTMKDCQEIYPGCMLPQEARHLAWLDLDTEAGQEY QLILEQH NA! GTHFDELAKKDAEDHQRNLPDKDLAYFEEGARYFGDY NKIAQKHIKAQSQCAQQGDRLEDRDHAYDEQGTAEFTQY NAGGTHFIGLAQKDMQRHIANLPDRDLAYFEEGSKHYADY QAlLQE
GGAVSDLLKKC MRCESK
FYVGQAWMDRARAEWPQG
QAVLRS
KYIGGAWRDKAKTWGRSVKYPDDASHAGLAQGTPEALAY KYIGGGA WRDKAKTWGRSVKYPDSNIFPLLSTNSHPELLVASY GNDADHY SRIAMNKTRLPAEAKHLAWLDLDKEEGQEY HQVASDY KKKMEEKYGFKNLPDRELDNAPLKSQLGKEY
 KYYGGMWRDRSQAGAWPKGLKYPDANIFPLLSTHSQLVASY AEYAQYY SRVAAEQCPLPKEAKQFAWLDCLNTHEGQEY EAILRE AQVANHFTRLAQALHPT NRUGSTY四ELAKKDMGDLLHDPAARKLAWLPLLDSEEGQAY HQSGRDSQMITRG DYPKLIPHPDNGIYLLPEGGREWRRF NK円AQHHDKVATELCRRWWIALPDPDLAYLVEGTEEFWAY AAVCSTYSAI AQAALPKKYEDLEGRLAWLDLESEAGQEY
 QSI DTEHDNSH AN AK HYT KYIGGMWRDRCEAWATTLKHRSRLFP

## UniRef90 Q6XE66

## UniRef90-H1H420

 UniRef90-UPIOO03755F14 UniRef90-UPIO0047B4385 UniRef90_A0A023BU80 UniRef90-D5SPU6 UniRef90-10S2Z5 UniRef90-UPI0004747D1F UniRef90-G4Q0L2 UniRef90-HOQQE6 UniRef90-EODFG9 UniRef90_UPIO003B58309 UniRef90-UP100047DB3D7 UniRef90-Q7NY50 UniRef90-H3N8U6 UniRef90-Q5C6U4 UniRef90_UPI000051043C UniRef90-B5R4R8 UniRef90-Q5DXZ0 UniRef90-D2QNT6 UniRef90-A0A017QU87 UniRef90 G2277M2 UniRef90 UPI0003B3D428 UniRef90_UPIo003337462 UniRef90-F5XJ30UniRef90-L1MmB0 UniRef90-UPIO003029CA8 UniRef90-K2GPNO
UniRef90-UPIO00395D1C5
UniRet90_WoPCD2
UniRef90-R6KK67
UniRef90_UPI00036848B3
UniRef90 N9WYH8
UniRef90-K2GFC8
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UniRef90-K9ZzV7
UniRef90-UPIOOO35EA918 UniRef90-A0A022LF81
UniRef90_W7YDQ8
UniRef90-A1ZHK0
UniRef90-M5RBZ5
UniRef90-UP10003B6FCD2 UniRef90 Q9RX85 UniRef90-UP100030D27DF
UniRef90-V5U2A2
UniRef90-R714Q6 UniRef90-B1KFI6
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UniRef90-UTQMN1
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UniRef90-F6GAF2
UniRef90-UPI00040F3E27
UniRef90-UPIO003736149
UniRef90-X1R4L2
UniRef90-R5IMF0
UniRef90-UPIO00423886F UniRef90-UPIO0046985CE UniRef90-UPIOOO36DF2B6 UniRef90-X1USH8
UniRef90-M7MY00
UniRef90-R9JQU5
UniRef90 U2M2W1
UniRef90-S2W3K0
UniRef90-UPIOOO29B247B
UniRef90-K8BK20
UniRef90-H8ZCP1
UniRef90_l3EGF8
UniRef90-A9BXK0 UniRef90_UPIO0035F3757 UniRef90-UPIOOO2EB1488 UniRef90-COZ9V88 UniRef90-A6EE17 UniRef90-X8DEK1 UniRef90-K9PEE8 UniRee90-UPI0003756B4E UniRet90_R9CR13 UniRef90-B7XHH9 UniRef90_UPIO00313287D UniRef90-A0A016QN72 UniRef90-SSVRI2 UniRef90-R5TBV8 UniRef90_F8A2H3 UniRef90-A3ZWI3
UniRef90-H8KNX7 UniRef90_UPIO0036569C0 UniRef90-U3AVY4 UniRef90_A9DSB7
UniRef90_K9VK83



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LAQHDGALRYAEANRQLIARRMLDRLGAKG
LAAMACAANYAWTNRQCI THWVRESFITVVGKS QREDGL


LAELRWAQRFARLNRDEMMDRFLVQLARLFGDHESAGE
 LARHADALRFAEGNRQLIARRIVLERLR ATFEQSMGSSCDG
 LQAEATAANYAF K MFWSLLHNAANFAFANRLMLGLMMYKSUSDVLGDFEH WDAMNLAGEYASSNHHETHNKIARALG $\square Q P M V R$ FSAMAAASNFAFANKQIITHWVR
TKELIWAQRFAGYNRAEMMDRFLQAFAHWMGADPTNEVAS LQAEATAANYGF WRAMQLMGRYAAANHELIHRHI ARHLSA
WTAMNLAGDYAAACHDDURRLDKAVGGRDKAR

WQAMNLAGRYALANHDLIHARLARALG
A D F Q
VEAVEWAQDFALWNRRLMMETTLQAIRSVLPESAQFTVDK RSTTGNAANFGFANRMFLGLDLQNAVENRVH

## V

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CSHGAGRKMSRS VAFKT LDLSEECRRMDEQGワ $\quad \square H G M R K$ ASHGAGRQMSRTQADKTITKNEMQTILLKDHGVTII GA LA H GA GRKWMRSECKDRLFKRYTPAQLGRTKVHVICCQDKQ $L A H G A G R K W M R S E C K D R L C G R Y T L A Q L S R T A L G S R C E D K Q$

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$A F \square D E \square P Q A Y K P \square D Q V M A D A S A$ DVE $\square R H T D R Q L V N V K G$ LI YEEAPQAYKSIDSVVDCLADAGLI TPVACLRPVLTLKT LI FEEAPQAYKSAESVVQCLVQAGLIIPVARLRPVLTLKN GDLDEAPMVYKNDDTVIEAQH DLVDVLAKFTPK』VRMA

## TDEAPMAYKNTQQVMKNQEE LVETIGTFTPK\|V

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 AFLDEDPQAYKDIDVVMTDA A ALVEVRHTLRQVVNVKG
 RRIEEAPQAYKPIGPVIDAQDSAGLVRPAVRLRPWVTFKA

GG IDEAPQAYKRTEEVL ARQADLVDVVAKFTPRVVRMD GLDEVPMVYKDIHQVMAA QSDLVETLGRFEPRIVKMA AFLDEIPAAYKP DDQVMADAE DLVS $\square R H T \square R Q V V N V K G$ DLDEAA
GDLDEAPMAYKNTDEVMQMQQA LVTVAGKFTPADVRMA GLDEVPMAYKDIDQVMASQQ DLVDTVARFDPKLVKMA AFIDEIPDAYKAI DVVMADA ADLVETVHTLRQVVNVKG GGI DEAPQAYKRI EDVI ARQRDLVDVLGEFRPRVVRMD AFLDEDPAAYKDI DQVMADA A DLVEVRHVLHQLVNVKG



 $G G L D E A P F A Y K D I R T V M D A Q K Q \quad L V D T I G T F T P K \| V$
$S G L D E A P S A Y K D \square E A V \square A F \quad E N D L I K P I D E \square A P \square A V V K G$ GLDEAPMAYKDI NMVMASQE DLVDVVAKFTPKMVRMA LIVEEAPEAYKPVDSIDDSQQHAGLVTVLAKLRPVLTYK LMF QEAPEAYKSIETVIGGMDQAGLVRVVARLKPVLTYKG

SGDDEAPGAYKDワRKVMAFQQE LVEVVA


A WПDEDPQAYKDTDVVMDDAAE $L V E V V A E L R Q V M N V K G$ RRIEEAPAAYKPI QSVDDVQVEAEMVGLVARLSPVLTFK GLDEAPMAYKDI ALVMAA QAGLVQPVARFEPRLVKMA


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UniRef90-R9PHP5
UniRef 90 - XVZ9A4
UniRef90_N9X3L4
UniRef90-A9AXP6
UniRef90 D9SVM2
UniRef9- JWSF5
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UniRefofo-E8RKEO
UniRef90-A5V1T6
UniRef90-UPIO003F59B6D
UniRef90-UPIOOO4266388
UniRef90 UPIOOO419A53D
UniRef90-UPIO00419A53D
UniRef90_V2Z8F4
UniRef90-D4JPP6
UniRef90_M2AWD8
 FAVNRIYPALVGNDIGCGMSLWOSSLKLS KVKLDKMAN
 PTVGAVIPaAVGVDVGCGMAGVETRYTAADIAKDLALLRE FSLGHFYPALIGNDIGCGMALWQTDLAA YKAKPAKLAK DUGCGMAAARTRFTADDDKDPAWLRK VSRGVFYPALAGNDDGGMSFWADDLPARKLRDR ETEHALLPQAVGNDVNCGMRLEVTTLRADRVRPRDDADER A DKI IPFAVGVDIACRMCLSVFEIEKSFFEKKQNYFKN EGQ1 SPSGVGYDI ACGNKAVRTNLMAADVKPQTKRTMN GQVSPSGVGYDIACGNKAVRTNVTFEEIRGALPQLDD
 NAVIPYAVGMDIACRMRLSVLDFPLLARMREKRESLLA FSTGHFYPALVGGDIGCGMSLWRTDMRAHATSASKDE SEN YPALLVGNDI GCGMALWQTDL GQVSPSGVGYD:ACGNKAVRTELDADDVRPRLSTMMD

 PTLIGTVIPAAVGVDIGCGMLAVRTQFSASELPQDRAAVRC FSAKRFYPALVGND TEDAVTPYGVGVDI GCSMMISVIPTQHGAVKTDEAVS FSLGRLYPALI GGDi GCGMALWSTNLESRKVAPDK HDKVVPNIVGVDI GCGMYTINLG GKMEDDLERLDK NAVIPYAVGMDI GCRMALSIIDESDGFDKRFEYQUKQ S E $\qquad$
GQUSPSGVGYDIACGNKAVRTNL TRKFKPARA

KG TISPSAVGYDTGCGMCCAVTDTDADTVYPEREPTFR KENVIPYAVGVDIGCRMSLTVEDAKADYLTRYSHQUKE

## HYTAED

KDK\VPNLVGVDIGCGMEVAVI KEKYLDLEKMDK VSSGTVYPYLI GND GCGMGFWQTDLLRRKAK
SRDFVCPNAVGVDI GCGMCAVKRIPTGGLGTYC GDKI ILNLVGIDI GCGMTLAQD KDKKDEYQKLDT GQ1 SPAGVGYDLACGNKAVRTNTAGE【LPRपSSIMD HGVYPAGI GTDVGCGDALYRL
STVDYIYPPDVGND VIVLPPLGNDGGMLAVETSLTAERGDKQLEKWVK TDKDCPNVGVDDGCGMETVVFHADSPTSRFDPEKLDK
 VTQGCIVPHAVGSDI GCGMGLVQRDVKPKQTKTD SNKVVPNLVGVD GCGMALTVPLEKYUNNINYTKLDK

 EVVVPNIVGVDI GCGVYTYPLG R R LGKINLQKLDA WSPDRI WPHLVGSDI GCGMALWETSLAVRKFRV TSEGILYPYLVGSDIGCGMGLW

RNQISPSGVGYDI ACGNKAVKTNVKYVDПKDQDSKDMD TANAVVPYAVGVDIGCRMALSDFDEGESFIKRFGYQMKM RDKVSVAGVGFDUACGNAALRTDLRLEQLQPYLEALAD
WSPSHVWPHLVGSDTGCGMALWETDCLVRKFRLS KDKAVPNLVGVDI GCGMEVVRL FSDRHFYPALIGNDI GCGMALWQTNLRVAKLKP AKLAK TSQGVFYPFLVGNDIGCGMGLWALDLPARKAKP LHCGMRLLRTGLTLSSAEEHRQALVA PQVNDSDPNCGMRLLKTSLNEDNFTPDTHKLFQ A LDKVYPALVGNDTGCGMALWQTSTKLAKLNLLKLE RK
$\qquad$ HDRVVPNLVGVDi GCGMETVRI RERWLDLKRLDT RDA SPSGVGYD

SPDRI WPHLVGSDI GCGMALWETSLPVRKFRDS
 KDKAVPNVVGVDI GCGMYTVNLG KNPTDLEKL D
E


GCGMGLFELDIAAR $\qquad$ | $K L R L D H L A B$ |
| :---: | :--- |
| $K G O F Q K L D T$ |

 KDKNDDRPNDS

UniRef90 N2IUB2 UniRef90－S4VCN3 UniRef90－L7U589 UniRef90 W5TPE8 UniRef90－CoDS91 UniRef90＿G7CB78 UniRef90 J8VDW3 UniRef90－UPIO0036EB979 UniRef90＿UPIOOO4665D41 UniRef90－UPI00041D495E UniRef90 UPI00037C1241 UniRef90－Q5WGQ1
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UniRef90－T2G8E5
UniRef90－UPIOOO3F9D108 UniRef90－W9VDA9
UniRef90 UPI00028A11E1 UniRef90－A9WEC5 UniRef90－R6L7Q4 UniRef90－K2JPC4 UniRef90 C7LN52 UniRef90－UPIO00255F15C UniRef90－R5F402 UniRef90－X8M292 UniRef90－E8UBT8 UniRef90－R4XV57 UniRef90－F5T9B8 UniRef90 W6TPK2 UniRef90－।13Y686 UniRef90－G4HJ71 UniRef90 UPIOOO1C37849 UniRet90－C3LEW3 UniRef90－U6KGU1 UniRef90 UPI0003B78574 UniRef90－F8X317 UniRef90－R7E4Q0 UniRef90 M1MZU7 UniRef90＿13WBT9 UniRef90－B9XDR4 UniRef90＿C5KHZ4 UniRef90 U2P9V8 UniRef90－UPIO0037948FF UniRef90－X8J5K3 UniRef90－F8KVU9 UniRef90－D2VBK9 UniRef90－A4HL93 UniRef90 H7EM31 UniRef90 COEE09 UniRet90＿M8EC08 UniRef90－G1D5H4 UniRef90－Q21NY4 UniRef90 U3WF04 UniRef90－S9PHTO UniRef90－N1ZP65 UniRef90－E9SHX2 UniRef90－A6EDZ6 UniRef90－G8LVTO UniRef90－WZZMQs UniRef90 G2FP09 UniRef90－UPIO003B55208 UniRef90－V4NJI9 UniRef90－L7U7Y7 UniRef90 Q9KBY5 UniRef90－C7PV79 UniRef90－Q8RJY8 UniRef90 UPIo00371FA06 UniRef90－W5XYV3 UniRef90－UP10003B6DD7D UniRef90 C5ETZ9 UniRef90－D3A3N5 UniRef90＿S9PQX0 UniRef90－A0A030SAF5 UniRef90 K2F8D4 UniRef90－R9PHP5 UniRef 90 －$\times$ 7Z9A4 UniRef90＿N9X3L4 UniRef90－A9AXP6 UniRef90＿D9SVM2 UniRef90－J2WSF5 UniRef90－T0JSJ8 UniRef90－R5EZ24 UniRef90 EERRKEO UniRef90－A5V1T6 UniRef90 UPI0003F59B6D UniRef90－UPIO004266388 UniRef90－UPIO00419A53D UniRef90－V2Z8F4 UniRef90－D4JPP6 UniRef90＿D4．JPP6
UniRef90＿M2AWD8

K F K Q
RMKGHYFFGTRDVAMSSRASTALLRDG $\square P G W L L E T \square D G C A$ ALFNDTPCGVGVGGKDKVSEKELKNDCMKGSRWMRSRGFA AI EKAIPGSPGNYNDRIGRDH QLGSIDAS
$\square D E S W Q A R \square N E \square L P Q$ ALEHAVPHGKTFGKRDQGAWADVPAKADKAWGQLAGRFKA
R $\square R H \square F F E G \quad G R Z A \square T A Q R E G L D R D G P R W P G \square R P E D$ LLDKNTCFGTGNGFQTPWDDP作EKKEWQ
El ARRTEFGTGGVNRKKSDH EDFDDPDWSVYRQVG EIYETLSFGIGQKNKQPVDHEDFSDPDWHVFSEDEP AI ERAIPLSAGHSNKRVLPSA
KI KRNVPLSFDSHEKEVFDAKKVLDGLVAKYASRNMAHDM ALETQTRFGVGGSFRPPLEHPVLAEDWMQEAA

ATRKLKPERAVARLQGLEGPWDGDLDAWR
DTARQTSFGVGRVNNEKVDHD LFDDPDWAVYQNDG TLTKVTVFGIGSPKKPVADHP【LADPRWR
ALKDYTHFGMEGG
R
AI EQETCFGVGGQFRARRDHAVMREDWG
AI ERAVPLSAGHYNKTDSPTAAPRLAELADAAAAAGF
Q $\|$ RHDFFEG GRSDPMNGDQREAMLRHGLTGLLEEGRG GCGMSLFQTDDKRAKVNLDKLEKQLSEMTDHA KRHTRFGAGVGFERKAWRGHPVLDERTWQEQGLL
AAH F $\square$ PSGMSVWGR
ALKNHTHFGMEGG

E $\square$ F DDPDWDVYRS $\square$
QI ERAVPDSAGSYNRKVVATA
FI YANIPSGFAlRKKPHRYT
T RKFVPSGFRGRDKEHRFSKMIDFDGVRAP
A NVATLPG L LGKSVGLPD DHADLESALELGGDWLLRRGYA ElTSRIPTGFDFRKK

G LD
ALKEYTHFGMEGGLTFQQEHEVLDRKEFQMTDLL
RLRERVPFGWNTRSAVHQALLDDPE LDDEDSRICVD
V ERAI PLSPGNYNRRVHHDHTRQRVQELE
VI HDFIPSGRDVRELEHKYSSF $\square$ NFNI
DD R WA G
SRLS G I L A GFNSHEKASPEMRAAMKRDMDEHKPT
VIRENI PSGFS IRMKPHRFAEYF
EปARR】SFGVGRVNQERVDH EDFDDPDWTVYEDVD AATPSRFVPSKDASRLRGLDDPWDGNVSAWLAQRGVH
QLNGLERGGDSGDESRPVLDVVRKFFGLDSSEDLLSDFEL
S E ELAVPHGRTHGGCSAADAGSWRNGVPANVQQVWKKH
SI RKNIPSGFADRKFPHKFADEVEWDK】RG
LI YEKI PS GFSIIRDKAHPYFEQV
EIAKTISFGDG
$R R L R L D V L R R Q \square E E A \square P L S P G N$ YNSTLSRFSF

RMKGHYFFGTGSRAVEALLRDGDPGWLVETLEQPDRADGG MlYQK PSGFDIREKAHSYFNKIN
LI YREDPSGFNURKKPHRFNAKV EGTGPA伿

LIVEKIPSGFAVRKTPHRYNEQUSKEDRNFDKEM

$$
\begin{aligned}
& D V G M D A R K A K A E R W A S K D D V E G A W N G D V E G G Q \\
& G V G R S N R E K V E H D
\end{aligned}
$$

ELAQS $\square$ SF GVGRSNREKVEHD ALKEWTHFGMEGGLEVVAQEHAVLDDPAFQSTEML
 E $\square$ ASTISFG $\square G R T N R$ ADDAPVDHPLFEDAAWEA $\square P G K A$
$\square 1 Y D R \square P S G F N \square R T Q V H R Y Y D R C R \square D E D D C A K N \square$
QLGNDDTPLDKDEQVDLLGDAVDMRQFSDGLA
ERWAA
$G L T H V L L R N G R D V P L R V Q A F H C L E R \square S E D G L W A E V D Q A R D$ KLVEVVPTKKFVGTKVPFN VVVD $\square$ CRQGTSA $\square$ MRHLN $\square Q$ LKHVEMP
RLDAA IPRGVGTKGVWRLDRRADEQVLTGGARFAVDQGHG LI HERI PAGFLVREKTHPYY
$D$ D
VI NKYI PS GKNTHEGRTVRFEKL
DVAKVI SFGVGRANAER
LI Y QK』PCGFN【RDKEHKYN
GVKKKKFK QEK
QVAREVVFGLGGTSGQVDRRLQGDDDPWGGAMEAALSAAGB
VWE GRTEKFDLTELRCY $\underset{G}{R}$
RMHALDRPWDG

ACCHYIPPSGRN


VWD G R K E R F D $\square$ QE L K C Y R

UniRef90 N2IUB2 UniRef90－S4VCN3 UniRef90－LTU5899 UniRef90 W5TPE8 UniRef90－CoDS91 UniRef90＿G7CB78 UniRef90 J8VDW3 UniRef90－UPI00036EB979 UniRef90－UPIOO04665D41 UniRef90－UPIO0041D495E UniRef90－UPIOOO37C1241 UniRef90－O5WGQ1 UniRef90＿UPI00047D68D8 UniRef90－A5K021 UniRef90－T2G8E5 UniRef90－UPI0003F9D108 UniRef90－W9VDA9 UniRef90 UPI00028A11E1 UniRef90－A9WEC5 UniRef90－R6L7Q4 UniRef90 C7LN5？ UniRef90－UPI000255F15C UniRef90－R5F402 UniRef90－X8M292 UniRef90 E8UBT8 UniRef90－R4XV57 UniRef90－F5T9B8 UniRet90＿W6TPK2 UniRef90－13Y686
UniRefol

G4HJ7 UniRef90－A9WQN1 UniRef90－UPI0001C37849 UniRef90－C3LEW3 UniRef90－U6KGU1 UniRef90 UPI0003B78574 UniRef90－－F8X317 UniRef90－R7E4Q0 UniRef90－13WBT9 UniRef90－B9XDR4 UniRef90－C5KHZ4 UniRef90－UPIO0037948FF UniRef90－×8J5K3 UniRef90－F8KVU9 UniRef90－D2VBK9 UniRef90－A4HL93 UniRef90＿H7EM31 UniRet90 COEEO9 | UniRef90－M8EC08 |
| :--- |
| UniRef90 G1D5 | UniRef90 Q21NY4 UniRef90 U3WF04 UniRef90－S9PHTO UniRef90＿N1ZP65 UniRef90 E9SHX2 UniRef90 A6EDZ6 UniRef90－G8LVTO UniRef90 W7ZMQ5 UniRef90 G2FP09 UniRef90－UPIO003B55208 UniRef90－V4NJI9 UniRef90 L7U7Y7 UniRef90 Q9KBY5 UniRef90－C7PV79 UniRef90－Q8RJY8 UniRef90 UPIO00371FA06 UniRef90－W5XYV3 UniRef90－UP10003B6DD7D UniRef90 C5ETZ9 UniRef90－D3A3N5 UniRef90－S9PQX0 UniRef90－A0A030SAF5 UniRef90 K2F8D4 UniRef90－R9PHP5 UniRef 90 －XVZ9A4促 UniRef90－D9SVM2 UniRef90－J2WSF5 UniRef90＿TOJSJ8 UniRef90－R5EZ24 UniRef90－E8RKE0 UniRef90 A5V1T6 UniRef90 UPI0003F59B6D UniRef90－UPIO004266388 UniRef90－UPI000419A53D UniRef90 V2Z8F4 UniRef90－D4JPP6 UniRef90＿D4JPP6

UniRef90＿M2AWD

QPLDETWAQTDAERKREKGIADTGFDQALGTIGAG RAADLKQLDHLGGVLRGNPDWAPEALTREGVVRLATVGGG SDEDVEHTEAFGSIEGADPAAVSARALERGKPQQGTLGAG TAERITELEELAARNGVEDTHSPGWREQLGSLGGG HPFQVALGSIGGG KWREQLGSLGGG
tQarldrlerlatesgणdushsp KTNNRHHLGTLGGG LERKTTGLETPWDGDLTPWRDKFGTAPSLADAGLGTIGGG AEDGLDRVHASGYPAGTAEAFADWIGGAGGASHDGGIGGG ASPTMRQLKSKAVQQDGSSGTG GAGD

EARVERLDGEAASAGFDPASYSRQ TPRHLK QMGTLGGG FCRLLKEQ RHKAAEQWGTSGSG
 GEQDLESTD
$\qquad$ FDDSAL KQE HDKПKADARDQ
QEHEVTEREE AT K K Lit R F R FDQALGTIGGG VTRRMQDTAWAQLGTSGAG DPAAYAGNWELQLGSLGSG TWSLYDRDEQEKALEYTAFDFDGAAHTLSYDDQiGSiGGG PLE WL NEHVPESMKSHDFMTSLSSIGGG पDKRLRNDDEP配DTWALVSELAPAGVGHRQALGTIGGG EQEKFDLEALHCYGQLKNPDRLRKSLGTLGGG ALDRRQEHEVLDSQVFNEDPFLKPLRGKAVRQLGTSGNG KKE HDKLLALARSQLGTVGSG
ARRDESKERAKADFDP DK】DLT QLYCYKH DDP GSYA FTDQRAQKSLGTLGGG
WTEDKEHCEENGRMDTADPSKVS四AKKRGDPQMGTLGAG YKEFRSASGD RKLDKKVKERLYVQLGTLGGG KKLQGKAVRQLGTSGGG
VLRTEKDRHRRSVGSLGGG NLADRDGVDLSHSPKWREQLGSLGGG $\square R C K N E D D A R A R \square S I G T L G G G$ RपSDLENPWEGDVGEWLQRAELPTTHSD MHSLGTIGGG AHTRGVCQSRTTPPGSYAQVIAERHVKQiGTLGGG DFSALHCASHIQMDKAMRSLGTLGGG
K Q
KESDFDKL
EHPVLEEKHWQG
VHDKLKALARAQLGTVGSG
EATTETKDTRGLRQTGMRQIGTSGGG LATYFDVDPPKSENKALEFAIRQLGTVGGG QVENTNNLNHLGTLGTG DपS QLRCFDA DDP IRAEKSLGTLGGG
K HE HDSLKALAKSQLGTVGSG TRKKHEELDQLQQTNDVDLSHSP KWMEQLGSLGGG WEKRLDGLDDYQGEDSDADANDNTNADAGDHNLGTI GGG EKLLKNLFNTDTN LRCEVNKNRAYMSLGTLGGG QLDRESTRVYLGGALEGDPAWAPTGLRREGDPGLASHGGG HETMDSSMFKETEFDHMDHNKADHSLGSLGGG DFAHLVCKESVNLERAELSHGGTLGGG DLTELRCLKAVKLDRAQKSVGTLGGG VERKLHGLDDPWDGSVEDALAAAGLPIVDASPGLGTIGGG AEEGVK

STGFEASLGTVGGG KQE
WERLVP EREAL

HDNGKTLA KHLGTLGGG REKARAQLGTVGSG KWRQQLGSLGGG $\square E R K \square H G \square D A P W A G D H A E A \square A E V G \square P P R V A S P A L G T i G G G$ NDDRAGKSLGTLGGG VGT GGG RDDLEGPWEGDAEAMDADAGVRPCGFEA R SLGTVGGG FRECIGLDEFGGRLEYAPEALRDRRRSLDRDPGLGTTGSG TKNELENTQCGGNFFQD DFDVTPKLYLFFAKFRLGDIGAG VTRDLQRCDEDGGVLDARAKQEKRIINSCFDNAFGTVGGG DLKKLKCLLEQGANDGADATVELERAEKSMGTLGGG

 AEHDLFDDGDAWRESDMEAYRQKAVSQLGTVGSG EDTDLNE

## UniRef90 N2IUB2

 UniRef90-S4VCN3 UniRef90-L7U589 UniRef90- W5TPE8 UniRef90-CoDS91 UniRef90-G7CB78 UniRef90 J8VDW3 UniRef90_UPIO0036EB979 UniRef90-UPIOOO4665D41 UniRef90-UP100041D495E UniRef90-O5WGQ1 UniRef90_UPIO0047D68D8 UniRef90_A5K021 UniRef90-T2G8E5 UniRef90-UPIO003F9D108 UniRef90-W9VDA9
NHFAEFQAI ETVYDQAALQELGLDSRYLQLLVHSGSRGLG
 NHFDELCLDE
 NHFIEVCLDEA NHFAELQVVEEVRDAEAFAALGLDKA NHFAELQYVARVHDAAAAHAWGLAPGTVVTMAHSGSLSGG NHFVEWGULS IVEGPENALQLPVGEGYVALLSHSGSRGFG
NHYVDWGILS
N
N
N
 NHFI EIA YDASDGGEEALEQNHSPESDIYYLIHSGSRNIGG $\begin{array}{ll}\text { NHFVEFGELH } \\ N H F A E L Q V V & D \\ N\end{array}$
 NHFVDLFEEQ GFWDDTHGRLWVANHFGSRGFG

 NHFVEWGVL DVT QAMPGLAEGTYGALLSHSGSRGTG NHFI E I CCVDEQ D NHFVEMQHVAEDYDGRTANAWGDRKGSVLVMIH S GSSGTVG NHFAEFQSVDK DNQELFEQSGLDKQKLLLLVHSGS RGLG NHFVEFGT DEFTDDQADLGLEPGTYGLAVLSHSGSRGFG
 HFVEFGEIELLAGNTLGLPA KKYMALLTHSGSRGLG

 N H NHFVVELDEDD $\qquad$
 HYCEVQVVDEVYDEFAAKKMGLEKGQVCVMVHSGSRGLG NHFIELG PDRDNKLCITIHSGSRNPG


 NHEFA E L Q A V E K V E D E T E F A K L N L L K K E K HF IVELLHD E $\quad$ G D D I W L ML H S G S R N I G NHFIDEADKDD $\quad D G N L Y$ I $V$ V I H S GSRRRLG HFVD L LVEQE $\quad$ NGKVVNI ANHFGSRGFG

 HF DE L C L D D QQP HK $\begin{array}{llll}\text { H F } & \text { I } & L & C L D D D Q Q P H K \\ \text { H } & \text { E A D R D D E }\end{array}$

HVWVMLHSGSRGVG GNLYIVVHSGSRHAG GALYLVVHSGSRRLG NHFVDLFVEEA TGMVWLANHFGSRGFG
 HFTEVDKSE KGQMYLTVHTGSRNLG NHFVEVQRVEAVVDRARAWRWGVREGQLAFMVHSGSRDLG NHFIEANKD GNGNYYIVVHSGSRHLG
NHFEADK GS HFVEFGE $\square$ E पYPDNAMG पAP NHFIEVNKHE
HFIGLNEWD
NHF: ENKDQE NHFVELGVDDEE NHFVDLFVEEA NHFVEFGMGT पAEGNS पGपPA N H N NHFEFQR $\square E A \square A D E T R F A D \square G \square R H D$ NHFIEADQDDE GNIYLVVHSGSRHLG NHFAELQTVDTVYRADL पPTDFDENHLQLLVHSGSRGLG NHFAEVQRVEAVHDASTFQTRKRETDRLLLVHSGSRGGG NHFVELQVVDRLDDRHQAFALGGRADELVVMUHSGSRDVG NHFAEFQAI EEVFNQQADDELGLDRKRLQLLVHSGSRGLG NHF EVQAVDRIYDDGAAASMGLAAGGVCVMIHTGSRAWG
NHYVDLFADEL
NHFIEVDKGD
NHYVDLMRDEE
NHFIEANK
DRTWIGVHFGSRGLG
DGTVYLVIHSGSRNLG
GSNGDVYGVHSGSRHLG
NHFAEFQCVERTYDQEAAGSLGLCADRILLLVHCGSRGYG
NHFVEFQRDEDVLDTDRFAALNVKADRVWMMVHSGSRGLG
NHWVDILEDEE GWVWVAAHFGSRGLG NHFIIEVDK AADGTQYLVIHSGSRNLG NHFCEVQADDEDAPEAAARAGLDRNLAYVLVHSGSRGLG NHF ELDQDEN KEVYMIIHSGSRHLG N
NHF:EVNDD

## UniRef90 N2IUB2

 UniRef90-S4VCN3 UniRef90-LTU5889 UniRef90 W5TPE8 UniRef90-C0DS91 UniRef90-G7CB78 UniRef90 J8VDW3 UniRef90-UPIO0036EB979 UniRef90-UPIO004665D41 UniRef90-UPIO0041D495E UniRef90-UPIO0037C1241 UniRef90-Q5WGQ1UniRef90_UPI00047D68D8
UniRef90_A5K021
UniRef90- T2G8E5
UniRef90_UPI0003F9D108 UniRef90-W9VDA9

ESV解 250
260
VEV 270

Q A I L Q E H $\square R R$ H S H Q

 NKI A Q R HILKIA QK LCCKQWWIDDLPSPDLAY LVEGTPEFTSY QQI LRRH $H$ VDAHGHQGLPENSSEAATY
 Q DVVGRE HQANAT ALDR LLRAAWPSGLPRRPRNG ILLPFLLDDERSEPPLRY A GVASHY SK LIAMEDTKLPA EAKHLA WL DLD T QE GQEY HKTAS GF LNLLAA GRDFLGKAPGESMDQAPVDLNSELGDLY HKTAS GF L N KNKP FA S KV S GESSMEDVPT L FDDVA S ELLG DMY
 KRTAEFY
GAVAQHYSRLARDELAS Q
GA A A

| G A | I | R | E | H |
| :--- | :--- | :--- | :--- | :--- |
| E S | I | $L$ | $R$ | T |
|  | $L$ | $I$ |  |  |

A S Q

HK TAS GFLLNAGRDF LANAP AKIA NYYAT
 QAILARH
GEVAKHYSALAGRMHPE GEAKHYSALA GRMHPE LDPRALGHLDAWLGLDDTDEGREY
 HQSGR $\square$ NRII TKE LTYPK GVPPHPDNGIVYLLPEREKMWQRF Q S I L R Q H
A QVAGHYTRVAEQLHR
RSI LE EH
 A AI AKHYY KRAMDSCKLPRYAQQLAWLDDNGEAGGQEY EA L LR GADD HKTASGFL NAGRDFLANAPGESMDQPMPVGLVDPEAPPARDY


 HQ A A DALVVMEKSMARDNLNPTDKQLACAR AS Q HS I G GYYMKLSKDE DTELPTGFLNLNRDT AKI AKHYSQVARDVC $L L P R E A Q H F A W L G L D T D A G Q E Y$

 K QVAE Y Y QREKE DQSELAAKLKVPK I K K DLAY L Q GK S ESILRAYVDQHRD
$N$ I TAQYY DGLAARQTGTSKENLAHLAI ASDA GQDY K EVT E Y Y L NQ GQKVLKE Q G L Q $\square P Y E \quad$ LTWLE GDMMQHY

AKI AD HYTKWAMEQMPT LEEQSVRHLA WLPDDSEA GLEY DHILGEH EDKFGNSGLLFDSDDAKHY
 LLI A N FY QEEA WRQLLN K NRESSLT S DP R D L A Y V S G S L F D D Y L E V A K Y Y QN E GYAVL K R K H T K Q T Q IP A P L A Y V E GR L F E D Y HKTASGFLNNGRRFSDKAPGESMDQPPTLLDLDSELLGEMY NK AAQVHIKAA QAYCP QSRFHLPHKDDAFL E EGTDQF D S Y Q S I L N K Y
K QI AD Y Y Q D K A $\square$ K Y C $\square E K Y K K L$ NK P H D D L CY L E N D L M E D Y K H V GH T WQERA RA A WP VGAPL P E S G I L P L A D P A L V R E Y L E V A N Y Y Q L E G Y K A L N G G C S K K D D D D L I A L A Y V T G D L F T Q Y $L E V A K Y Y Q Q D Q Q E D T T G K N T K R T D V P K Q L A Y T E G E L L F E Q Y$ ANIAQHYT RMAMAQCKLPKEAERLAWLDMNTAAGQDY K QVAA F Y Q R E K E DQQE DK KVVK P V K I S K Q L A Y V Q G K S Y N D Y
 LEV A K H Y QE A GYK QL N S NEKP IT DVVP Y P L A Y V S G S L F E D Y
 EAILRAHVDRHAAG GLDADSAEASAY HKTAS GFMNLAKGVK FSDKVKGERMEDAPTD LDDSEDGDMY A NVAMHYT K I AAMDTCKLPREAQQLA WLDMNS EAGQEY
 H T I A S GFMALSSQNRPWGSR NAEVEALLDLNSELGKA Y
 QA LQQAHRQADARQ LIV A GHY IME LIKA Q GREKEDQK A LDKE LQQAY VE GP LAF E QY QQI LQQRHIAAF GHQ GLAAE GEAAAAYLAE
E HIL RA H
FHVGQRWMDRARTAWPRGRRHPASGLYAL G GELAGEY QYTMYTHTVYKKMQEK $\square$ S L LHMTKDD SLLLKYDANGDD GEMY
QS LI L E H
LETA GFYQDLAYK S LIKEPSRKYTVNQMDESYYVSGQQMEDY
 H T SAT RY L K A A
CEVASLLYQD IQKELKRKKEE\|VTDIPRALAYILSGRLLARNY QEI L S R F




 $L Q \operatorname{I} A \mathbb{V} Y Q K K A Q Q L L D E Q K L L T P D K N L E Y L F T E S$




P|V I I P G S $\stackrel{380}{ }$ G S Y S WL V V K P $\stackrel{390}{\square}$
400

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UniRef90 U2P9V8 UniRef90_UPI00037948FF UniRef90-X8J5K3 UniRef90-F8KVU9 UniRef90_D2VBK9 UniRef90_A4HL93 UniRef90_H7EM31 UniRef90 C0EE09 UniRef90_M8EC08 UniRef90_G1D5H4 UniRef90-U3WF04 UniRef90-S9PHT0 UniRef90_N1ZP65 UniRef90_E9SHX2 UniRef90_A6EDZ6 UniRef90-G8LVTO UniRef90-W7ZMQ5 UniRef90_G2FP09 UniRef90-UPI0003B55208 UniRef90_V4NJI9 UniRef90_L7U7Y7 UniRef90-Q9KBY5 UniRef90_C7PV79 UniRef90_Q8RJY8 UniRef90_UPI000371FA06 UniRef90-W5XYV3 UniRef90-UPI0003B6DD7D UniRef90_C5ETZ9 UniRef90-D3A3N5 UniRef90_S9PQXO UniRef90_A0A030SAF5 UniRef90_K2F8D4 UniRef90-R9PHP5 UniRef90-X7Z9A44 UniRef90-A9AXP6 UniRef90_D9SVM2 UniRef90_J2WSF5 UniRef90-TOJSJ8 UniRef90_R5EZ24 UniRef90-E8RKE0 UniRef90-UPI0003F59B6D UniRef90-UPI0004266388 UniRef90_UPI000419A53D UniRef90_V2Z8F4 UniRef90-D4JPP6 UniRef90_M2AWD8

SE $\square$
A GVRSMDPGSMGTSSFVVEG KGCVPALCS




ST GQLGFI GGSMGDYSVIVEGIDK
N G L P GSMGTAS YVVEGL LGRLGVPGSMTAPGFVVRG K GNK K S Y S GQTGF EAGTYGLI PGSMATASYIVEGL QAGQPGLI PGSMATPGYLVAGR
GAGFFGII PGTMVDPAFVVEGL
TAGEPGLI PGSMGTASYVVAG

MGSSSYLL|AGM
GNPMS NS
K GNALSLNS GNPQSLWS ASDLSLNS KGHAAALES ASEASLISS K GNPEWNYS
$V L I P I N M R D G S I L A L G$
PVVi
KGSNDADYS
GQTGFI GGSMGDISVIVRGKDEENRDACYS

$P L V P S S Y Q L I G Q P V L V G G$
$E K K G Q L G V I \mid P G N M R D G V Y \prod T E G L \quad G N E E F L S S$
GVAGFIPGSMATAGYLVCG $K$ GEVQSLNS

GNEEFNSS KGNEDALYS
QKGERGVI
$P M$ I P P NMRDGSIADG QDQLG।
SGEKVI I
$G Q V G F!$
$N M G V A P C$
NMGVAPCP
GKDVLGMI
$M G E L A D V$
GEKALL
$G E K L L$

PVVI
NKDETVI
EEEQPVI $\begin{array}{ll}P V N M R D G & I \\ P G M G A E S Y L M V G L\end{array}$

 KGNPDWNYS
GDPAAAWS GSMGTVSYLVLPTGDELPAAAWS GNMRDGY LLGTGKGN AWNS
NPDNCS SMGDDSVIVRGKD

 E GNDNA HS 1 NMRDGSLI CIG KGNARSYCS KGNEDWNFS KGNEEWNCS
$\qquad$ QENKEAFYS
KGCKEGGWS
QNSQHAGFS
$A G E M G I!$
$S G E V V L!$
VII
L L I

| V | V |  |
| :---: | :--- | :--- | :--- |
| LI | P | P |

PVVI PGSRGDFSYLAEPVLDSGDKALFS
,
$A G Q Q G L$
EGQK GFVV G
DEGVKALI I NMRDGSLICVG
GGSMGDLDSVIV KGKD
G KGNARALLAS
GNWYS GKGNEDWNYS K G $\square P$ A A L H S KGNKDWNYS ATGKGNADWNYS $G R G K G V K K L N F S$

$P V L D S G K A L F S$ | $A$ | $P$ | $G$ |
| :--- | :--- | :--- | :--- |
| $R$ | $G$ | $G$ |
| $S$ | $G$ |  | GTGSAF KENRDAFYS

$K G E Q A L Y S$
$K G E Q A F C S$ V GEPQAFCS KGFAPALRS


PV V
Q G D


$\square$ A K A A D A KGNDDWN

NGEKLLIP DNMKEGSLICVG
KGNEEWNWS GQRGFVGGSMGDISVI EGVD
 GQKGFVGGSMGDDAVI LEGVD SPEAQADHS
KGNEDWNYS

## NKSEKLLI

$V V$ KNQ GS C G O WNFS
LVVIPGSRGDESYLVEPVPDFAHKSLVS $G Q R G F V G G S M G D \square S V V V E G V E D E S R D A L H S$
GEKVLIPINMRDGSVLVAG KGNPEWNYS
LVPVPGSRGTLSYLVEP LAEMPGDALAS $V 1$ MP 1 NMKD GVIL GKGKGNAE WNNS
QAGERVL
$K G N P E W N Y S$
$K G N P D W N Y S$


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UniRef90-UPI000419A53D UniRef90_V2Z8F4 UniRef90_D4JPP6
UniRef90_M2AWD8


LA H GA GRKWLRTECRDRLSNRFSFDQLIKRTS|L|GSRCEDKA LAHGAGRKWQRGECQGRLAHKRRREDLYLTALGSRCGNKT ASHGAGRARSR FSLARAGADQSEAALGLKGVDCDSLREE

APHGAGRRMSRTEAKKRFTAEDLAARMQ GDEYRHGE LA HGAGRKWQRGECKGRDSHKYSADS LRRTAFGSICADKA

 A CHGAGRRRVPRGASFRVVTPDDHRNPVVARRSDVMAA WRR ASHGAGRQMSRTVALKNI SPQDLKRALIENDVTLIGA TVHGAGRLMSRTQAAGRFTGKGKNRRRSGGADSSEQMAAA APHGAGREYSRSAARRTFT RDELRRAMRGIEYRDTD CSHGCGRDVSRTHAKK\|IDNTDFVNIMR GVRCDTNA
 LAHGAGRKWKRGEARGRLLSARQRPDDLLTTADGGRCEDKE TVHGAGR】MSRTMARKRSGGQDTPRQMHEAVREFGDELRG ASHGAGRRFSRSEARRTDTPAMAAAVVREAGVLVRG


 LA H GA GRKWMRTECKGRLSHKYTPLQLSRTTLGSRCANKQ ASHGAGRQLGRKAAQAQVPKRDVQAYLQDRGVTLIGG

APHGAGRDVMRTKAQNELSMEEYRESMKGDYSSSIIN NQ ASHGAGRAMSRQKAKDSMTVSAMKKLLSNADVITI G

 A P H G A G R L M S R S R A K E N F T V S E F K K Q M D
G P H G P G R
$l$

A SHGAGR $\square \mathrm{MGRREAKKKLS}$ LDDRFKKHME $Q Q Q V T M V$ A SHGAGRAMSRQQKAKEQFTQSALKK LLQQQQVTLI G GS

APHGA GRDLMSRSKAKE I NDDDFKETMKNVYSTTVV NE LAHGAGRKWTRSESKSRI RDRYRPDELSQTELGSRCENRD CSHGAGRRLSRNAAKRVVGVGEDNEMMEGVVWDTRDDRVC


 A A HGAGRKWKRSK SVGMAAKENVQSFVVTDGSHVICEDKN
 A P H G A G R V M S R A Q A R R E LIK L
 APHGAGRKFSRTKKAKEHFTVDDLKA QM Q G I I E WREDQAE



 A A HGAGRAMSRQKAKNNMTASALKK LISNAGVTVIGGS

 APHGAGRKMSRRKAREKVLSFKEFFKEVVVMKAGVYS STVS S K LA H GA GRKWSRNDAHARLSRRERVADLQRTKSHVIDCDRR LAHGAGRKWTRTAARERIKERFTAESLTRTKSHVVCENKD
 A SHGAGRAMSRKRARESMTVSALKKMLAAANVTLIVGGS
CSHGAGRVMTRREARERDRPAALAHALRR VVFDEGRVT T $\square H G A G R V M S R R Q A L G K I D R K T M K K W L K Q K G V I L R G$ APHGAGRRFSRTEARKRFTAAD LAHGAGRKWSRKDAHARLSRRFKVADLQRTAGGVIDEDRR APHGAGRDMSRTMQKNSFSVSEFEEQM KGIYTTSVSME LA H GA GRK WQR GECK GR L S HK Y T A D S LRRQTE F GVVVCD K T
 APHGTGKGKNNNE KS IENKEELFAKMKEK GVVRLYNAKS S LA HGAGRKWKRGECQGRLSHKYKREDMDNTALGSRCGSKE

APHGAGRDMSRRAAKKAFTVAEFEQEM KGワYTTSVGAE TVH GA GRVMSRT A A R GK I N Y R T GKREMMNEWUQQQGVELR A PH GA GRRLMSRTKAKEKVDYEEFKKSME GDYSTTVVT
TVHGAGRLFGRKEAKRRFSRAEMDRWLNERGVTLIGAA
APHGAGRIMSRTQARQSFTLSQYRELMMKGIYTTSVNKD LSHGAGRKWARSICKSRMDQKYDRDSIRCTGLKSRCHDTN LAHGAGRKWSRNDAHARLSRRYKAA DLQRTKSHVICEDRR


 A P H GA GRRI MSRGKAKENDSLLE Y Y A SME G I Y T T S S N E N

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UniRef90_M2AWD8


EWVDEDPDAYKPDTEVMAAAEPAVVSVHQLRQLLNVKG

 LLY Y EAPQAYKDI A QV IA D DLEAAGLVTTVADYRPVLTYK



 GGLDEAPCAYKDI HAVMAA QAELVDVVGRFSPMLVKMD LLFEEAPQAYKDVDSVVAS LVEAGLVQLVARFKPLLTYKK LLYDEAPEAYKGI DRVVADLVEAGLCHII ATLRPVLTYK AGTDESPFVYRKLQEVLDAHAET IDVLHVLKPI GVCMA
 LLFDEAPQAYKDCHSVVDDLVQAGLVQLVARLKPVVTFK GGLDEAPMAYKNDRDVMAA QADVVRIVGTFWPRIVKMA

 GGIDEAPQAYKRIEDVI R EQRDLVDVVGRFDPKVVRMD




## ARDDESPDAYKDTAEVLSYQEGD <br> $V 1 / T D N S V R P F D N D K G$

 VE E DPDAYK

 $D T L D E A P F A Y R S M D D M L D V I Q D T$ V DIITNVLRPVYNFKA







 VEENPNAYKDDDKVMAL G QKSLI EVQGRFMPKIV


 LLFEEAPPAYKPI DRVVATDDVEAGLVRVVARTLAPVLTYK GGTDESPFFVYKNLADDVLEAHKQTLSI E M HVVKPMIGVCMA ALVVEEAPTAYRDI T EVLEEADEAELVTPDRRLTPDAVLKG

T LDECPMAYKAMDD VVKY DDST VK\|LQVIKP TYNFKA GGTDESPHCYKRLPEVLN HHANTIKVVHTLQPLGVAMA

 LLFAEAPEAYKNVEQVMGVLQEYGLIDDAATLRPLITFKA






| UniRef90_N2IUB2 |  |
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| UniRef90 S4VCN3 |  |
| UniRef90-L7U589 |  |
| UniRef90-X1VE90 |  |
| UniRef90-W5TPE8 | T |
| UniRef90_C0DS91 | S G |
| UniRef90_G7CB78 |  |
| UniRef90-J8VDW3 |  |
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| UniRef90_UPI0004665D41 |  |
| UniRef90_UPI00041D495E |  |
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| UniRef90_UPI00047D68D8 |  |
| UniRef90 A5K021 |  |
| UniRef90-T2G8E5 | T |
| UniRef90_UPI0003F9D108 | $\mathrm{G} \square \mathrm{A}$ |
| UniRef90_W9VDA9 |  |
| UniRef90_UPI00028A11E1 | G A |
| UniRef90_A9WEC5 | G S A |
| UniRef90_R6L7Q4 |  |
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| UniRef90-W6TPK2 |  |
| UniRef90_I3Y686 |  |
| UniRef90_G4HJ71 | G A |
| UniRef90-A9WQN1 |  |
| UniRef90_UPI0001C37849 | G E |
| UniRef90 C3LEW3 |  |
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| UniRef90 F8X317 |  |
| UniRef90-R7E4Q0 | P E |
| UniRef90-M1MZU7 |  |
| UniRef90_I3WBT9 | T E |
| UniRef90-B9XDR4 | R S S |
| UniRef90 ${ }^{-}$C5KHZ4 |  |
| UniRef90_U2P9V8 | G E |
| UniRef90_UPI00037948FF | G A |
| UniRef90-X8J5K3 |  |
| UniRef90_F8KVU9 | S |
| UniRef90-D2VBK9 |  |
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| UniRef90-C0EE09 | G E |
| UniRef90-M8EC08 | G A |
| UniRef90-G1D5H4 | T |
| UniRef90-Q21NY4 |  |
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| UniRef90- ${ }^{\text {S }}$ - ${ }^{\text {P }}$ |  |
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| UniRef90_D4JPP6 | S E |

Y NEAAAYTD I I E E
TEALI Y S DSPQL
$E \square K G R V N T$ A V CYA K V V E D


 E VLE E
K S WTD D
$\square \mathrm{K}$ VWGE P L
K N WME H
$M \square A \square N G D Y T S A S \square Y K T N D D P$ EVKGKFNT ALCYTPALDG
$E \square K G K M N T \quad A \square C Y A K 母 V E N$

E V K G K Y N T A K VFT D N T E T
Y S NALVFTDVIE E
Y N KAKVVTTNLDN
T L K GKYNEAKVFTN NV
$M 1$ IK GDFNEAEVVFTEND D K


VF F HEN $\square$ S A D T P VE
CFAK VI E D K N WI E Q
Y N T IRRVHTDDVDE
VEVRT D I I A E E S YV D P
NK S WI E S
E $\square \mathrm{KGKV}$ K T A $\square$ CYA K VI E D $D \square K \square F T D N$ I

D N $\square \mathrm{P}$ VF GEHEA

A P F S I N $\square$ K A E NK LIE E E NV

$K \square E G K Y N K D C K \square F T D D \square G E$
Y N EAVVVTMDMLD
GK YAQA Y $\square M C D E T M E K S M V E E$
$E \operatorname{V} P \mathrm{~V}$ F Y Q N D N E LEEKNKT


A LES $V$ WME G


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UniRef90－R2PHJ1
UniRef90 B3JPB2 UniRef90－H1SAT0 UniRef90－UPIO003825C4E UniRef90＿A6FXH5 UniRef90＿UPI00047CD76F UniRef90＿UPI0003749F84
UniRef90－UPI00036A38AF

| UniRef90＿D3E3Q0 |  |
| :---: | :---: |
| UniRef90－V5CD60 | NAI QQLETTAKDPNMLR VVGMPDLHPGRGYPVG AAFF |
| UniRef90－H7BV18 | EALEQI NTLLSQDAFKDCKR\MPDV |
| UniRef90－L1NM76 | NAVRQLETTARLPAM RRVAGMPDLHAGRGYPI GAAF |
| UniRef90－R9K8H1 | YALAQI RQLCSLEAFAGCKIVMPDVHPGKVGTIGFTATAG |
| UniRef90－R7J2M7 | SALDWI TELCNHPAMDGVPIQMPDVHAGSLC |
| UniRef90－R7ELK1 | EAYDQI KRLANYPAYENS\I IMPDSHAGKGCTVGT |
| UniRef90－10X6S5 | GRV QIERLCDQPYAADSKIMMPDVHAGAGCTI GTTMT |
| UniRef90－UPI000478E585 | EAlEQI RRMCDYPMTAGSKI 1 MPDVHAGKGCTI GT TMT |
| UniRef90－F7NMP9 | RAAEQIKTVCDQEVFADCKI I MPDVHAGKGCTVGTTMTI |
| UniRef90－E7NPZ4 | EAKRQVEELSRQEFAKNSKIIMPDVHAGKGCVI GRTMTI |
| UniRef90－A9SFZ7 | TADEQLNYVANLPGVVLA VGLPDLHAGASCPI GATTA |
| UniRef90＿SOEXL2 | SAVTQ |
| UniRef90－UPI0003B31 |  |
| UniRef90－D1AHK3 | QCLSQTYRMCKQK\FKDTIIIMPDTHAGKGSVVGFT |
| UniRef90＿W3Al00 | TAIEQI EELCNQAFLKDAKII MPDYHAGKGCVIGTT |
| UniRef90－J4UIGO |  |
| UniRef90－A6P237 | TARGQI QAVCDWPEFAGCKIIMPDVHAGKGCTIGTTMTI |
| UniRef90＿A9GY31 | NAVQQLARVAALPGCVRA VGMPDLHAGRGDPI GAAFAF |
| UniRef90－SOKLM0 | TAVDQIVEMLNQEFVKKEQIIMPDVHAGKG |
| UniRef90－C7LRZ7 | EALLQFESAMNQPFTIR GALMPDAHTGYSLP |
| UniRef90－S4A9A7 | DAVKQLHQVAASLEDVVFAVGLPDLHVSKGFP VGTAF |
| UniRef90－G5HM33 | A AKDQLCGVGRLPGVIKA VGLPDLHPGK DPVGMAV |
| UniRef90－W4C853 | NAVSQAVT CSQYGDVLGVALMADHHKGYSQPUGGVVAY |
| UniRef90－F7NNA3 | TAVTQLQGVADLPGAM QTVGLPDLHPGKSP |
| UniRef90－R5T7W1 | HS IA QLQALCDNPANKGCKICMPDVQPGK VGT GYTQ |
| UniRef90－G9RNF8 |  |
| UniRef90－N1U | MPDVHYGMGATVGSV |
| UniRef90＿UPIO00402B380 | EA】EQ】RRMCDYGCTEGSK【IMPDVHAGKGCT】GTTM |
| UniRef90－B81A67 |  |
| UniRef90－U2KDU0 | GAEGQIQK\VSQEFTKGR\RIMPDVHAGKGCTIGT |
| UniRef90－D4M1S2 | EAIEEQIRRMCDYDLTRGSKRIMPDVHAGKGCTIGTTM |
| UniRef90－B8FHF7 | DALAQLMSGANLPGVV HAAGLADIHPGMG |
| UniRef90＿A1ZPN4 | NSIKQ1 KNCL GEEDLGVLTADAHYGYG |
| UniRef90－UPIo004041A8E | MTRSQLQTLVDQPFTKGATI I MPDMHAGKGSVVGTTMT |
| UniRef90－F7KLE4 | YAEAQVKMICDNEVAEGSIILMPD $\mathrm{C}^{\text {CHPGKVGPI GLS MTV }}$ |
| UniRef90－UPIO00376D2B0 | GAIELVQNILNNEISAGPVRIMPDTHAGKGIVIGFTMPM |
| UniRef90－A31XW8 | KSLNLIQT NT K S T K I HNHRKYQHGYNHKVVSV |
| UniRef90－E2NPE7 | KALEQ K RMCDYDLTLGSQUIMPDVHAGKGCTI GT TMT |
| UniRef90－R6EAT4 | EAlEQI RRMCDYPMTEGRIRIMPDVHSGKGCT |
| UniRef90－R9JRD5 | YARRQLQMICDHPSAAGSKIVMPDVHPGKVGTI G |
| UniRef90＿R5ID05 | AALQWVKAQCEHPAFEGRIVQMPDVHAGNSCNVG |
| UniRef90－F5J2D3 | GAIELVQNILNHEISEGQVRIMPDTHVGKGIVIGFTM |
| UniRef90－UPI00036A1AC8 | $N A V Q Q L Y D A M R L P V A A A G A L M P D A H Q G Y G L P I G A G V L ~$ |
| UniRef90－G4TEM4 | DAVKQMEALKSLQG VYSVVGMPDLHKGDRFPI GCAIFAQ |
| UniRef90＿W5XIL2 | RARQQLLRCAQ GDAPFAVLCADHHPGYSQ |
| UniRef90－19QCU6 | AA GTI Q N LDNPVTKDPVR\MPDTHQGVDIVI GF TM |
| UniRef90＿M4ZLK3 | A A VR ${ }^{\text {a }}$ |
| UniRef90－R9KXU9 | QALNQI YTLIKQPAFADCKRIMPDVHAGAGCV |
| UniRef90－UPI00037E0E8F | KSREQ |
| UniRef90－K0 | EALKQFNNCCSKNFVVEA ALMPDAHPGYVAPIGSV |



EADEQLKELCNQPFVEGCKR\MPDTHKGASCVIGFDA


NTLEQARLCAR TADRFALMADGHLGYGVP IGGVIA YALAQLQNLCDNPAFSGCKDVMPDVHPGKVGTIGFTSTLG S SVVESMNVLMKTPTLVQGAIMPDACPTGPAGIDPVGGIA NTLAQMETCLAT GSAAAGVLCADGHDGYNHPI GGVVGYE $K V I D S M N Q L M K T P T I V G G A I M P D A C P T G P T G L D P V G G V A$ STIGQDMSLCNQEFAKESQIIMPDTHSGSGCVI GTTMTI HENTHGLYDEVHLMPDTHRGKDVPVGFVAKVD



 RALEQVRGLLS $\square G F S D K K \square R I M P D V H A G A G C V I G F T G N L$

UniRef90 D3E3Q0 UniRef90_V5CD60 UniRef90-H7BV18 UniRef90-R9K8H1 UniRef90-R7J2M7
UniRef90 R7ELK1 UniRef90- $10 \times 6$ KS5 UniRef90-UPIOOO478E585 UniRef90-F7NMP9 UniRef90-E7NPZ4
UniRef90 A9SFZ UniRef90-SOEXL2 UniRef90_UPI0003B31DE5 UniRef90-D1АНK3 UniRet90_W3A100 UniRef90_JUUIGO
UniRef90 A6P237 UniRef90-A9GY31 UniRef90-SOKLMO
UniReffoc-C7LRZ7 UniRef90-G5HM33 UniRef90-W4C853 UniRef90-F7NNA3 UniRef90-R5T7W1 UniRef90-G9RNF8 UniRef90-N1UFK8 UniRee90-UPI000402B380 UniRef90-UPI0001A44BAA UniRef90-B81A67
UniRef90-U2KDU0
UniRef90-D4M1S2
UniRef90-B8FHF7
UniRef90-A1ZPN4
UniRee90-UPI0004041A8E UniRef90 F7KLE4 UniRef90-UPIO00376D2B0 UniRef90-A31XW8
UniRef90-E2NPE7
UniRef90-R6EAT4
UniRefono-RyJRD
UniRef90-R5IDO5
UniRef90-UPIO0036A1AC8
UniRef90-G4TEM4
UniRef90-W5XIL2
UniRef90_19QCU6
UniRef90 M4ZLK
UniRef90-R9KXU9
UniRef90-UPI00037E0E8F
UniRef90-K0P097
UniRef90_UPIO0047A267F
UniRet90_A6LZ98
UniRef90_W6SK54
UniRef90-UPIO002F2585A UniRef90-S5L630 UniRef90-B0ABV7 UniRef90-UP100004418234
UniRef90- $\mathbf{x 5} 58 \mathrm{~J} 8$
UniRef90-F5RJ89
UniRef90_JOMWY3
UniRef90-UP10003B427A7
UniRef90-UPIooo3B79FEB
UniRef90-F2JM60 UniRef90-R7DNS9
UniRef90-M5BXU7
UniRef90-KOAWH9
UniRef90 R6Q9J7
UniRef90-F1T809
UniRef90 FOR728
UniRef90 A0A059EJ00 UniRef90-G8NVW3 UniRef90-R5KTS6 UniRef90-A6ELD8 UniRef90-AOAO17HPA4 UniRef90_-2IGF8 UniRef90-UPIO0046F06E5 UniRef90-U2TOY7 UniRef90-R5LC27 UniRef90-K8ENX1 UniRef90-G2Z4T6 UniRef90-14ELOO
UniRef90 R2PHJ1 UniRef90-B3JPB2 UniRef90-H1SATO UniRef90-UPIOOO3825C4E UniRef90-A6FXH5 UniRef90-UPIO0047CD76F UniRef90-UPI0003749F84 UniRef90_UPIOOO36A

TDKAlVIPNLL ${ }^{90}$ VIGS DIIJGCGMET ${ }^{100}$ 110
TDKAVPNLVGGDIGGGMETVYLLDTDEDDFN RFDE
D LGNKVIPNVGVDTGCGM LCVS LGHRDFNAVT पNT पDR F SVGRFYPALI GGDI GCG SK LLPNVVGПDi GCGTT LAKL KQKKAEFQKDDT



TNGLI YPSLVGSDI GCGMLLVETSLT

 E

QDK AVPGMVGVDIGCGMETVELGKABREMDFGKLDA
ADRVVPALI GGDAGCGVRLVATSDGRMAPDVLERRARQ
SNGKVVPNLVGVDMGCGISVYYDG DLSGTDWSKLDL
ATRSUVYPALI GDDIGCGMALFKTEMKADKWLNKGHDLDR RGRFYPHLIGNDI GCGMSLFQSEVRQKKFRMDK
RNMISPSGVGYDIACGNKAVRTNLMWDDDRDQDATDMD

EDHTSTSGVGFDTACGNMAVRDDTRYAD DADQAPSTLA
TDKIVPNLVGVDI GCGMETVEL
TDKICPNIVGVDilGCGMYTVKLQ
KAKRDNDPELDS
LMENMVYPHIPGTDAGCGVGLWKTSLKPGKDNLDRAKVMD
 TDKI IPQLLGVDI GCGM

 TDKAVPNVVGVDIGCGMYTV NLGKVDIDFVKGKVD


TESRTSPTAVGFDTACGNKAVRLDMPGTEDRANDHRVME


 KGVIPNNVVGVDI GCGMSVYEIP KLLDVENIDWKAFYN
 VAKKILPSLVGIDIGCGMLAVKLG KIRNDFDKLDT



FSTAHFYPALVGGDDGCGMALWQTDLKHHKD


UniRef90 ${ }^{\text {V5CD60 }}$ UniRef90-H7BV18 UniRef90 L1NM76 UniRef90 R9K8H UniRef90-R7J2M7 UniRef90-R7ELK1 UniRef90-10X6S5 UniRef90-UPI000478E585 UniRef90_F7NMP9 UniRef90 E7NPZ4 UniRef90 A9SFZ7 UniRef90-SOEXL2 UniRef90_UPI0003B31DE5 UniRef90-D1AHK3 UniRef90 ${ }^{-}$W3AI00 UniRef90-J4UIG0 UniRef90_A6P237 UniRef90 A9GY3 UniRef90_S0KLM0 UniRef90-C7LRZ7 UniRef90 G5HM33 UniRef90-W4C853 UniRef90-F7NNA3 UniRef90 R5T7W1 UniRef90-G9RNF8 UniRef90-N1UFK8 UniRef90-UPI000402B380 UniRef90 UPI0001A44BAA UniRef90-B8IA67 UniRef90_U2KDU0 UniRef90 D4M1S2 UniRef90-B8FHF7 UniRef90_A1ZPN4 UniRef90_UPI0004041A8E UniRef90 F7KLE4 UniRef90_UPI000376D2B0 UniRef90-A3IXW8 UniRef90-E2NPE7 UniRef90 R6EAT4 UniRef90_R9JRD5 UniRef90_R5ID05
UniRef90 F5J2D3 UniRef90-UPI00036A1AC8 UniRef90-G4TEM4 UniRef90 W5XIL2 UniRef90-19QCU6
UniRef90-M4ZLK3 UniRef90_R9KXU9 UniRef90 UPI00037E0E8F UniRef90 K0P097 UniRef90_UPI00047A267F UniRef90 A6LZ98 UniRef90 W6SK54 UniRef90-UPI0002F2585A UniRef90_S5L630 UniRef90 B0ABV7 UniRef90-UPI0004418234 UniRef90-X5J8J8
UniRef90- F5RJ89
UniRef90 JOMWY3
UniRef90_UPI0003B427A7
UniRef90-UPI0003B79FEB UniRef90 F2JM60 UniRef90-R7DNS9 UniRef90-M5BXU7 UniRef90_K0AWH9 UniRef90_R6Q9J7 UniRef90-F1T809 UniRef90-F0R728 UniRet90 A0A059EJ00 UniRef90-G8NVW3 UniRef90_R5KTS6 UniRef90_A6ELD8 UniRef90 A0A017HPA4 UniRef90-F2IGF8 UniRef90-UPI00046F06E5 UniRef90 U2T0Y7 UniRef90 R5LC27 UniRef90-K8ENX1 UniRef90_E6LRJ4 UniRef90 G2Z4T6 UniRef90-14EL00 UniRef90-R2PHJ1 UniRef90-B3JPB2 UniRef90 H1SAT0 UniRef90-UPIO003825C4E UniRef90-A6FXH5 UniRef90 UPI00047CD76F UniRef90_UPI0003749F84 UniRef90_UPI00036A38AF
 SQHRFYPA LIGND\GCGMS $\square W Q T D L A V I K H S P D K \square E K K\lfloor G$ SQHRFYPALIGNDIGCGM

VIDRYVPSGKNVHDGRQM | VIRTYYVPSGKNVHDGRQM |
| :---: |
| FWQTDI PAAKAKPAKLDAK | VI RENI PSGFQDRKKAHR F EGEA RI REAVPTGTEI CPKNS LDEKELFRFDNSQYQKARS A VI REMVPNGFNI HDTQK

ClRRNIPVGRE』RRSGHVHKFV
AAH
T $\square$ PS GRDVWE GRTERFD LTEDRCYR VIHKClPAGFDVRK

1 P H K Y A VIRENIPSGSAlIRKDERDS

S S S ACKPRTLDRWAEC $\square$ QLE E P

$T L R R V F F Q G Q R R L S T T G K Q R E A V L R A L V D T P L H P G Q S G L W$ FI DN NIPFSVNINKTVDKAVPKEWKKTLKP LITDK I II RQFVPS GIELHSEETVGSV EATHYIPSGMN

VWE GRQEHFD LTK K NCFR LIDRREIPSGREVRDGLH

MDDEPLAECDPRAVFERVWERGARGFAEVDG VISENVPSGKNVRNKMDSEKFQFREMSFEDFN
R $\frac{1}{}$ YKAVPVGFAHNTKETAWPEGDDLPRSDQMQE $\square F S R$
$A$
QGED
N $\square$ N S T $\square$ S F G $V G R N N P T P V D H E L F D D A S W K \square F D T \square E P$
VIRENDPSGFQVRSKPH H LSEGFD

AAH YIPSGMN IWWEEAQEDFDLDELR
D $\square$ GRTDS F GVGQKNNFKVDHP $\frac{\square}{V} F E S D \square W D H A \square G A K E$
F IHKNI PCGFEDRSAAHKY $\square$ A

## A CHYIPSGMN <br> VWE GRMERFDLT QLKCYR

E TFKQ
VI RQLVPSGMNDREAAHPYADDLS LEEVRAP
VI REKI PSGFSI RKEPHHMAEEF
 E I E A T I PVGFEQNK
EVCSWIPSGMN
EAAHFIPSGMN VWEGRQERFDLTELACYR VIR DNVPVGGAVRKTCHK RI REAIPTGMEI CAKNSLNEKELLFRFLDSQYRKARSSAPD
 ATPA HLTPQKDASKLLKGRDDEPWEGDAKRWLSUYG VRLI GF GVGRPNPDPVDHPVES INKAEFR
T I R N VVPMGFD $\square$ NS ES $\square$ TES
EKQSFFDKAN $\square$ N $\square$ S FH
VIRKYVPNGRNVH
ETEDNFSE\|I DNQ QY
I I NQYVPSGKDVHEGKKYNFTKL
QVNRDIPMGTGRYNKQNDRIVYLVDEM
1 IHKYTPSGMNVHEGRVVRFPELQN
LK C Y R

 FI KNK IP H GFK $\square$ NNKAVV

DDPWDGDVAVWLARYG
QVNNRD $\quad$ LPMGAGRYNKQNDRVY LVDEME DEGLKKLKDATSYQ VDLGKEEIDLARFDEAAHYVPSGRN
ERF $V T K \square N H D R A D E D \square P T E$
$\square A$ Q Q $\square$ T H F GPG GRQ
MDEAAHF $\square$ PSGKS

GDVSAWLSERGVH K $\quad$ ACHY $\square P S G R N$ VWEGRMERFDLTQLRCYR K
$F \square L H H \square P S G \quad R N Y R D N R Y A P L P Q K Y M D A Y R E S K D$
 ETWSTLSFGVGRKN AERVEHPLFERDAHPG VIRDKVPSGFSDRKNDHHKAETF
AAHSITHFGPGGRDRNTQFRFPM
DVART】SFGMGRANKEKDDDPLFESDLWKAAGVTDLR
AAHACTHFGPGGRPRGKQ
IIRTR 1 PSGSQSH
HI NENIPSG PKLQDKTQKFDFSNLI
$K I K N \square I P M G R G V H K E G Q \quad N G L L N T E E L S E L \square K N F T \square N Y N K$ LI RNRIPSG
VI R DNVPVGF G LDRKDVHAYADR $\square$
AAHEITHFGGGGRSR
E!ANTISFGLGRANQ ADDAPVDDPLFDDPTWDL

FIHSNVPSGM\VREDRFGFRPLVG
$S G S K \square A K Q L G N M D G V L P D N L L Q D A A N A D G G G A$ AAFEAD DDGVDDEALL RAVWERGAEALAEYARTEDLDAFA

VRERY PYPTTNRRDLSYRDVIAAATEGAGFAVERNGV
UniRef90-B8IA67
UniRef90_U2KDU0
UniRef90-D4M1S2
UniRef90-B8FHF7
UniRef90_A1ZPN4
UniRef90_UPI0004041A8E
UniRef90 F7KLE4
UniRef90_UPI000376D2B0
UniRef90_A3IXW8
UniRef90-E2NPE7
UniRef90-R6EAT4
UniRef90_R9JRD5
UniRef90-R5ID05
UniRef90 F5J2D3
UniRef90-UPI00036A1AC8
UniRef90-G4TEM4
UniRef90 W5XIL2
UniRef90-I9QCU6
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UniRef90_R9KXU9
UniRef90 UPI00037E0E8F
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UniRef90-JOMWY3
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UniRef90_UPI0003B79FEB
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UniRef90-R7DNS9
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UniRef90-K0AWH9
UniRef90_R6Q9J7
UniRef90-F1T809
UniRef90-FOR728
UniRef90 A0A059EJ00
UniRef90_G8NVW3
UniRef90_R5KTS6
UniRef90-A6ELD8
UniRef90_A0A017HPA4
UniRef90-F2IGF8
UniRef90_UPIO0046F06E5
UniRef90_U2T0Y7
UniRef90-R5LC27
UniRef90_K8ENX1
UniRef90_E6LRJ4
UniRef90 G2Z4T6
UniRef90-I4EL00
UniRef90-R2PHJ1
UniRef90-B3JPB2
UniRef90_H1SAT0
UniRef90-UPI0003825C4E
UniRef90-A6FXH5
UniRef90 UPI00047CD76F
UniRef90_UPIO003749F84
UniRef90_UPI00036A38AF
$\mathrm{N} \square \mathrm{D}$
 ILPNHPFQTALGT CRRHI HMEKA LLSSLGTLGGG

## RLED\K




QLKD SKRLE
DEDD L S E
$\square R C A K H V N L D R A Y K S L V G T L G G G$
WDGDYSLMLERAGVEPTQFD KINLEREYFSCGSLGGG
A WKDEPVRDDKQMAYESGGGRGO SRDARQRLHAGGQLPPAHLDWLREPHHLTHDAQLGSVGGG NYD DRKADRAAGSLGGG KEEFPESADFKAGH $\backslash \mathrm{L} N \mathrm{NDRSRFSLGT} \mathrm{C}$ GGG
 APEALARLAANGQ $E N R D Q L S K G T L G G G$
$N G L K Q L G S L G G G$
VPRWLREFDVEPTEHDA
WVTRLNS $\square$ RELGD $\square$ PCD $\square$ P $\begin{array}{rl}N G L K Q L & G S \\ A C L & G \\ G & G G \\ G & G G\end{array}$

WVTKLNN $\square R E L$ LT A


CREDLRHPVY

SSLGTVGSG
TRLEELYCKE
$\begin{array}{lllll}M K G K A R A Q Q & G T V G S G \\ S M P R A E C S \\ M & G & G G G\end{array}$
S LK D A K R ${ }_{\mathrm{L}}^{\mathrm{R}} \mathrm{E}$
WSKKLNGLDDPWDGDTLEWLAEFGVEADEPDPGLGTIGGG HADFEPLRELAKM FK $\square$ DRA $\quad$ R S SVGTLGS SYE GLHCLGHINRERADRSLGTLGGG WEKRSGETKRVDKTY $\square A N L C R K I G I K E D T F Y Y S V G T L G G G$ WRNFK S L KK L $\operatorname{SRLD}$

## ELKDTKRLE

AVEEA
LINEAPRDDAARFVSDFCRKDKDQEAMAERSIGGTLGGG


## IKGDEE

KELLGKAAKQLGS GGG
PORKMDEFDSSLGTVGGG
 A MFPE VDESY ADRLRDVAKPGDCDLASELDATRGLATSDFDAALGT GGG CEDRLKKNVDWL K K K K W

KRSCGTLGGG

s LK NTKR E

DY पDE $\square$ SKVRC $\square D K M P K K \square E E F N R$
DYLDE』SKVRC【DKMPKK\|EEFNRA LGSLGGG TAR ASEFDRTALGTVGAG
LWDGRQEKFDLLGLCCYRALK $\frac{L}{D}$
 PRRAA PERQFALPAEDEAEFRANPFLNSLRSGNSAREHLGTQGDG WVTRLSNDRQLTRLRCFRDLKDNYEEESPGRSGGGGGG KESEFD ESLYCFPQL SNDGNLKKSLGS L G G G $S \square R D A K R \square E$ $D G \square N G \square E N \square S \square E D F D E K T H \square P F K E K L G T i G G G$
$R D P S E F E D V S K S P L G T S L G T M G G G$ LI K Q L R S Y RELLKETKRLNLS

 FALPAELIA QFESNPFDKSVRMLSLAQEHL GTQGDG DK SLHEFELGMDHAPDHKGW ALRSLGTLGGG MQKPKEKIESYS RALGTLGGG
 QSNHDTAMHQFDFTKLHAPVHEGWAMRSIATVGGG DLSNLKCFSHI RSEKALLSLGTLGGG EDQFRFPAELLEQFESNALLNDQRMMSVARSHLGTQGDG
 $\square Q H \square P \square D F D S \square$ RAEAEPA W $\square$ PASRRFADGELPEA $\square R \square D A R G R C F L$ DPAELERVEESGR\DLAPWAEVPALTWQLARLRFATVGGG LP LD A S P T


UniRef90 D3E3Q0

## UniRef90_V5CD60

 UniRefoto-HBBV18 8 UniRef90-R9K8H1 UniRef90-R7J2M7 UniRef90-R7ELK1 UniRef90-10X6S5 UniRef90-UPIO00478E585 UniRef90-F7NMP9 UniRef90_E7NPZ4 UniRef90-SOEXL2 UniRef90-UPI0003B31DE5 UniRef90_D1AHK3 UniRef90-W3A100 UniRef90-J4UIGO UniRef90-A6P237 UniRef90-A9GY31 UniRef90-SOKLMO UniRef90-C7LRZ7 UniRef90-G5HM33 UniRef90-W4C853 UniRef90-F7NNA3 UniRef90-R5T7W1 UniRef90-G9RNF8 UniRef90-N1UFK8 UniRef90-UPI000402B380 UniRef90-UPI0001A44BAA UniRef90-B81A67 UniRef90-U2KDU0 UniRef90-D4M1S2 UniRef90-B8FHF7 UniRef90-A1ZPN4 UniRee90-UPI0004041A8E UniRef90 F7KLE4 UniRef90-UPIOOO376D2B0 UniRef90-A31XW8 UniRef90-E2NPE7 UniRef90-R6EAT4 UniRef90-R9JRD5 UniRef90-R5IDO5 UniRef90-F5J2D3 UniRef90-UPIO0036A1AC8 UniRef90-G4TEM4 UniRef90 ${ }^{-}$W5XIL2 UniRef90_19QCU6UniRef90 M4ZLK UniRef90-R9KXU9

 QAVLAQHIDNDYEDMRNFRAVTPKYGHHGLLEGSEEARLY












































































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#### Abstract

A D H Y Q N L A A


#### Abstract

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| －D3E3Q0 |  |
| UniRei90－H7BV18 |  |
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| iRef90－R9K8H1 | DMQVLQEFASLNRGI L D EL |
| UniRef90－R7J2M7 | IIAQAYALYNHQIIRDR！FAlpkKLCKAK C |
| UniRef90－R71 |  |
| UniRef90－10x6S5 |  |
| UniRef90－F7NMP9 | MHDMKIMQRFAVLNRKAMVDTILVGMR KTDLA |
| UniRef90－E7NPZ4 | LHDMTITQSFASENRKIIGElILEKM NGEA |
| UniRef90 A9SFZ7 | LQAHDNACKWAKDNRRLATRLVDQLNGEC TRFLLDLTH |
|  | LQCMHLAGRYAY |
| UniRet90－UP10003B3 | MDALNAAANFAAVNRLCLAGMAAQALSEHLP GTST |
| UniRef90 D1AHK3 | LEAMKMVQKYAELNRKIMSGR AEFLG |
| UniRef90－J4UIG0 | L N D |
| UniRef90－A6P237 | D |
| A9G | EDAGACRFA |
|  | D MELAQCFA |
| niRef90－C7LRZ7 | FALANRREMMRRLDVIDSVV |
| IRet90－S4 |  |
|  | WA M M Ald |
| UniRef90－F7NNA3 | EHDQAILWAERNREYVVVKLLDYLGYTPQAKKLID |
| UniRee90 ${ }^{\text {R R5T74 }}$ | DLQTVQNFAALNRKIIVAE |
|  | DMR\｜VQRFAVLNRKAMMDVILSGM GFTK |
| UniRef90－N1U | DMEWCQAFALDNRQDMLIT QVA |
| $\begin{aligned} & \text { UniR } \\ & \text { UniR } \end{aligned}$ | LHEDIEVCOAFA |
| UniRef90－B81A67 | A |
| UniRef90－U2KDU0 | D |
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|  |  |
| hiRef90－UPIO004041A8E | M H DVR |
| 7KLE4 | MEDV |
| N8 | LVDMVIAQTYAQFNHQAMAKA |
| 2N | LHD CTCQKYAMRNREL |
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| UniRef90－R9 | LHDLEIVQEFARLNREAMVDE |
| UniRet90－F5J2I | LVDMVIAQTYAEFNHRAMAHSI FVGLKRVV |
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| UniRef90 W5 <br>  |  |
| UniRef90－M4ZLK3 | LAAHDHALRWASLNRRII ARRAATALR CEA |
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| UniRef90－UPIOOO37 | MI |
| 47A | WRQHQQALRFAEFNRQC ${ }^{\text {a }}$ ARMLQRWHA |
|  | NTCQEYAVLNRNTMAD |
|  |  |



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LHDLKIVEEYA乌LNRKITAAE！MKMKWK DNFV



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A WVHRKGAAPARGSD
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DAMVLRKGSVSA G A

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##  <br> DPVCECSHNCV <br> HNYПNFKDNII

NLWTNKNHNHClTK
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FEAFSTTHNYINF
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TERFDTIHNYIDMDN
VSAFDCVHNYIDDDN
LNKFESI HNYIGEVEKGF
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E VVTVIDCYHNFLEETS
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$\square E \operatorname{VFDCPNY} \mathrm{D}$ DDEN
WESVHNYI DFEDMTV
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ЏEETSCSHNYVDF SNGOPLLKGATSA
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$R L L S D S P H N L I$ E GMKGAFDHRKGAAKADDP


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UniRef90-R7ELK1 UniRef90-10X6S5 UniRef90_UPIO00478E585 UniRef90-F7NMP9 UniRef90-E7NPZ4 UniRef90_A9SFZ7 UniRef90-S0EXL2 UniRef90_UPI0003B31DE5 UniRef90-D1AHK3 UniRef90_W3AI00 UniRef90-J4UIG0 UniRef90_A9GY31 UniRef90_SOKLM0 UniRef90_C7LRZ7 UniRef90-G5HM33 UniRef90-W4C853 UniRef90-F7NNA3 UniRef90-R5T7W1 UniRef90-G9RNF8 UniRef90-N1UFK8 UniRef90_UPIO00402B380 UniRef90 UPI0001A44BAA UniRef90-B8IA67 UniRef90_U2KDU0 UniRef90-D4M1S2 UniRef90-B8FHF7 UniRef90-A1ZPN4 UniRef90_UPI0004041A8E UniRef90 F7KLE4 UniRef90_UPIO00376D2B0 UniRef90-A3IXW8 UniRef90-E2NPE7 UniRef90-R6EAT4 UniRef90-R9JRD5 UniRef90-R5ID05 UniRef90-F5J2D3 UniRef90-UPI00036A1AC8 UniRef90-G4TEM4 UniRef90-W5XIL2 UniRef90_19QCU6
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410
APHGAGRLMSRREAKDKIS 420 430
${ }^{430}$ K Gll F T N S V V
440
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 A P H GA GRVVLSRMQAKAMIDMKDF DDSMKGワYSSS\|CKH
A P H GA GRII L S R SKAK A QI S LD S Y QK TMRHI WS TSVVSKH
A P H G S GRVVLSR GEVNS SHTVS E FKKEMK GIVYTSCISS K
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K


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| UniRef90-R6EAT4 |  |
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| UniRef90-W5XIL2 | G A |
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| UniRef90-R9KXU9 | S E |
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| UniRef90-UPI0003B79FEB |  |
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| UniRef90_K0AWH9 |  |
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| UniRef90-F1T809 |  |
| UniRef90-F0R728 | A E |
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| UniRef90-G8NVW3 | G A |
| UniRef90-R5KTS6 |  |
| UniRef90-A6ELD8 | G |
| UniRef90-A0A017HPA4 | G |
| UniRef90-F2IGF8 | G |
| UniRef90-UPI00046F06E5 |  |
| UniRef90-U2T0Y7 |  |
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| UniRef90-K8ENX1 |  |
| UniRef90-E6LRJ4 | G |
| UniRef90-G2Z4T6 |  |
| UniRef90-14EL00 | S D S |
| UniRef90-R2PHJ1 |  |
| UniRef90-B3JPB2 |  |
| UniRef90-H1SAT0 | S |
| UniRef90-UPI0003825C4E | G E |
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A G
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[^3]

UniRef90_D5GM04
UniRef90_U2HUD4 UniRef90-UPI0003B529F5 UniRef90 ${ }^{-}$C3WDX5 UniRef90_UPI00036BAFA2 UniRef90_F0RGT7 UniRef90_UPI00047D01E6 UniRef90_UPI0003627D56 UniRef90_D1AHK5 UniRef90_H1DIC6 UniRef90_G8TKV1 UniRef90-W4T2H1 UniRef90-H7BVQ6 UniRef90 UPI00047D27C5 UniRef90_UPI000471E827 UniRef90_UPI0002DC58B9 UniRef90_UPI00036D907D UniRef90_E4TDM0 UniRef90_C9CUI6 UniRef90_R9MMN4 UniRef90 R8QEE0 UniRef90_I4AGD2 UniRef90_E2CFS4 UniRef90_B0MS53 UniRef90_B2VT71 UniRef90_R9ZZC9 UniRef90_G9ZEX8 UniRef90_UPI000174475C UniRef90_R6QZF6 UniRef90-X7YNX4 UniRef90_R5GF46 UniRef90 R0DVY5 UniRef90_A4X6J3 UniRef90_M5FZV3 UniRef90 F4L0E4 UniRef90-UPI00036B49C4 UniRef90-T0Q2R4 UniRef90_C7NMA0 UniRef90 UPI00040F682A UniRef90-UPI000380FF53 UniRef90_H0TLD5 UniRef90_R5LBK1 UniRef90 E7QV75 UniRef90_UPI00037B7D01 UniRef90_C7P1X1 UniRef90 K2GAV7 UniRef90_C2NJ85 UniRef90_GOLKS4 UniRef90_UPI00034D1728 UniRef90_G8PVI8 UniRef90_M1XN13 UniRef90_Q0UMZ4 UniRef90 A4EPS4 UniRef90-UPI000375AAD1 UniRef90_R4L5M4 UniRef90_A0A037ZM41 UniRef90 G0UXP8 UniRef90_UPI00037CB81B UniRef90_W0N773 UniRef90_UPI000248EC58 UniRef90- V9VI12 UniRef90-X6MG76 UniRef90_W5Y7X3 UniRef90_T0MGM8 UniRef90_A6MAH4 UniRef90_E8LIE0 UniRef90_G8TA17

$Y A L S Q \square Q L I A D N E A S K G S N D C M P D V H P G K V G P D G L T M T I$ EAIN QI E EI NKIFNDNN IVIMPDYHAGKGCVVGTTMLI
 S SVVTDTMNELMKTPTLDTGAIMPDACPTGPIGTIPVGGVA $R A V E Q L Q R C A T A G G A V A G V L C A D G H V G Y S Q P \square G G A D A B$


 $K \bigvee 1 / N T M N I L M K T P T L I D N G A I M P D A C P T G P A G Q I P V G G V V$ QAQA Q DDLLA QKP FEDCKVVRIMMPDVMA GAGCDVIGFTANNLD GALLSQARTCAAEN G NVIDAALLMMADHHK GYSQP IGGVVMVYD



 DAV K H H M T ELDMRT P T E A G A V M P DVVCPA G P L G T I P V G GVV CAVS QIEEDCNHPAFENRDRIMPDCHAGKGCVIGFTCVT

SVT QLTTTAHTLPGVVHAVGQPDLHPGTKFPIGAVFA $D L V K M S M D S L M K T P T I V D D G D M P D A C P T G K L G Q \square P V G S V V$
 K SVVRRFMTE LLDQTPVVTRGAVMPDACPGSVPATDPVGAGV $N T V E Q A N L A A S M P F V H P H V S V M P D A B L G K G S A V G T V I$ GALD QLRGLMA DPAFAGRVRVMPDVHAGAGCVIGFTGDLG RA EE QLE QVAGWP GM K AVAGFPDLHPGRYGPVGAAA L L D AVD QCRQVAALDGMV HVAGMPDLHPGKGAPI GAAM QAVK QLQQVA ALD G V R VAVVGMPDLHPGSRFPIGCADIAD SVLSTMNDLMKTPTLVGGAVMPDACP TGDGQIPVGGVA A A V K RTMAALMRTPMVRAGAVMPDACPA GVEGAIDVGGVV E T L K Q I E A I A A H A SVVAHAR IMPDA HKGN GC CVGFTCHLLT $N C L D Q V R T L \bar{L} D H P A F T E P \square R M M P D A H V G A G A P I G F T M$
$R Q L T Q T L A R P G \quad V Q A V A A F P D L H P G D H G P V G A A I L S D$


GCLLNQTQELIDHPAFTEPVR\MPDTHWGAGAPTGFTM
ARS QI TA L CNNEAFWERIVRVMPDVHAGKVCPI GFTATM


$N C \square E Q \square Q Q L I D H P A F T E P \square R \square M P D T H V G S G A P \square G F T M$ A AV $\square$ A HMDALMRVPT VVKGAVMPDACPGFAEGT PVGGAV
$N V L D Q L E D L V D H P A F T E P D R M M P D A H V G A G A P V G F T M$ $A V T Q L S T H A H T L P G \square V H A V G Q P D L H P G S K F P I G A D I A$ $R A E Q Q L E E \square A G W T G G V K \square A A F P D L H P G K Y G P V G C A V L A D$
 $D K V T A T M D V L M R T P T L R K G A V M P D A C P A G P E G T I P V G G V V$ M H D V I R H S VA V M P D V H T S H G A T VGTV
A A $\square D Q \square D E M S R \square P G \quad V L E \square A A F P D L H P G Y G A T \quad G V A L L$



[^4]lupas_21
lupas_14
lupas_28
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sol0
jhmm
jpssm



UniRef90 G8TA17

VS ERF $\downarrow$ YPS S ${ }^{90} V$ VGS D $\downarrow G C G M T{ }^{100}$
110

 TDKVCPNHVGVDI GCGDAGYK DK YFKFD VSEAI HPGMHSADI CCSMAISVFPGVAPKFDKLKELDD VAKNAIHPGMHSADICCSVMLDTDFGKVSPKDVLD PDHVSPSGVGYDI GCGNKAVRTDLRTDDVRADVPRTMD VSEAI HPGMHSADICCSMALSVYPGDAP



 ASEAI HPGMHSADI | $G Q$ | $S$ | $P$ | $S$ | $G V G Y$ |
| :---: | :--- | :--- | :--- | :--- |
| $R N A$ | $D$ |  |  |  |
| $H$ | $P$ | $G M$ | $H$ | $A$ |



 G C GI T NF GY DEPKMVLDK



RAHPALDGGDVGCGMAMFR LDDPARRDK DDKAAAAL ACEDADHPGFHSSDICCSVA $1 \mathrm{~T} V \mathrm{~F}$ T K K D D P K RVLD $P \square P D R V V P N V V G D D G C G M C A T N D G D D \square P D A H A K R E R R V R$

$P \square P D R V V P N \square V G V D V G C G M V A T K \square G S T \ P D S G S E R E Q R V R$ ACADAMHPGFHSADICCSVA ILSDRVHPHMIGNDI GCGMTVFRTSLSAHKDKP QKLAD PLGDRIVPNDVGVDVGCGMAAFE $\square G D E D P L S D A D R E A$ SKGWVHPPLI GGDI GCGMAWFKTTDPRSQVDGDKGKKVA $R V Y P Q L I G N D I G C G M S L F Q L D L P V R K L K$
$S T \square \quad \square Y P H L \square G S D \square G C G \square A V F P V Q \square R K A$
AAENAI HPGMHSADI CCSVMV TEFADSDPKTVLDAVHK PTTCVIVPASVGVDVGCGVIAARTSLKQEDLPASLASLRL

NPLEKFPFELVGNDTGCGVTSLVFETARPFTDDELVSLYS VSQG IIYPYLVGNDI GCGMSLI Q $\square P$ LDANVSEQKI TRLAS AARNAIHPGIHSADICCSVMM TDLGAVEPKKVLDA

$D \square G K R V I P N \square V G V D \square G C G \square L V Q P F T C \square K S \quad M N F H E L N E$

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130
140
Q T MR 150
150160 QT GMRRVAESLRGLETA
 K F $\square P K G Y E$ II RKNIPS GLSINKRKS
AVHADTHFGPGGRPRGQ

A TYESVSFGMGRKNDEPVDHPVLDA DRHADFR
AVHAVTHFGPGGRPRGQ
TI KNNDPSGDNRNKNSLRYEKYVSQDFDKK LIKKLCD
LI RKVVPMGCDDHKDSHFDHWWVEDYDASATQNVNHFQSE KAHAVTHFGGG G
AAHAVTHFGYGGRPRG
VI RKYIPSGMAVHQNAG YFT AVHAVTHFGPGGRARGSQDRPP

AQSVTHFGPGGRPQGKRFTTSLKLLDAFR
AAHS ITHFGGGGRDRH
AAQSVTHFGPGGRRNGARFTTSLK
VI RENVAGSLTRKKPH

K A H S LT HF G G G GRKDL
AAHAMTHFRAG

$E K L R \quad G L E G V W R T Q A Y R Q L W L L$
1 AFETTQFGPGGRRGLGGWSS LLD G

PENYVPHAVN
FI YENTPS GRNDSNDIS DFN $\square$
$L V E D A B P P S P G N Y N K K$
 A V

LDRPLDPDRDADDPAWSVLDGEV $H R L V G L D E P W E G D V R E W L R G Y A$
MAHSVTHFGGG

## PRDQLQPGWG

$A M Q A V T H F G P G G R A$
$V I Q E V V M G N G H D R V H T P V I D P A Q Y A P F F A Q A Q V Q D A F G$ EMGRAVHDYDDAPHLVEEFPFEGANDVFERFDAAYRERFG
$R G L S E S W R G N P$
AVHAVTHFGPGGRDKLLSPPDEVMAA
VDEAAHF $\square$ PSGGN
DMGREVHDYDDAPHLVNEFPFERANEVFERFDAAYRERFG VIRECVPSGFAARTRPSVFA
EMGQTVHDYDDAVHLVEEFPFERANEVFEAFAASFEERFG $E \square K K T I P T G G L S G E V I S K N L A N E \square F A S G T S A D T K R F E L R T$
$D V I P M G Y D V H N D A D A D H L D D E F P F E S V F R R F E Q A Y K D E F G$
$A V Q A V T H F G P G G R N G V I$
$R$ R L A VRNAVPMGRSVHAYDDAPHVNRLQDYTDPAEGQAHLL

$L E G P W R T Q A H R E A$
$L$
$L K A D R R M R V L G E P$
VPERLARRFPD LDTEPAADDPAWA I IDDRAEL
ATH FGPGGRPNGQRYTVSPALYDAFR
A $\square \mathrm{E} \square \mathrm{SVPHGRTHSGRSGLDAGSWRNKVSKH} \mathrm{\square AA} \mathrm{\square}$

E TE K E TK T NVN D K N $\square$ A
QLKH DDGPFKNYCADSHGSTAHDEHFDQQLLAKPDKQWPV QLASAMTHFGPGGRREGSRFAVEEDLLEAFR

F 1 L G N $\square \mathrm{PS}$ GRDFRGKN
Y N V IP D K F MD $\square$ Y R N GKE

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UniRef90-U2HUD4 UniRef90-UPI0003B529F5 UniRef90-C3WDX5 UniRef90_UPI00036BAFA2 UniRef90-FORGT7 UniRef90 UPI00047D01E6 UniRef90_UPI0003627D56 UniRef90-D1AHK5 UniRef90-H1DIC6 UniRef90-G8TKV1 UniRef90-W4T2H1
UniRef90-H7BVQ6 UniRef90-H7BVQ6
UniRef90 UPI00047D27C5 UniRef90_UPI000471E827 UniRef90_UPI0002DC58B9 UniRef90_UPI00036D907D UniRef90-E4TDM0 UniRef90_C9CUI6 UniRef90-R9MMN4 UniRef90_R8QEEO UniRef90-I4AGD2 UniRef90-E2CFS4 UniRef90-B2VT71 UniRef90-R9ZZC9 UniRef90-G9ZEX8 UniRef90-UPI000174475C UniRef90-R6QZF6 UniRef90-X7YNX4 UniRef90-R5GF46 UniRef90 RODVY5 UniRef90-A4X6J3 UniRef90-M5FZV3 UniRef90_F4L0E4 UniRef90-UPI00036B49C4 UniRef90-T0Q2R4 UniRef90_C7NMA0 UniRef90 UPI00040F682A UniRef90-UPI000380FF53 UniRef90-HOTLD5 UniRef90_R5LBK1 UniRef90 E7QV75
UniRef90-UPI00037B7D01 UniRef90-C7P1X1 UniRef90 K2GAV7 UniRef90_C2NJ85 UniRef90-GOLKS4 UniRef90_UPI00034D1728 UniRef90 G8PVI8 UniRef90-M1XN13 UniRef90-Q0UMZ4 UniRef90 A4EPS4 UniRef90-UPI000375AAD1 UniRef90_R4L5M4 UniRef90_A0A037ZM4 UniRef90 G0UXP8 UniRef90_UPI00037CB81B UniRef90-W0N773 UniRef90 UPIO00248EC58 UniRef90- V9VI12 UniRef90-X6MG76 UniRef90-W5Y7X3 UniRef90_T0MGM8 UniRef90_A6MAH4 UniRef90-E8LIEO UniRef90_G8TA17

WRS P QERTA W ${ }^{170}$ Li $\operatorname{NCAAGDE} 180$
WRSPQERTAWLGNCAAGDE WDRSVIGTUGGG Y LK HERVDHSVLDSSVFESNAFVRALKDKAWTQLGSSGGG RKDKALLSLGTLGGG

PQRSMVQKAANQLGTVGAG
Q $\square$ RPSDAVMARFDANPFLRNVASKADEQFGTQGDG
 RPEFSELPKDLEERIIANKFFKDQASLNLAKSHLGTQGDG EQMPMSQELMDAFRANDFLHDEKLISIARSHMGTQGDG LLD DLYYCRDRLRNVEWL

ADLMTAFDAHPMLNDLTSVA DEHFATQGDG K Q E HDKLKSLAREQLGTVGSG ANPFLDNPKSLRMAQEHMGTQGDG AEFPDPKDLRERMAANAFLNDNKARSMASSHLGTQGDG EEFSDLPQELKLKMKNNPFLNDEKSFSLATSHLGTQGDG ENRFLNHPK ILRM LRCYGSTNERKAQEHMGTQGDGGSGTLGGG LTR $\quad$ LRCYGS DNERKAGLSLGTGGGG L PR D LDE DK I K GNYY LNSERSLNF ARTHLGTQGDG NGKRFTMSMSLYEAFRENRYLNNPKILRAAQEHLGTQGDG $\square A K V N G \square C D A \backsim G E S A D V D Y H L$
ES LLTSRDEENY
DDWLPHIAVTG V HENVWQ

EKLKCFSK L KN IDD Y L
EQLRDCSAGEQWDVALGTIGAG FTKDYDEKARMHMGTQGDG NP LQGR KRSGS
TAKKHDELLELQADLDVDLSHSP YRELLRDV
R D H A L A E L H A A G $\square$ T G L I E P D A PAGHLD
VAGHLD GLGTVGRG VDRETEFD REEYS ILPKEFEEKDSENRFLNSERS LS $\square$ ARTHLATQGDG LLSRFAENPFLKDLGSA AKFQLDLTPYMPTYNDAY LRAADCARTRSDYDYDLGTLGGG $R P \square D L E F D F E G Y D G A Y F K A L C R R V L A G S R Q \square R G A G T L G G G$

WELLEAEGLHPETFPAA ATI GGG VWEGRDERFDDTK KKCYRANPFLKGLERFAVGHFATQGDG RADDPISFDFDGYGESYFKSLCERVLSGQRQGMAGTLGGG


QHDFDGYDSEYFKS $\square C Q R V L A N Q R Q G M G H V I R S A G T L G G G$ GNRFLAAFAGL AVGHFASQGDG RSADLPD DDAVTADGTIGGG HAARFGER DDPGFDFDGYDSTYFNSLCGRVI KSAGTL GGG W G MHEEDGSCSTG GDSPEEWD DALGTIGAG VSEDLERRLEKA GLSPDLFADALGTVGGG $\begin{array}{rl}G A D S L G T V & G R G \\ T R G F G T V R G\end{array}$
A GE
DNAFDKDKK LLQAAMEHLGTQGDG WRAQLQDGFEEDCGMQRHपE SSNHMEHLGTLDSG $A Q N H L G T Q G D G$
$A P D A L G T D G G G$
AER $\square R R \square E T Q A \square G E A R E W L A E T G \square P A D L A P D A L G T D G G G$ NHFLKDKQMDQGARAHLGTQGDG
YDF $\square R D \square G S D F E \prod P V S L N C G E I P E Y E W R T F G T \ G G G$ GSPDCPPCD

INAAKQ SDNNLKFSESNGK FNGNVKLDSQKSKARGLNQLGTDGTG $L I K S M R C Y R Q L D D P K R D N D S$


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 NHFVEFGVMEFADDPADGVEKGKY GLALLTHSGSRGLG NHFI E IDVDEN NHFiVVGENEECY
NHFAFVGT ${ }^{\text {NHK }}$
NHFLFVGTSKK
NHYVDLFAGD NHFCELQAVEDV AEGGHVAGLD $D Q G L Y L L V H S G S R A D G$
$T R N T M M V T H H G S R G P G$ NHFIELGE $\square$ S DNTYMLSIHSGSRGLG NHFAELGCVERDENVEDGLEDGLDKDSCYGMIHSGSRGGLG NHFLFVGRSR

 $\qquad$
G
N

 TGETALVVVHSGSRNLG TGNTMMI THHGSRGLG D GF LDVGVHF GSRGFG



[^6]


[^7]


[^8]


KHI LETFT 250
260
270
KDDKSV AYGDPKTAEY
ATIAGHYTKLAKQLCK $\quad \square P Y Q A E N L A Y L D L N D P K T A E Y$ KEVAEYYSKLGYQHLRKMGRD DVPIELSFLTGDNLSDY VQVANYHQNI REKMI EEYKKENPHI LNPSCYLEGVYLEDY
 ANLYSKGMKVAERFGRKELSPETLKQNAWIPYNTEEGEEY ARLYSAGMKLAERY RRDLSPETDKENAWIPADTRDGDDY
 ANLYTQGMKVAEMF RKDLSPNTLPKNAWIPYDTNEGKAY A ALYDKGMK A ANRFRMDISSETLKENAWIPYDTDEGKAY K QVA E $\square Y Q D \square A V K T D H S A K G E K S T D P R D L C Y V E G E D R E R Y$ AKLYSKGMKA AGGKMRESLSPETLPQNAWIPADTTEGEAYY $H K T A S G F L N A G R E F L G K A P G E H M D Q P P V L L D M N S E L G D M Y$
$A V L Y K N G M A V A E R F R K E L S P E T A K Q N A W I P A D T Q E G R D Y$ A Y Y YKGMKVAEAF RRELSPRTDPKNAWI PYTEPEGKQY

 ANFYTTGMKLAETF RKEISPKTLAKNAWIPPYDTEGKQY
 GSVLKKYTTETRT SSVVKKGMHTAERF RKQLSPKTDPMNAWDPF E EKEGELYY GAI LRA H DEQHGHAPDAAASPDAAAYDAAHDAAVAYA AKVYARGQKAALAHVKRHAADDPAPA AWDDYGTQEGRDY K QVAD $\square Y Q K \ A V N Y Q \square N F K \ N L P M D K E L C Y L E N$ DNFNDY NKIA QRHDNI AQQCSGDPLIKVPNRDLAFLNEGTPEFDRY $K Q V A S L Y Q K L A V K C Q S G W R M R P S S V P S D L A W L E G R E R D D Y$ A GI FQG
ERILREHT
LDD SWKHGFVADSEAATHY
SSI LLASQLRGAGPAGDPPDSSAGAAY ANLYTQGMKMAEYF RKEASPKTSEKNAWIPYDTAALSAY ARLYARGVEAAER HRDRLSPETLPVNAWIPPDTEEGEAY QK IJARYHYEQAQPRSHSDDDDITGVQPHSGADAGAAAAAY VTGGKGKSHVRKDA $\square R R P Q E A L E D R N E D L D W L E G Q E A H G Y$ GQILREH
$P M L L G A L T P A E Q E A L D L A T E A G A D Y$ A QVYKRGMAAARKHTADHAPKVPD HNAWIRASNDDGRAY K QVADYYQQVLKELEKTRYENEPQNPEDLCYLYGKYMEDY

 RYTAS LYTPRKDKSFLQRTI RKTNDALFAYDGESEAGKMF KQ $\square A E Y Y Q N F K E \square Q E T L R G I Q K P K \square R K E L A Y L E G Q G F K D Y$ VTGGMGESHLRKESDRRPHSEDDDQSNDLDWLDGREAHGY ASIFADY AEVGSEGLAAEDERTAAAY QGRASDYRSADR DREA DPDSDYEF LDKFDPEAVGDREDHA W GSVLKKHTTDA NAV ERILRRHTEVH
$\square G S V S E G A$
HVSFQEDSPEAIEY
ERILRSHTE K GAGPAPDPVSY A GLYKLGMKCAEKWRKKLSTGVLK QNAWGAAPAADPQAY NRIGMIFDELAKRDMGKHITRLPNADLAYLQEGTEHFDQY ASLYKQGMA MADYFRREISPNTLSKNAWI PYDTEEGKAY ATVFSQSLAAHSGLA ARLYTKGMKIAERFRKDLSPETLKENAWIPFNTQEGQTY AFIYKKYKEIAEKGSQHRIESKRKE\|DNFFPHDYFDGSGY
 A QLYKEGMEVAERY RQQLSPTTLRQNAWIPADSTDGRAY FNVCQEILESFRYEVDTNC
A EVYKKYSKKHLDSMDQAADT NANFKVIKNDMTDKMWDYY KQVAQ

[^9]

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 L L VE EAPGAYKSAKSVAEDLERTAAAHCDAEFHPLLTFK


$\square D \square S E P S A Y K N A R N V K A Q M K A F G L G E V V D E D L P Y G C \square M A$
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