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 $P Q L E G M P L L V L A G G G N N G A D A L V C A R L A L E A G H Q V K V V Y L$ QPTPATRVAVVAGRGNNGGDGWVMARYLMEKQDPVTVVLL $P T T R \quad R W L V L C G H G N N G G D G Y V V A R L A R Q L G I Q V T L V A H$


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 GNKLSDDCRIUKKRLAECSNEVTTRFDPPKISNDCVIVDG AERDKVSGDAGLNGLEKLNADIIRYTNKEIINGSDLI DG TGRLSDDCLNNKKRLENLAGLMFSQFSFPEVDAKDVII DG SDNRSQDFLLNFDRIKNLKYWPQLLTKNDDLPSNDVVVDA GNEAHMSARLYRRTVEKMWVQVIPTDWETPLESADVIVDA HNKLSADCATNKKRLTECKTEITVNFDPPQLTEGTLVVDG SNKLSENCTLNKDRLLDCKKFVTVSFDPPELNAETLVI DG AEEFKGDAALNYRLYQNTGGKLFTIDGEKQLRQADVI: DA GEPADVDAGDNLE WKRLGQRLYLMQDRNAGQQTDLVVDA ANPLQGDAKLNYELFQKMGEKI IPVEDEKQLRQSQVAVDA QEELKGDAALNLRLFQG1KGEKQRRDTRGADAQADVVVDAA NNHLSADCETNRKRIAQCFSEVTQEFEPPKLDADTLVVDG AP SAKDADDNFLLLESAGLDVVRYLHRELVINSSDVIVDA KTQGTAEFEHALSAYLNQGGVIDSP NIGEALQAPVIIDG NGPLPPEAQQARDAWVRTGGEDQGVNTEFAGDDELIIDG GDVKNFHAKQNYEVVSMLPGEVRNDESLESVLKHCDVVVDA LSKASGDLKTQYDULTRLGYEQKKEDDY NNGYDWILEG NHGLSTDCETNKRRLLENNTEDSNFDPPERPANMMVIDG HNHLSEECAKNRDRLVSEGTEITSNFEPPQLTEKTLVVDG PPKEKVKGAAKTALYEWKPYSGNEQMFAAHILQYDVIIDA REKDSEDGRTYFDVCQK LQVDMMEVDKQNRLEAAKVIVDA GDPDRLTGDAASAHADYCSAGGLVEPFCGAPLRADLVIVAA EYTLHDDFRQNLSRLGNHPRRIHSENDLPQLPKQVVCIDA KGSLSADCEINKDRLAENPHEITTQFTPPELTDEHVVIDG GNPDKMSEEALKARQGFLSTGQQAQPFNGDUKDADVLVDA NDRLSADCATNKQRIMDCKTEVLVDFDPPKLTPETVVVDG SDKRSKDFLLNYDRYKELTNKWPEEDDFPVLTHNDFIVDA GDKIKGEAKQARDAWLVAGGKESQQFPQKWDSDA MII DA SDKRSEDFLANYEKLKEITNNWPQEDDFPEDNTGDFVIDA KDNFKGDALINFNTLKKMG\|TENLNLDK SLIDADMVVDA ESKGSEDYISNFNI LHHLSAIPIYQLRFPLIPDACDIVDA AEELSGGALYHKDLYCACGLSLKAGAGVPSPDAPGGYIDA
 PNCSEFKGEAAQAQAEKLNSLNQLNASETDFAEFDLLIDC GKETSMECRQQRQDASNLGVSVVTNDP PKEYTVVIDA CEPAHDKTARMKKASDKMGLEVHWNRLHDALKFADGILDG FELYKGDALINANAFVKMGGNICFSNEEKMIKDADLCIDA DKPLPEEAAQAREAWLNAGGVPHDPDKIKWPAGVDLIVDA STRLDLLAEHALSQFIETPDKDALEAVTE\|LLDHDLFVDA ADPSSVSGDALKAQQKFVAAGGLIVQGAFPDGDYD 1 QDRGQGEALAAWQWAEAVGUELERWQPEQELTG EVVLVDA SDNASHDFRINEAKLKKISEEIRDENADPKISGNQUIIDA GSPAHKSAALNRDVVKMGEVVHVEVATERDWDKVDGVVDG AAPGSVTGDAGANLERLDPGVVTTLPQEHLLKSATVVVDA SDKRSKDFLLNLERLKENKVW/ NKESDLPQUSPNDVVVDA EENASEEMKKQLDARKLGUHICTGLPS GGYDVILDA GESEAVDAEVNLNILQKLDYEVRELQTEDDLEGADLVI DA GSEGTEEYRLQKNUVSNLGIECVEYNGNIDFSEYDYUVDA PEKLKGDAKLNYDILTKYPARUYEIDEEPSFPVYDVVFDA RESLSGDAAQARAMLLAAGCATFPNDPEQALQQATLVIDA EDNLSGDCAQARAMLLAAGCAVFFNTTEQALQTAREVIIDA PDEERDDARYHKNVYKKCGHTYEQYDKDSDIGEADVII DT AEKLSPDNLKNLEIFKNFGFTYQFITEKNNLDQTDLIVDG PEHSPATPSAQRARDEFRQRQGPLEAFVDKLPPADLIVDA NDNRSDDFLINYDRGKETTNDWPEYTDFPEIAQNEFVI DA SKDENYDFKI NFGILEKIIEKNDVLFIISDIKDYDVLIVG SARPTPEYEVALKHVEENNVAYNTGEVYDFKRGKLVYI DA SEKLSEDCQANKLQAAKDFVEVTTQFDPPELTENTLVIVGG AEEVNGDARFHLELLRRYGGEVDADREERDWEKADALVDA SKDENYDFRVNYNGLKKLINIKDFLFDRSDLSSYDVVVDG GNEAHMSSKQYRHVIDKMGAPVDPDSRAPYVHDADILVDA


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UniRef90_R9NEV1

250


280



 $L V V A G A A G Y S G A A V L C A L A A A R A G A G L V T L A V P A S L Q P V V$

 AIVGGSKGKSGAVIMASKAALKMGVGLASAVIPESLNTAF



GI I A GSAGMEGAALLAGQGALHAGAGKVAVVTVPKAAAVI
LLI A GS Y GMS GASVLAATKACLRAGVGKVTTHTPKRNYDIM
L I I A G S Y G M A G A A V L A T R A C L R S G V G K V V V V H T P K R N Y D D


$-<$


$L$ L MA GS Y G K M G A A L L A S R A C L R S G V G L L T I Q C P K T G Y A I L


$\stackrel{F}{V}$
G G DLGYSGAARMAGEA GLRVGAGLVSIATRKEHAGLM




 L L I A GCQ GMA GASILAAARACLHSGIGGLKVHVPFCNNFIV
$L V V G G N Q G M S G A A R I C A E A C A R T G A G L I A D A T Y P E H A N W L$

$V L V G G N K G M P G A I$ RLAA ESALRCGAGLVSVLTHPDNIAAV
$L$ I A G G S Y G K $\square G S V V L$ T A T A A L R S G T GLL CS L Y I P K C GYN I I
$L \vee A G G G S R A Y S$ G A P L L S A R G C L A S G V G GlV Y L A V P E E L



 AV L G G S DLLYR GAP LLLT S L G A L R A GA GVVVMMILPEKVYEQT VLI GGDS GTAGADRMA GEASLRAAGAGLVRVLVTRAENVAPDL
 $L V V A G S K N M S G A A Y F S A L A A Y R T G A G L V K I L T V E E N T T M L$ MI I GGDYGMGGAALMAA EAAARSGAGLVSLATMPE HVAAA
 $L V I$ A G S A GKTGAAA A MA A Q S A L R G G A G L V SLL A



 $L V V A G S V G K T G A P A M T G L A A L D R T G A G L V T V A S A G S A D P N I$

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




 GI FA G S Y GMEGAALL S GQGALYAGGGKVAVVTSAGAHSAL


## QUERY

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R LQECLELSKDVDVVA G





 ANRVPEAMYYPCPSHDGSFSGV $\quad$ GDVSRDD DDA $\square A I G$
 AGKVPELMVSSVGDSDFFTSAMA EEVLQKAEAYDVLAI G

 QIA FPEAMVLTDPHQEVFTTPPD LGAYAAI GVG A GFQPEDMTLGPETGAGTLSRAAREQDEEFLDRASVLALG DLGVDEATVWPAKDYEMLSVNAWSVIQERLQGADACAVG RTVLPEAMI ATDP QTAVPEATVWSAPGEDSL NEEAWPVILRQAE
 APKLTEPLLLPDDSNEGTFSFNALAD $\square$ FEASKRASAVLLGG QTAVPEAMTEDDDNDVRFSCATDTD
 $L T S C P E M M V Q$
$A S K A S E V F V P Q E E T S S G S \square A L L T K A S L E A A L D W A D V I V I G G$
$M$
 QSMLP EVMLFGTYEN TVG VKKALDWCDCILVG

 EQKLTEVIHCGLPDEDGFFSKEAEK IIGAMLDRYDVIAV G N LTTRP E L M V A Lick $P \vee Q L P E A M Y C F Y G K K E \square K S$

 $N \square D R P E L M V$ K QUS LDPEALLSTGKEDYFFTEPLDTE HYDAVGMG
 $V$ S SRP E LMMQ Q T GLDPEAMVVTDPDHEILTT A G K V P E I I L R GDPA A A GQLAA E GFFMMLSELLDSKVKAAAVIG QTAAPEAMLDPDTEATHDAHPN YAPDLLF $A$ A S HVVLEA TYFPDPETKDGQVADLQETPFPWDGMD GVAAGG






 L Q I SVPEIMCQLDKDKSNDSK








 ETNNDE EMSDPDRSENGMFGENPEKDLIIQNGKFSSVVVGG

 QTALP E A MVI VD K N DEKLTHUDHGM S S R L TEAMTLDYEDNDNFIE Q T Y L P E A MVLTDKNEK I SEDIKFDME QS S FP EAMALTDDGDEHITK DGFEDQ QTAVP EA IVVHLDDHEETVVFSEP DDTA $\left.\begin{array}{llllll}R & P & S & V & A & A \\ R & G \\ R & A & S & S & I & A\end{array}\right)$ | $A$ | $S$ | $S$ |
| :--- | :--- | :--- |
| $P$ | $S$ | $V$ |
|  | $G$ | $G$ | $P$ K A V $G$ L $G$ GFD A L A A G




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PGLGNNEHVREFVNEFLKTLEKPAVIDADATNVLDTSVLK PGISTEPATAGFVRDLLPELNKPVVIDADGLNALAGNVLK

PGLGTGKTARKLVRLVLKYAEAPVILDADGLNVTAEHWLK PGLGGSREVHWLLEKLLESSSHPLILDADGLNWLS GHMLK



 MGLG GTESTKALTRA L Q
 $P G L S A A P E \square Q R L V N G F V A D C P V P V V I D A D A L N V L D \square E V L K$

P GMGK H A E T V D A F H Q F L L Q N E K P L V V D A D A L N I I S E N K L P

 P GLGGQESSEF L Q



$P$ GLL D K R A E T K AVVV R QLL L H K V S F P I V L L D A D A L

P
P
P GLGTDPDTRKLVTALVETCSLPLIMMDA
$P G L G Q T A W A R Q A V Q Q L Q R F D D K P M L W D A D A L N L L A Q S B C$
$P G L G Q G A W G$




$P$ GLG GRS G WGLLDL WR A K K EVVA R P L V V D A D A L N A L A S E P L A

PGI GQDPATVKALEKVLEKAKVPVIVDADALNI TNRHLLEF

PGLGGQNAWSETLFNTLI NTDKPMVI DADALNLLSQH
$P G M G Q H E D T A \| A L I S Q I R R T Q C P M V I D A D A L N I L A S H W M Q$
 GLGQDNWAI SIL RQILD L DKYRVMD
MGAGTSFNTVKALKELLELMDKPVVIDADGLNILSENNLK

 S GLGGRTESTRVLTKRLLLTETQQPLVLDDADGLYFLPETEMT

 CGLGKS RTAGQILSYLMKYAEVPCVIDADGLNLLAD HMLP
 $P G L G Q Q E W G K K A L Q K V E N S R K P M L W D A D A L N L L A D D P D K$




 VGI GLDGDTVSAFGNFLKKVNSPMVIDADGLNILSQNMLT

 P GILS M N E V A A A E I T T R S
 $P G L G T D P E T V E D V R E L Y E S V E Q P M V V D A D G L N A L A G G G S L D$
 $P$ GM G V $V$ H E E T E K T L E Y $P G L G Q S M W G R V L F G A A L G S N K P L V L D A D A L N L A A A R D N V$






 P GLGGREKETGKFVVKRI TSFDKTMVI DADALAFAVKE E HDLD


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410
420
DCVLVLKSAT T IVTDGEKTLINNDTGNTGLSKGGS GDVLTG $R V N V V L K G A E T V I A G V D G S F V N S T G N P G M A T G G S G D V L T G$ $N A V V V L K G A A T V I V G P D R E A V N T T G N P G L A S G G G S G D V L T G$ GVTTVLKK GAKTVVASPDRVFINPTGNSGMSTGGTGDVLTG $N V I C V L K D A G T V T A D P D G T A W D N T G N N G M A T A G S G D V L T G$

 Q S Yill lik G WS TVVV TP E GN CYFNP T GNP GMA TA G S G DV L T G





 DVVI LI K GAYTATVYHDKVFFNSTGNPGMATGGS GDVLTG GVTLVLKGMPTVIAAKDGFAYVNTGNPGMATGGMGDTLTG QAY I L L K GHY SAL CLDPNGHEFNSTGNSGMATAAGS GDVVLTG
 QCY L L $K$

 EAVVVLKGAVTII ASPDRAFFNPTGNPGLGTGGTGDVLTGG
 $K C Y V V L K G G H T C I G T P T G E Y F N C T G N P G M A T G G T G D V L T G$ GVTVVLKGANTVVCDPTRDYVNPTGNAGDARGGSGDLLAG GVYIILKK GAYSVI DAPSKCWFNPTGNPGMATGGSGDVLTG $G G V V L L K G A G T V I \quad F D G K Q M V V A P V G N P G L A S G G C G D V L D G$ $N V I L V L K G A Q T L I A D P D R L F L C P A G N P G M A T G G M G D V L T G$ G GVVVLKGAGTLIASEKKVSVADVGNPGMGTGGMGDVLSG



 QVITTVLKLERTVI A DPNGDTYDNRGNS GLAKGGS GDVLTG
 $K V I I C L K G A N T A V V L P N G E H F N S T G N P G M A T G G T G D V L T G$ QVYILLKGAYSVIVTPQKCYFNSTGNPGMATAGS GDVLTG GGVVVLKGAGTLI CD GQTTVVSTAGNPGMASGGMGDALTG HAYILLKGHYSALCMPDRVYFNPTGNAGMATAGS GDVLTG
 Q N
N NIIIVLKKETTLIAAPTGEVWYAGGNPLLAKAGSGDVLSGG GCYLVLKK G NTII TTP E GRQYVSTGSSALAK GGS GDALTG Y ClM I L K GA GTIVTSSAGTY\|NTSGNPGMATGGMGDVLTG
 GVVCAL K DAR TVVA GK DRAMFDRAGNPGMA A GMGDLLA G QCI LVVKSECTLVAYPDGMAFFTSGNPGMATAGSGDVLAG



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

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


 $G V T L V L K K S A D T L I A L P D R V F V N S T G S P A L A K G G S G D C L A G$ GATV V K G DRTVIAFADGDWVNPTGNPALATGGTGDILTG $N 1$ L L L K G Y N TVIT D GVTAII NTTGNSSMASGGMGDCLTG GIVYVVVLK G A F T L T T A A P S K I WI N D T G N P G L A K G G S G D V L T G K K F HRMVIF TPNGKIYYSNGNSGMATAGSGDVLAG NTVVVLKGAGTIVERGRRTGVIGAGNPGMAVGGMGDLLTG
 DVILIVKGAHTITIVENKGYVNTTGNPGMATAGSGDVLTG $K L V I V A K D A H T F I V N G N S V Y I N S T G N A A L A T G G T G D V L T G$ QGYI I LK GHHSAL CLDPNGK』FNSTGNSGMATAGS GDVLTG QSVVVLKGAGTVIAAPNGEWINPTGNAGMATGGCGDVLTG $K V L V I I K G A N S I S V Y Q D K D Y I N S T G N P G D A T G G T G D V L T G$

 HVVLVLKGAPTVTAMPDGSYVNTTGNPGMATGGMGDTLTG



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| UniRef90 UPIO003B7B211 | EVAET P P LiAl K EL |
| UniRef90-A3DIW6 | DL |
| UniRef90-S0JFT5 | DI 1 EGTA |
| UniRef90-R50 | DLLDabl |
| UniRef90-b9M | Dil EGLN |
| UniRef90 UPIOOO36B0416 |  |
| UniRef90-R61LU6 | DLI DALPAAWKKL |
| UniRef90-R7RND3 | DI IEYIGQAM |
| UniRet90_S6A5X66 | S. MNFLPRAMKELR |
| UniRef90 B0K5Y7 |  |
| UniRef90-R71 | Dil RHLPHAFKSL |
| UniRef90-C5L | DLIDGI S SVLS |
| UniRef90 L7vs |  |
| UniRefyo-13C137 |  |
| UniRef90-R6AGE2 | DVARMVP |
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| UniRef90-C6W7 |  |
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| A4AQX9 | KMI DSI GMAYıDL |
| UP100037C6FAO | I NYLGKAYLK1 E |
| UniRef90-EGT300 | D |
| UniRef90-T2KL04 | DVISYL |
| niRe990-K6TT47 | DI |
| UPI00041F6EDA |  |
| H1CXN7 |  |
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| Ref90_R9NEV1 | K K L L M Q V $\mid$ M K E C |

## UniRef90 womx33

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UniRef90 B7IERA UniRef90-Q21H97 UniRef90-G2SDN2 $\begin{array}{ll}\text { UniRef90 } & \text { E1QNGO } \\ \text { UniRef90 } \\ \text { W5X5 }\end{array}$ | UniRef90-W5X5X8 |
| :--- |
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UniRef90 C9LG92 UniRef90-UPI0003B48CD7 UniRef90-W8VS68 UniRef90-Q26CL6 UniRet90-W8REF8 UniRef90-H2J5S9
UniRef90 M1MN30 UniRef90-U2WH55 UniRef90-T2V547 UniRef90-2890W9 UniRef90_D5DF19 UniRef90-UPIO0035D4E16 UniRef90-H8LOU1 UniRef90-UPI00034C3753 UniRef90-R5GEI4 UniRef90-UPIOOO47C4533 UniR Ref9-F7V6E8 UniRef90-A6ER28 UniRef90_O7MXT9
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UniRef90 C4UM43 UniRef90-D8JR32 UniRef90_Q6MF43

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TSQQVRTGEDKAAQDAGVSMYDLMQKAGDAVYKCFRQHY
M
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YTKKEMQAIDAYTMDKПGI P

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    TAVEMKELDHNTIGKAGl
            OEMREADKDT: SNQN|
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TARAMREADRRAL E
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T G A R I K E LD R YT T E HEPVVS S $\square D L V E R A A A T W V Y E F E R B Y$
Y S A A QVR DL DARLI A A GTPGFEL MQRAAHAA WRAARRRW
SPE EMA QI DKMAI DEGRDPG GVLMENAATAVTNVVLNTVL
N A E K

VDNYCSETLKIPLVMMENAALKAYKHIN
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SKTMHRLDEQLI KQQRVSS LDLMKRAAS GVKDY I DELH


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

N A S QQL S E
$T$ LIE QAREAD Y RADH DF N I P S L L L M E H A A Q G CV V R L I K K I
$Y S A Q Q V R D L D A R L I A A G T P G F E L M R R A A H A A W R A L B R Q W$

NALQQMRQI EDR I FAASMPVAAALMEKAAM LCANRDQQLY
$V S Q L D Q A H I Q R E G D S G L E L M E S A A N A F V S W F I D K F$

STTEMAEADRLA A A GGVP S L D L L M ENAGRAVAEAA LKK LA


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 PDA QELTVLAGHGNNAGDGYLVATLARRAGWSVRVLTV
 GPVKGKTVCIFAGPGNNGGDGLVIARTVHGLGAFPFVFFI $P G A S \quad R L L V L C G S G N N A G D G Y V V A R L A Q K A G L D V A V Y A T$
Q Q G
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$P D A$
S P $\mathrm{N} P \mathrm{l}$
$\mathrm{S} P \mathrm{~K}$ SPAGBALITVVLA PHVR HLLAVYCGSGNNAGDGYVV
PTASEL $\qquad$ V LAGSGNNAGDGYVVARL
DRKSK $\square A 1$ GSGNNGGDGVVAALARRAGWTVRVLAVV

$\stackrel{\mathrm{P}}{\mathrm{P}}$ AEPDQHMVFFVGPGNNGGDALAAARMLAWAGIIVVYLDL
SDASN
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$K G / V L \mid D A$ GEPRRLQGDAANAHAEAVAVGVPMEPWSDEAELRGVLLDA
 $V \operatorname{DPKQLQGAAAKAVSAWQEEQGRLVDASFIKEGWDVVIDA}$

 GDPQADQGDAAQALAEAQACGVADEPWRAEVSDQGVLVDA NHHLSADCARNRDRLKEKGYEI S SQFTPPVI QPDDVVVDG KALTDLPDAAQHAALLADNAGVDCQPADEPLDEVELIVDA GDPQHLQGDAADAHAEALSEKVD DETWTAQSGLRGIVLDA VEEDCGDADFHFKVYRKSGFDVMSLRDFSCDKKYQVIFDA GDPQR $\square$ TGDAALSRAGWRDAGGT $\square E P Y R G D P R R S D V L V D A$
 GEPREELARVNFEAVRRLWGVELAVVRQDWFLWADVIVADA HNSLSPDCEQNKLRLLEHKTEVITNFDPPKLTEKEVVI DG
 CDKLKGDALINFNILKNYDAPIFNVEQNPSFADYDFVVDA
 GKEEKMTAETA GQLKTAEYYQVPRVHNLDLDDEYTTIVDA AGKPTPDFETALAEFNQLGVEHNQSEDYQYEKGKLIYIDA

 A DVSAMSAAANYRLLEQLAAADASGRLHDHLPPADLYVDA
 SEPLHGDARSAWELAQQAGVEIQPFSGARADPAADVLVDA FEKEQLTS SECAVN LERLPSYUERVTDDKRLSNKHILI DS DE HA SEEMKKQLEDAKNLGDSFVTDMKK DKPLPEEAHAAREAWLNAGGVIHSP QTVWPEETDLIIDA RTKLSDDCA $\square$ NRQRLVDMEVEVQKKFTVPEDSKRDVVVDG
 GREDTEECR\QKQUCENLGGDIYREDPK GLGEYTAVVDA SGTLSSADCSANKERLAGAAGEVTNEFDPPELPASVLVI DG PEKATEQFQTQKEILDRLGYSQESAEQFWDNSWAEVVVDA NDHLSADCEANKQRLDTLANIVTSKFQPPQLNNDDIII DG

 SGNQNYDFRTNFNIIEKLSEEDDDENFDDDLNNYDVVVDG SNEDMNDCMINYKI CKNMGDKIFYE円EDKLLDDCNVVIEG GEKDSECSKI NYNVLLNMGINIINJIVKDRVSKSDVVVDA GGQKGMDCSINYNILKNLDVNINLIDDNDKDIVEDSNIVVDGG PESLLRGDAAAQHAlAERLGLPVYTPGEAGTFSGFTGIVDA AP LTASHPGFEALQKAGVQVQVHVPGQPLPQADGQVDA
 GYA AEDKGDAAVMFERMGMVPVIDAPDEDALLSEADLFLDA GNREHTECGRQLSDAEKYGIPIHTEYP NVSGSLSPECNECRVRLLETEVVDNFDPPELSSSQTIVVDG
 APRESDDFMHNHRRLKLLVETIHYVERDPALRHNEVI I DA NENFSTDFNSNLGRLKECYEVISEATEFPNDGENHIII DA
 GDRKKQTELNKKQQQULESLQIK GDTDRTD DEYDGIVDA KPRREYRGHAHDRLAARTGVPLKRARFAEPDRQPDILVDG DKP LPAEAEQARSAWDASGGQUGADAS P WPENSALIVDA A NRKVSDLLK I QLLNLLQSSLVEILRNLLQNYLELDKEYDLI I DG DEPVPDPAEEARRDWLKSGGHCTEL NALTGKPDLIVDA FDRAEFGGDALQALRAAAEAGVS DTWQPGAEDDGVVLDA GEPKTKEAVQHLQYYKSCG FEVIPFNQAANYNWI DG SRWPNDIDIDG ADPQQLDGHAREAADAALAVVPPIA T PWTADGEADAVVDA GGSVAEDAQRALKIYENCGHSYK IYEENEEDKKSTVIVDA EKISGEERDQFDMIQSLLIPYHFLNEALDLNRFDYIVDA GDASRLS GDAASAHGEARAVGVDVQAWSDRAELRGVLVDA
 EHLSNCSFQANFNRLPKTIPDDMDFDTFEFQLIPEKTFVI DA GDMREEPAATNLKICCLNLLGCRVMEYQDYFIKWADVII DA NRPDPAEAS QAREQWLSAGGMDLDQESDLWPQDDDLI I D G E S L L E N C S C K K N A L R F E N L G G T I I S Q Q D D


UniRef90＿womхз3 UniRef90－F2KBI2 UniRef90－TOLEM4 UniRef90＿E8RGS6 UniRef90＿B5JUW1 UniRef90＿A8ULM3 UniRef90＿UPI000255BB51 UniRef90－R6PAE9 UniRef90－A0A023WP42 UniRef90－W0ETL3 UniRef90－D1RC42 UniRef90－J2SEP9 UniRef90＿UPIO002F3A63A UniRef90＿C6WZB7 UniRef90－F9UFS2 UniRef90＿UPI00046E89C4 UniRef90－A3MWC2 UniRef90＿U3AW61 UniRef90－D3ICF1 UniRef90－D4KQV0 UniRef90－G5IDV1 UniRef90－R5EBE0 UniRef90－B7RW27 UniRef90－R7CN17 UniRef90＿UPI0003FEC892 UniRef90－R7BXA5 UniRef90－B7IER9 UniRef90－G2SDN2 UniRef90－E1QNG0 UniRef90－W5X5X8 UniRef90－E1VKY5 UniRef90＿F8WZX5
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UniRef90 C4UM43 UniRef90＿D8JR32 UniRef90＿Q6MF43

TGQSULGVAVVRADLTVITFTGLKTGLLTGEAADLVGELVVIFD

TGAI H GAAVQADQTVTYGLPKPGHAHHGGPCVGRLERVDD






 TGEVRDKAVKAALTVTFHKAKRGLLAPGAERYVGELVVEP TGAVHGVAI QAEHTVTFVAVKQGLCTGQARSYI GKLHFAG TYNVRVNVI NADLTLTLQQKKLAMLLADCQKHIGKVLDDR

THNVIGECVDADLTVTFARPKLPHVMYPARGFCGDIVVAD
TGEVLGTAFYADYTVTFGLKKLGMFFLDGDDACGTVICKP


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| $D$ | $I$ | $T$ | $V$ |  |  |  |  |  |  |
| $Q$ | $P$ | $E$ | $A$ | $T$ | $D$ | $A$ | $I$ | $E$ | $P$ |
| $D$ | $Y$ | $T$ | $V$ |  |  |  |  |  |  |
| $K$ | $K$ | $T$ | $T$ | $I$ | $A$ | $I$ | $H$ | $S$ | $D$ |

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TGRVMGTAVRAATTPTFIGLKQGLVTGEAADFVGELAFDA
$T P S Q A E E V I Q A D D T Q S F$
K GEVDVT
S G K V F GI A V K A N E T F

TGGRVLGCAVNADLTVVTVGLKLGLFTAQGPDQCGELVFDG

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




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UniRef90 C4UM43
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## 7

210
220

240
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4








I GFPAQAAMVKPMDYAYDNSDLDKDPKRVNNSNKGTYGRVG




G YP N

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GFPEAAYEKGAPKMISFKEDLALLPERKAWTNKGNYGKV


G G DP N W IV T T K N Q N Y L V T E G S A A NLL L P Q R L P D T H K G H Y G R V


1 GIP K D N K F D T K E Y I T N K E Y I K N S M L K K D T Y S F K S D Y G K V













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250
260
270
280 LVI GGDHGFGGAALLISAESALLRSGAGMLTLIATRAEHVPAA LLIGGDRGFGGADQMSAESALRCGAGMVSMATRCEHVSAA
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 LVVAGSREFTGAPVMAATAAARDGAGYVLCACPSDVRP LFIGGSREFTGADYLAAKAALRTGVDVSVVMAPRDVARDV LVIGGDYGMGGAVLMAAEAAARMGAGLTTVAGRLEHAPAL LLLICGSKGMAGAATLIATGAALRSGCGLVTTHDPYNERFAC LVI AGCEAMCGACYFSAAAAYRAGCGLVRVLTAKENMQAL VIIGGDHGTAGA\|RMTGEAALRAGAGLVRVLTRDENVAPI LLVAGSFGMGGAAVLAAKAALRTGVGVVDVHTPSCCYMPL

LILAGSQEYAGAAVLAASAAYSMGAGMVKVVTHRENKEI L
LLLIAGHYGMAGAAVLAAKASLRSGLGKLTLHTPTKNNDIL

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LIFAGSSGFYGAGNIVAKSCVRTGAGLTTVITDKNN FSL SIV VAGSKGFYGASFIATESAVKSGSGLVTLISSSEDVQEKV
 LLAAGSLPMSGAALLSAKAALRAGCGLATWALLPAALLPHT
 LLICGSHRYAGAAILTALGARASGVGMLSVAVPESVKTLL LVVAGSYGKSGAAAMASLAALRTGAGLVTAAVPQPILASV LLAGGSRMAGAAlLAARAAYAAGCGLVRILTPECNRIPL
LIVAGYGSMGAALLSTKGAFRIGAGKVTTLVPCGYTIM LLIAGSRGKMGAACLAAKACLRSGDGLLTTHIPACGEAVM LVAGGDAGMGGAVLLAAESALRCGAGLVSAATRVEHVPALL LLMVGSYGK GAAVLAAKACLRSGVGLLTVQIPRCGYDVV
 AVIAGSEKTPGAALLCTKAAFATGCGYI RLMTAEENKKLV LVVGGSPGLTGAPHLAALGALRGGCGLVTLAAPAALCAEA
LLVGGDIGYAGADRMSESALRAGAGMVRVLIHKAHIGPL LVAAGTRQYSGAGLLAAAAALRSGAGLVSWALPERLLDPM LAl GGSRSMHGAITLCAKAMLRSGVGTLTLFVPKSIGMLL LLIGGNKGMAGAIRLASEASLRSGAGLVSVLTHTDNVALV LLAGGGPGMPGAIRLAGEAALRSGAGLVRVFCHPDNRSLV VLVGGDRGMGGAIMLAAEAALRSGAGBVSVATRPEHVAPL LLLIAGSDDMPGSAVLSADGALRFGIGKLSVLTTKEAKQUI RVIGGDHGMGGAVRMAGEAAARVGAGRVSIATRPAHVAAV



 $V V V S G P A L Q T G A A R L G A R G A I R A G A G V V T L V G N A T A T A D I$


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UniRef90-F2KBI2
UniRef90-TOLEM4 UniRef90_E8RGS6
UniRef90_B5JUW 1 UniRef90_A8ULM3 UniRef90_UPI000255BB51 UniRef90-R6PAE9 UniRef90-A0A023WP42 UniRef90-W0ETL3 UniRef90-D1RC42
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 LTR R L P E EVMV | $L T A$ |
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 $D K K G A D A$
$A S R G R F S$
 N TOQPEDMCH ASRGRFSVEDHGLIEESAVQGKDGMVVGG
 QTAALPEVMVI TDDEQNKQUSAVEVPE HCTLPEAVTTLLNSD
LVRRPEIMCS GVESTYGLTA $\square P K A D D V N V I C L G$


 QTSCPEAMFSENGTE H
$N$ S S RPELMVSAVETSA QNS IPP A AMAS ADQS DLMMFTQ







L
L N H
 AANVPEAMLLPLPENSGTVSGDAARFLLQRAGKYDAAVFG
 KTKMPEA VVGSYDEEEDGQDFTPKKEVEEAIGWADVIVI G
 QTAVPEARVRQDRGSSYVTED EVYYVPEKKYTVVAG


## Q

 QQLLPPEALVTSYYRY

 LVRRPEIMCS GVESTYALTGLTQRADVLVIGG LNH ANRLVEAMTSNFDSN NVFVPEAMSFPDNFDNDN ENLDEKLENEISNCDVIAGUG SIRLTEAMTLNFEEF

RLNKLLNSSDAI GFG
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 A S E QLDDK Q
 LTARPELMVQELTEES AMKLEECMLIEADDENGMFAQGALSSLLKEKIGDYDLIVIG



 MAARPELMAQRLTDDS

 QTRSPFDMSIRAPEDNGHFSKEADDCLERILDQYTVFSIGG LAARRPELMAR
 VVAAEIMAVADSELLEMSGAUAELPNLASDFNNYSVAGG
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A GP T P Y A L GDTQKVLQEDTRRNAVLI G


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UniRef90 UniRef90-D8JR32 UniRef90_O6MF43
UniRef90_U1LPT5

330
340
350
360
PGLGQASWGRSLLSAA ANADRPQVIWDADALINMLSAGQVS PGLGQAAWGRSLLSAAANAPLPQVWDADALNVLSSGEVR
PGGGQHFETLELVRRLVSRDNKPLILDADGLNAFAKDPLK
PGIGTEETTAQLILRLYTQNSCAQVIDADALNLLAAHMLG
PGLGQD ${ }^{2} W A Q E L F K A C V E S D K P L V V D A D G L N L L V S N Y A E$ VGLGTDDGTAKAFEAFLKISKTPLVIDADGLNLLSKKKTL MGLGLHDDTKDALTNFLKKNKDPLVLDADALNLLSANRLE
SGLGUSDNSRKMLEYVIENSKAPLVIDADGLNVLSENTLK
$P G L G Q A P W G R S L L S V G A Q R E L P Q V W D A D A L N L L A B S G V V$
$P G M G C N T S V S A L M H L K E L K Q P L V L D A D A L N C I A Q E Q L R$
$P G L G E S D W A D D L F L T A I T S Q L P M V I D A S A L R L L A S N$
PGLGQAAWGRSLLSAAANAPLPQVWDADALNLLAEEQVS PGIGREKGGETLLSSLLETLQVPLIVDADGLYHLAKEKLK
PGLGTHPETEKAFLSFLKSYEQPLVLDADALNTINTDQLN
PGLGREAWGRDLAEHV LGGDRPMVVDADALNLLAEA
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PGLGLREETMKAVVELVSRAGKRVVI DADAIKATGELKRQ
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PGLGQAPWGRSLLS LAPQCRVPQVWDADALNLLATGAV
PGLGRSDETMQFVRNVVEYSRVPVVVDADALYAVASGASLR


PGLGRTKETKKVVEQVLHQ P TSVVVDADALFHHLEKEVK PGLGRFPGEAGFLRALLWEGPRPLVVDADALNTLAAAGWQ PGLGQGAWGHALWLTALLDSGKPMVLDADGLNMLAQESHA PGLTVDAKS VVVQRVLQAECPLILDADGLNLLAEHVLS
 PGMGQQPEAEKFLLGLLETTNLPTVLDADALNLISRHRDR MGI GTQKDTVEALS SLEKKAKSSIVIDADAINCI SENKLK PG|GRAEGTVLLVEKILSTPNGPLVLDADALNDAENWLD PGLGQRAWGRSLL SAARGRPGPQVWDADALNLLALEPVG PGLGTEKGTEEVVKKALLDFNTSLVLDADGLNVGNTNWLS PGI GKAPETLDMLKGLLKSVKKPMVLDADALNLIDENRLK MGI GQDDETTQAFHHFLKNNSDPLVIDADALNIENQNWLS PGLGTDKWATDVFSQLMAHLEKACVIDADGLNLLADSSRS PGMGTSEETKLFLQAVLRELQLPVVLDADALNLFAWKLTA PGLGRDDGARDFLRVLGPNLLLPLVCDADALFHLSGSP E PGLGQNEWGESAFKLLSA SDKPALWDADALNMLAKAPEK PGMGRFAGDGAWLREIWAGAPCPLVIDADALNMIADDAWP

 P GL GTDEWGQTVVWQS LLSS N NGHWVV DA D GL NLLALTT QK

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

 NGMHKNEDTNQLTDVVLQSKKTVVI DADSLIAAKDH GS WLL P GVGRDAWGRVLV SAAAAS LE R RQVVWDADAL NLLAE ER V A
 $P G L T S D A K S ~ I V E T V L Q A E C P L I L D A D G L N Q L A Q S R L R$ PGWGI Q N D F S F F E S L L N R F R K PVVI DAD GL N T L A P HLL K $P$ G L GLLE K T T M E A V Y I I L E T A G K R I V I D A D A I K A I G G K K L M PGLGQGDWGQNALKVLQE SDKPALWDADALNLLALN


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410
 TATVVLKGA GSSLIASPDRLAVVS QGHPAMATA GLLGDVLAG $K$ LVLVLKK GAPTVLVAEPSGEYVNSTGNPGMATAGSGPDLTG $P \vee V T V L K G A G T V I$ A A GS GE WA DNT GNPGMGTGGMGDVLAG NATVVLKGTGTLI TRPRRESEYDAGNPGMASGGMGDALTG
 K SVV LV L K GA H T I CFYN GVGY I NSTGNPGMATMGS GDV L A G
 A CVVALLK G A GTVI A GP D R L A L C D D R G H P A M A S A G L G DV L A G $D$ DI VVLKK GAHTAVALPD GVHFNSTGNPGMATAGSGDVLTG G GVVVLKGAGTVI QTTEKTYDCPRGNPGMASAGMGDVLSG TAVVVLKK GA GSSLI A HPDRLALLCHQ GHPAMASAGLGBVL A G $G V Y L V L K G P C S G V T T P T G A Q Y V N T G N A A L A K G G S G D V L A G$ GI Y V V L K D H H T QV DTP D GRVF YN S GNP GMAK G G S G DV L L G $G G V V V L K G A G T L I$ G S E P P L A AVV S D GNP GMA TA G S G DV L T G $G V V L V L K G A Y T A I A C P D G C W F N S T G N P G M A T A G S G D V L T G$ $G A V I L L K G R F D V A S D G Q R D K \square N A T G T P A M T V G G T G D V E T G$ G GAVVLKGAGTLIYDGVRMYACLAGNSGMATGGMGDMLTG GCYI L L K GHYSALCDPDGNYFNTTGNPGMATAGSGDVLTG QV I CVV K K D E H T V T A L P D H K R Y L N S G N P G M A T A G S G DV L S G GI T C V L K D A V S V V T GK E G QVV N T S G S S A MA KA GA G DV L T G

 $G A V C V L K D A C T V V A D A F G D M Y L N S G N A G M A T A G S G D V L G G$ $N$ II LVAK DAHTMVVYR GSDY I NSTGNAALATGGT GDTGLTG

 GCVLLLKGMPSVVGWPDGTVVINTGNPALATAGTGDVLAG G GVVLL K G NVVDVI TD GERYKLNFTGNPGMTVVGGTGDVL T G $N Q C V L L K G P Y S L V G E P G Q P D V N D T G N P G M A S G G M G D V L G G$ Q GVVVLKGAGTLI GEHDVPHLASVGNPGMATGGMGDVLSG K S I I I VKGAHTMICLPD GNCYFNTGNSGMAKGGSGDVLIG
 GGVVVLKGAGTVVACEAGADTDDAGNAGMASGGMGDVLSG $K$ KVIVLKK GHYTVVFRPD GKVFNTTGNAGMATA GS GDVL S G $G G V V L L K G A G T L I Y D G K Q L F V A P V G N P G L A S G G C G D V L S G$ $N A T C V L K G A G T L I D N A E N T W V C E D G N A A L A V G G S G D V L T G$ $P \vee V C A L K D S R T I V R H K K P D F V N T A G N H G M A K G G S G D V L S G$ QIVYIL K GHYSALCMPDGKMFNSTGNSGMATAGS GDVL T G HCTVVVLKDAVT TVVSD GRE LVYYNQS GNSGMASAGS GDVLA G
 UniRef90_UPIO003B48CD7 H
N UniRef90-T2V547 UniRef90_Q890W9 UniRef90_D5DFI9 UniRef90_UPI00035D4E16 UniRef90_H8L0U1 UniRef90_UPI00034C3753 UniRef90_R5GEI4 UniRef90_UPI00047C4533 UniRef90-F7V6E8 UniRef90_A6ER28 UniRef90_Q7MXT9 UniRef90_A6VD62
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 DVI LVLKGAHT DCAVLLKGAG $\begin{array}{lll}R A T V & F K D A T \\ G I V V & L \\ G\end{array}$
GII LLLLK G Y N N T
 AD R D GRLALCD R GHPAMASA GLG DV L A G N

 $G V T L V L K G A R T V V A D P G R V Y V N T T G H P G M A T G G S G D V L T G$
 K AII L L L K GARTAI SNERGFTWISASTPALARRGGS G DVL T G

 GAAVV MK DARTVVTE DGRCFINCS GNHGMAVGGGS GDVL T G $K V V V V V K G A N T V T V F E D H L Y I N T S G N P G M A T A G S G D V L G G$ $H \bigvee Y V V L K G A F S A T C M P G G M V F N N T G N P G M A T G G S G D V L M G$ QAVVVLK GA GS LVA SP GRRAVVSRGHPAMA GA GLGGDVL S G $N S V I V L K G T P T 1 A A S P H G S Y I V S T S N S G M A T G G S G D V L T G G$ $R V V \vee V L K G A F S A V A T P E G D H F N S T M N P G L S T G G T G D V L T G$ HLVVLI K GA ATVI DDEKNVYVNSSGNQALATGGGS GDVL S G


 GVTLVLKGARTVTATPA GDVYVNTGNPGMATGGAGAALAG

 GGVILLKGPGTLIVDGKQMAIDTEGNPGMASGGMGDVLSG GCAVVLKGVGSVGDQGQPPGUCTFGNPGMATAGMGDVL S G $H V I V V L K G Q Y T V I A F P D G S G F I N T G N E S D A K G G S G D T L T G$ $G G V V V L K G A G T V I A G E H G E M V A D V G N A G M A S G G M G D V L A G$ GGIVVLKGAGTLIADDRRCVICTEGNPGMASGGMGDVLTG
 $G\|Y L V L K G P F T\| V T T P S G E Q F N S S G N P A L A K G G S G D V L T G$ NCVLVLKSSFTIIGHQDQLRVLYVPNNSLSKGGSGDVLCG Q A V A V L K GVG S I A S A D G RLA L C D H G H P A M A G A G L G DV L S G QAVFVVKKSCTVVVYPDGDAFFTTGNAGMATAGAGDVLAG
 NCILILKGAFTSI SLDNKQFFNSTGNQYMATAGSGDVLTG GSVVILLKGNTDVI SDGSR DKLNMSGNPGMTVGGTGDVLTG G GVVVLK G A GTVI A CE Q G EMM A DVG NA GMATGGMGDDI S G GAIVILKGSDTVIAEPERAAINANAPPWLATAGS GDVLAG



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UniRef90_U1LPT5


 $V$ I A S L A A Q GLS LYEAARCGAY L HAVA GDALA G GQR GLVA S VI S GLI A Q GYE PLAA T I F GVVYLH GRSA DVL ED Y GY S LI A S


 I A GFCA Q GYP LA QAA QY GVVWVHAVA GDRVAKGGT GL LA S $L V G A L L A Q Q M A A F D A A C L A V W L H A N A G E Q L G K L G R G L A A S$
 I GALLRA Q GLDDAEDAA CA GVVCLHAAAA GDRAAR GER GVVVA G $1 L L G L A Q G Y A A K D A A D L G V F L H G M A A D L A V E E Q E A L L A G$

 LI GALMMA QK LT S Y Q A A PL G V Y L H G L A G D I MVVQ GLDQ GLTA S
 I I A GMLA G GLTTLADAARMGTYVHCAA GDLAAKGNYAMLAS $V$ I A S LL A Q G L E P V A A S A L GVVCLHGAA G D I A A E E GR G L L A T $V L A B G Q C M Y L S P V M L A A L G V Y V H G L A G D L A A E G Q R G M T A G$ I I T GLLA Q GYEAANAA I F GVVY H GLTADVAVEEMQAFTAM

 L CVGLVA QGLPPTQAAVCALHVGGAAADRYAAHYASMMAL $V$ V S A L MVK VQ D P LEAA A G A F IT GLDA G D L A T K E GY H DT P I V I GTLLMAQDLP GYYAASCAMYWHGAAADLCAMGPTGYSAS LI G GLLAQ GKSLLDAARDGVWLHGAAADAAKYGERGLLAT Y T GLLAARGYSSAHAA LLGVYVHGLAGDKAAA GDES MNS K
 I GAALLGQAFSLYDAA CAGCVVAHGAAA DELAAAGTRGMMLAT I G A L MA QKYRPDVAASMGVFIHGYA GNLAA QGEY GLTA G


 ML GA SLVVWGMPVSKTAAI TAY IVGKA GDYAA E GKKAV TA G

 $V A G A L L A Q G L Q P Y D A A C L S V W L H A T A G H R L G Q Q G R G L A A A$
 I I CS L A GQKYDLMKSANIGAYLHGKI ADELVRRQYTVNAT MI T S F I G Q GMDDLEA TVS GA YI H GY I G DK L SKAMY TVVNAT
 I A S LL A Q GLDS Gl $Q$ A A A A L G V $Y$ Y L H G L A G E RAA S S S G S LI A G
 $\begin{array}{lll}L I & G G L V & A Q G T K A F N T V A S A A W W H A Q A G G D L A A\end{array}$

 I I T G L L G S G Y L P A S A CVV L G NY I H G L A G D I Y A Y S Q E S LIA S $V$ I GALLAAQGMAAFDAACLAVVWHAAAGERLLGAQGR GLVAT I I T S L I G Q G LTTVEE GA L LVVVYLHKDA GEKAQS GEAS MTA T $V L T A A L A A Q N Y D P D E A A V L G V F T H G L A G D R D A R G P \square G M T A S$





 I I A ALLA Q GLSLLF QAACCGALLHGKAANEVAKGERGMLAS $V A G A L L A Q G L P A G Q A A R Y A V L V H A L A G D T A A H G H R G L L A G$ ML LA S L S D H Q DVVKA A VA N AVVYI H G L C A D K WIDE D N G S L V A H II GGLLA QKLSLYDAACAGCVVHGAAADRVAQGTRGLLAT V I A GLRAQGLDAFDAA CLGVQAHARSADRACEGERGLLAV
 II T GACGW IKDAF LAA AYGVMVHCLAA PABDEDGFTPD
 LI G GLLMA QQVT CLLAAVATAAWWHAQA GDVAARTELVGVDAF I T S F L G Q GYS SENAA I CGVYYH GLA GELLASSKKR GMIA S $V L A T M L H R V N D P D E A A A D A A F D T G V A G D L A A B L G Y H P T P M$ II GGGIVVQKLVLYDAACAGCVVHGAAA DQLAQGTRGLLAT



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Y T

保 AQWLRREEPHAAQSUGVSLYTLMQRAGAAAFHUARQHY

Y
ASQMYAADKETVAKI MPEFELMSNAGFATVCEI SKRF
$Y T A R Q V R E L D R L L T L Q T L A D D G Y T L M C K A G Q A A F A T V V R T A W$


YSADAVRQLDRFVIDELGVVGFELMQGAARAAFRRLMGRW






Y DTAAARTLDAQATALLGGDGYTLMQRAGQAAWQWLLERW
YHSQS DQAWEQRWFAQQN SS LGLMQQAAWA IVQQLIVQF
TAKSTK I LDDSACVNEYK円PLIVMMENAVLSAFKHMDI


T A A QMRD DEQQ IFAAGMPVVALMEKVAGLI ARRVQDLI


TAA QMRNMDR】AMHGYAMAPVVLMENAGHAVAERAGAWL
E E MY A A D R Y T DID QVGGVR D E TLLME CA G Q A V I S A L L P R RL
YSTHALRELEARGI ADAGDPRALLMVAGQAAWRAVVLEHW
Q I R KAD QYCID SESDS SAQLIERAAKGCFNWII HNK
SRERARELDLIAAEKEYSIM TLLL MENAGRMDAENVLKVA
Y T A D QVRA L DARA DN QA DVP GSSVLMERA GAAAFR HL GDE W
Y H S Q S I QAWE QRWFA QQN SS LGGLMQQAA WA DTQHLLQQA
Y K A A QVRE LDDRRT $\square A$ G G $\square D G F A L M Q R A A S S A W H S F R S R W$

T A A QMRD $\square E G R$ I FA A GMPVA ALLMEKVARLIDS RLQAM I



WGHGRH
TVKEMYAADKAA NES G $\square E T Y$ D L M E A A GRGVADAVIDRMM
M E N A G R A V A D A V E CVV L

TNAEMRRADAAADAAGTDGFTLMRRAGTAVAERALART
TA A QMRADEQAA IAAS GEVTGLELMERA GR GVVEAMVE E W
$M P B Q L E C C D A$
A DW $\square R Q A E P$
A A Q M A A E PLAAAAAGI S L YELMLRA GAAAYR LAGVCY
TAA QMRAIE QAAIDSGEVTGLELMERAGQGVVEAIFEEW
TPKEMAVMDRHAV



TSEQVRYAEQHWAENHGGDTWPLMNAAAQSF VRGTV
Y D S Q Sl Q A WERRRWFA QHN S S L GlL M Q Q A A WT $\square$ S QR L R R R F


K E M Y A A D K A A NES G $\square E T Y$ Y$M E A A G R G$
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| $T$ |  |
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| $G$ | $Q Q$ |YHSQS DQAWEQRWFAQQNS A K S TiK Livill

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| $Y$ |
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TA A Q MRD ILEQ

| F A |
| :--- |
| A |

## $\begin{array}{lll}G A & T \\ G M & P \\ G & I & R \\ A & M & A \\ G & V & R \\ G A & P \\ S & 1 & S \\ S & I & P \\ D & V & P \\ N & S \\ G & \square & D \\ G & Y \\ V & A & P\end{array}$

$G V A G F E D M M Q R A A Q A A Y A A L R S R W$ WGHGRH
TVKE MYAADKAA NESGDE TYDLMEAAGRGVADAVIR M M E N A GRCCLA D KI SEEL TNAEMRRA DAAADAAGTDGFTLMRRAGTAVAERALART

 A D W I R Q A E PLA A A A A GI S L YELMLDRAGAAA YRLAGVCY



TSEQVRYAE QHWAENHGGDTWPLMNAAAQSF VRQTF
 TPKDMMVADANS EAMGIDPQTSLMENAGSCDARRIIDN

S S V E D T R A Y E V V T V
Y
TVTEMYRADALTDA YNADADRR
$Y$ TAAE
Y


 S A A WL R E A E V E A A R K A N I T L Y E L M Q R A A Q A A Y D VI V H S F $V$ R A A E Q A LMAR
TPQEIMAGWDAASVAECGMSFGALLMENASAREAMHALVGGV S A A QMQEDI NWL FT QGMPVAAL MEKAALQTAQRLLTLY
 YHSHEIIQAWERRWFSQQN SAFGLMQQAAWSIAQHLLLQLF $L K K Y D E Y$ L L E H GYG $\square E E L V A K A A D C L F K H F K$
TAA QMRAA E EAAVGARGDDWTVLLMERA GVVGVATAAALH H F

 L M QRA GAAAA E WV A T L A A



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PAAR HWLI LCGHGNNGGDGYVMATLARAAGDTVTLVAV
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VLSGKGNNGGDGIVLARYLKLNGYNALIFPG
PKARRLS LCGBNNGGDGYVLARLALAVGFEVRVLEW
${ }^{\mathrm{P}} \mathrm{G}$


 EQKNGSRVLILAGAGNNGGDGLVAGRYLQSWGEDVSTFKP PQSEYLSVSVLVGSGHNGGDALVVARELHLAGYQVLLYCP PDISP LLVLCGAGNNGGDGYLVAANAHRHGLEVHAVAP $P E A R$ R LICCGPGNNGGDGYVLARLLRERGLFVQLVAT PCAENRRVGVLVGPGHNGGDGLVVARELYLQGYEI HI YRP PYPQTRRVGVLVGPGHNGGDALVVARELRYQGYEVLI YRP PQARRLS VLVVGGGNNAGDGYVIAALAVCDG|DVVQLVAV AERSGKRNVTHTGPGDDPGHGGVIRRHLTDAGLRVTVVYV $P Q A R$ RLVVVCGTGNNGGDGYVLARLAQRAGRQVCVVHL PNAKRLLILIGGGNNGGDG LIVARLAKEDGLHVTAALY DTADKDKKVIDCGSGNNGGDGIACARILYEWGFNVEDFVI

NNQRYVIVSGVGNNGGDGLGLARQLTAHGKEVEVFAV

$K G \square$
NNQRYVIVSGVGNNGGDGLGLARQLLAHGKEVEVFVV
 HTSRAFNVLIVAGHGGNGGDG1ABGRILYQHGYRVQiALV
 GNPAGRCALVLVGPGNNGGDGLVAARLLHDAGVKVMLYFW SLANFPK GVIVGPGHNGGDALVIARELHDAGYQVSLFCP GS!T DKRVLVFMGSGNNGGDAAAVARHLHNLGADVLLLHT




 $P Q A R S$ LTVMCGSGNNGGDGHVLAALAMQSGLLKVQRVTL

 $P N D N P Y H \quad I \quad Y A G V G N N G G D G L A L A R L L S Q A G V K V T I V P F$ $P E A \quad H R L S I L C G G G N N A G D G Y V M A A L A A G D G L D V Q L I A \sqrt{L}$ $P P C R \quad V A V L C G P G N N G G D G F V V A R H L A D A G W D V Q V G V L$ AVWQREHWYI LVGKGNNGGDGLVAARHLTDAGLLVTVVYA $P A T P \quad V T V L V G P G N N G G D G F V A A R R L R E L G R N V T V C L L$
 $V K P C K V A I F A G T G G N G G D G F V A V R Y L L N R G F E V E V F L L$ G EGARILVLCGPGNNGGDGFVAASALAAAGRRVEVALL $P D L R G H R A V V L C G P G N N G G D G F V V A R L L K E A G W D V V V F L V$ P Q A Q H WL I L C GHGNNGGDGYVVAR LAQAA G L S V V T L L A C A AR
 $P E E T K G V I, I L H G E G N N S G D G F V L A R W L Q N Y G K Q V I L L Q V$ PKKYPQVGIVVGPGHNGGDALVIARELYFAGYGIRIYCG $P Y S P S P R V G I L V G P G H N G G D A L V V A R E L Y F R G Y E V S I V C P$ E S G T IVVV I A G R G N N G G D A F V A A R H SLDA H N N V L V
 PEAR R R GVLCGPGNNGGDGYVIARLARAAGEGCWVLEA

 $G G L A G R R V L L L A G P G N N G G D V F A L A R H L L C A G A V V R L A Q T$ GDVRGKKVVVYAGKGGNGGDAIVSARHLAARGADVTVVLL
 $G G R H G R \quad V L V M C G P G N N G G D G F V L A R Q L R Q T G F D V V V A Y Q$ $P \quad S P A R V T V Y C G G G N N G G D G Y I L A A B A A Q R L V P V B V D Q P$

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

A P L



R Q



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110
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 EPPDR GEAAA QRDDIAA LGIPSVVLYGRDSDLVRAS GIVDA PEHGPASALA QRACTDYLAVGGAIVELPYALAQADVIVVAA GEKLS G DALRAK QE WLANGGEVVCLDDSLELEQDADVI V D G





 R R Q E T ST D GNWR L CRE R A I SEVVRAAD D P Q L A E S D LV I D A
 GKEEDYEARQHLHTLQQQLADEETCLLLSAPQSDADWVIDA PEKVR GAALCALNCFQASGYHHHQYHAYSRIAQSDVII DA

 GDEGR I GGGDAK T A Y L R F I EA Y P Q E LGHS A DLDK HA Y VYA QE Y QVG GQL L NLP K S LIFEF DCHI DA KEELS GDAARAA QLATSAGVGCEEWEANTVLTGGEVIIDA NAKAEHEPAVQARRACRELGLEERPGTDCTANDYDLIVDA G D K LiP P D A A A A L A A W WRA A GGETVVSSDFPAAAPAN G WA L V V V D A

 R D PLLS GD A A R A Y E MA WQ A G L D V I E WR P V T V I $N$ N G D D V V I D A



 GDK LAP PDARVNYERWGELGGTSPDSEFNANKCHYELAVDA






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



## 


 Y D PKHRDA QVNLQALLKMKVVHLEDPREYRPEEADALI DG A DKQPD DARKALQRARESEVVEFLDDADAEHVTQTRWVI DG
 A DK LS GEAR QAYDFAVQEGVLMQVFTAASAPAE GVIVVA
 SVDRR GDSKAA EDMY LA CGGRVSDPEVSDLLLGGACLVV DA RDPLSAEAAEAVQLARRSGVEITPWHQEMRLPDSDVVVDG



 E $\square$ G A S T DLKK QA DQLA E QNQLLK DHLD F DLQ A A S F DCHI D A GEPDNF SKAN QYYY DK CLDEN H TIYE F A E DL Q N Y DC I GD G






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UniRef90 J7Q815
 L L G T GLASAPRAPYD GLIVQANRHPAPIIALDIPS GLNAH
 $M F G l G L N R P M P E N L Q S F V K K V N E T D V P C D A V D L P S G V A A D$
 L L GT GFS QAPRENIA T LI EHANQHRAPVVA LIDIPS GLLA Q



 LL G T GLA H QVE GAEAHLI GMINNRWRAPVLAVVDLPS GL QA D
 L L G F G Q T R S L




 L F G N G L L L G T GI H G AVV E P F S QVVE Y I N Q Q A Q P T L A V DVVP S Gl C S D LFGFGLERELKDSVASAINHLNDKSVPII SI DVPS GL H T D








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L L G T GLLNRAPAAP YQSLI E Q $\square$ NA HAAPVVAAVD PP S G LVA A
S GLLPIVALDI PS GLLAA
$V$ V G T GFRGKLP FEALGAYGFDT TYASRFLAIDMPS GL RTE















 $L$ F GVVGLT R L I T G A I A D L I T T I I N N L



 $L$ F G A G L L S R P L E G E V A D D L V Q R I N N R S T




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180
190
200
GAMKLSDTVVADLVISFQRAKVNFFLPESAGFDRE\|IVVD
 Y GTAF GEAI CAA QTLSTVIVLKA GQLTAKARAYTGQLLFCHD T G DADP H TVVHADYTFS LHGLLKPSSLLLFPSSAYFGETKAVG TGEVLGGAALKCCLTVTVCRPKPAHFLYPAKEYVGETVVCP



TGEAYEDYV K P DLVV T




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




T G E V L G TA A R A S Y T F C L G L W WK L G L L Q D Q A L E Y V G K A E L DD



 GA DVS LA V QA DVTVT DQHPK LSSAFL Y PAA S CY GK L E V V D T GHATGGI A I D A D H T L E F L A P K A G L R T G A A R D L A G T L S L A D


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$$TGRPAPEAVRAHATATGAVLGRAVRASHTATMIALKPGLLTLDGPDHCGELSVHDT

S GATLEACVRADLTVTFIARKFGLLYTGMAADFTGEVVLAP

TGVASPVAVVTA DATVTFEAAKTGLVVAPQAAAYVGRLLEVRP









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UniRef90 C9Y182 UniRef90-E8R859 UniRef90-D2BGS5 UniRef90-K9PXM9 | UniRef90-M9U5V6 |
| :--- |
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## D

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## L

 VI G G S Y T F S G A P T L A A M G A L R A G A D L V Y V A S P E D T A R I I $L L V G G N S G M A G A G L L A G R A A D R A G A G L V V W V C Q H P S L P S P$ LLICGSKQYSGAAILAGLGARASGVGMLSMAVPESVKLLV
 LCVGGNLGSGGAIMLTAEAALRSGAGLVQVATRDEHVAPL LCLGGNNGFAGAIRLCASAAARNGAGLI RALCHVNSTVAL LIA GSEEMCGASYLSALAAYRSGAGLVRIFTPKGNRISLL LVVGGHADMGGAVIMSAEAAFHAGTGKVSIVCHAKHHQAI








 $L V M G G A P$ G F G GA A L LAA S QA A A R M GA GK V S L A A A P E H I TA S













Li $\quad$ GGG GARYS
$L \mid \quad G G G \quad R Y S G A P A B L$




 $L V V G G S Y$ H Y F G A P F Y A A S A A L L A GA D L S F L A A P S DV A K A A






 $L V V G G E R M T G A S R L A A R$








UniRef90 R9GLA3

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UniRef90-F0BG14 UniRef90-E8LV48 UniRef90_V2XIG9 UniRef90-N8WBT9 UniRef90-R5X560
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UniRef90- B8GNC2 UniRef90 K2QF36 UniRef90-E6UHZ0 UniRef90-A1U4D0 UniRef90-S7TYV0 UniRef90-V4JVI7 UniRef90-UPI0003158F07 UniRef90_W9H7A5 UniRef90_UPI0003791AA7 UniRef90_I315Q3 UniRef90_UPIO002EB8250 UniRef90-D1BAA5 UniRef90_UPIO00380835B UniRef90_GOTYJ2 UniRef90-D1A325 UniRef90-E1JWD4 UniRef90_P74217
UniRef90_G7V9Y0 UniRef90-M5ISN5 UniRef90-N9ERP4 UniRef90-M2Q1D5 UniRef90-B8G841 UniRef90_UPI00047A2D23 UniRef90_UPIO00475C083 UniRef90_C7NUB4 UniRef90_Q47DG6 UniRef90_A1BFX0 UniRef90_K9FH07
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 QTALPEAMVLTSSQEEELAPTD IPFSPNAI GIGG
 IGAAPELMLAAAATGDGEWNADSAEELLQLAQKRDVLAVVG AAH ETSIVLKAAVRGDAMVQAVKEFH PAATII G ATANP GIIPVPLKGDDITREHVKDVVEEARHVNAVAIGG RSYSPDLIVKTLRDDGSFINPGNVDEIIEELSKGADSLVVG AAHLTAIMLRACNGADDLEDLL VDERLNAIAAG
 LTARPELMVQALDDE ALLQRALAWADVMVI G ASHDTAIMLQQIDGAHGVSELLEDKRFNAVCLG VARAPAEALIKTYDCNDTSDDIKYD NANPAEFLGI GDPRDEGTDTP D DK DFTTDFKTADSVVIGG


## V

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A
L
L
$\frac{L}{P}$


 K S GMPELM I R LGKGNEWNGHFMAELGPHLGRAGAL, GVG

 DPE QP E LMMRRTPA E $\quad$ VLLT G D LA T C V A I G LARRRPELIMA

 L A R C P E L M M V S $L$ S R C P E V M A C LSRRCPEVVMAC







 | $P$ | $L$ | $S$ | $\emptyset$ | $P$ | $E$ | $A$ |  |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $S$ | $L$ | $P$ | $P$ | $E$ | $V$ | $T$ | $L$ | $L$ | $P$ | $V$ | $A$ | $E$ |
| $R$ | $C$ | $D$ | $W$ | $G$ | $\square$ |  |  |  |  |  |  |  | $R C D S P$ S L L $V$ Q S C D

$S L Q L P E A L I V G C P E T E$
Q GY S E D LIV R P F D G T Q L
D LLQP EL MMRRA DA


HAFAP GAVVI

$A V A B L L L L L E N G R Y S A A G A G$ A GA I A G L P P GA D L N S Y S A IAA T E P A V

## UniRef90_R9GLA3 UniRef90_D2BXA3 UniRef90_UPIO003708BAE

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UniRef90 C3X1F0 UniRef90_E0RDP3 UniRef90_F0BG14 UniRef90_E8LV48
UniRef90 V2XIG9 UniRef90_N8WBT9 UniRef90_R5X560
UniRef90 R9CP97 UniRef90_R9CP97
UniRef90 C5BRI2 UniRef90_UPI000474F602 UniRef90_UPI0003B39772 UniRef90_W4AG96 UniRef90_K9X1K7 UniRef90_A7NJE2 UniRef90_B0JW32
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UniRef90_F6D424 UniRef90-F6D424 UniRef90_A4ELC6 UniRef90_U1THA6 UniRef90_LOMD51 UniRef90_A4EWA3 UniRef90_UPIO00409176D UniRef90_B0VJQ3 UniRef90_L8M4J3 UniRef90_UPI00034770B4 UniRef90_D7EBA1 UniRef90_D5E885 UniRef90_A4BHY6 UniRef90_N9EAT0
UniRef90 ${ }^{\text {B8GNC2 }}$ UniRef90_K2QF36 UniRef90-E6UHZ0 UniRef90_A1U4D0 UniRef90_S7TYV0 UniRef90_V4JVI7 UniRef90_UPI0003158F07 UniRef90_W9H7A5 UniRef90_UPI0003791AA7 UniRef90_I3I5Q3 UniRef90_UPIO002EB8250 UniRef90_D1BAA5 UniRef90_UPI000380835B UniRef90_G0TYJ2 UniRef90_D1A325 UniRef90_P74217 UniRef90_G7V9Y0 UniRef90_M5ISN5 UniRef90_N9ERP4 UniRef90_M2Q1D5 UniRef90_UPI00047A2D23 UniRef90_UPI000475C083 UniRef90-C7NUB4 UniRef90_Q47DG6 UniRef90_A1BFX0 UniRef90_J7Q815

340
350
360

 PGIE P D E QLE S F I H GVV LK E
SGCG\|S QT TKERLK IVSD S QKPFVADADAIAFAKDT




$P G I G T G S W G Q Q M L Q Q V L A B E K P R V L D A D A L N L M A A R V A V$
WARGC FR




P GLGRFAGDTGWLR R L WE E Y G G P L L V L D A D A L N I L A S E A WK
P GLGQDDWARALWQGVVLGSDSAVVI DADGLNLLAATSAP

 CGMGDTEDTYTKLKYVLESSKCPVVI DADGLNCNKKDLLE



$P G L T K D S T P \quad I V Q A V M K S P E P L L L D A D A L N I L A Q P T L Q$
P GLGREKATRAF FERELGLQS PRHRI DAD GL N I L A DVWDR

PGMGRSKDAATEL RK LI ALLLRPPTVEDADALYHLAE DK L Q
P G L G R D A E T K E F L L K V L A A V T CP V V L D A D A L N L L A K A L I A

 P GIWD E E G S K K V LIDH TI N K A K I P II X D A D A I N I L S HI DL G

 P G L G N S E E A DIS L E R A I H S S D K P L I L D A D A L N W V A R S Q V A
 PGLGGRQA WGHALWQAALA A GLDSSVLDADA L NWLSEAAA S $P G A G V G E Q T R E S V L A M M L A T G R P T V L D A D A L T S F P E T T M A$


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


PGLGRGADTQALVLSVLKE KRATVLDADALTLNPEALFE



| $P G G L$ |  |
| :--- | :--- |
| $P G$ | $L$ |
| $L$ | $T$ |

$M$ GIG R D D R S K S A I E K
M GLG NE EA I S QAV H QI L P LDCK K IVVDADALNKLQLP









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




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


CGPGLD




## UniRef90_R9GLA3 UniRef90-D2BXA3 UniRef90_UPI0003708BAE UniRef90_G2TQJ6

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UniRef90-V4JVI7
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UniRef90-J7Q815
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YENAVITPHAGEFKIFFGEEPSNDRDRISQVIRYAKKC LSDRQ ILTPHPGEAARLLGCSVAEVNDRVSAAKKLQSTF RHQDNWVLTPHPGEAARLLGSTVAQVEDRFAAVVALQQRY KRRGQTVLTPHVGEFRRLFPDSAELLPDRVKAVQKASQLS RRQGATVLTPHIGEFKRLFPDSAELLPNRVSAVQKASVLS
 PRSAAVVLTPHPGEMARLLGIPTAEVQDRITHAREYARTR PHGPRVLTPHPGEAERLLGLPTAQI QDRLAAATALAQRF NVDPKRI T TPHPGEAARLLDCSVKQVQDRFKAVRALQQKY KENRKLVLTPHDKELDSDLLYGSKEEVKDDIIGGI AEELKYC RLNNHVYATPHSGEAATLLGCSAKEI QDRIVAIGQQLQQKY KHPNRIIITPHLGGEMARLTGYS I SNI RDNVDVAKEFAQKY
 PWRENWILLTPHPGEAARLLDTDIATVQDRFKAARKLQLNF SKDKQLVI TPHVAEFARLYNAAFGDERNMLKWPLALSEKY
 LPMGRCVLTPHPGEMRRLDGVEAQUAEHPVDVAKDAAARW
 SRGSRDIMTP


 VRRDNWILT PHPGEAARLLUGCSVADVQQRPAAAQALQQRAR
$\begin{array}{ll}H & S S Q L I T P H P G E A A R L L\end{array}$
 QRPKNAILTPHPKELERLIGKW SDDLDRQAKAKEFAKKH CR EDWVLTPHPGEAARLLGVSGAEDQADRRAAADAHERY S $\square$ SGPCVLTPHNGEFARLFDPCG DK LDRTRAAARRS PRSAAVVLTPHPGEMARLLGDSTAEVQDRITHARQYARTR ALHDKAVLTPHDGEFARVFPKEAGAKASKIEKARSAAQRS KLWPEAVLTPHRGEARMLAGHDGEPQ KLNKKVVLTPHTAEFKAVFDDPVPQNFDKVETVLEASKNS AGAPRAVLTPHAGEFARLFDDVAAPPGSKLERARSAAAFLD

 VLHENCVLTPHGGEFAKLFPDTTGPAYSKVDATREAAKRA ESKTPVVITPHFAEFSKLDDVPREDDKDPI GYGQKFADEY
 KRQAPTVLTPHAGEFKRLFPNDSDPNKDRVKAVREAAEQS
 VPCTNWVLTPHEGEAARLLGWRSDKVRNNRVAAQALASRY
 RRDYETVI T KKQSTVILTPHPGELARLCGVSQDEVTDRLKYSYGFSKKY $A P A D N H V L T P H P G E A A R L L G C S V Q E V E D R M G A A A R D Q K G W$
$R L P E G T V L T P H P L E A G R I L G T G A G E V Q D R R S A V H A L I D R T$ ALWPQAVLTPHRGEARMLAGREGEPQ ELLAAEIAKAY QHKAKTI I TPHPDEAARLDDATTAEDQDRPAAARLLARHF
 PKRDNWVFTPHPAEAARLLGDTTAEVQDRFAAVRADQVRY KRDAVTIVTPHPREFSRMTGKTVKDIGNNRMELAHYSLEN
REARCSWI TPHEGEAACLLGTSSRWVVENRRDAAEALAS R ERRDDWILTPHPGEAAMLLGCSIGEI QNDRHGAAALQRRY ERGGNRIITPHSGEAARLLQCSVSNVERDRFSATELVQTY $\frac{\square}{L} R A P T V L T P H A G E L A R L L G R D A E D E A R R L E H V R R A A A E L D$ EK DSEVVITPHPGEAARLLGTDDPAVEDRLESARALAATY QRRHDVIVTPPHEGEAARLMRSKASCVGAKRLEFAKS DAEK A L HEQCVLTPHAGEFARVF QLSPNTYLTPHPGEAAKLLDCS $\square$ AE DESDR DAA HRLKKKY KQKKPVILTPHLGEFKRLTDY NDQDDDMEKAVEFAREY LRVQPTILTPHDGEYRRLFG DCEGNRLVRAGTAARES ERRAPAVLTPHDGEFKRLFPEDTLTPNPRIAAVRAAAMQT ETEATLI CTPHRGEFERMGGQDAADWETRAENVAELAAEL
 $K R D G Q T V I T$

## UniRef90 R9GLA3

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UniRef90 C3X1F0 UniRef90-EORDP3 UniRef90-FOBG14 UniRef90-E8LV48 UniRef90-V2XIG9 UniRef90-N8WBT9
UniRef90-R5
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UniRef90-N9MS98 UniRef90-G4F8K4 UniRef90-A3WJ74 UniRef90-HOPV98 UniRef90_K9ZII2 UniRef90-J4×6M2 UniRef90-A0A024PTB0 UniRef90-UPIOOO46AA132 UniRef90-UP100026C5AFA UniRef90-UP10003AAE9B0 UniRef90-D9Q1R1 UniRef90-F6D424 UniRef90-B8IN29 UniRef90-A4ELC6 UniR Refo U1THA6 UniRef90-LOMD51 UniRef90-A4EWA3 UniRef90_UPIO00409176D UniRef90-B0VJO3 UniRef90-L8M4J3 UniRef90-UPIOOO34770B4 UniRef90-D7EBA1 UniRef90-D5E885 UniRef90-A4BHY6 UniRef90 N9EATO
UniRef90
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410
420
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440
GCTILL|KNQYTM|IFTRDGKCFNPTGSPAMAS GGMGDVLITG GGVVVLKGAGTVLASEQGNVIADVGNPGMATGGMGDVLAG GGVVVLKGAGTVADESGGQA ADVGNAGMASGGMGDVLSG $N C T V V L K G A D T V A A C A D G R A A V N A K T S F E S T A G S G D V L T G$ G GVCVL K G S GTTLI T D GPQRWWLCSAGNP GMAS G GM G DVVL G




 $R S V V L L K G A R S A I A N P R G S V W I P E S T P A L A R G G S G D V L D G$ $R S V I L L K G A R S A I A N S Q G S V W V P E S T P A L A R G G S G D V L T G$ G GSVVILKGAGS LVA GPENMKVCPYGNPGMAS GGMGDALSG NAVIVLKGSGTLVCSPDGKTINPTGNPGLATAGTGDVLSG GVTLVLKGARTVIACPDGTYVNTTGHAGMATGGAGDVLTG DAVVVLKGAGTVVAAPRAPRIDDAGNPGMAVGGMGDLLTG GGVVVLKGAGTLICGDGKTYVCSAGNPGMASGGMGDVLTG SGMVVIKEARTVVVGEGRCYINDSGNSAMAKAGSGDVLTG GGQWVLKGAGSLILEK EDFICTQGNAGMGTGGDGDVLAG KMIVLLKGYETVITDGNYTYINPTGNSSMANGGMGDTLLG KINILIKGAYTVSVLSDGNCYFNTGNWGMATAGAGDTLSG GAVVLLKGARTAIADDQGIVWINPESTPAMATGGMGDVLAG NCVVICKDARSVVAGKRQIYVNDSGNSGMATAGSGDVLAG GVILVLKGAHTVIATPEGQAYINTGHPGMGTGGAGDVLTGG $K Q I V V L K G A T T V I A D P E R V R V N D G G N P A L A T A G T G D V L A G$ GALVLLKGARTI IASPGGKMYIPESSSALARGGSGDVLTG KGTVILKGVSC AQQGKPTVISPFSTSALAVAGSGDVLSG KVNLVLKGAPTLIVSAKTVYVNSTGNAGMACGGMGDVLTG GVYLVLKGPYTIVTTPEGDQYVNTGNAGLAKGGSGDALTG GVAVVLKGAGSLVATPCLPRLVDAGNPGMAVGGMGDVLTG KSVTVLKGAHSTSTPNGNFNSTGNPMSTSGSGDVLTG QATIVLKGAGSVVIDGDERFVCPYGNPGMGSGGMGDVLAG AGQWVLKGAGSLTELGDDLEICTOGNAGMGTGGMGDVLAG HAQIVLKGAGSLI SSPGLVVCYGNGMASGGMGDVLSG RALVVLKGSGSVLTNPDRWLINSTGHPGMASAGMGDVLTG GAVILLKGARTAISNPQGVVWINSETPALARGGSGDVLTG K】ILVLKGAFTMITDGEHFWVNSTGNPALATAGSGDVLTG GGSVVLKGAGTLVADADGVSVCPYGNPGMASGGMGDVLSG GAVIVLKGADTVIAAPDRAIINSNAPPTLATAGSGDVLAG GVTLVVKGARTVIACPDGTYVNTTGHAGMATGGAGDVLTG GAVVLCKGPDTVIARPDGLVLVNTSSPFLASAGTGDVLSG GATVIVKAPDVICSPDGRCRFNLTGHPAMAVGGTGDVLTG DCVVLLKGAVDVVSNGKYVRLNATGNPGMTVGGTGDVLAG GAVLVFKGADTVIAAPDGRAAINHGTPWLGTAGSGDVLTG SCVVLFKGPDTVIADPSGRCVYERSAPWLATAGSGDVLAG GGVVVLKGAGTVIASATGDMIADVGNAGMASGGMGDVLSG GGVAVLKGAGTLIADEHGAMAIDVGNPGMASGGMGDVLAG GCVVLFKGPDTVIAAPDGRCSVNSAHPWLATAGSGDVLAG QVVVVLKGYRTMVFTNGEDWFNSTGNPGMATGGSGDVLAG GAKVLLKSDTTHFSDGKRMFTNTSGNDGLATGGSGDVLAG NATVLLKGARTAIANPQGQIWIPQSTPALARGGSGDVLTG TAVVLLKGARTAI ATPQGTVWNPESTPALARGGSGDVLTG HLITLKGKEDIISDGERILYNQTGNPGMTVGGTGDVLAG KIITVLKGKTDISDGRYIRKNDSGNAGMSVGGTGDVLAG QAVVVLKGAGTLVATTSGLTFCHPGSPAMATPGMGDCLAG SAKWILKGAGS TLDNH LWW CTQGNAGMGSGGMGDVLAG GGVCVLKGAGTVIRDAEGTAI CTGGNPGMASGGMGDVLTG DTTVVLKGAVDIIAGNDKLKLNSTGNPGMSVGGTGDCLAG HGIVLLKGAGTVVATGSGVPI DPGGNPGMATGGMGDVLSG GAVVILKGAGTLVAAPSPVHLCSVDAPALSVGGSGDVLAG GATVIVKAPDVI CSPDGRCRYNLTGHPAMAVGGTGDVLTG KSilk GAVVLVKGADTVVAAPDGQAVDNAAPPDLATAGAGDVLAG RASVVLKGCGSVLALPDRWFINTTGNPGMASAGMGDVLTG NATVILKGAGSVAASGDKDAVVTDGNPGMATGGMGDVLSG DVIVVLKGRNTVIAFPDGSYVNETGNVGLAKGGTGDTLTG FGGVVLKGRNSVVMRGEADSVVCAGHPNLSVPGSGDVLAG GGVIVLKGAGTLVQDSLHCYVSRFGNPGMASGGMGDVLGG GGVALLKGPGTVLQVAEDADKCDAGNSGMATGGSGDVLTG SATVLLKGSTTLIAEQDRPVRNPTGTPWLATAGTGDVLSG GCVAVLKGPATVVAAPDGSAVSPVVAPNLAVGGSGDVLSG QATVLLKGAKTVIASPTGPTWIKDSTPALARGGSGDVLTG WGTVLLKGAGTVVDDGNRTSVIKDAHPCLSVPGSGDVLSG GAVLVLKGADTVIAAPDGRALINAAPPWLATGGSGDVLAG SGKWVLKGAGSLILEDKLWICTAGNPGMGTGGMGDVLAG ESVLVLKGPHTVVTGYESYRMTSGNKAMAVGGMGDTLAG RQTVVLKGATTVIAAPDRTVIHDGANPALATAGAGDVLAG GAVIVLKGPDTVIAAPDRAVINSNAPAELATAGSGDVLTG GAVVLLKGARTAVAHPDGTWVQPESTPALARGGSGDVLTG GMTLLVKGPADIISDGKSTRVSRTGNPGMTVGGTGDVLAG RSH ALKGCGTVATVDGRWWI NTTGNPGMATAGMGDVLSG RVNLLLKGYPTVTAAPSDPVLNTTGTDALGTAGSGDILSG GTMVILKGAKVALASGDRLWLNPHSTPALARGGSGDVLTG

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UniRef90 F4XY06 UniRef90-B4VMG5 UniRef90-S2KGS9 UniRef90-C3X1F0 UniRef90-EORDP3 UniRef90-FoBG14 UniRef90-E8LV48
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UniRet90
N8WBT9 UniRef90-R5X560 UniRef90-R9CP97 UniRef90_C5BRI2
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UniRef90-N9MS98 UniRef90-G4F8K4 UniRef90-A3WJ74 UniRef90-HOPV98 UniRef90-K9ZII2 UniRef90-J4×6M2 UniRef90-A0A024PTB0 UniRef90-UPIIOOO46AA132 UniRef90-UP100026C5AFA UniRef90-UP10003AAE9B0 UniRef90-D9Q1R1 UniRef90-F6D424 UniRef90-A4ELC6 UniRef90-U1THA6 UniRef90-LOMD51 UniRef90-A4EWA3 UniRef90_UPI000409176D UniRef90-B0VJQ3 UniRef90-L8M4J3 UniRef90-UPIOOO34770B4 UniRef90-D7EBA1 UniRef90-D5E885 UniRef90-A4BHY6 UniRef90 N9EATO
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| R5 | V ${ }^{\text {d }}$ |
| UniRef90-G4E44 | DVLTQVRGV |
| UniRef90-c9Y1 | DLFSTLYRF |
| UniRef90-E8R8 | TLMEHLPKAVR\\|LR |
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| E0 |  |
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| UniRef90-H0PV98 | EVITE A |
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 A P P R K GS DAMRASLLFYKGPVVASNGEFSVVASGGVI DA
 F PKGN R D $N Q N Y Y A K F S N L K D P L R E L T N D S D Y D V V I D A$ GEMKHKD GMVVNVSAVENNMDYSSITMMLGGFDDVLGGEADDVLI DA T E R N Q L G S L C K K K L N E L V H A F I Y E Y P C P V P WT KA D Y V L D S VIPVD S L T G D A A LIA A A E WQ GVVV LT EA DPA GA A L V I D A

 GEPRPDSD A AARAAGECPGLPMPLAGFSAQAGSVIVVA Y P E D T L C G Y Q A L S GRLLR DFH GHAEAL P F VR DTHYEVVLIDA




 SKP LDPE EAATAREA WLDDAGGVIDHAADVAAWPD DVDDLI I DA
 S GLLS DDCLIDNQRRLS QNQANVNVRFNPPMIQPEDIVIDGG
 $T$
G $V$ V R R H R P D DA Q K A F L

 TPPDTLNGDARLAAASWDG RVVEAATCDFKGVDLVIDA
 SPDRAHAGGLRALRHAGGRVVTDPEDALRAVGRAALVLDG KPDLKP LT A EHARYLRALGAEFVERDVEALACDDL LI DA




 GS I EALKG GAALAAGRWTGGVEDAVQADLVQADLIVVA
 GKQKPGSDAA LAASDACNLPVVEHDGHCYPEAGEVVVDA PSRARSDGRQARRRWGESGGKVATLESFDPATAERWVDC REDRTE ETKKNF E I LDKRA GYEVVKTFHE WDDEEECDVVVL D G SEKYHRE GLAA LVAA GGRVAAGSSGTSAADDDAAADVVV DG A SKFKNEAKLDAL DDF LQA GGELEESAKFVESKTFPFVVDC A APTSAATTAALQALLAAGLQPVPRLAEEHPRPAEVI DG

 A APESLAAGDAALAQWARMAGVAVAQWQGELPAENSVVVDA



 YP PATLQA YEAE QAPLR DFEGIVEEALPPFVEENHYTMLIDA GTPRAGSDAALAA
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 GDKQSLENKTQLE IVTKLGGECVFENVKSRFSDFNLII D G
Y

## G

 ERGDSPALQQAFLYA QDKVENDLYTHFNVA GHYDABI DA LS NGVTS DERKHALERAAAQFVATFDAAYAIGGWTLVI DG AEGQGGDALLLARRALEAHSLEDRP L E EA I WNREEVLVDA
 GDKLLPA DAKVNYQRWCALGDVHRLDAATTKVQHADLVVDA GRRVHEGGGAALRSAGGRVRWFTVALLADEDLIFDADDLVVDG

 E A GLA DLRAA G GRLL G GGEEAA I A GA DLI I D G VDKQS LKGDAAKAADEWEG EDRPLNAALEAPHDVVLDA






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UniRef90＿UPI00047D3325

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##  <br> 再


 SGHILGTAI RARATVTFFRKKPGHLLQPGRAHCGVLHVAD

 LLGEELGEYVRPDLVVTFHDVKPGLDKREFRFVIKKIV
 $T G E V M G I A V E A S A T V T F F R R K P G H L L L P G R R D H C G E V E V A D$
 S GKAMGPAFRAGLTVVFARKKPGHLLMPGREFCGEVALAD

 TGEVLGGAVQATTTVAMAAEKDGTAVTPGALYAGQVRVAD TGAVMGAAI RARETVTFFRRKPGHLLVPGRLYCGKLKVAD

T TGSSTD D AVEPDHVVT TGEADGSVFFRATETVT SNNNMENVIKATYTYTFFRLKPGHVLFPGRELCGTVRLAD TG G VDTGAAQAADTVTFFRKKDAGMLSDNAPYVGEWKVIN $\begin{array}{ll}T G G V D G G A A Q A A L T V & T \\ T\end{array}$ TGMILNGALMAHKTIT

## 

## ロールー

$T G A V I G A A V S A E V T V C L G A A K A G L L V G D G R L K V G R L R V I D$ NGQISGVAVNARATVTFFRKKPGHLLQPGRAHCGILHVAD
 $T G A V R G A A A P A D E T V T$




##  <br> ．

## S

## S

\section*{| 1 |
| :--- |}


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


TGSI NGPAVRASHTI



r

| $T G L V R G A$ | $A$ |
| ---: | :--- |
| $T$ | $A$ |

SGRVDGAAVQADLTVTFHAQKDGHVLAEGPQHCGTVRVAS TGEVAGHAVRADVTVT
TGESLGAHVTPDLVV
$S A K P$ G $K$ G H K P G L I D P A S Y C G V V E L V D
 G QVPSAAI KATDTLS DGLPKTSYFQNDGPAHVGSLINLD





210
220
230
240
A G|I IS SKADLGGGDKWLLNPSHFVDVI A SRSKFDHKNRFGHT I GI P D H I L T A DE P H A FE P D L WA S A L P V S G DE A HKY S R G HA
 LIDSSNIIKLS QSEYQVVYKNHIQDDNLRKKKNTNKGTYGNLL


| G DP I I E G L G VQ T F V N C P E L |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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I GIDEMR\DDADAM YTHPALFRGQYGDRAVDLTHKGSEFGRV
I GID P AVLDEIJKPQANDPNLWLPHFPDPRADCHKY GR GHA
LVK QTSRVKK DWTK GDVRQS FPKR SP GAHK GTF GN G

GTPPDVK LDDKARVNGLA LDWREHFRWPSHTGHKYAR GHA
I GLGDS QP DKRTKYYVFSSSDMEELPRRREKHTCKYDYGRV
I M D VA E S VQP GA F E NAP E C WA S D WP F L
$L$
$D$


L D D DGHFAPA RLHLNDVKFFSRHDRSRVHNSHKGSYGNV



-



 L DLPEA I A QMPRARHLGPQ GWHGRLPARRPGAHKGDAGHV 1 GIPEYFEK LTGPGDVK SYRRDPNAHKGQHGRV





 PSYSAKSTSNAPYMYFGT QEME QVLPDRKRFSNK YDYGKD IG LAA P ELDPEAALLDRPQAVDDARMLPSSPSVEDDKYRRGVL





 LIPP D D QLLNALA QL S P T I IDDLPPRRAF GHKGSYGHA LDIEARHFEAASMHLNDPRHFARHVKTRRQNSHKGSYGNV



 I G L T P E L P G P E L V S P P R A A D DA S L L L P V A GA E S D K Y R R G V L



$\rightarrow R \perp P$ P
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UniRef90_M0CS71
UniRef90_A6DFZ1
UniRef90_A4G5W4
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ATHLTSIMVRETRGLRD
DARCPEAMVH
SGAAPEVMLAPATEEESYW
D IS TPELMTKP
SSIMELMP S SLS P DL TSVKDSGKND NEDNLTELDKWUDKVNSVVLG

AAALTAVMVRETDSARQFAELLA DKRLNACVAGG
LARRPEVMVR AMHLTSIMLRKTDDRDELDAFLADRH PRAFVLGPG HSYAPEAVVIAQE MDADLEKAGWADAVLDG LSRAPNDMLRDINDF DENG:KETLSQVDAVCFG AAQRPELMVH AVETVAELDALAARASVLAVG GMVVVGGEGAKGGEWAPDIVVRSQTEVPAAFADCQAVVIG ATALTAVMVRADDTPDQLAGMLA AGRVPECVFLHNGLEKDAKGE
 DTARPELVHHEELTAASLDESLEWADVVVI G AMHLTALMLRPFEGPEGLSADLDAS DERKNALLI G HTSLPEAVISRDKHSEYFTMFDNAHD YDAI AIG AAALDSTMVQPGPGQDALALSASLHEVLGDARTSAVLVGP NQERPELMVQ QNHLTSIMIYPENNNDDVMSFLSQ AAHLTS MLRKTVDVADIREGOQGERRPSAFVLG
 KAGYPDVMTMPMGEGGHF GPGDAAAVRQFVHGADAVALG APALTAVMLRVADGPAGLAALLDRDGSEDKRKNVVALG
 HSALLPEVLVHA WE GIPSSLLAEKDSETSTQDKPFQAVAVG ■SRAPNDMLRDMNSLQD SDSDAGEQLLQQVDAICFG SRRWPDVLVT
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 LARYPEALVAAGPPSE LDPDVGLPGRVQAWVVG HLAVPEAVLI GRDVDVLTEKIGAWADSVLIG AAHLTSDILRRSDSFEDADAFLD DHADARRPAVLVYG LVTSPEAMFANWK LDALEQRLTWCDAIALG ASHTTADMLKETGSAADLGE AGQITALMLRRVEDGDDLSLLLDDGRDN ACQ TALMLQRVDGPEGLSDLLD MTALPEAMVT A A HAVMUPETDADAGAER AA A L EAVMLSPFETDADLAAAAERADA

DSAHPELMCRLADGFDFNSA
GFDFNSA LARVPEVM FREDNSRGELLAMDDAAEVVIAGG QGFGEDLIVRPYQGKQLPEKQVGFLLQMARHHDTVVIG TPLEPLEAVFHPVQAPALPSMRVEADAVGMG A A HLTAPD ALRLDEEGKNFTKEHLEEVLALAEKSDAVIIG AA HVTADMLQEDVG NGKADLESYLKDPRRTTFVLGG LARWPETVASLLDPQNSTDLSP GRVSAVVVG ASASDSLVARAYDHDADFGEVLA DHRASAAVLG ASYSPDLVVVKLRGENF NQRNLEERKPWAEKANAVIVG
RHRWPEVVTVIEPGR ASHWT KEVSDAEKLERDGRVQAWVVG RMALDSIPVVGDPADTRAFGAAAGEQLRESAESASTVGLGG QGYAEDLTVQDYEGDHLTPDQVDGGVETAHDYDDVVVLG HESLRTPQNPGIICLTKPPD\|ISSHFEKSQSVLIG DSVQPELMCRPYDADRLSPD QVGSLVAHTDDFDSTVVVGG AGYAKDLIVQPYDADRLSPD QVGSLVETATDHDDVVVLG
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 E $\square K K W A V L T P H P G E M K R L L R M D F S$ AERRPEDARSFVKDK DGGGQAVLTPHAGEFGRLFAGTDAVDPSKLERALRAASDA RNDPQVVLTPHDGEFARLFSASSRPHASKLERARLAAAQS QPPADAILTPHPGEAARLDDTDTAGDQDRFAAAAALAERY LFAAAAVLTPHDGEFARLFPDDAADERSKPDRARQAAARA ADFANTILTPHYGEFSRLCGHTADEDANALVLATDFARDN LSL H I YATPHPGEAATLDSCSTWQINDR』AADYALQQKY V LPAGAVVTPHPGEAARLLACSVEAIRDRFAAARAABTRY PVAGEYVLTPHPKEAARMLGWDVSTVQARREAAREIAMRS GANPQVVLTPHEGEFPRLFSDMKNPLRSKLERVRVAAQRS SREAPIILTPHPGEFQKMTGDPDKEQKNRGQAARDFSREN AKSGEFI ITP
$D P A G E I I C T P$
RHNR $\square V L$ GHAGPVVLTPHPGEAARLLNCSVAEDED ASPGDSVLTPHVGEFDALVGTSSND YERLMKASQDAVDH A R GAVVL PHEGEFARLFPQAAAPSRDKLSRARWAARQS RRGEDWI LTPHPGEAARLQGTDVASDEDRPGQVHALVGRLD ESHVHVVMTPHEGEFQRLFPELASCHMTRDEKAKQAAK IS PHAPALVMTPHEGEFARLFPDIADDASSKLDRARAAAARA RRPGGCVLTPHPGEAARLLGTTDAEVQDRVGAARKLAAKL AGNDPCVLTPHPLEAARLLGSDAKSVQDRLAAARELAARY AAPGPVVLTPHGGEFARLFHGQRWEPDSKLERTRDAARD $\square$ SGASEIVITPHVREFARI RKMETADLNKRIEEVMDFSKEK GRTAPTLMTPHAGEAAALDGVRREEVEATRLAVRELAAVY EHR AQA GVSIT P HIGEF IRRVFGEIKAD
QLPEGSYL T
DRRAATVLT
DFKAKLVLTTP
AGAKAAVIT
A INCPCVMT
PNAPALVITPHEGEFARLFPERGQQHNDKLTRARLAAKQS
TWSPALVLTPHEGEFARLFPDIGNKKQSKVTKAREAAKRA RHMDSWILTPHPGEAGRLLNRAVTEVEDRPDAAVAMARRF KVFCEAILTPHAGEFKRVFGKE ATVENVKEEAKSS GDHPNVLITPHAGEDARMLGVERSQVEERLKHARQAAERF S LQQPA LTPHVREFARLFGELPNSSMAIPSRLREDATNT QRQAPPVLTPHPAEAARLLACSTPDVQDRLAAARELAQRR EQRDDWVLTPHPGEAGRLLGDSAAEVEDRPAAVEALRQRY
RGEPRLVLTPHEGEFARLFPDIGSDDAGKVDKAVAAARRA NRNSATVLT L SHGPRLL
ERRAPSLL
R GIVT

| $M V P K$ | $G$ | $S$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $E$ | $L$ | $T$ | ERQAPTLL QKCNHVLL

$R P G P A L V L$ D N S R
ASGGQVVMT
LLLHEGCVLT LNKRKTVI

LRGKSTLLT

KA GVPTVVLT
$\frac{L}{D G K T F V L}$

A $\square$ HDTCVLT
NKNVVIT

DTDATLVCT
PRNAPTIIT

PAKAQWI LT
GEELDPLVFT
ERKAEVVVT
D LTHEGCIL T
$P R Q G L T V L T$

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UniRef90 X7EFG6 UniRef90_UPI0003639AF9 UniRef90_UPI0002FA9499
UniRef90_UPI00047D3325
 NAVLI YKGPDTVI AEPGGAVVNANGTPLLATAGSGDVLTG



 $G A V V V L K G A D T I V A A P D R A A \| N D H A T P Y L G T A G S G D V L A G$ $G A V V L L K G A D T V I A A P D G R A A I T A A P P W L A T A G S G D V L A G$ GCTVVVLKK GAGTII ATP GRDPAVDAGNPGMATGGMGDLL T G HGVVI AK GPDTVI A A P D RAAVNPNGAPWLATA GSGDVLAG $R$ VNLLLKGHPTLIVGGEEGMLNDSGTEALSTAGSGDILAG A GQWVLK GA GSLI LED N LYYICTQGNA GMGTGGMGDVLA G G A V T V $L$ K G A G T 1 GAVVLLKK GPDTVVASPDGRAADANAPPWLATAGSGBVAG QVI L V L K G R H TV I A F P D G E A R I QVVTVLKGNDDVI S DGKETRDNRTGNAGMTVGGGGDVLAG THTFLVKGAIDI I T DSETTRINRTGNPGMTVGGTGDVLAG A GVVVLKGA GTVVASEA GEGDDDAGNAGMASGGMGDVLGG GAII LL K GP DTVIAA E P S RAA V NVNAPPWWA TA GS G DV L G G
 $G A V V V L K G A D T V I S S P D G R A L V N T A P P W L A T A G A G D V L A G$ $G G V V L L K G A G T L V A D A G A G T C V T G G H P G M A T A G S G D V L D T G$ GAVIVVK GADTIIAASPCGRDAVTNGSPHLATAGSGDVLSG $N A V I V Y K G A D T V I A A P D R A A I N S N G A A W L A T A G S G D V L G G$ NANVVLKGSGTVIAAPNGDVINTTGNPALASAGTGDVLSG
 GCVVAV L K GP A TVVVAA S D G QVVVSPVVAP N LAVGG S GDV L S G GAIVI FKGPDTVVAAPDRASILAEASPWLATAGSGDVLTG
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 GAVVLLKGFATVVAEPDRCFVNSTGSPADATAGSGDVL A G $N A V V I P Y K G P D T V I$ A A P D R A VI N A N GTAAFLATA G S G DV L A G RSSVVLLKGSTTVI A HPGPTVVNPTGTPDLATAGSGPVLSG $K A V V V L K G A D T V V A A P D R A S I A E N A P P F L A T A G A G D V L A G$ GAVVVLKGADTVIAAPDRAIINSNAPADLATGGSGDVLAG

 KAVLLLKGRKDVI T D GEK $\quad$ KKFNVT GNE GMTVGGTGDVLAA $D V T V L L K G S T T V I A A P D G Q V R I N T A A A W L A T A G A G B V L A B G$
 QAVVVLKGAGSLIVRPDGYYRVNTGGPALAVAGQGDVLSG
 NAAII YKGADTVI A APD GRALIDNTNAPVWATAGS GDVLA G QSTILLKGARTAIASPSQVWINPESTAALARGGSGDVLAG A A NVLLK G G GTVI A A DASLYLDSSGNPGMAS GGMGDVVLSG ATTLLLKGSRTVITQGHPTAYNATGTPGMASGGMGDVLTGG $K \vee V T L W K G S P A V V S D G N E V K V N S T G N P G M A V G G T G D V L A G$ GIVYILLKGAYTATATPMGQVVFTSGNPGLATAGTGDVLTGG



 GGVVVLKGAGTIVTDSDCHYVCRAGNAGMATGGMGDALSG HAVIVYKGPDTVVAAPSRAVVNVNAPPWLATAGSGDVLAG GAVVLLKGPDTVVIA EPD GHCAVHAGVPWLATAGAGDVLGS GCVVLLKGSDTVI A APDGRCSYERAAPWLATAGSGDVLAG GLVLVAKDARTIVTDGRQAY INDS GSDALATAGS GDVLTG GAVVLLKGPDTVVAAPDGRAAVSNGAPWLATAGSGDVLAG
 DVIVVLKGSGTVIARPDGHVINTTGNPALATAGTGDVLAG $N C H V L L K G V G T L L A A P D D Q E E V V Q A G N P G M A C G G M G D V L C T G$ $G Q T V L V K G E Y D V V V D G E T T R V N R T G N A G M T V G G T G D V L A B G$ $G L T V V L K G N P T V V A Q Q S R D S V N P T G N P A D A T G G G T G D V L G B G$ GGVI L L K GA Y DVI S D GK T WKYNRTGNRGMTTGGTGDVLAG GGIVVVYKGADTVI A APDRAADNETAPPDQLATAASGDVLAG GCTILFKGADTVI DCA $\quad$ CHDAAGARAAPWLATAGAGDVLAG GCTVLLKKGSTTVIA HPGPVVVNPTGTPLLATAGTGDVLSG GAVVVFKGADTVI A APGGDVRVNHASPRLATAGTGDVLAG NCVI L L K G Y L D I I S D G R E F R L N K T G NPGMT T G G T G D T L T G SATVVLLKGGTTTLVAEEDRPDVRNPTGTPRRLATAGTGDVVLSG $G C V V L L K G P D T V I A K P D G M A I V N T A T R W L A T A G S G D V L A G$ $N M V V V A K G P R T A I V G V E R V L L P K S G P A S L A T A G S G D V L A B G$ GHVVVAKAAEDVV SDGERTRLVRAGTPAMTVGGTGDVLAG S IQQVLLK GPQSIYNEQGAFSYNTSGNWALSTAGSGDALAG

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${ }^{1}$ SAGQMRADETEAlIESGQVITGLLELIMERAGRGIVVEAVFSQW ${ }^{20}$
SAGQMRALETEALESGQVTGGLELMERAGRGIVVEAVFSQW YHSSE $\square Q A W E Q R W F D D Q N$ SAFGLMQQVAWMMAQE T T Y TYEETQTLDERAYTTFGLNPEILMEHAGSALAKAVKKKL TVRQMAEADRLSVAAGVSSFELMGNAGAAVAHEIETRW TAERMAAVDRNAAABGVSQKQLMESSGNA VAAAVRD HEMQQWDRQAVE LGILPE LLMENAAAAFHQLGTLC HRVETVRAAETRLMDR LVPGALMARAATGALAAAAELL YHSQSIQAWEQRWFARQN SSYGLMQQVAWTLHDQDRKIF TSRRMAAVDLNA EALGVPRKQLMESSGNAVARACRDLA YSVETVRAAERALMAR VPEGALMQRAAAGLAAACANALD SSTEMAVVDENA AADGVPRKQLMESSGNAVAHAVREVA NVEDVRRVEEALTKAGVSVSELMHRAGAALAHEVLRM TAAQMRA, EQAADSSGKVTGLALMERAGQGVVQAACETW SPREMGEDDRDASDT TPDAALMENAGRAVARAVR
HEVERVRAAEAALMAT DPEGTLMRRAAAGLANTCVRLD
 LDARAVSEFGLSTEVLMQNAANALARAVRTRF


YSADA【REAEAPLLAA YGDDGALMRRAAFGLATADGRELD
$\quad L P A G T L M Q R A A A A L A A V A G R L L$
TADEVRDAERASGDL ASGTLMRRAAHGVAQAVLNRA $\square G V P R K Q L M E S S G N A V A R E V R A D A$ NVEDVRRFEEEKLFSMGQTPLALMSIVGAMSALKFIEDF TV V DLRACEAHA EATLPAHTGMARAGAAAAHWLREHA
SVETVRAAEQELMAR
TVDQMRAAEQAAMSA GT
RAKWLRDAEPGAASSGGID


SVT Q TRALEQTAFAH pogat PDGAL DEVRSLDKRAVENFYLTEDLLQAAGVRSALKIVDQH


LPP PHTLMARAGGAAARWLLAER

 SPE MRR
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 VRAAEAPLLKS

LP E G T L
LP P HTLMARAGAAAARWLAARG
SPETMRVVDNNA DDYGI SAAQRMESAGSVLAAAVRSEC TTDRVRAAEERVLAR GVPAGSLMRRAAFGVAVAAVDLL
TAAEMGEADRRTIAA GTPGIVLMERAGAAVARAR RARW
SAFEMQAAEQR I FDTGTSVFELMEAAAGGAAEWI RRD

 LD K R ACEKYHLTPE ILLMENAACALESLINSL
T P K E ME VI D N NC E Y L G $\square$ P K I L L M E N A G R A VVEE L L K $\quad L$


YSGTQVRAAEEPLLAAG पGDVLMQRAAHGLANAVITEL
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TPKEMA $\triangle 1$ DDNA EF $\square G \square$ PK $\square L L M E N A G K V V Y E E \square$
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RRRYGARVGILVGSGDNGGDALFAGARLARAGARVVAVPL GGCYGRSVGVVVGAGDNGGDALFAAAELARRGVAAHAVLL DPGASVELLCGRGNNGGDAFVAARFLSAYDVTVRLLGR $K N V C K V V A V C G K G N N A G D A L A L L Y N L K L K G Y D C S I Y Q P$ GVGDVETVAVLCGVGNNGGDGWVASEALRKRGLTVTVVTP AHDAAHPVWLVAGPGNNGGDALVMATQLDRAGVAVEVCMP $P$ P $\quad R P V V V L C G P G N N G K D G A V V A G L L E K S G W P V R V L S Y$ $G R V Y G A R V V L L V G S G D N G G D A L Y A G A R L A R R G A G V V A V L L$ G GRDVCVLCGPGNNGGDGYVDAESLRRRGNLVHVVAD KDRKHWLI LAGQGNNGGDGY VVAHAAATMGAVVTVWAMPH

 SETHSTRCVVLAGPGNNGGDACIVAGELKRKGLQVDLLQV

 QP GAA LVAAGPGNNGGDAALAACLLKQAGYAVEVLLPB
 PEGKVQ P G K RGHEYA LILCGSGNNGGDGMVAARHLAGE ADI TVVWY RGHEYA VLVLAGPGNNGGDAFVAARHLKASWHQVTVVFT PHAR RYWI ACGPGNNGGDGLEAASHLLQHGKTVTWLGH
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DDTEEATVVGLVGAGDNGGDTLYAMGLLSEAGFPCLVLVP REKKESKLLFVAGKGNNGGDALVMARAAFSEGFTAKVVLF


GG SGRPVWFAVGPGNNGGDALVAAARLQQLGVAAHAWMP KRNDEDKVLVVAGMGNNGADGVAVARMLMHNGIDDKLVGN
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UniRe90_F3WST2

GDP\PPDARANHDRWCAMGGAVRPYLLPDSGHDGRVLLVIDA PGRPPSTALAQRAALEFRSAGGVVAEFDDALPGADI WVDA SKVDHHSADSLQSAYKMSQSVPFKQFTDLNLQGYDVYVDA FPPKSSLAKLQLKRAMQAGVPIV ENLDDADVYVDA GSRFSLQDEARQHAQRWSG EVEALSPLVLKDAELTVDA GRPETVTTDDARENWADCDTRVVRDSRDLELDDPDVVVDA LDHYRNETAYHMQAARSCGVPFLPTEPSRALPHPDVVVDG TRGSSADDHQAFLEAQTEQVNDIQGFVAFQQSYDCYIDA SKNLKPLIATKQLERAKFAGVREN KDAESSLNSAKCVIDG PRKAHRGGLAALRAGGGRAVTAEDVDAVALVHRADLVLDG GRRETITARENWDADRSADIDAQRVGDSRSLEDPEVIVDA AEDEDIHARVCAQAAHKAGVGVMVAPPRNQLDSADVVIDA GDPLPPDARANYERWCRVGGCAPTALDDSTFSDAAVTVDA KEPKSEDCRLQKERLEALGUSDKKTUE G TKCDILFDA AEPSPGGD AARASALYRGPRVPFSVAEAARADLVLDA APERAHSGGLAAARRAGVRVRDARDPARTELGRADLVLEG LPPRPGSDGAARAASRWNGPVITTGMEAl RKYDLVIDA VEPDEGPAALARAVARRGHVGPSRDELVDLIKSSDVVVDA GDPARLKGDAARAFNGWLGKGATIDAYE PAEGDVVIDA APDR AHAAGLAAFQAAGGRVADDPFAVLSGADLVLDG DAPLRAEAAEQRN\|VEAFGपPALVWEDRVEWEHGTGIVDA


GARIHAGRDALDAGGSGS
GARVHAGGRDALTDAGGSFGS
APEKAHPA GLRAFRAAGGRVDDA PESRTEDARENWDALKSAAGRTDTDAADGAPGGLDAVIVG WGAATEECRVQRELCRSLG| VEVEEVQSDLARVVARSAQVAPPRDELKALLASSDVVLDA VDVKPEDARWALAEARAAGVPD SVEPPASFENFGWLVDG RGGARSEGLPALT GSHEKLKGDAAAAAARWSGPT $\square$ AADPAA $\square$ AGAH VVVDA SPERAH RGGLLALLRSAGGRVSNEALRDDARADLVVDG KEPRTDTARTARNAYKGAGGAVHEPASTEGLPHDHVYVDC LP VSELTGDTAKAASAWEG PVHKLEDALKSQPELIVDA GEVGRLPADAATAYRRFLDDGGSVLDGDPNGRWSLIIDGG TEGKQKDRMQAVLWALAHGTQPIELEPDMPLPEGTVIVDG KNPKTNGKLQEKRASTGLNFVDEF FPDKKTLTNNHLNYLTSLGV TKLLEPPDANGKDLWI DA VEPKPEDARWALALAREAGVPISBPEPABSLDABGWCVDG PSKHPLTRRNRRRDGKVGVPLTPAHLRREDRDAALVVDG GHAPRTAAAQRAAAAFEAAGGQVEATATAVLPPADLLVDA VEKNALTGDAAKAAALWEG DVRPLEQALEAPHDIVLDA DSGRQTDTRTQLQRLLSCSVTSIPFEHTRIFQDTDLIIDA GERAKLPPDAAAAYDAWVDAGGEVQSALPERGNWQLVVDG
 GKKSNEMDEFQMQDAKKVGVEFTHLFEDSDLNSSDCIVDA TPPETLKGDAAAMAARWTGPVIGIDGIGW DEVGLVIDA PARHRLTQLNRRRLQAVGVACRPAAAQRSVEAAALLVDG YQAKSAMAKLQHKRAKILGVNDVDDLERSLEHAPDVIVDC DPDRAHPA GLRALRKAGGRIVPMATPEHLGDPDLVLDG VPPKPEDARWALALAREAGGPVSAAPPASFDGYGWLVDG SDKLNDMAKFQLNILKKLGVDFIFSYKEEF KFDCFIDA
 VEPKTDAAKQARNDWGGAVQTSGRG ADPLPADAADAWQQARAAGVPVRVVATMDTSHDDDWLVDG AGSAHPQALAAFEQAGGRVLYLSDAASGALVSEADVVIDA HKRLKEDTLKQLKRAEDTGVEVI KEPKSPLCDQAYERACECGUKF DKKILPCDVVVDCVV ETVGRADLVDG GRSKTYESRENFK LIKNDSEFDERDEQNTKKGEVIVIDA GTRHELAGRMRRRLEGLCPDELLTEERCAGLSKTRVVLDG
 APPRPASDAAAAAALWRGPVVVSVADEGRVQSAELVIDA AEPRPGGAAAEAA ARWRGPRLGWDPVAVSRAEVVVDA GGAAHPAALAAFLRAGGHAEELTGETपKPLAAEAGVVIDA
AAGRDGVHAGGDEAAETAGVMVHVAAEDAAAAAAVVVLDG ASENGESVRLHTKICEGYGLKVLCMEVQAATSDADVI FDG AENDGTEARENWDVLEQTDHDTREDEDSSDLPDADVVVDA
GE $\square$ KTYEARENFK $\square L K N \square A E F G N \square K \square R E \square R \square A E K A V V V D A$ VPVK P D D T Q WA L G VA R A A GVP D A GEPPAS LDGYA WVVD G I E H A S D E M R K QL G I A K K L E I S F VT NDIE D


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170
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200
S GARYHETVVRADLTVISFHAAKLGHYLLQDGPAACGALL|A||AD RGVVPGEAVRATLTLQFIVAHRGLYSGDADDHCGQKVLAP R


TGDAADGAVEADRIVTFHDTKPG

S G L P C P P A V RA D MTV | $T G Q P L P C A I K T D Y T F T A L G D K A G L F T G Q A Q E Y T G L V D V L D$ |
| :--- |
| $T G D A A G L A V D A D R V V T F H D D K P G L G D L D C E V$ |

 RGVAS GPCVAADITVTMLVLKK G GLALADDGRDACGS

V VA P
SGRVIGGDEQGDETVTFGAAKVGHMLDPHAGDTRH


TGQSMGKVTQAQATITFVRCKPGHYLMPGKLLCGEVILAD
GVPQGAVFKADTTVTMGADKSALYSDFAKDCVGRVKVAN



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TGKPSGGPCFRA H H T 1

TGHAAGAADHAHTTFSFGAVKPGLVVGQGRGHAGEVHLIG F G QVLDQ DA FKA D IT DT M GA CK Q GLL L S E R G K GLLCGE L WI D S

## S T S S T <br> $S G E$ $S G A$

TAVPGA
T A K P G
P GFRAEGTI
S GRVLGGAAL RARHTLTF LAALKPGLYT LD GPDHA GEVTPAQ
S GASLGAAVAASDTLTVAFI KQGLVQDAALPLAGTVHRDD
TGNALGACVQASHTLALLLTLKPGLVTARGRDAAGDI WFEE




 RAD RVI A F HLLAK TE





 T G R V E G P A V R A HVTVVT F GA Y K T G L L L V D P GA E R A G A V DKVVT F HKRKT LL RKS E I F E S S R L R K P S V F E S S R N S ND D N TAGDGSDAVRADLTLALVGFKPGLLFSEVGEVQ
$T G K T F D C A A R A D S T L T V G L I K V G L L Q D M A L P Y V G S L E R I D$


 GEVDD HDAVWADETVTFATPKPAHLMPA GEAASGRLTVVID



T G Q IVGGAVVA TH T LT F $\square$ GAK P G L Y M VD G R D LAA GE DDVA S S G R I L G I A V K S D M TVV F G T L K R G M I M FP GA GF S G E I K V R D

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UniRef90-S5ZNI6 UniRef90_S5ZNI6
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UniRef90-C7RIJ3
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UniRef90-C7P8M5
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UniRef90-A9AJR9
UniRef90_R6LWI2
UniRef90_F3WST2
 LQLPATAWQVPAAEHWTQVRLRALLPPRRANTHKGESGHV L 1 GNPKSVLDSITPRANDPALWLALELPRAQADSNKHSRGHA $T P V T V A D V G D P E A A E L F V G P G D R H I V D R A R G A H K G E N G R V I V$
 LIPA PADAELKALAQLTPHLIQLPARQAFGHKGSYGHV LG GS AQNYECESDYHLLEKCDLVLPNRKNQCVNKGDFGHA LGGPDLAGTPPDDEALQHADVAALLPVPEAESDKYRRGVV
 LGICR DI YERSSNWNLLDLQQLKKLPHRFKKDSHKGSYGHLL


 G L
Y D R L D E D V
 I GLGBPHLPSVPDVESLQHPDVAVLLPEPSGESDKYRRGVV|


L GVSS L F YE GESHTCCLEERCDLKLPSRREQSTHKGSFGHA

 I GFP PPENGDKDFTSSDAKTLIKKKDDFSHKVEKGSLL

 I Gl PASVLAADRPRLNGPAVWGAKLPSPAAAGHKYGRGHA

 LELDAERDANASAHTDGTDLGVDYMCPRARNSHKGSYGSA L CD HTNDWGPFVHAVSRDDQLQRSPTRGHEHHKGSFGSII L GVENEFFQ VPTNKYLDEKSDLDLPFRDKKNSHKGQFGHL




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LGII S S S PT P SA QA VLANPAAPAT QA A BPA

LTVAAWVQAQADAVRTDAEVGAMLPARRNDAHKGTAGHV
 LTLPEAGLV $L D A P V R A D S A T L N A A A L F A P H W P A R A S A S H K G S F G S V$
$G A E V Y S \square G \square P F G A E V F C G K G D L L S V P K K P A G A H K G W A G Y V$ LGVSKTKFQSEKSPFYLLEKSDLTMPNRTKNTNKGDFGHL $D L G L E P E L G G P D L V E L D L A D V G A A W P V P G R D D D K Y T Q G V T$
$I G G D A D V L G E D G P R L N G P A L W R S V F P R V G P A Q H K Y D R G H P$
I GVEPVVEGAA QVVTKPRLS PPAVDAHKYRRGLA
I GLG G GHNAPP DAMVNGPALFDAADPRRHHASNK GTHGSL I GI E E H LD QP G L R RLLEDA DVA RLLP HPARRAHKYSRGVL

LGLE EHLPARAAVERLEDADVRALLPRPGRDSTKYSRGVV L GLS G NHYEVVTSNLKMLE S S DLAALPQR DNKNVHK GDF GHL
 GVPPALLERHAHASCITPEEVRALLPRRVRGAHKGTAGRV IGGPS GVLN LLDPKDVPLNDDI SLDKAPQDECNASKYERGRL




 LD $\square$ P H P K Q S S F MEMNQT M N M LH DTK SE ETK RYKP DD S K A HK G T Q GHA PKEAEYVVGWGDLLKALRKRDSRSHKGQNGKV



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UniRef90-F3ZK22
UniRef90 ${ }^{\text {N9CJ31 }}$
UniRef90_D4GXM8
UniRef90-A7ZB29 UniRef90_UPIO003645342 UniRef90-M1XL37 UniRet90-U2VGS1 UniRef90-Q30U34 UniRef90-A3VDC4
UniRef90-S5ZNI6 UniRef90-UPI0003FC821D UniRef90-UPI0003807CD7 UniRef90-Q0BSJ4 UniRef90-F2NAD9 UniRef90-B9D2L0 UniRef90-UPIO0036F5FA4 UniRef90-E2Q2G1 UniRef90-UPIO004716C72 UniRef90-R5AUR5 UniRef90-X5KF65 UniRef90-12K496 UniRef90-U6EZ71 1 UniRef90-AOLRQ9 UniRef90-K6WK62
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CVVAGSAAYPGAALMAAKAAARAGAGYVSVATPDCADLI FVVSGEK

GGAARDAG
VVFSGEKGKTGAARMSAMSGLKAGAGLVTTASPADAMDEN GVAAGSARYPGAAVLTVAGALRGGAGAVRYVGPEGAA V LVVIGGTLIAMSGAGLMTSRAALRDGCTGETHDPCDRACDTV GLLVGSEQYTGAALLASAAALRTGAGLLTAAVPRLVKPA GVLSGSATYPGAAVLSTGAAVAATSGMVRYAG AVFCGEKE $\qquad$ SAAQQV
LIVAGTEGFTGAAYLTTEGAVKSGAGLVTLSTHEKITKDIL GVVAGSPRYTGAAVLTVGGALRTGDGMVRFVGAAEPADRV GVIAGSHRYPGAALLAAGAAVTATSGMTRYVGASAHAEV LVWAGSKQYPGALRLCLEGALNMGVGMSFSIVEDEFSRLP LVVGGSLIFPGAPVMAALAAARAGAGYVTLAVPAPVAPII $A V V G G D T G M C G A P V L A A R A A L C A G A G K V H V A F I G S G W P P Y$
$A V C S V G V R S V G A V K A A L A A L R D G S G A V A V A C A D E E T C D Y ~$ VVVSGGASTTGAARLSARAALRAGAGLVTLASPSDALAVN GVVAGSARYPGAAVLAVAGALRGGAGAVRYVGP AIVAG DMPGAPLLAAEAAMRSGAGYVKLLSNHSH VLVGGESGFGGAAVMAAESALSVGAGLMRVLDAKEHVGAL KVVSGGPWNTGAARLTAKAGLRAGAGLVTMLSPPDAAGVH GVLGGASSMVGAAFLAGRAALRLGSGRVYLGLLDPQAPTIV AVLGGQQGMVGACLLSARTALMLGCGRVALTLLHET
$N L$ SGDK TGA AIVGGDTGMCGAPILAARAALHAGAGKVHVGFLGDDAPSY SVIGGARGMSGAAILAGRAALALGAGKVFVHTQD WVLGGHPGTAGAAALAGVGALRAGAGLVTVHS LCVGGDHGKGGAVLLAAEAALRSGAGLVTAATRAEHAAEAV KVVSGPASATGAARLSATAGLRAGAGLVTVMSPPGAMTVN LVIGGGPYQGAPYLAGLAALRAGADIVRVVSPH
GVI GGAEHMVGAALLAGRAALLTGAGRIYUGLDAPDAPAL AV AGSDAYRGABVALARAALHGGAGBVYVGLPRAVDQQL GVAAGSDRYPGAAVLAVGGAMAGPAGYVRYAG AAAADYV FVSCG DMSGAAEIAGLSAHAMGAGVVSVSDRGLK WVLGGHPGTVGAAALTAAGALRTGSGLVTVHSVAE
$\qquad$ GVRAGSARYPGAGVLCTGAAVAATSGMVRYVG
 Y G G G G G GVAAGSATYPGAAVLATGSALLATSGMVRYAG AAAEGV AlVGGK MPGAATLATEAAMRSGAGYVKLLGTQA AIVGGNDGMTGAPLLGARAAQYLGAGKVHIGFLAQSAPLV GVVAGSADYPGAAVLACRGALAAGVGMVRYLGPPEVADLV GVVGGSELYQGAPYLAGLAAFRSGADLVFVYS
ALAVGSEQYPGAAVLAVSGAARTGAGMVRCLAPQAVLDLV AVFVGEKS GAGILSAQSALHFGAGLVSII
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 ERKRKTPPY L I QASTL
A AT T N S $\square \mathrm{MV}$ VP WVT PEDFGH LLN
 TARHPETLVSSG

A LTGAEI QHLI EQGLN

LARFPETLVSAGPPHK QGYSENDIVRPQAGD LLAPSSVPELLETASGMDAVVFG A GRMNAGAVVGG QAHMMEIPVIAFPADDGCFSTRAHDLIVESLAKKCDVTLVG KIE\|PHS\|MYSHAVPKNTTALALG A A QLT A M L R E A E G A A A L A DLL R DKRLNA CL G
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LAAWPETLATTSAPAD
 LIAALT IGAGLVSVVGENLNDEPVLMQSARDMPKMRVGAVG ATHLLTAVMLHGIDDGDALLD WLKDERLRSFVLG




RARWPEAVVTVLPDDARDVAA AGRVQAWVVG
VSHFPEVVAAPDLAD QGYSADLI VRGLDGNRD GPAHVDRALELAGAGNDVVVL G $P E T D P D A$ QP HLLEDPVLALPEEDGTFSTGS $\square E Q V V Q L A Q K R T A T L V G$

$A A T N L A V M V R A V D G A G A \square S S F \square A$
LARFPETLVHAGPPDK
 LD DERFNTLLI G LVRCPEAMCVGPDAPAELVIESAAT $\qquad$
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D DAA
QPAAL DDRLSALLVG AAHLTAMMLAPFVTP

QPA ARARSTAMVIG RAAWPEAIVTDGRPGD AGRVQAWVVG D L H L P DVQRQGQLPF DDLIFPEDMNK LESNLEFADTVVVG $A A F S F G V G L V T D I C Q N E K V V P Y H D M Q S K N I T Q N C T A I A L G$

 $P L V M P E L M I R R H T D L D G F$
$L A R M P E A M A Q A A E A G A G F D G$
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$L L N Q L D G M T V V$
$A G R T A W L V G$ AADHPGA VLECPD $\quad \square$ SPALLMQKKSLNGAK VVVI G $P$ LVMPELMV HRH SVWDAAFRAFGDRRPDAVAVG


 DGFMPDLILERLPGNKV GKEHLTR LLALAENAGVVIAG S SEYULNLPPFLMQKSSFKDAKCVVDG

 DPQHPE LMLHPQDG
RRSCPEMVCSTGAVADN
 RARWPEAVTTVLDSQKDLQUPFD $\quad$ MMQTHT LDPHNTTAIALGG
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 RAAVPEAVI GDGRVQAWLI G PPDRSGIMIRRLDP KGAASVDSVVI G
 Q $\square$ SNPE $\square M T L T D V E E T F I S N \square D$ D $N$ N




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340

360




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



## P

C





$P G L V G Q D T R D L V L A A L A G G R R A V V L D$

PAAGVTTDATRANVEADLVGPAR VVLDDADALTAFGEDPFK





 $P G L G \quad P E S H D V I$ T SLAPY I RK GVFDADALRDP
$P G M G S T P A A K A L L Q Q A A L I L A A Q P G V L D A D A B L N D L A A B A R Q Q$
$P G L G S V E G V W R G W A E P L L A F P G L L V L D A D A L N Q L D W R W F L$



 RACALELP LLLDADALNMLAREARLQEAVRARA PGAGTD DEACANLRD\|LAATDLPVLVDADGLTLLAREPVR



 PGMGTDANAHRQFARLLQGAPDPLVLDADAADPALDAGALA SGMGPDDHDQLLQRARDAVTAGLPVV ADAGA LDAALPDVMAP



 P GI G L S I E K WE D S AL I L E E F L G L L V L D A D A L N R I S WE WF R

 P GMGTDPS LNKLIIGNDI NEFNGKII DDADGLNAVAKDKSV P GLLGEEAEAQLAVARAALASDLPVVIDAGGLDLI EG
PGWGRNEAR LAAAFDAVVQHA ASGVI DA DGI T L L G M WLNK

S GVVT QM Y E K EA C LDDLDMI Q N CHAP LI L DA E GI R MYN T WK L R $\left.\begin{array}{llllllllllllllll|llll|l|l|lllll}P & G & L & G & Q & G & K & D & T & Q & D & A & L & H & Q & F & L & K & S & N & R & V & P & L & I & L & D \\ A & D & A & L & N & I & I & N & K & N & W & L & S \\ N & G & F & G & V & N & D & E & T & K & A & F & V & N & E & F & L & L & K & Y & D & K & K & A & V & I & D\end{array}\right) A$

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370
380
390
400 LIFDTQC|VLTPHGGEFARILFPPTTGPAMSRVVDAAREAARRA RADPDAILTPHPGEAARLLGCSTAEDQDRYACAQRLAERF

A
S

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V․ IT

 $R L R G A A V I T$ TWS A P VL L T $H L K G T A V L$
$R$ R D A P LI N N K N I V I T $\begin{array}{llll}\text { E G E T R } & L & V L \\ \text { A R T A P T } & L & L\end{array}$



 Q K D R E IV V I T P H P K E F V V L W K V L T T G E Q E K R F E M V R K

 DT D A E LI CT
I $K$ C
K $\begin{array}{ll}\text { R R N A P } \\ \text { A P A S P } & \text { L }\end{array}$
 S R DA NVVVMT P H E GEF K R V V F P S LLK G S V

 GCDDTA R R LRAD H S I I T
$\begin{array}{llllll}Q L & R & P & T & D & L \\ Q & C & P & S & P & L \\ L & L & T \\ N & R & P & A & P & T \\ H & L\end{array}$
HRAKS LVLT
$\begin{array}{lllllll}Y & L & D & E & N & V & L \\ E & R & K & L & K & T & W \\ T\end{array}$
$\begin{array}{llll}\text { N R H A V } & \text { I } \\ \text { Q R S Y } & \text { T } & \text { T }\end{array}$
A G H D A C L W T
 $P \vee V A G E S G L Y T$
$R A P$ G S T $V$
$K R R G P T$
RMALLT T VLT T
$\begin{array}{llllll}\text { E R S E A } & V & V & L \\ Q & T & N & K & M & V \\ T\end{array}$ $L$ I Q G P C V L T $\begin{array}{ll}H G H D S C L W T \\ N R & E N V V L T\end{array}$ HR GA VTLLT


 | $D$ | $P$ | $D$ | $T$ | $P$ | $V$ |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $L$ | $L$ | $L$ |  |  |  |
| $L$ | $L$ | $D$ | $A$ | $D$ | $C$ |
|  | $N$ | $L$ | $L$ | $V$ | $A$ | A GGA P C CVMT Y F S GRABVLT $R L C P D V V L T$ D F S R E I I L

R R A A P T

T | R R A A P T | V T |
| :--- | :--- | :--- |
| E F K D N F |  | A GHD AVVWT $K R K G P$ T WIIT

$L R G W A A$

$D P D T P D$ | $L L$ | $R$ | $G$ | $A$ | $T$ | $V$ |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $K$ | $L$ | $A$ | $P$ | $H$ | $V$ |
|  |  | $V$ | $L$ | $T$ |  | LSKK N I I L T RRDAPTVVT

 $\begin{array}{llll}E & \text { T A T L } & \text { C C T } \\ \text { F A K S P I I L T }\end{array}$

 A A AVA CVLLTP HP LEAA ARLLGGS DTATVVQDRLAAAAQALAAR Y

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UniRef90_D4GXM8 UniRef90-A7ZB29 UniRef90-UPIO003645342 UniRef90-M1XL37 UniRef90_U2VGS1 UniRef90-Q30U34 UniRef90-A3VDC4 UniRef90_S5ZNI6 UniRef90_UPI0003FC821D UniRef90-UPI0003807CD7 UniRef90-Q0BSJ4 UniRef90-F2NAD9 UniRef90-B9D2L0 UniRef90_UPI00036F5FA4 UniRef90-E2Q2G1 UniRef90_UPIO004716C72 UniRef90-R5AUR5 UniRef90-X5KF65 UniRef90-12K496 UniRef90_U6EZ71 UniRef90_AOLRQ9 UniRef90_K6WK62 UniRef90-B9LN89
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 GVTLLVKGAVDVI SDGERTRVNRTGNPGMTVGGTGDVLIGG GGCCVAKGSATACVSPESALLPKPGPAALATAGSGDVLAGG GCTVLLKGSDTVI ADETGDACYDRAAPWLATAGSGDVLAG YPTVLLKGANVLIGSNGKDF DNSLGSSSLSKAGTGDVLAG NAVVVLKGATTVVASPDGRAALNHATPALGTAGSGDTLTG DCVVLLKGTTTVIAAPDRARINPTGTPWLATAGSGDVLSG NAVIILKGSDTVI AAPDRTAI NASAPPWLGTAGAGDVLSG GGVVVAKGPTTAVVGVDHVLLPDSGPAALATSGSGDVLSG $K C V L V L K G A N T L I A Q G G E V Y V M T Q G S A A L A K G G S G D A L S G$ NAAIVYKGPDTVI ASPDGRALDNTNAPWLATAGSGDVLAG
 $R V T L V L K G A R T V V A T S D G Q Y V N T T G H A G M A T A G A G D V L T G$
$H C V V L L K G A T S C I S D G R R V V I N T S G N P G L A K G G S G D T L T G$
 HITILLKGANTLIMQEERLYDNPLGCSKDSKGGSGDVLS G EVIILLKGYNTVITDGDKTFINSTGNSAMASGGMGDTLTG GATVLLKGTTTCVASPSGVRVNPTGTPVLATAGSGDVLSG
 $N \square T L V L K G P N T L V G K G S Q K Y V V P \square A D C D L A V A G S G D V L S G$ GGTVVSKGSATACIGTDVAILPKPGPASLATAGSGDVLAG ASVVVLKGSGTVIAAPDRLAVNPTGNAGLATGGTGDVLGG GAIIVLKGHDTVIAQPDGVVVNNNAPSSLATDGSGDVLAG HAVVLLKGADTVIADDGRTAI NANGPPDLATAGAGDVLTG GATVLLKGSTTVAAADGPVRVNPTGTSWLATAGSGDVLSG G ITVLAKGPDTLLA GPDGVRFFERGSSWLSVAGTGDVLAG GGVCVLKGPGSVIYNPQHCAIVDAGNAGMATGGMGDVLTG GCVILLKGADTVI AQPDGNAVNTHATRWLATAGSGDVLAG QALVVLKGCGSVVATPDRWFVNTTGNPGLAAAGTGDVLSG GAVVLLKGEATVVADPGGTFVNATGTPWLATAGTGDVLSG DCTVVLKGTGSLI CDSNQIEI NTTGGPALATAGSGDVLAG K T TLLLKGANVVI SQNETIVINNFGSSKLSKAGSGDVLASG NISILLKGANSIIADNKNAWQIFGTDSQTARAGDGDLLSG HAI AVVLKGSGTVIAEPARVAVNPTGNAALATGGTGDVLGG ACNVLLKGSGTLASSGQPYRLLVHGSPALAVAGQGDLLGG GGVVVLKGGPSTIAHAGG $\square W V V R G G H P G M A S A G M G D T L S G$ GCVAVLKGAGTVVAAPGESRVIAAGNPGMAVGGMGDLLTG
 $N V T V L L K G C G S V M M S D G R W F D N R S G N P G L A S A G M G D T L C G$ $G V V V L R K G A H S V I A D P S G S V H Q L V G D R Q V A R T G L G D L L A G$ GCTVVLKGSGTVISTPGAPRINPTGNGRLATAGTGDVLAG NCTVLLKGHHTVVAASDGAVYANTGRPALATAGSGDVLGG PQILVLKGANTII AYNGKLYIMPLGSSKLAKGGSGDALAG GAVLVLKGSDTVIAAPDGKAI NDNAPADLATAGSGDVLAG GGVVVLKGGPSVVAYSGGLSVAQGGHPGMASAGMGDTLSG QTVLLLKGANSLI SYNNMLYINTLGNNALSKGGTGDVLTG RALAVLKGCGTVVAAPDRWFVNTTGHPALATAGTGDVLSG GVHVLLKGRATLVARPDGHFVNDAGGSWASTAGAGDVLAG YAAIVVKGSGTMI AHPDRVAVNPTGNAALATGGTGDVLGG GGTVLLKGAVDVI SDGSRVKFNRSGAPGMTTGGTGDVLSG RSVLVLKGANTIIVQNEKLFVSNFGSPALSKGGSGDVLAG DAVVLLKGHATVVAAPDGRVLVNRARSWAATAGSGDVLSG GAVVVLKGADTVIAAPDRAA NANAPPTLATGGTGDVLAG GAVVVAKGSGTVIAAPDGSPCNPTGNAALASAGTGDVLAG GATVLLKGATTLVAAPAGDVFQADGTPWLATAGSGDVLAG GACVILKGKVDVVHCGDKGVLNETGNEWMTVGGTGDVLA G GATVLLKGAITLVAPGDGGPSQDDATPQLATAGTGDVLAG HTTLVLKGANVFIAKAQD IVY INPDGDNALAKGGSGDVLS G
 GGTVVLKGGPSVIATPGALRVCLAGNPGMATGGSGDVLSG GVGVLLKGANTVIAVPNGPIWQTNTSSFVARAGLGDVLAG GAVVVLKGPDTVIAAPDRAAINANAPPFLATAGSGDTLAG DAVVLLKGHCTVVAAPDGRALVNTPRSWLATAGSGDVLSG VV $\quad$ K K G S TVVAAPDRVAVNDNAPPGLATAGTGDVLSG GATVLLKGPATLVADPGGEFSQADGTPWLATAGSGDVLAGG GGTVVLKKGSTTVSHGDDPVRSQADAPPWLATAGAGDVLSG NGVIVLKSH $\square$ SHIASPDEGGYEVVEGNPALGGGGSGDVLA G
 KVIVVMK A P




| UniRef90_A6FNZ9 | $\mathrm{D}\|\mathrm{~L}\| \mathrm{PE} A\|\mathrm{~L}\| \mathrm{PG} \mid V \mathrm{~L} \operatorname{RG} \mathrm{~L}$ |
| :---: | :---: |
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| UniRef90_C2BDJ6 | D I DS Y L P K A I R L L |
| UniRef90_UPI00047E3376 | A V A H G I R P TVR DL |
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1 10 20 30
 TPDRTRAAEERDFGT VAEPVVMRRAANGVALHVRRLL YSSEQVYAMEQAWFAE GYDSFGLMKQAAWQMAQHI EQLY

$Y G \square A G V R R A E A R A M E D \quad \square P A G E D M Q R A A R G D A E V V T A R L$ $A E A D G F E E S L L T E N A G S S V A E Y Y L$ SSDQMRAFEKAA $\square A Q G A V T G L D L M E R A G Q G V V D T \ L A H W$

HPVEA $\square R S A E R P L \square E A A A A D P D A V M R R A A S G V A H H L R S R T$
 YELMKNAGKALLSDFVISMV

TAAQMRDAEQALFDA GVDDYGLMEKAGAAAAE DI W AEMAR $\square \mathrm{D}$ AAASVHVPVATLMESAGRAVARAZRQH YTAEQVKNGEVVAAHMAGVSMYSLMQRAGMAVYERFLHLY

$\square$ MK N A G M A VA NVF K N N F


TVQQTRDAEQAWFDAH PGEDLMAEASAHVASTALQMV TVADIRQAERKQAHEP LMARAATGLARRCTTML

YANEQMGRVDA LAAARV VR DRT DMEHAGRAVERAVRRH YANEKVRALDARLIES GVMGLELMERVGRGVVDFI AQCAAMDEMASHGIGIEALMERAGWAVAQAVRARF TTERVRAAEERVMAR VPDGALMRRAAFGLARVALGML
TPAEMTAAEQAVFDA GTDSFDDMTRAGTAAAEFLHARW Y A ANDVKAAVARDLETGAPDRLLRKAAAGLALAHELERRC
AAAMRAVEQRADDA GSSVEADMDRAGVAVAEAVRRLA SSRAMQQLEEALFAQ GGVPVALMEQAGLGLAQAVLQH SPKEMA $\square$ IDENA EY $\square G \square$ NR $\square$ M $\square$ MENAGRA $V Y E E \square K D$

A G Lan VA NELERRY
$Y R V A A D R E A E E R A F A E F G$ PDVLMQRAAAGLAAAVLRRL
 VRDAEAPLLAA $\square P D G A \square M R R A A Y G L A R V C A E E L$
TSQQMRE DDRKA VVKNLSGLA LMENAG LR DFQS $L K N \prod Y$ TAEQMRAAEQALFDA GTSVSELMEVAAGGAAEWIRRI

TTGR $\square R A A E D V V L A R T Q \quad P G A \square M R R A A F A V A R M \square R E R S$

S VD S LMMRTAGRAVATAVARDA

$R Q \square E Q A W M Q Q \quad \square P P H A \square M Q R A G \square A \square A R \square A C A L A$ TADQMRAAEQTWFDAH PGKDLMAVAAHAVAVEAEQML SAEEMGVVEANAV GLGVPLDTLMERAGRAVAEEAAAHL
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UniRef90-B8GEZ8 UniRef90 UPI0001DDOA96 UniRef90-W9BVP0 UniRef90-JJWL81 UniRef90_C2CF19 UniRef90 Q6L1G0 UniRef90-C7HU63 UniRef90-A9HRWO UniRef90 lourm7 UniRef90- S4D6V3 UniRef90_W7CJL1 UniRef90-D7GJ88 UniRef90 UPI000476F06A UniRef90-A9BBQ6 UniRef90-G8QGB6 UniRef90 U4TCJ5 UniRef90-UPIO0028990F8 UniRef90-D5QHE8 UniRef90-D1Y8B2 UniRef90 V8AAJ5 UniRef90-G2KVK9 UniRef90-C6WLX1 UniRef90 E8SHQ3 UniRef90-A0A059FV78 UniRef90_W5TP61 UniRef90-A0A038D1D4 UniRef90 UPI00026CD163 UniRef90-A5GUP7 UniRef90-W8×318 UniRef90 XoWHU1 UniRef90 N6VZZ6 UniRef90_UPIo0024906BE UniRef90-H6R473 niRef90 H3NF5 UniRet90-R3WCK6 UniRef90-G4L4M2 UniRef90_G2H318 UniRef90 UPI000367366C UniRef90-R4LFM6 UniRef90_UPI0003B5779D UniRef90 D5UUEO UniRef90-T1PAK8 UniRef90- хоZOAO UniRef90-UPI0002E4C464 UniRef90 Q11444 UniRef90-UPI000311E212 UniRef90-C7H516 UniRef90 R2QLH9 UniRef90 W9DRQ6 UniRef90-O5UF39 UniRef90-R9WGS6 niRef90 UP10002195D2 UniRef90-UPI000287DDEC UniRef90-ЕЗН5М9 UniRet90_D5T198 UniRef90 M50P97 UniRef90_UPIO00468C14E UniRef90-UPIOOO38124C4 UniRef90 W6U4C0 UniRef90-K7RQJ4 UniRef90-TOZGXO UniRef90-R2RGR9 UniRef90 C8PZL5 UniRef90-UPIO00255D08E UniRef90-R5SSK9 UniRef90 C9MWB7 UniRef90_J4KDM2
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PGS VLILCGRGNNGGDGLVAARYLQMTAETTVIYPD AAGGPVTVLCGPGHNGGDGYVAAAALKARGLTVKVVAP GTTP TLVLCGPGNNGGDGYV1AEFLRKKGVPVTIAAL RAGHRRDMLLMCGPGNNGGDGFVIARLLAERGVPVRVAAG
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GDHA RVLVVVGTGNNGGDGLFAARDLANAGCDVAVWCT SSVYGARVLLLI GSGANGGDALLAGAQLARRGAQCSALLL PELLLNGVLIVVGPGHNGGDGLVLARELFLENDDVSVWCP SDTSQRKASVWVGRGNNGGDGWLIAYYLRQAGWQVTVITV

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GAVYGRRVTMLVGSGNNGADALLAG■R $\square R R R G V R \| D A L L T$

RHLHDAGAEVLVLHT DGAYGARALLVLGSGNNGGDALYAGVRLLGRGVAVSAWRT GGVYGATVVLLIGSGDNGGDALHAGARLASRGAAVLALLL PA GRVVLLAGGGANGGDALVAARHLSVAGRDVQVLAL GGVAGRRVTLLVGSGDNGGDALVAGAYLRRRGVMVEAVLF
$P D \square R \square K K D I I F S G S G N N G G D G F V V A R H L Y D Y G V K V F L L A P$ AA GRTVTVLCGPGNNGGDGYVIARRLREAGNAVTLIAP
$G R \boxtimes A G C R \boxtimes A L L V G A G N N G G D A L W A G A F L R R R G V G V T V L L A$

GDAD $\quad 1$ LI CGPGNNGGDGYVAATVLAAMGRAVRVAAL ADAGQHRILLLVGPGNNGADTVYAGTRLHQQGYRIEAVLF

Pha $\quad$ QR $\square W \square A C G P G N N G G D G \square Q A A L L Q A W G R Q V E \operatorname{VTL}$
GAHEGRRVLILVGGGDNGGDGLFAAAELASSGHSVELLSV PPAPAAVAV IAGSGNNGGDGTCAAHYLLDGGTAPEVWLL

SNQKGSYVLVVAGAGNNGGDAWLVAHYVNQLHWSVTVVQV GRVYGTVVVGLIGSGNNGGDGLHALAKLRRRGVDARAVLL

UniRef90 UPI00036FE4D9 UniRef90-UPI0004637723 UniRef90-F9PT12 UniRef90-UPI0003671260 UniRef90 UPI00028A2909 UniRef90-H6MTF4
UniRef90-F6IGS0
UniRef90 A3ZQU7
UniRef90-UPI0003625857
UniRef90-T1ATF7 UniRef90-UPI0004691976 UniRef90 X0QAK5 UniRef90-L8DKV3
UniRef90_F0GZK5 UniRef90 A0A022LKD2 UniRef90- C7M310 UniRef90-TOLPC1 UniRef90-T0N4J5 UniRef90 UPI0003FD6D6 UniRef90 R7H8L2 UniRef90-N1MTG9 UniRef90_F3SD10 UniRef90 UPI00046ECOAE UniRef90-I2BK83
UniRef90-B8GEZ8 UniRef90 UPI0001DDOA96 UniRef90-W9BVP0 UniRef90-J2WL81 UniRef90 C2CFI9 UniRef90 Q6L1G0 UniRef90-C7HU63 UniRef90-A9HRW0 UniRef90 IOURM7 UniRef90 S4D6V3 UniRef90-W7CJL1 UniRef90-D7GJ88 UniRef90 UPI000476F06A UniRef90-A9BBQ6 UniRef90-G8QGB6 UniRef90 U4TCJ5 UniRef90-UPI00028990F8 UniRef90-D5QHE8 UniRef90-D1Y8B2 UniRef90 V8AAJ5 UniRef90-G2KVK9 UniRef90-C6WLX1 UniRef90-E8SHQ3
UniRef90-A0A059FV78 UniRef90-W5TP61 UniRef90-A0A038D1D4 UniRef90 UPI00026CD163 UniRef90 A5GUP7 UniRef90-W8X318 UniRef90 XOWHU1 UniRef90 N6VZZ6 UniRef90_UPI00024906BE UniRef90_H6R473 UniRet90 H3NF57 UniRef90 R3WCK6 UniRef90-G4L4M2 UniRef90-G2H318 UniRef90 UPI000367366C UniRef90-R4LFM6 UniRef90_UPI0003B5779D UniRef90 D5UUE0 UniRef90-T1PAK8 UniRef90- XOZOAO UniRef90 UPI0002E4C464 UniRef90 Q11444 UniRef90_UPI000311E212 UniRef90_C7H516 UniRef90_R2QLH9 UniRef90 ${ }^{-}$W9DRQ6 UniRef90-Q5UF39 UniRef90-R9WGS6 UniRet90 UPIOO02195D2B UniRef90-UPI000287DDEC UniRef90-E3H5M9 UniRef90_D5T198 UniRef90 ${ }^{-}$M5QP97 UniRef90-UPI000468C14E UniRef90-UPI00038124C4 UniRef90 W6U4C0 UniRef90-K7RQJ4 UniRef90-TOZGX0 UniRef90-R2RGR9 UniRef90 C8PZL5 UniRef90_UPI000255D08E UniRef90-R5SSK9 UniRef90 C9MWB7 UniRef90-J4KDM2 UniRef90_13LS60
 AAEVHQQALAAFVAAGGTFVTLEASNAEELAAGQDVLIDA
APDKTH LRAAGGRALAAEGGSGLTSEAVGADRRGDVVVDG GHDVVSDAKQAKQIALSAKVNYQRFEDREADWQADIYI DA APDKAHPA GLDAALRRRGGRVVAALDPADLDAVIDG TEPKTDAARNARALFRGEVVALDDLGGDVQVEG DVFVDC

ADRVHEKARAAAEGEGATVLMPDDDGVLGWLTSAGVVLDG GNLSEMHKKTALLNYKLLSSIMDDDUI NEYLAKANTVVDA GDPLPPDAKVNFDRWEADKVLPDDPESVFTGPRPALFIDA GFSKDDDATKALQ DPERAH AEGLEALRASGGRVVTRC GPADVVVDA HPDRVH ARALGALRSAGGRVTTDAVCGAAGTPDVVIDG RDVVAGAATSA D DDH K S AF $\square$ KNLISEWKGK DS G DQD DDSSLSNADLII DA K G $\square$ N G $\square$ K T P EARRA $\square$ NE Y E G QY Y D $\square S V D S\|I S E S D\| I I D S$

GTSGTVSSRRALAAWDG PVEDLATAAPATQLVDA AAPRPGGDAAAAAAAWRGPV VPFTAESAARFDLVVDA GD QLQGDALRAYQDWQTVDGKNS SWDDWNTLLEAEVI IDA
CGHATSAWTAEHALLTHAAVHDCPVRSDRHFSGADLIIDA】SPQTDLARHAASTFDG EVLSDAEGVRGTAFVDA TEPRTEAARHARARFGGEVIGFDE AEPATQLVDC AESRTMAAQRARAAW PGPVEPFMDARPASQLVDA KDPKTPEARRAYN EYNG $\square$ SYKYDE $\square D D L I K K T E \square I V D G$ APPRPGGDAAAAA ADWRGPRVPFTAEEAARADLVVDA DPTGRNLELIAREAGEGTRVLHTEQSLRNDDSYSLI IDG

GSR WHEAGRAAAEAAGCVFADAREAVEGLAEASLVIDA SERYHAEGMAAFRAA GGR\VSTVVPADLVIDGIVGIG
 $D D G Q R A P A D A R A A R Q A F L E A G G T I L D A D P P C P R W G L V L D G$
$G H P M T D A T K A L Q V A L A A R C D Y Q R F E D S N S C P N D A D V Y I D A$

APPRPGGDAAAAAAL WSGPMVPFDVAQVGRFDLVIDA HERSQGDAAVNLTKLGKMPVPVDEAALTELLDSHDLVI DA ATPRAGTVAAQAAARFHGRHVAFDQESAARADLVIDA
RPDRAH AEGLAAFRGAGGRVV DRLGEVDLVVDG
VDPSALTGDAAKAAAQWQGGV RPLEAALSAPHDLVLDA GATAYEPGVRGLTSAGGRIIASHMLGQRAVLEHADGVLDG GVPRTDAARAARALWD GPVADFATLPSDASHGAVLVDA FNAHKPLTAEHDRYARWDGDPQLETA PDPSDPALWLDA GGRDALRGDAAWAAEAWSG PVEPAVPGCDDGAGLIVDA

GATAYEPGVRQLLSARGRVIPGDVGAGKMSDRTADLILDG

RPLGGYRGAAHARLAKRCGVPWPRSLPAPHWLAPHVVVDG AATVHA AGWAAFVAAGGRPVDAAEAL AVLPRQDVVVDG
QPDRVHGA GLAELRRAGGRVVEDL APATHPLTRLNRRRLKAVGVSPQVLSPRAGARGAALLVDG APDRTHAAGLAADRRAGGR\|V DQPRSPHLVIDG


PDKTHTEGLAALRRAAADVSSERSDGDSNALATADLVIDG

GEPRSDAARVARTAW TGPVEADHDAPPAAVLVDA DPTGNNLELLARESGEGTRVLDTAQSLRD DASYSLI IDG

A DP $\square R$ PEDARAAHAEAVAAGVP $\square$ STA $\square P$ TA $\square R$ A H D $\square$ A $\square D A$ $\square \frac{\square}{R} \square P H A E G W R A A D A A G C R Q V T P T D V \square H$

QRYDLAVDS RPPSQHSARRCWAR $\square E R R L P \square H V G V P T A T E D A A F P L L I D G$

A APSTLDSQTAKHLYQSNCANAPKYDTLTAFYQYDVVIDG $R G D G H P D G$ GAAFRAAGGR\VEEVPASTEVLVDAIIGT

UniRef90 UPIo0036FE4D9 UniRef90-UPI0004637723 UniRef90-F9PT12 UniRef90-UPIOO03671260 UniRef90-UPI00028A2909 UniRef90-H6MTF4
UniRef90_F6IGS0
UniRef90-A3ZQU7 UniRef90-UPI0003625857 UniRef90_T1ATF7 UniRef90-UPI0004691976 UniRef90 X0QAK5 UniRef90_L8DKV3
UniRef90_FOGZK5 UniRef90-A0A022LKD2 UniRef90 C7M310 UniRef90-TOLPC1 UniRef90-T0N4J5 UniRef90 UPI0003FD6D61 UniRef90-R7H8L2 UniRef90-N1MTG9 UniRef90 UPIO0046EC0AE UniRef90-I2BK83
UniRef90-B8GEZ8
UniRef90 UPI0001DD0A96 UniRef90-W9BVP0 UniRef90-J2WL81 UniRef90_C2CFI9 UniRef90_Q6L1G0 UniRef90_C7HU63 UniRef90-A9HRW0 UniRef90 IOURM7 UniRef90_S4D6V3 UniRef90_W7CJL1 UniRef90-D7GJ88 UniRef90 UPI000476F06A UniRef90-A9BBQ6 UniRef90-G8QGB6 UniRef90 U4TCJ5 UniRef90-UPI00028990F8 UniRef90-D5QHE8 UniRef90-D1Y8B2 UniRef90 V8AAJ5 UniRef90-G2KVK9 UniRef90-C6WLX1 UniRef90-E8SHO3
UniRef90-A0A059FV78 UniRef90-W5TP61 UniRef90-A0A038D1D4 UniRef90_UPI00026CD163 UniRef90-A5GUP7 UniRef90-W8X318 UniRef90 ${ }^{-}$XOWHU1 UniRef90 N6VZZ6 UniRef90-UPI00024906BE UniRef90-H6R473 UniRef90-H3NF57 UniRef90-R3WCK6 UniRef90-G4L4M2 UniRef90-G2H318 UniRef90 UPI000367366C UniRef90-R4LFM6 UniRef90_UPI0003B5779D UniRef90_D5UUE0 UniRef90-T1PAK8 UniRef90-XOZOA0 UniRef90-UPIO002E4C464 UniRef90 Q11444 UniRef90-UPIO00311E212 UniRef90_C7H516 UniRef90 R2QLH9 UniRef90 W9DRQ6 UniRef90-Q5UF39 UniRef90-R9WGS6 UniRef90 UPIO002195D2B UniRef90-UPI000287DDEC UniRef90-E3H5M9 UniRef90-D5T198 UniRef90 ${ }^{-}$M5QP97 UniRef90-UPI000468C14E UniRef90-UPI00038124C4 UniRef90 W6U4C0 UniRef90-K7RQJ4 UniRef90-TOZGX0 UniRef90-R2RGR9 UniRef90 C8PZL5 UniRef90_UPI000255D08E UniRef90-R5SSK9 UniRef90 C9MWB7 UniRef90-J4KDM2 UniRef90_I3LS60

VTGMGGRPGLSSSVARLRDWL PDDAYVIAVDLPSGTDPA
 VFGUGLSRPLPDAVA QVLAWKSSHEDKRVAVDCPSGLDDD
 VVGLAGSGPLREPAAARVDALARAGSPFVAVDLPSGVDAD ALGTGPARPLSPLGLEGV PEVVAIDIPSGIDAD


LFGTGLSRGLDPAVAARLCELTGAASRSYADDLPSGVETD $V F G A G L S R \quad D V G A D I A A V L G A A P R L V A I D M P T G V D G A$ $M L G T G L K G E V R T E Y R R Y U E Q I N Q \square Q C P V I A V D \square P S G L C A N$
$M \square G T G G S G E L R E P L S G C V E E A N R A G V P \square I A A D L P T$
$M F G \square G L S R P L S D E H R A L I R D L H A S H D R A V A L D V P S G V D C D$ LF GSGLARPLDGVVWHRFAELVGQARRSFAIDLPSGADAD $L F G T G L T R G L D N A V A A R L G A L V A Q A S H S Y A L D L P S G V G T D$ $\square L G \square G \square S G N P R E P E \square S \square \square R M \square N S S G K K \square I S \square D V P S G F P Y E$ VFGAGLSRDTDAGLASVLAAARR VVAVDMPSGTDGG $I L G T G A R G P V H G E A G E Y L G Y L R S L Q P P V I A C D \square P S G V D S N$

VLG DGGRAGLREPVAEFARACADVGVPVLSVDLPSGLAAD GTGGLRSPLPELPD EAPVIAVDLPSGVDAD


VFGAGDSRAVEGGGADVLRAARRD DADDMPTGVDGA $L L G T G A A G A P R G E T A R L I A A V N R H G R H V L A V D I P S G T E G G$ $V \operatorname{FGAGLDRAPSDDVMTVLA} S A K K L V A L D L P S F V N G R$
$\square V G \square S A R G P \square R P D A A E H V A A \square \quad D A P V L A V D L P S G \square D P D$ LFGGGLSRPDDGVPA A LATRGGRVISDDVPSGDDGLD $\|L G E S G T G G L D D A A A Q L A D A\| P D A$ ALVIAVDLPSGLEPD LF GTGLTRATAADTADVLATLTRHAHLAMTVDVPSGVDTD LFGLGQRRPLGPELSQLLQARQRSGGLIWSIDGPSGLDSD $L L G A G L S R A P D G A L E A L I H A V N A A G A P V C A L D V P T G L D G A$ M LGTGQRGELREPYKSVVSELNK $\square K E R N K E \square F \square V S V D V E$ $\square V G E S G Q G S \square R G A A A E L V A A \square P P G T P V I A V D \square P S G V D P D$

LLGTGFTGMLREREAGLVTADNEGRAFVLALDTPSGLGGL VAGDGSRPGLEPTVAALSSACVEAGVPVVAVDLPSGLAPE
 LLGTGFRAPLRPSMEALIAELKNAAGAPVLAAIDVPSGLEAG
$\square L G T G L Q G R V T D \square K A K \ I D L I N D A G K E V A A \square D V P S G L N T D$ $L F G S G L A R P L V A E H A L L L R D L A P R H R L C V A V D L P S G I A S D$
$1 \mathrm{~V} G \mathrm{~L} A \mathrm{~A} R \mathrm{G} G \mathrm{~L} R$ P DAAALVERV
T A P $\square$ I A VD $\square$ PS G VD P D

VFGTGLARALAPDLAATLARDGASARDTDAVDLPSGVATD ILGTGAKGAARGEAGEYLAKLRAVQPPVLACDAPTGLDSE
$L L G \square G A S R A P S A T L Q A C \square D A L H A T P A P V L A \square D L P T G L D A D$
 MLGTGQTGPLRDPYRAAAGAMTASRAPVLSVDLP
L LG GG LDGKPSGDYQTD


UniRef90 UPIO0036FE4D9 UniRef90-UPI0004637723 UniRef90-F9PT12 UniRef90-UPIOO03671260 UniRef90 UPI00028A2909 UniRef90-H6MTF4
UniRef90-F6IGS0
UniRef90 A3ZQU7 UniRef90-UPI0003625857 UniRef90-T1ATF7 UniRef90-UPI0004691976 UniRef90 X0QAK5 UniRef90-L8DKV3 UniRef90_FOGZK5 UniRef90 A0A022LKD2 UniRef90-C7M310 UniRef90-TOLPC1 UniRef90-T0N4J5 UniRef90 UPI0003FD6D61 UniRef90-R7H8L2 UniRef90-N1MTG9 UniRef90 UPIOO046EC0AE UniRef90-।2BK83
UniRef90-B8GEZ8 UniRef90 UPI0001DD0A96 UniRef90-W9BVP0 UniRef90-J2WL81 UniRef90_C2CFI9 UniRef90 Q6L1G0 UniRef90_C7HU63 UniRef90-A9HRW0 UniRef90 IOURM7 UniRef90 S4D6V3 UniRef90_W7CJL1 UniRef90-D7GJ88 UniRef90 UPI000476F06A UniRef90-A9BBQ6 UniRef90-G8QGB6 UniRef90 U4TCJ5 UniRef90-UPI00028990F8 UniRef90-D5QHE8 UniRef90-D1Y8B2 UniRef90 V8AAJ5 UniRef90-G2KVK9 UniRef90-C6WLX1 UniRef90-E8SHQ3
UniRef90-A0A059FV78 UniRef90 W5TP61 UniRef90-A0A038D1D4 UniRef90 UPI00026CD163 UniRef90 A5GUP7 UniRef90_W8X318 UniRef90 ${ }^{-}$XOWHU1 UniRef90 N6VZZ6 UniRef90_UPIO0024906BE UniRef90-H6R473 UniRef90 H3NF57 UniRef90-R3WCK6 UniRef90-G4L4M2 UniRef90_G2H3I8 UniRef90 UPI000367366C UniRef90-R4LFM6 UniRef90_UPI0003B5779D UniRef90 D5UUE0 UniRef90-T1PAK8 UniRef90-XOZOA0 UniRef90-UPI0002E4C464 UniRef90 Q11444 UniRef90-UPI000311E212 UniRef90_C7H516 UniRef90 R2QLH9 UniRef90 W9DRQ6 UniRef90-Q5UF39 UniRef90-R9WGS6 UniRef90 UPI0002195D2B UniRef90_UPI000287DDEC UniRef90-E3H5M9 UniRef90-D5T198 UniRef90 ${ }^{-}$M5QP97 UniRef90-UPI000468C14E UniRef90-UPI00038124C4 UniRef90 W6U4C0 UniRef90-K7RQJ4 UniRef90-TOZGX0 UniRef90-R2RGR9 UniRef90 C8PZL5 UniRef90_UPI000255D08E UniRef90-R5SSK9 UniRef90 ${ }^{-}$C9MWB7 UniRef90-J4KDM2 UniRef90_I3LS60
 S GEVHWPVLDADVTVTFGG■KAGLMADPGEGCSGRVELVH
$T G L V E G P A V S A E V T V T F G G L K P C H V L E E G L V R S G R V R L V D$



GEESGECLYADETVTFGMAKPVHLLPAGEPATGLLTVVD TGTMNVIHIKSASILAMHKDKKGLANNSSMQGDNTVDIGM $T G L I P T D M N T A H L T V T F H A P K D G H Y L A D G P T L C G E L R V V D$ TGEVFRMADQADVTLCLIARKFGLHTKDGTDYSGDVVDIP TGAAPGPAVTADVTVTFGARKPVHVLAVPRCGRVELVDIG
$T G T V H D A H V R A D V T V T F G T L R R A H L L A B S P T C G R V E V V D$ TGEVTGVAVVAHRTITVGALKPGLLVGEGPEHAGAIVR

$S G A L L S A V P H F G V C D A D G A D K P A H L L Y P A A D Y V A R L V C A D$ TGAVRGHAVAAELTVTFCRRKPGHLLLPGRTLCGRVIVAD TGSVLGDAIQADHTVTF $\square G V K Q G L C T A Q A R D R \square G E L H F C G$
$P G \square R P T L V L G F H R P K V V G S E V A D \prod G \square P \square E A E C C D$ TGDVVDDMPRYALTLAFGAWKPAHFSGPALASIGAARLVD RATWLNEPLHFDHVLALGAWKYAHLLDPVASDCGTLSLIEE DGA ILSPLPHFTGTIALGAFKPAHLLQPAAAHMGWLVCAD S VKPD■TVTFTDLKENM NESNSGKI SHD TGAVRGYAPHAFMTVTFVRAKPVVIDKNEAQLNLSISHD DGTLNEPAPHAEMTVTFVARKPGHLLLPGRERLGRLVVAD

SGARDTПSFRATRTVTFGALKDCQLANPARQACGLVELAP TGAVPGLALKADVTVTFGCLKPGLVAGEGAQYAGQVDVVD
 TGEVFDRA UQAD DTLCLIARKFGLVTKDGMDYSGGU ILDAP
TGAVRGYAPTAEDTVTFCRPRPGHLLLPGREDCGRCEVAD EG TGEASREVPDYLMSVTFVRPKPGHVLYPARSICGEVICAD TGA $\square T G P A V R A D V T V A F G C \square K P V H A L A D C$ GRVELVD

TAKPLGACFRADGT TTFSGLRPAHVLQPGAADCGVVFAAD TGE $\square H G P H \square T A D \square T V T F A A W K P A T F L P P A R Y S A G E L R F V D$
TGTVHGNFAPFDDTLALGAVKPAHVLQPSAALCGAVRLLD SGQPTGHGTACCQRSIVGLWKRGFWQDSAMAWVGQQQRIP SGRCPGAAVRADLTVTFCRRKPGHLLLPGRALCGALICAG

TGD $\quad \square K \square D \square T V T$ FHKKKN $\square$ NKNA $\square 1$ K D $\square G \square$ PKEAE W


TGRPRPDAVRAHATVTFEAAKPGLVLPEAAPYTGRLHVRP PPFSGEPHFHADLTVTFGGLKLCQLMEPARSACGMVDLVD $T G D V P G D A V H A D V T V T F G C L K V A H V V G A A A A D A G H V E L V D$
$P A R A A G P A V Q A D A T V T M M G W K P A L L F G E A A T R A G A V D L T P ~$ TGVVHGPAVAAAVTVAFGALKPVHALAPAHCGRVEFVDLG

$T G A \boxtimes T G P A V A A A A T V T F G A Y K P L H V L A P A A S R C G E V H L D D$
$T G L I P D A A D A A D V T D A D G R D K P A H L L V P A A E R C G A V R L L D$ RGTLHEPSLAAARTVTF 1 GRKLPAGTH $\square A E H C G T \square K L Y D L$

S GDWLQQCVHADHTLS LLS $\square \mathrm{K}$ PGGFTGHGRDAAGMVWWDD SGEV ATAVHATVTVTFASRKWCHVAHPAARRCGDVVVAD TGTRDPAGLHPTWTVADTAPKSEM DPTTAGTVTVRD VG
TGEVYDDADKADKTLCLDGRKVGLHMGDSKDYVGSVDDVP


UniRef90 UPIO0036FE4D9 UniRef90_UPI0004637723 UniRef90_F9PT12 UniRef90_UPI0003671260 UniRef90_UPI00028A2909 UniRef90_H6MTF4
UniRef90-F6IGS0
UniRef90_A3ZQU7 UniRef90_UPI0003625857 UniRef90_-T1ATF7 UniRef90_UPI0004691976 UniRef90 X0QAK5 UniRef90_L8DKV3
UniRef90_F0GZK5 UniRef90_A0A022LKD2 UniRef90_C7M310 UniRef90_T0LPC1 UniRef90-TON4J5 UniRef90_UPI0003FD6D61 UniRef90-R7H8L2 UniRef90-N1MTG9 UniRef90_F3SD10 UniRef90_UPI00046EC0AE UniRef90-I2BK83
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UniRef90-C2CFI9
UniRef90_Q6L1G0
UniRef90_C7HU63
UniRef90_A9HRW0
UniRef90_IOURM7 UniRef90_S4D6V3 UniRef90_W7CJL1 UniRef90_UPI000476F06A UniRef90-A9BBQ6 UniRef90_G8QGB6 UniRef90 U4TCJ5 UniRef90_UPI00028990F8 UniRef90_D5QHE8 UniRef90_D1Y8B2 UniRef90 V8AAJ5 UniRef90_G2KVK9 UniRef90_C6WLX1 UniRef90 E8SHQ3 UniRef90-A0A059FV78 UniRef90_W5TP61 UniRef90_A0A038D1D4
UniRef90_UPI00026CD163
UniRef90_A5GUP7
UniRef90_W8X3I8
UniRef90_X0WHU1
UniRef90- N6VZZ6
UniRef90_UPI00024906BE
UniRef90_H6R473
UniRef90 H3NF57
UniRef90_R3WCK6
UniRef90_G4L4M2
UniRef90-G2H3I8
UniRef90-UPI000367366C
UniRef90_R4LFM6
UniRef90_UPI0003B5779D
UniRef90_D5UUE0
UniRef90-T1PAK8
UniRef90_XOZOA0
UniRef90_UPI0002E4C464
UniRef90 Q1I444
UniRef90_UPI000311E212
UniRef90_C7H516
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UniRef90_W9DRQ6
UniRef90_Q5UF39
UniRef90_R9WGS6
UniRef90_UPI0002195D2B
UniRef90_UPI000287DDEC
UniRef90_E3H5M9
UniRef90_D5T198
UniRef90_M5QP97
UniRef90_UPIO00468C14E
UniRef90_UPI00038124C4
UniRef90_W6U4C0
UniRef90_K7RQJ4
UniRef90-T0ZGX0
UniRef90_R2RGR9
UniRef90-C8PZL5
UniRef90_UPIO00255D08E
UniRef90_R5SSK9
UniRef90_C9MWB7
UniRef90_J4KDM2
UniRef90_I3LS60
$L$ GPE $\quad L G E P D L R Q L D V G D V A A A W P \square P G V E D D K Y S Q G \mid V$ $\square G \square E K S L E$ $\square G L A P H L D E P$ DLTVLDPADAGAAWPVPSPEDDKYS QGVL LIPTQSNNSAATLVTVAHALNNARRQNSYKGSYGHV
 PRKTNSHKHKDYGRG

 $L \square P Y$ Q M A L H Q $\square$ A S N H T DS E K N T H S M S L R R Q N S Y K G S Y G H V

 D DVVKS S G G G D MVVYMP IVSTPPESHK GMN GTV
 I GIIP EA AVATVP $\square R T$ WH NE P G LDWRPPAC GVD S Y K Y S R GVVV $L G V N V E F D A \square E E E S A \square D H K V I P R$ LLPKPKATAHKGDNGKLL
GPGDLT
1 GVPD R G G A MRLSL
I GVVTEA A KVRRRIAAR AIA
IGGIGVPDRDHE LAAAPHLAA GGVPDRDHELAAPHLAA APDARSHKYRRGG CDYAVADCTKDTHDLDINTVFDNVLPKRSKSSHKGDYGKI

 GVPHALDNTEPALRVLETKDYRRELETPTVESHKYTRGVL RPQESESHKGTFGRVV




 $L G E N S A P L L G V P D A L E L E E D V R S F L P R R R S D D H K G R R G G V$

 $\square G V P A Q T A A V E N S P L I \quad$ WGPAMPRPGPEGYKHKRGHL
 LG LDA S A S P D WT LAARPELA $R P$ TPAMHKYSRGLV
 IGMMPDADALVPEAHVNHPDLDWADAFPWPRSEGHKYRRGHA
$\square$ VGFGD $\square$ K ALNLIEE NKHKGKNGKV

 PRPHHSHKGTFGRS


 $L$ SVVP R S WVA P E A V A A R LDP DA L D G F WP ERPA A A H K GTA G R V LATGEG DLRSYDDADVATRWPVPGVRDDKYTLGVL
 AVKGAA QL DGRPRLGAPAADSHKYRRG P PRAADAHKGDFGHV KRYRP $\square D S Q T H K G \square Q G H A$ MFETTSDFVWQKVQPRPRDAHKGTFGSV $M N Q L T E D \square L T K V I T R R P E N S H K G T F G R A$


 $\square G L T A A D D V D G S \quad L R A A A R P S F L A T P S F A A H K Y T R G M V$ GVIP E A L K G Y K P M L R V M E R E D Y R D L L E K P S V F S H K Y N R G V L MEKLLS E QULY QVIVNRANDSHKGTY GRV
 PYR I QS D DKKLFK R TAFSYKGTYGHA
 IPP A A WF ET GPGEFRFFPSSHLEHDGRRSRVIV
 1 G I E A N L Q L PVVRWLV GE D QPVGSVRPRPADGDHKYSR GAV| $M P \square R A Q N S N K G T F G K V$ FHIKRNEDSHKGDFGKV



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PG||GTGHEGREVLIRHVLAE ${ }^{340}$ GPlVICADADATT\|I|AKNPAR SGVDGEEQLQRAREASTSADDIPVVVDAGALSLLPE CGGGRNEENRKVLEMDISNFQNPVVIDAGALSELKEDKDID PGI GTGSNGREVLARVLEEARPVVADADAITLLARWDAR MGLGRDKKAQALFISYVQAAKKPLVIDADGLYHLASLQME PGAGTDAAALEVLRTV LGGDLPVLVDADALTLVADHHVVV $P G L G R D G L A R E R L A V A L A D A T V P A V V D A D A L T L L A P R H L A$
$P G L G R S H G L D L L I K D L Y C D L T T P M V V D A D A I N A S R E N P L A$ AALTE
G PGMGVSDRTRALVGEVHDLDDPVVVLDADALAHDPQRLFD WGLAVTKKLKHLFINYVQAAEKSIVIDADGLCHDASLHID PGFGTDEDSADV VRRVLE TDGPVVVDADALTARNEHWVA PGMGKGKDLNQLVKALLDNYHKKIVIDADGLNLKNDTH1 PGLGGTLDASANLVRRVVSGLGVPFVLDADGLTSLAASVLA PGMGNSDYEDSVMEKIMEAANVPVVLDASAINIIGKQGKG PGMGKTDEARSLMEYAVNNYPGQLILDADALKI I KPSKMA



PGLGDAAWGKSLLS VAANASQPQVWDADALNQLATGSV NGI GP SSQLVITHLAPLCRKAVFDADAIRLP
PGLGRDDAARERLEAAVRSGHPLVLDADALVLLMAEILAA PGLGRDDQARSLLETALACPHPLIVDADALHLLPGHFLK PGLGRDGDARRRLDGALDAGRPMVIDADALSLLAEGGRM PGMGRTDSDDYDLESMIVNYGGKVLVDADGLNAVSNPEIL PGMGKGNNLYKLEKILQNFDKNLLIDADGLNALKENDIL
PGLTVDEVDHTLPILVGAG GRTVLADAGAFAVAADQPDRLR

CGWGARDDAASVIAERLA TGVPAVLDADALRDLPDTV
PGLSLDSPGQADLRTALLE QVPLCLDADALTLIAAHWLE PGLALANEKWSDIACQLEKFPGLLVLDADALNRLAWEWLN PGLGQAPEVREFLSRAT TGPLPLVEDADALNLLAADPLA MGLGRDEKAKALFISYINAAKKPLVIDADGLYHLASLSRD PGMGNNSVEVGSVFPVLVEAGRQVVADAGGLNSMAGGRPGEL
CGPGLTP E EVVEAALPSLLRAGRDVLADA GALGGWA D GVPA SGLGTDEKSLSLLKTVEASVSPTQIVDGSAIDLIASNNLS PGLGTGLSAEGVLRAVLEAGVPVVADADAITMLANWDAR PAAGUTPSTRANVEVLLKGAARAVLDADALTVFDSHPFK PGLGQQEWGKKALQKV ENVRKPMLWDADALNLLALIPPDK PGLGTGAAAAEKLESAVA SGYRLVIDGDALALFDRIKTR $P G L G G G A L N A E L Q D F P G L L L L D A D G L N R D A A Q G N V Q L W L Q$
$P G L G R A P E G R D Q V L A L L A$ PGLGRAPEGRDQVLAGLANGRPCVLDADALSVFAGRPLD NGLSVNEKTKDFVNEFINNYEKKLVIDADAIKVINYHKFD $P G G G D D A N S D E Q L K N V L A T V S Q U V I I D G S A L S I L A S N N W N$
$S G V E D D P L D K A L D E A L S ~ S G L P C V V D A G A L E A C V R R R L P ~$ SGVEDDPLQDKALDEALS SGLPCVVDAGALEACVRRRLP PGLGLSAHSEQLGETVRQKPEQWLVLDGSA|ATLFAQNHYA
 SGWGDRREKGLVARAI ASGA PLVVDADALRHVPEGG SGLGTSDDARTELRSVLASPDPVLLDADALLLLVDGRHDG

PGLGRDAAARERLGEALRTAPALLLDADALVLLAPAMLL $P G L G Q A S W G R S L L S A V S H V H P Q V W D A D A L N L L A G A P L A$ PGIGQEEPTQKALHEFLITNTISGVIDADALNLLAKAWLI PGLGRAAETRALVKTLLPGFSGSAVLDADGLNAAADEKML PGLGTASGARETVREVLA ADVPVI ADADAVNLLAA WDAR PGLGRNYWTDQMLYKTTNFAAKPLLDADGLNLSENRLK PGLGNDETSLRLLKNVFAHTKQNVII DGSAITLMAMEKLE SGLGEEDGVLNQVLAHDQP KQTLII DGSALTMMAEQNLS PGLGRDAAGRERLDAGLATNAALLI DGDALHLLDEPRLR GSGTGPETLDHNRYLVNAPEPALLDAGAVDLAADYLMA SGLGGLAPWGRSLLSAA AQAKMPQVWDADALNLLANADFK
 PGLGKGAKAVQTLAQLFA LLKRDFIADADALNILLAPDLLA SGWGSAPGNAARLDRRLADGVPVVVDADALAVLP MGVGAAPETDEAMGLLVRAWRRPMVVDADALALGGADPTD PGLGSHSQQLLALVLQQQKPEQRLVI DGSAITLFAQHHYA MGILGRDKVTLDLENQAIKKSEKLCVIVDADGLYHLADWRLGG
 PGI GKSKQAFLIFEKLIS DKKNNKILDADALNLLAENRFE CGLGLSEQATTLLSLVLSHLQQKLIIDGDAITLFAKYSQN


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 $V L G A L L A Q G D R W A A V A A L A A S V H G R A G A K A S A D G G P L T A S$ IILSLLGQGDSVFNSAKLGVEIHGLAGDFAKEGEDSIDAS MLGRLLAAGVDPLWACGCAVLVHARAAEDAATG
$A \square A S R V A S G V P A F E A A C E G V W L H G E A A R L C P P A F T A G$ VIA A LLGQGIPAFEAAQLGVYLHGLAGDLAAKGSDGLIAS $L A G T L L A C G L S P L D A G S V A A A V H G L A G R R A N P G G E P V R A L D$
$I I G S Y A A V H D N S F E S A V A A V Y V H S R V G D A L A E K G E H I I A C$

$\square L L S N D C \square M D T F E A A V F S V Y \square H G L A G D \square Y A K N E D S L I A S$ MVGALLANG
VI GGLLAQGLDPLRAAWAGAWLHGTAGAQDAMMDAAPT LLAGLISRKVPTLRACSMASFINKRAAERCMNHRKVFGDD IVAGIASRKVNPFRSAVLGSFINKRCAEMFEKYGYYYGIMM I I TSFLAQGYEPKHAAKLGVFI HGLTADDAETGYQSFIAS


$M T V A L L A Q G W E P G A A L L G A V H L H G A A A D T L P G G P \square G L T A S$ VI A GLLA AQDLTSDMRSLAAVMIHGLAGDALLIGQRGLQAQ I A SFI AQGYEPFQATYMSAYI HGFCGDVLSKDMFCVNAT I I A AMLA A GMPAWEGACAAVWLHGEAAMRA
ACAALLAAGVPAEKALDALGAWCHGAAGEALGKGQDGVLAH VI ATMLAA GMPAWEASCAGAWLHGEAGMKA
1 I GGFVAQFENTENAVLAAVYTHSADADEDAKKQYVVLPH $L V G T L L A A R L D P L D A A A C A A R A H A T A A D L A S R$ GAPIPAS MI TSFVGQFDNVIDADTSATYTHSY DGDKLSKDMYVVPPS FIA G LMAQGMATLPAAAMGAWLHGEAGLRV GAGLDSE AGTLMAAGLNALDAGEFSAHVHGRAAELASRHGGPIHAT I G GALLGQKFTPYDAACVGCVAHGAAADLLAAGARGMLAT YAAGLGAMGL

GWGLLAE AI A GLLA Q GLSSLFDAAALGVYLHGEAGEMVKAGDTGMIA T
 MIGGFTAQFADTTNAVQAAVYTHSADAEQLARNQYVVLPT

 LAGALLA QGAPSDVAACLAAYLHAKAGQLLLHDYRGNTPS

 IVGKLLASGLDPLDAAACAARVHSL
VLSVFFHWSLEALAAFAASYFLKHCNAAAFQKHGRGMLAT
ПAASRMAGGADPFTAGCEAVWLHAEAARRA
GPAFTPS VLAALLAQGLDAWQAACLGVWLHACAGERLGMKGRGLAAS 1 IT SLVA QAYEPDDAA IFGVYLHGLTADDAET GTQSFIAS $M T S A L L A C G D P A F E A A A C A V Y G Y G A A A D R A A H G E T G M L$ MIAGFIA QFGGSSETVAAAVYLHSKIGDDLAEEHYVVLPT
 $M V A G F A A Q F Q P L G P A V L A A V Y C H S A L A E N L S K T A Y V T L P S$ A A A VVAASVALLDRVAAGVWLHSEAARRL GGAFLAD IL GALLAQYMAAAQLAALAVYYHNRAALASLEGRKGVPPS
 VLGT L LA A GMEARDAAVVCAASLQALTAT L
 GETLGTEHYVVLP T




G\| VIEA\|PDAlRRTR

D M P A A $\square R \mathrm{H} \mathrm{V}$ M Q
QLAERTPAALA
DLLDYLEAAFQQ
DVAHELGRTDAHL
DI DD Y I PKELKK

DMPAA $\square R H$ VQ
D $\square 1 \mathrm{ENLPKAYRLMR}$
A L A D A $\square G R L V A Q M$
EMVNEI PQVFMEME
DMIDNIKNILHN

DFDRHVGAA
D LMPATRQLLEE
D MLECIPR
mLAEAVHPALEDM
QLATALPQALE
DLLARLPAAI
DII K Y L S K A I K L L R

$R \vee A Q S \square P Q A \square A E \square$
AI SAELPRYMKRF EVAEQIPFYLKKFS ALAHRMPGVLAKL
DVAAALRPVVSSL
ETADAARALFN
DMPAA \RHVMQ
$\mathrm{H} \backslash \mathrm{I}$ E F L P Y G $\square \mathrm{K} M \mathrm{~L}$
EVSDHLPA L LKEL
Q TSEA LPQFMKK
A L L R A V P D A DRA LR
KI I DEI PYAMKQLE

AVGF ATLADVIVG
DLARALSKVRAAL
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ELAERLPSVIAEL
D MA A A L R P VLA A L
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D M $\square$ GE $\square$ PS VFAR $\square$
QLA EAVCEALA
DLAPVI RALLEE
D I I S Ni GKAY Y L I
DLLDAL GTLDAE

DL L N F I
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$R T \square E Q Q A A A R \quad \square P E H C \square M Q R A G M G \square A R \square A R A \square A$

T REFMRSWEADSWAE G $\square L$ KEEVIAR VGQQ $\square G Q R \square M D A$

NTAATRRMERAATAT $\square P P H T \square M Q R A G \square A V A Q \square A Q A \square A$ TAET $\square$ RAAERAWFDAH PGEGLMETAAARVSATACEML

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YSVDT $\square$ RAAEAPLLAS $\square$ PDGA $\square$ MRRAAFG $\square$ ATE $\square$ GREL

YPAAT $\square$ RECEAPLLVAQEFD DQLMDEAAAADAHVAEAML
$\square R$ QAECSHVEQAR $\square D P D R \square M R \square A A R A D C D E V L A L V$

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FAAGQA LVVACGPGNNGGDGYVAATLLAAKGQRVRVAAS PHA QTIWVACGSGNNGGDGWEAAYHLQLQGFKPVVTWL

LAP HAR R $\square$ W PHAR TVWIACGPGNNGGDGLEAATHLQRDGLRVVVTWL

A PLA GYSVLLVVGSGGNGGDALYAGRDLAARGAEVTALIL EQLGAQRVVALVGTGNNGADALYAVAGLALTGVNCAALHL DHHPGKRVLVLAGSGGNGGDALYAAEELERRGAHTTVWQT KDSRAP VLVFAGPGNNGGDARVMARVLKQQGDAVIVVGP DDVEDARVAL LVGAGDNGGDGLYAGAELAQEGAQVTAIAV $\square A K K \square N H \| A V W C G Q G N N A G D G Y Y \square A A F L K Q Q G F K V T V F A T$

PHAN R $\square \mathrm{W} \square \mathrm{ACGPGNNGGDGLQAAAW} \mathrm{\square QQHNCR} \mathrm{\square LVSCV}$
$T \square P G D S V L L L A G M G H N G D D V R A A C R W \square E R \quad E \square T L I N F$

PHAR TVWDACGPGNNGGDGLEAAMHLQRSGRQVVVTWL GPASRTRVLVVVGPGNNGGDGLYAARDLAAAGDEVALWPT

SQTRSLS ILLVA GSGNNAADGMVLLKTLILKGFKVILAKP DDIENARVTVLAGAGNNGGDGLYAGAELANEGAQVTADAV

G GVVGRRVCAVVGSGDNGGDALWAATFLRRRGAAADAVLL

QGTDKRVLLVV GTGGNGGDADYAGQMLIENGADVTAVIP

AQHEHDTVCCLVGGGDNGGDALYAASF $\square$ RNEGVPACA LL

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SPPRTAAAMAARARWAG PDEPLETAAPAALLIDA GQPGRCSADTLTSRQAA $\square R A G V \square C Q D Q P P E \square G Q D D L C I D A$

GPPGKTS $\square P A D A D A S R Q R A D A A G V P M S A Q P P E D F D F C D D A$ GSPEHTDARLSWERAQAAGV VWADAAPADMTAADLCIDA

TKAQKRADDAFPGR VVNRDAVDPRDFDLLVDG SGKVHPAGVVLLAADENDT $\square G D F S W P D V Q F \square S E A D I V L D G$ STGLHHAYRR PEEPTAAAAARADLII DG GDDVPK GRSLHEEAFAAFDHASAGEAGERDQAADEYAQGSHVILDA $E L G H S E D L Q Q A F H Y A Q S Q Q V D T Q E H E \square N Q D \square P \square F D C H I D A$

RERRMPADARAAWDAAHKAGVQW $\square$ AHMPPDMGPQD $\square C \square D A$


GQPAPVDAKASWQRARDAGVLWALTAP ANDTASDLCDDA SARRHESGWAA A $\square$ ASGAHEVDAAAAMAGLADTDLVIDA

KPPKRDEKNPYSEVFLS LKKMEVP LLVWDGDARAD I IDG $\square A D S E M N A T A N F K \square L Q K M G \square P C L L W E R Y T V F S K A D L I I D A$ GRSLHEEAFRAFVHASAGEAGERLQAAVEYARSSHVVLDA
NPDRTH RKALAAFTKSGGR LVESVSAATDLVIDG

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LFGT GARPLDPAQDATLARLAAAARLILAVDLPSGSDAD $L L G \square G L T Q Q A E R P A T D W \amalg E R I N C S R A Q V L A A D I P S G L S A D$

LLGDGARRAGTGSMQQWLDAMQASAAPRLAVDVPTGLDAD $L L G \| G V S R K P D S R M L A A L T A L H H S P A P V L A V D L P S G L D A D$ VAGLGS TRPLAGEVAHDF AGS $\square G V P V L S D D V P S G \square D A D$ 1 LGGGRGGLPRWGATWVAAV PDTAYVIAVDVPSGQDPN $V V G I G A S G G L R G E A A R A A S I I A E H T C P V V A V D I P S G V D P M$ LFGI GLTRPIAGGHADLDARINAFRGPVLALDIPSGLDGD MT GIGVSGALAGDAGTIAASLGLDGPLVVADDTPSGVGVN LIF GUGLNRMLDQKWQN』IHLYNLQTGFKVSVD $\square P S G I H A D$


LLG $\square \mathrm{G} \square \mathrm{SRTPHAQDQAC} \mathrm{\square HALQHSAAPVLAVDLPSGLDAD}$ $V L G L G G R P G L R E P V A E L A R A C A D L A V P V L S V D V P S G L D S D$

■F GTGVKGPVKGSSEEMDTVVNALKPFVVSDDVPSGNSD
 $M T G \square G A A G A L R G\|A G T L A A S I G V D G P L V V A\| D V P S G V G V D$ $\mathrm{VVG} \square \mathrm{SGSGPLRPAAAQVFAAVQAAA} \mathrm{\square PVVAVD} \mathrm{\square PSG} \mathrm{\square DVA}$ VA G L G A G R P $\square$ A P A V H
$M L A L D V P S G L D S D$
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T GTTNAAKP TGQFAASHRQARHTLGLLTLKPGLFTASGRDAAGNVWLDD

T GTFHPEAVFPDVTDT F GADRYAHVIAPECGEHRPLTEAH GGADSADGVFADETVTFSVAKPAHLLPPTEAAAGTLTFVD TGVPGDSYIRATNTVTFGGLKPVHVLGWEYCGDVVLRGLG T GRVLGAAVRATHTISF $\square G G K P G L Y T L D G P D H C G A I S V V D$ DGSLPGPY PA DVTVTFGAMKPCAMVPPASYACGKLMLVD TGQALPCSTEADQTFTLLGYKAGLFTGQGKEYVGKLHLVS

TGEPMN $\square$ P VSARHT $\square$ A LLT $\square$ QPG $\square$ FTGSGRDACGQ $\square$ WWDD


T GQFNHHPRPAHHTLS LLS LKPGLFTAAGRDAAGQVWLDD GGAEHPACFTAARTVTFGALKPCHVAQPAASRCGCVEVAD

 $D G S L P G P Y I P A D A T V T F G A M K P C A M V P P A S Y A C G R V T L V D$

TGA $\square$ TGPAVHAALTVTFGGLKPVHALADC GRVVLVD
$T G R \square V G V A V A A T H T D T F \square G A K P G D Y T G D G R D L A G E D H \square A S$ TGEAADACVTAD $\square T V T F G G L R D A H A L A P E C G T V F V A D I G E$

DGRLAGPVLGADVTVTMGGLKNSLVLAPAAAMSGKVTVVD
$T \square T F G \square P K V G N L L Y P G Y G R G G K \square Y V S H$ KGEPFNNAVKADHT $\square$ A $\square$ G $\square$ NK K $\square \square$ G QDSA $L$ PF $\square G E \square H H \square D$


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QVLGGGMTGAALLAGRAALHAGAGRVLVGLDDTDEARDSV LI I A GDDGMGGAGLLSAQAADRCGAGMVSLATREQHISAA AVVGGESA SGRHMTGAALLAARAALHAGAGRVYVALLAT $A V V G G G L G M T G A A L L A A A A A L H A G A G R V L V A G L D D G Q M A L$ GVVGGCQEYTGAPYFAADSALKVGADLSHVFCTREAAPVI AVLA GSEKYPGAGVLTTLAALNTNSGLTYYVGDS PBEV GVVAGSERYAGAAVLAVTSAVEAGDGMVRYI GPATPTGLV GIYAGSVAYPGAAVLCVEGAVRATSPMVRYLGP A 1 GGAAGMTGAALLAGRAGLMLGAGRVV VGLLEPLA $G L V T G S N R Y P G A A V L S A R S A A R T D S G M V R Y L G P Q R A Q D M V$ LVVGGHADMGG
VLI GGNAQYGGADIMSAEACVRAGAGLVTVITDSVNHTAL TLI GGNRNFGGAI I MASAAAVYAGAGLVTTITDASNQSSLL

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 GIVGGCQEYTGAPYFAG】SALKVGADLTHVVCACREAAPVI LLVGGNEEMGGADMDAASGAVYSGAGLVTVATHPNNHAAL GVIGGCQEYTGAPYFAABSALKVGADLSHVFCTKDAATVI

 LLVCGSRGMAGAAVLAAMGALRSGCGLVTVHLPESERTVI GI I GGCQDYTGAPYFAADSALKVGADLVSHVFCTKDAAAVI AVVGGEDGMAGAALLAASAADHGGAGRVLVALDDNGHLQL GIVAGSARFPGAAVLTACGALHAGAGFIVRCAPEPVPAMV LCVVCGSENMMGAAVLAVKAALSAGVGYAVAAVPEKEKDVI GVVGGCQEYTGAPYFAADSALKVGADLSHVFCVREAAPVI LVVGGHATTPGAVLLAAEAALRGGAGKLQCAVPGTVAVPL MVVGGSEGMGGAAL S SEASLFCGSGLVHLNTHPKNVEAS



GVI GGS LEYT

 GVLA GSSTYPGAAVLCTGAAVAATSGMVRYAGT
 GVVGGSDEYTGAPYFAADSSMKDGADLAHIFCQSNAATSLI



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H S Q DP E A MVV $\frac{290}{1}$

300

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LSRLPEVMA
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DGAQPEVMFRQFDALLLEE EALLLKQ
KSYSPELIVHPVLD

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CVTKVIRAVPDVVAGEGRVQALVI G
DP LQQAELMLRTPDDA
LAASLPEAVVGKGRVQSWVVGSDEAADEDMQRETDAMLLKH
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ASHGSDQAISPWPE
DLLHPE IMMMRRPDADAT
KSYSPE MMARPDALAT ALAQLDAVAI G K SYSPELIVHPVLD ASRCVCAMPFPLPDKRGKLRADALEQVEEKLAGCQVLALG

FADMEQTQALLPMLDRATGIVIG
A A QLQNVMVHP
KSYSPELIVVHPLD
$H G R L P E A M V L$
$K S Y S P E L I V$
$K$

NAYHSEKLINQIKKSDVIVI G

HAHLDPEAMT F
$K S Y S P E L I V H P V L D$
$H A R L D P E A M V V D H$
F S PHAADDQEVVEKQMK SADLLILI G HARDPEAMVVDH SDGFEALTQAIGQADTIVI G

 HAQLPEAMVL DYHDTDYLSELLTDMDGLVVGG
$D P Q Q P E L M L R H F D$
VAAMPSVTLGP
$F T S V P E A V V L P V G D K E E D A S$
$\begin{array}{rl}A & L \\ G R & E Q Q L T V V \\ M & Q W L V G\end{array}$
FTSVPEAVVLPVGDKEEDAS FVVKNKVDAVLVGA
KTYSPDLIVFPQMRQAVHAKKEETKETYPLLDRMHAVV $V_{G}$ KAYSPELIVHPVLD SPNAAQEVEKWLPRLHALVVG HA H DPEAMAF DYEDE AMAVPEAGVASDPDDGGDDAVSAAEEIVELAKDCAAVLLG

K
ASRASGVMVSPISREG
 LSAMPEAVLGKGRVESWVVGSGVPSAGDETGEDDAQRVTI KSYSPELIVHPLLD GAEDADEQIAPWLERDHVLI G

 HDWLPEAM FVDDNQFDAAQSIVTAANVIVIGG LA HWPEVIASPTPAA KTYSPELIVGPQLTASCKMDKTVEETSKYLARQVHCVVVG HSHLDPEAMAFDCDDKELFYE NLTKADVVLI G


ESVDKLKKVDAAVIG
HARLPEAMVDDMYNE
I A GFPEDMLDTA D S LDAK
KSYSPELIVHPILDKS
DRLLKKLSTATVIVI G
DATDELKEWMQKMHALVI G A AKNDLAMI DASPQDEEGYFANDAYLSLLDIGNYRVIGCG K GYSPELMVVP
HNWVPEAMTADYQ
HT IVPEAMF\PFDSEYKLIDA
QQQSQLI

| $H$ | $R V D A F I$ |  |
| :--- | :--- | :--- |
| $K$ | $T$ | $A$ |

VTR PECCLCPCEGAQGGIDAENVP
 LARDPGVVL
K S Y S PELIVVPLLDH
HQTADEVMCLDW
QAFRPSLVVGSFASDDVASALPAKDQVRQKLQASDTILI G
KSYSPELIVHP\|LEESYS $\square S N V D \square A E F D K W M E R F D C L V I G G$


 KSYSPELIVHPVLD S PSAVQDVEKWLPRLHALVVG
 KCYSPELVVHPNPVADDNCDETAVDRMSPGLCRLDSLVVG WQVAPEIVLKNTMQSDQNGNASLFSALNIDLSAFDSVAVG

HSHLPEAMVVDFN
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HSHLPEAMA
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 UniRet90 W4NAL5 UniReffo-DoSJ48 UniRef90-SONET1UniRef90-M5ADR6 UniRef90-UPIO0036E1ED6 UniRef90-S2Y4R5 UniRef90-C6WX65 UniRef90-UPIOOO3C90B55 UniReffo-R6TNO UniRef90-F3LHC6 UniRef90-UPIOOO466C9E9 UniRef9O-UP100037B99DE UniRef90-Q9CZ42 UniRef90-K8E2X0 UniRef90_UPIO00328B08E UniRef90_UPIO00440CE7F UniRef90-UPI000363F1A2 UniRef90-UPI0003C131D8 UniRef90 N1ZW17
UniRef90-C5RAV1
UniRef90-R51080
UniRef90-UPIOOO3940184 UniRef90-W6T8G5

 PGLGQSAWSRALLSSAAQRTDM QVWDADALNMLADNDCS CGGG EAVKTVLPKILSAAPRVVLDADALNAIAQTQLK CGCGGGEAVRTMLPAVLTRAARLVLDADALNALAADAALR

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

$P$ GCSSE D D T Q L A E R Q Q L H S N L P L V V I D A T S L T R V A E S E V R

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

PGLGQSDAAITELTFWLTQA CPLVLDADALNLI AQHHRK

TGLGQSAWSEQLLYQVLDNVIIDPVLDADALRLLSQARFK
$P G L G T D D A A L A T L Q Q V F Q T A Q Q T L V I D G S A I T L V A Q H H D A$
PGLASPQELRAQVVETWESLPAPVIVDATALDWIPSGR P









$P G L G K$ E K A SA A I P F L L N D L

$P G \operatorname{LGRDG} D S T K G I L E A A R D R D I P V V I D A D G L W L V A Q R P L I$



$P G W G K$ E G D R A E Q L A Q A K E K N G T P


 $P G L G T A D T T L E A V E Q F L Q K F D G R A V V A D A L S V V P G$





P G L G R E P K T T A A I M K L C L D A E K P L V I D A D G L F L N D E F D MV



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P G L S L N E E T R N L T R R E L A R E I E K P L L I D G D G I T A V S Q E I L K

P G L S R D P V M LA M A K R IV E K L G TP LVi D




N G L G C G T $\quad$ L V V L D G V V


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UniRef90-C5RAV1
UniRef90-B3T7W1
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 A R H Y R TV L T P H P P L E A A R L L G T T T P D V V D D R L A T A R Q L A S R F
 Q GY HK A I L T P N H V E F G R V F G G P V D S E D Q G D A V L K L S Q A L G R R E A DT I L T P H E G E F K R L S D A T G T $\quad$ P
 RRTASTVVMTPHPAEAAR LMATTTEAVQDRVGTALQLAARF PA QVVITTPHA GELTTRLLTRRLT QVQANPLRAALEAHELTT

LTVP QTVFTPHQMEWQRLSNLPMNQQNQQTNQQAAQQQL LP QA H I I F TP H QME WQRLS GLKMAA Q T PAANKAAAAT





 HS Y H K A L T P NHVVE F SRELWEAVLDS S PMDSND T L K L S Q A L G T P K A K T V Y T
 QFYQRGILTPNFMEFTRLYEAMHHRPDDSTRAQQLSLAMG




 QHGQPTVLTTPHPLEAARLLLGLTTAEVQANRGAAQQLAADQF



## 

Q
HLLEGKALVL $\begin{array}{llllll}D & S & C & K & E & T \\ S & L & T \\ \text { S R E A P } & \text { T } & L & T\end{array}$



 NDLSNVI L T DTDATLVCT




 A R G $\square$ A C V L T P HP L E A A R L L G S DTA TVVQDRLAAA EA LAA A Y KRTATTILTPHEGEFARLSDATGTAAERARALAEDLL T P V A K T T Y T P H L G E WQ K L S RLLKPT EQNETGNDQAR K E L



 FPSS QLI LT P HQKEWERRLSGLVLDDHQNTEATA RALSAAFP Q HAAPTA LTTPHAGEAA A L L Q S HGQSWTRRQRQAA QE I A S A T Q LP E K T I L T P P H P G E WK N L T G L D L A S S S S WQ E S S D WQ K K I $K V L R R T V L T P H K G E A A R L G A P F G L N L D N M L Q E A Y S L A L A Y$ S GYP LAAVLTPNVNE YKRVLGCDVNDQDTH GELLSSLCKGDG EREAPVI LTP HPGEFSKMTGLSI QEDETNRAYARDYAE EH
 LANKNVVVTPHAGEFKRLFGEPPSNSKNERDKVEKKAKEF ERKAATILTTPHLGEMARIT R DERREEDEKNRDVLQETAKK L Q GYQKAVLTTPNHMEFSRLAEAVLGDALDGRDRCRASRAGG DFDSPVI LTPNK DEFERLSNKI DVQTMG
MGYQNVILTPNTNEFKRLCHSVNIDASENCEVAALSKALG ERRFKTWITPHSKEFSRLFPNIKCE TNVEKALNAAQEF K DFKNVILTTPNASEFKRLLDSLTNNNMPESEQLNSFFKS Y TS K K D K $\quad V \quad$ L T P H P G E A A K L L G I S N N E V D D R DN A A K S DS N K F LPHARLVLT $\begin{array}{lllllllll}\mathrm{Y} & \mathrm{L} & \mathrm{H} & \mathrm{K} & \mathrm{D} & \mathrm{I} & \mathrm{V} & \mathrm{I} & \mathrm{T} \\ \mathrm{F} & \mathrm{P} & \mathrm{T} & \mathrm{A} & \mathrm{Q} & \mathrm{L} & \mathrm{V} & \mathrm{L} & \mathrm{T}\end{array}$ HRRATTVLT K GHKECILLTP P NDVEYEALMMGEAPGMDRDAAAAARLAAAERS

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UniRef90_R4YWS9 UniRef90-W9X159 UniRef90_UPI00037476FA UniRef90_N1JGN7

NATIV I LKKHHTE\|YT DTKVVYQLPDGSAAQAVGGMGDT|LAG
 GAIVVLKK GATTVADAARCRVHPHGNPWLSTAGSGDVLAG DAVVVLKGSGTVI QTDQTPH\|NPTGNAHLATAGTGDVLAG NAVTVLKGHHSLIATPQGESRVERGHPVMAGAGFGDVLSG QCVVVLKK GS GSSVI A VP GQPP CIN S GNALLLATP GT G DVLA G HCIVVLLKGSGTVI AAPMAPAINPTGNARLATAGTGDVLAG $N V T V V Q K G A R D V I S D G Q Q V L V C S R E G S G R R C G G Q G D L L S G$ $K C I V L L K G R \square T T I A E W A D S V Q A P A G S S W G S V P G S G D V L A G$ GATVLLKKGSTTVVVGPEGPVRQADGPAWLATAGAGDVLAG



QATVVLKSHRTE TYHHTG $\square Y$ QNP LGNPGMATGGMGDTLAG G GlVVVKSSHRTQQYTPTNAYENPGGTPAQATGGMGDTMAG GATVVLKKHHTEI YSPKQETTRPDGGPYMSTGGMGDTLTG $N C T A L L K G S G T V I A G P Q G C W D N P T G N A R L S T G G T G D V L A G$ $H \vee I C V L K G A G T I I A E Q N G Y C I N T T G N S A L A T G G T G D V L T G$ $N V T V V Q K G E Q D V M S D G Q E V L V C S Q K G S S R R C G G Q G D L L S G$ GCTLVVLK GHRTVLTATPA GTVVVNTT GNS GLDAKGGS GDVL T G GGAVILKGA GTVVVTSSGEQYCDAGNAGMAS GGMGDVL S G NATVVVKSHRTQIVTPTGSFQNPLGTPAQATGGMGDTLAG


 GTVLV AKSHQTKVLQG DLL GELRRVGGPYQATGGMGDTLA G $N L T V V Q K G E K D L I S D G E K V V V C S H E G S S R R C G G Q G D L L S G$

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

 GTTVVLK GAAQYVAEP
NCVCVLKKGKETVIVVYNNEVFDNTTGSDSLAKAGTGDVLAG
 $N V T V V L K G E Q D D, S D G Q Q V L E C S H K G S G R R C G G Q G B L L L S G$
 GATVASGTAMTWIVTPDGRSWRDGGSPGLGVSGSGDVVAG KSTVVLK GKHTVVCSMENKF DCSDGGPELSTGGTGDVLLAG
 K A T I L L K G H DT I A GA D GR WGVI D GMMPADAA G GS G DL L A G
 NAVI LLKGHVIVYI SAP DGSYSVID GMSMLAMMGGS GDDLLAG $G A T V L L K G A V T I V V G P D G D G G D R R A P A W M A T A G S G D V L A G$ $G V I V L E K G P Q D K I Y D P S T S E D Y P A G G S G R R C G G Q G D L L C G$ GHVVLA KAKDDVI T DGETTR ICRAGTPGMTVVGGTGDVLAG


 $K T V L V A K S H Q T K I D Q G N Q V G E D T V G G P Y Q A T G G M M B T L C B$ GVVVLRRK GA DDKI Y $\square P$ Q T N E V H P E G G S GRR C G G Q G D L L C G A SIVVVLKG S GTVVIAAP DRDTVVNPTGNAAADAT G GTG DV L G G KANVVLKK A RTEI YF LDDEVWKNSVGNPAMATMGMGBTLAG



 NAVVVLKGARTVVASPDRVCVNPTGNPGLARGGSGDVLTG GTILVEKGPATRI WQQSEYYQLEVGGPYQATGGMGDTLAG G GI IVLLKTAATVVQDGQCPDIMPVGTPWTGVAGAGDVLAG ENIVVFKKGQTDCASNVAQWKSNEGGSGRRCGGQGDIL S G GALLVLKQSRTQVYTNDQVYQNTAGNPAMAVGGMGDTLAG
 GVTLVVLKGNETMI A F P D GKC WRNTGNGALAKGGGTGDTLTG

 $N A I I V L K G A H S L I G Y P D Q R V E I T G G K A G M A T A G S G D V L N G$ $N V T V V Q K G E Q D V I S D G E Q V L V L S R Q G R C W R R G G E G L R W P X$
 SVVT L CK G S K DL I A T G D D I LFFVSDPTSDRRCGGGQGDVL A G NISVLLKGANSIVADNKKAWQLFGTDSHTARAGLGDLLSG G DVVTLVKK GNNDEIIDNFKSYSCVVGGGSVCRCGGQGDVLABG S A SVI LKK GK E T II C S D E E L F DCTVGGGPELSS G G T G DV L A G MP VVLKQHHTQI YTSKDIYELP GGPYQATGGMGDTLAG
 GAI ALLKG GTTVVAAPDRVRDSSAGDQRLATAGTGDVVAG

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UniRef90_W4NAL5 UniRef90-D0SJ48 UniRef90-SONET1 UniRef90_M5ADR6 UniRef90_UPIO0036E1ED6 UniRef90-S2Y4R5 UniRef90 C6WX65 UniRef90_UPI0003C90B55 UniRef90-R6TN05 UniRef90 F3LHC6 UniRef90_UPI000466C9E9 UniRef90_UPIO0037B99DE UniRef90_Q9CZ42 UniRef90-K8E2X0 UniRef90_UPI000328B08E UniRef90_UPI000440CE7F UniRef90_UPI000363F1A2 UniRef90_UPI0003C131D8 UniRef90-N1ZW17
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UniRef90 E2VDR UniRef90-M2XA72 UniRef90-F0VW88 UniRef90-B4MZ34
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UniRef90 R7UNW2 UniRef90_UPIO0036ADF63 UniRef90-A8NPJ9 UniRef90_W9EFN7 UniRef90-J1F1F5 UniRef90_D4K7T4 UniRef90-F2QED7 UniRef90_UPI0003B31918 UniRef90-14DKG2 UniRef90-K9E740 UniRef90-R6HJL4 UniRef90_UP100042B0DF6 UniRef90-UPI00047ED794 UniRef90_S4NAK4 UniRef90-KOBBN9 UniRef90-X1RSP9 UniRef90-UPIO0044062BE UniRef90_UPIO0034F85C8 UniRef90-F4NZ38 UniRef90-UPIOOO4730155 UniRef90-T2M9H7 UniRef90_UPIOOO37962E7 UniRef90-B1MXT1 UniRef90-G5GGZ5 UniRef90-S3AD35
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## $\square L A G F L A Q F P K E L A T D Q A A V Y L H S Y \square G D Q L A K N R Y V V L P T$

 MI GGFVAQFADSSAAVCAAVYSHSAI AELLAQQQYVVLPS II AAFMGQSEDPKAALDAALYTHSAGADQLAKNAYVVLPTLI A A LWAQGLDPAQAATLAAWRHGHAADQWPAQM PFSAS
 SLGVLAHWALLAVAAFGACALTRQCNHQAFQKHGRATTTT 1 I A SLLAQGTTAAQAAASGVWIHGRAGDLAAEEPYAMAPQ $L V G A L L V Q G M D C D D A A M L A T I L H S S A A D K A S T G D R S L L A T$
$M V G G F I A Q F A D H Q D A V L A A V Y T H S A D A E A L A A S Q Y V V L P H$ $Y L G G L L A Q A S D P L S T L S Y G V W A H G H A A D E C E T H$ SLGVMVHWALRAVAAWGACTLTRECNRQAFQKYGRSTTTT $M L A G F L A Q F P N H K T A V L A S V F L H S Y D A D Q L A K T H Y V T D P T$ $S L G V V H W G L N P F L V A G F G A L T R Q C N S Q A F Q K Y G R A T T T T$
$S$
$S$
$G$ II AGFDAQFQSNFETVAAATYLHSADADELSKEAYVVLPT SLGVLAHWA LVAVAAFGACSLTRQCNNQAFQKHGRSMTTT TI G GFVGGQFKN H L K AVV E A A V Y A H S MI A Q EM A S H S Y V V K P S




LMGAFSAWNEWFDPVYSACAMTRRCSDQAFRKKQRSMLTT MI A GFVAQFKNLFNSVATATYLHSYIADQLSDQAYVVLPT SLATFLCWSLQAFLAACASSYIKTLNYVTFQKDGRSLMAS

 MI A GCSAQFKNYRFA I I TA AVFLHSKLGDDLAKKQYVVLPS IIGSDLAQGVPVFEAACAGAWLHGAAADVI KESAGIAAGG IICGLSA WIIANPFHAAVLGAFARNQAA VGTLSPVAFTPLL | $A L A V F S Y W A D R K N D S A A A S Q L I D R W A K V S F E R N G R S S T A S$ |
| :--- |
| $I I$ |

 MLA ALLACGLPAYQAAACAVYLHGADRAAAKRGEYGMLPH $M 1 A G F A G Q F V S L Y E R V V A A T H L H S A D A Q E L A Q E N Y L V L P T$ $M M A A C A A Q W Q S L M E A V A G A V W I H G E A A R R H G Q Y G A P I R A Q$
 VIGGL LAQGMSAFDAAHLGVYI HAEAGNDAAKGVVSTCAE ML LGMLCCHENPREAVLNAVHLHGACADAWTKTRHTLLAH $M V G G F V A Q F S D T P K A V L A A V Y S H S A D A D K D A E K Q Y V V L P H$ LVAGLLSVNRNSLESAAAATFINGLAGKSAQKKGLHMTSM TI A A MFCLGLSLEEAVRTGVFI HGLS G RPAKPLPRRSGPLLVAAACALTRQCARQAFQKHGRATTTT $R P A K P L P R R S G P L L V A A A C A L T R Q C A R Q A F Q K H G R A T T T$ ILCAF LA WRNGYQSASNASSFARKCAALAFEKHKRSUVAS FI AGSSADDLTFCDFFAKYVLLHSFAA SKCKKGSNAS






| UniRef90_C7XTK8 | QIS HALLPGFMKK\\|S |
| :---: | :---: |
| UniRef90-D4YSL7 | QI S QLL P K LMK K |
| UniRef90-A0A031HLR | DLANALTAA |
| UniRef90-UPI000375990A | TLASALRR |
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| UniRef90-Q12A28 | T L |
| UniRef90-UPI00047DF59B | A L A R H 1 G |
| UniRef90-G1T9P2 | D M 1 A EI GAAFREL |
| UniRef90-S2Z28 | KIAESIGS |
| UniRef90-N0E215 | RVA Q ALP S TIA DL |
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| UniRef90-W0SF27 | ELIP $\square$ AR T R L N R L |
| UniRef90-W4NAL5 | DVID A $\square$ A G A F ELL |
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| UniRef90-M5ADR6 | Q। IT ELPHFMK |
| UniRef90-UPI00036E1ED6 | DI I DQLQRFMKE |
| UniRef90_S2Y4R5 | A L A R L G Q |
| UniRef90-C6WX65 | ELVTAI R DVLNQLS |
| UniRef90_UPI0003C90B55 | D MVAEL GAAFSTL |
| UniRef90_R6TN05 | DAAAALPKVFREL |
| UniRef90-F3LHC6 | DLIA EVQ T |
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| UniRef90-N1ZW17 | DIIEEHLQT F MAQFS |
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| UniRef90_UPI0003FD6CBF | ELSQWLP EVWK K Y E |
| UniRef90-M3YGT1 | D MIA E |
| UniRef90-F5YAY5 | E |
| UniRef90-E3E077 | ELSALLLPRVWKRFE |
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| UniRef90-UPI000479CEC1 | DVIAAI PQAFDEL |
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| UniRef90-H1LKY3 | Ql S E ALP T F MLQ |
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| UniRef90_W9EFN7 | Q I SAALPTFMKQ |
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| UniRef90-F2QED7 | EI SKLLPKTMKK $\square$ S |
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| UniRef90-S4NAK4 | QI SESLPKFMHK |
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| UniRef90-F4NZ38 | S ILKEI GPAFDSL |
| UniRef90-UPI0004730155 | A IG D ELS SLM |
| UniRef90-T2M9H7 | DFFPKI HNVFKDM |
| UniRef90-UPI00037962E7 | S L $\mathrm{S}^{\text {P T I R D }}$ |
| UniRef90-B1MXT1 | QISQQLPKFMKH |
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| UniRef90-S3AD35 | TISSHIPT FMKKIQ |
| UniRef90_R4YWS9 | DLPKLVGAALLDDL |
| UniRef90-W9X159 | DLTDEVHES |
| UniRef90-UPI00037476FA | ELTETARRVLNQWR |
| UniRef90_N1JGN7 | DMLEEVHGAFQAL |

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UniRef90-B0U8B7
UniRef90 X5DJT1
UniRef90-E7N7Z6
UniRef90_M7Y552
 YSTNSVRAMEQPLLER DVPLMRMAASATANVVLHTW HTVT Q $\square$ RDAEAVLLAS $\quad \square P P G T \square M Q R A V Y G L V A H V A R R L$
 GGVPG $\square V L M E \quad H A G R A V A R A \square R$

TSSDVRAAERPLLDR SVPLMRMASRALADVCRSRG YPAAQ $\square R$ A AEEP LLGAQREP DELMRAAAHAVAEQAARLL E E S G D $\square$ D R K T $\square$ F S T G $\square$ S GS HFMGFAA $L$ S $\square$ Y Q K Y E K K $\square$


TAAAMRAAEQKLFDAH PGTDLMAVAAGQVAAQARGMLD YRAGAVAEAERRLTAATDRYMHHAAHALALAAVRELRATA

YS LQAARAAEQEVLAAEPEPDAV MKKAAQACAGVAVAML

YSVETVRAAEAA $\square$ MQR $\square P E G A L M Q R A A A G L A A A C G D L L$
$S \nabla A D V R A A E E P L L A A \quad G V P \quad \square M E R A S F A L A T V V A R D L$

NTAES $\quad \square \mathrm{W} \square \mathrm{V} C G S G G N G G D G Y A \square A H F \square Y Q E G Y S V R \nabla F Q T$ DNERSTR $\square V V L A G A G D N G G D G \square Y A G A F \square A A R G Y D V T A \square A D$

GRVYGAR\|VVLAGGGDNGGDADWAGARLAARGARVDAVAP
 RRFRPRPTVVLCGPGNNGGDGFVVARRDHEAGWPVRVALL

SEVERSS IVILAGAGNNGGDGLYAGSLLARSGAGVTVLAV DG PGAVLLLAGSGGNGGDALYAGAELAAEGRRVDALLV
 KTAES $\square \mathrm{W} \square \mathrm{L}$ S GTGGNGGDGYA $\square$ AH $\square$ LHQEGYKVRSFST

ADVRGGSVLVLVGGGNNGGDGLLAAAELADEGCHVRVC GRTRGRGVLLLVGGGHNGGDALLAGALLARRGCDVTAVAT

PDT GQVLVIAGPGGNGGDGLFAGAHLALAGHTVHAVLV

GRVYGSRVLLLVGSGDNGGDALYAGARLARRGAGVRALLL

GRVTGARAVLLVGSGNNGGDTDHAGAYLARRGVDVLAVLT
$\square$ APHART $\square$ W $\square$ ACGTGNNGGDG $L E A A A L L Q A A G L P V C A S L L$ GW $\square$ S GAPVLLLVGGGHNGADTLLAGGLLSHSGCAVSAVLV

SPNKNEAGKYYTT $\square G K \square G S \square 1 D F Q N E T K H T K E D S V L L V D A$ GKR LHNGA LDA L CEAGGKVLVLDPYAQ $\square$ PYVRHATVVLDA GRAHPEGSAALLAAGGRLHGPAPAPDDETDRGLFGQADLV GEK $\square$ SECSK $\square$ NYNVLLNMG $\square \mathrm{N} \square \square \mathrm{N} \square \mathrm{I}$ FK DRVSKSDVVVDA GERAR $\square$ AGAAA $\square$ AASRWSGPVG T $\square$ TPAAVARAHLVVDA

GTA $\square$ HDAAARS $\square M R A G G R V L V V D P R C R \square P G F D H A D V V M D A$ GSGVHERARDALLAAAGRVLDDAEAGGYA $\square$ A $\square \mathrm{DG}$ D GN L S E ESEFYKNAY LDSGGH $\square L P L E S F E V L P G S E T \square F D A$ APNKFYES LVSKTLGA $\square$ GT $\square$ DD F YEE WEEAKEDSVLLVDA
$P$ VLGTPHAAGWQVALRAGCEVVTMEQAGQVVPDLVIDA GRPHAAALEEARRAGVRSAASPPAACEHAAAGGADLVIDG

AERAH EAALATFQAAGGVVHTGADTDDDETYDLVIDA

PKFKKFH■IVDC

APDRAHPG G $\square$ AAFRAAGGQVVDGA DG $\square G V L D L V V D G$

AEAD LVIDG

GEHAHVGGLQA LRAAHDH $\square$ DPHVADRVAA QVARADVVLDG

G VPEH $\square P$ T DAAASWQRARSAGVRFVDAPPA LGPQDLCVDA

TEHPHP $\quad V A$ LDE ARSHGVTVYMAADEAF LVHGGLVLDG

LLGTGFKSPLSKELQR\|VET $\square$ NDSRVYR $\square$ S $\square D S$ PS GWDPY

$\square D G L L G \square G G R G G \square R A D H A R \square A A L A P P R T V A V D V P S G V D A D$ $\square$ F G T G $\square$ K R D $\square$ T G $\square$ F K E V $\square \mathrm{D} \square \mathrm{V}$ N N S K N T Y S $\square \mathrm{D} \square \mathrm{PS}$ G $\square \mathrm{DS} \mathrm{D}$
$M T G \square G S K G A \square T G T A S V M A D L L A H D R P T V V A V D V P S G L G V D$
$\square A G \square G G R P A L K E P A A R A V A A V D A A G V P \square L A V D V P S G V A A D$
$L L G T G F R F P L K S P V D V V V S K \square N P D R \square F \| L S D D V V S G F N E D$
$L L G T G F Q N E L S E E L T E L V E T \square N E S D V Y R L S U D S P S G W N P D$

VAVD LIPSGVDAD
$V L G \square G G R P G D P D D L A R L G E Q L \quad S A A S W L A V D L P S G L D A N$ $L T G \| G A T G P L R P T A V E L V A P L D A A G R R V L A V D V P S G T G V D$

VA G L G A S REVSAEVAALVDR
GDK VLA $\square \mathrm{DCPTGCGTQ}$

A G S T P T
$\square L G T G T N R E V D E K T K E \square L E K V N Q S K A \square K \square A C D \square P T N L G$
$\square T G \square G G R G G L R E D A T E L V H T V T R D R T P V I S V D L P S G V E A D$ MYG $\square$ GGRPGLVDHAAWQLVQA $\square$ PD DAY $\ V A D D \square P S G A D P A$ GVP 【 L A VD L P S G VD P D
$L V G \square G A R G A \square R G V A A D L V R R L G A A R P W V V A V D A P S G T G V D$
$P L V L A I D T P S G l D I D$
$\square F G \square G L A R A P D A R \square P Q W \square A H L R G S A A T L L S V D L P S G L M A D$


NGKDSQHYVYADS $\square E E \square G T R K W E N V G F \square Y E K D N V I P R Y F E$ D G T $\square$ P G P Y $\square$ P A D $\square$ T $\square$ M F G A M K P C A M $\square$ P P A C Y A C G K $\square \mathrm{C} \square \mathrm{V}$

TGAVTGAAVRASATVTFGTYKRGLWLMPGAAHTGPVELVD NGNVLGTC $\square$ RANKT $\square$ SFEFYKRGF $\square$ NYDTSTLIGDVVVEK TGAVLGTAPQAADTVTFFRLKPAHLLRPGRDDCGEVVCAE
 T GEAQPGHVTAAATVTFGG $\square R R$ R A A $L L P C R A R G L A G E L A A$
$\square P \square P \quad F E A D A \square A E \square G M K K W K N R F \square P G K V R K T F H K \square G F$ PDSKANSFVFADS $\square E E \square G T R K W E N V G F \square Y E K D S \square 1 P R Y Y E$

S GTVTTSTRADVTVTFATRKWCHVAPPAAERCGRDDVVD D GTVS GPVLRADLSVTFTCLKGAHLLAPAAGACGRVEVVD

RSVLADAT $\square$ TFGHARTPHANHPECGQDKHAPVGYTSFEPS

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

F T PCFKAD $\square$ T QCMGA $L$ KE $\square L L E D F A K E F V G K \square K \square A N$

TGEVHGEAVRADATVTFGTYKPGLLIDPAAEHAGALRLVD
GERPVADAVFADETVTFGMCKPVHVLA GADATGLLTVVD T G V VHEPSVQAAVSVT F GRPR LIAHLLAAPVCGRVEVIDLG DGTVPGPVLRADRTVTFGAAKPGLLLPPATHLAGHGAVVD EGTLSGPYIPADATVMFGALKPCAMLPPAAYACGA $\square T L V D$

TGTWASGFDAGDHAGTGPRHT $\square$ S $L L T \square H P G \square F T A H G R D A A$

 $K M V P P L L E K F H K G Q M G R I$
 $R M$ PPMLDKFHKGQLGRV
MQDVREYSSDELVALLPLPTNDANKYTRGVL
$\square G \square E \quad \square P E P D \square R A D D D A D \square A A M F P V P G P E S S K Y R R G V L$
 MQVIT NSTVRAVLQARPA ISRKGDFGRV $\square G$ VP D F R K Y H DE E F IT D K T F V K N NI R R R D K H G F K S D F G K V R I I P P MLE S F H K G QL G RV $R L I P P L A A H W H K G Q Q G R V$

$\square \mathrm{G} \square \mathrm{P}$ A R V L E G $\square \mathrm{AP}$ P R N D P A $L \mathrm{WR}$ | $A$ | $A$ | $R$ | $R$ | $P$ |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $R$ | 1 | $T$ | $P$ | $P$ | $L$ |
| 1 | 1 | $P$ | $P$ | $L$ |  |
|  | $A$ |  |  |  |  | $R A M P$ A A GLHKGQGGRV R M $\ P P$ P MLD G G D K E QR GRVV FP K R LA F GHK G S Y G H V V GGLDLDPGRAVV RRMDASCASSMVLPPMLEKFHKGQLGGRV LLPTLDDS LLRKGDCGRL A A T G K E A R LVVRVVEGDRDA LRGVVDDLDEPGE GDDKYS GGVV $P \square Y P \square S$ Y TMENP \VP T GKF LWWKK D HF LK K L

 HRTHT LIKDMEN $\square$ F QLVRNV DP P LT GKRHK GQDGRR V D R H K Y D Y G HA LAEDPE GEPTPRLYA LT DAE $\square A D A W P \square P G P H D D K Y T Q G V V$ $R R Y A L Q H F P D I C Q P H P E N S H K G T F G T V$ MHYNQLRSH\ARLDPTLS GASRKGQHGKI ITGVEPPERAEGWTSVVDEDDLARLWPVPGPGDDKYSRGVV
 A HKRCVTP

 $R V P P L E R F H K G Q Q G R V$



 HKAHSVKDMENTLQLVRNVIPPDTTKKHKGQDGRII RMQD $\square R S M S G T T F E A D A E N V M R E \| T P V L D P S K H K G Q A G K I$

$L G \square N A K K F S L D S K A F L L E E K D L K T \square E R N T S S N K G N F G H \square$ LI P P L N G MLDHK G Q S GRQ RSDQHKYDHGHA WP LPAPGEDKYSRGSV PARLLNSHKGSYGKLL
 RAWPLMPSEDGDEQRGSV $\square G \square A$ E P VT P H A A A R LV H D D $\square$ A A FWP VP GP GD DKYS R S KK LT LP P P $T V A S L T D A Q V G Q V W P V P G P G D D K Y T$
$\square G A R A D V S A T P V V R R L E P A D V A A L W S V P G A T D H K Y T R G V V$ FEFD I DEQQPAI ESADDGLARQAIRLPHLDDAKYSRGVV $L V T R Q D V A R L W P W P Q F S D D K Y S R G V L$ UniRef90_D0YRX6 UniRef90_L8WIW0



UniRef90_U4L314
UniRef90_A6WEC4 UniRef90-W9GKS5 UniRef90_G2QY89 UniRef90-UPI002B457D1 UniRef90-R8ZWG6 UniRef90_K1X1T9 UniRef90-UPI0003B66A07 UniRef90-I7IFT4 UniRef90-M1W7H4 UniRef90-F7UVP4 UniRef90-XOPIE5 UniRef90_I8QNT2 UniRef90_E2QUG8 UniRef90-G6CDF6 UniRef90-T2WTU8 UniRef90-G4YQN1 UniRef90_UPI00035D3F5B UniRef90_W5EDC2 UniRef90-G4TLW4 UniRef90-K8G3L0 UniRef9O-G2Q5U 8
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UniRef90-DOMVY0 UniRef90-J4QKV1 UniRef90-FOM268 UniRef90-M5E6S9 UniRef90_A0A017SG00 UniRef90_S7ZJL7 UniRef90-D5NWP2 UniRef90_V4PA86 UniRef90-A8N8Z0 UniRef90_UPIO0047C0118 UniRef90-D9XVD3
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 K SYSPNLMVVPSSSGADTDAQQ\AARIVVPMLDRDHVLVI G
 A KTYSPNLMVHPLMRQSTHASSSDAKSVIDMLPRLHVLVIG
 KTYSPNLMVHPLMRQTPSGDEAKAPPIDEMLPRLHVLVI G RGFRPSLVVRPR TALPVNLPAALPGKPRAYLVG

 HARLPEAMFIDYQQPFVQWSSAVQAADVVVVGP

K S Y S P NLMVHPLMRQSPAPNPNQDPQIIDLLPRLHVLVVG KSYSSELIVHFDESKRAAVLAEAVERIVQVLPRLDTLVIG CRA GDPGVIVVEAPVTELLGDLRRQVWLVGG
 A L A VPEALVLGLAQNGQGE\|VRGHRALDGAMAACDAAVIG KSYSPNAMVHPSASSGDTDATEDANRIDPLLARCDHVLVVGG KSYSPELMVHPVVD NPDDP DNLI EPWL ERLHVIIIGG KTYAPNIMLVRDNDF KTYSPNLMVHPDMSAPDTDPSQLAAQUIPMLDRLHVLVIGG LQAMPEVVVGKGHVQAWTVGCGVDPDDHDDDSPASAVGAL KSYSPEVLVGKSP
KDRFPEAVWSPSPEATAFHWLDALDGVLIG
 KTYSPDLIVMPI MQLSKNASENSINDIIHELERGHVVVVG LKKDPSWMVDTIPEVSKDMDLDPGVRKTSVFLLG KSYSPDLIVAPPLRED VSAASLRPEMSSLLARLHVLII G KGYSPDLIVMPGMTSS LKI $\quad$ S S FVLKKEDSKMTKTSSLTETFEDPFLKKTKTVVVG $K$ TYSPNLMVHPPDDEAPEPDPDTVSADIEMLPRDHVLVVG K S Y S P ELIVMPVLD AARDDAI MVKAYPDDDGFADGLSTL RASAVCI G VEHFPEVVAVPE FADAGRVQAWVVG HARDELM KSYSPELIVHPFDRSDQDLANESVEKVMAVVPRLDVLVIGG LAAMPSVVL ADGRVQAWVVG LARRPEVVPASGRCQALVDGPGTDPADPECAAQIDAAAL E ALAMPEARVIGLENDTDGFHDDADGSDDPDADKVDAVLVG

 $G V A L P E C G A M A C D P L Q P E M M R D A R S L L E E D W G D A W V A G$ KSYSPDLIVVHPLLDQRKSQ EDVRAELRTGLGQRLHSVIIGG K S Y SP SLMVVPPVSDPNSMDAPSLAGPI ISMLSRLHALVI G KSYSPNLMVHPILDPKSIDASELAGPIIAMLSRLHALVIGG




 KSYSPELIVHPIDEERRR DSSK LLAEVVDKWMERFDCLVVG HS Q LP EAMA KSYSPNLMVHPLLPSTDDDARADASPIVSMLSRLHALVIGG $\square A A Y P E I M L \quad D T A S A L L K R T D L S A R V A G$ KSYSPDLMVHPYDHEGGHGEMG KIQSLVNRMHVLVVG GLLVPEAAAIALPEDSDGEDSDAGEALAGPLQGCDTLVL G VPQLPEATWVVLPHEMGA】AEGAAAVLEKELDQTQALLLGG MLKEPDVHPLLKEESSVD TVRSQLEKIENNASAIALG $K$ SYSPDLIVHPDLKEESSVD TVRSQLESULSRLHVLVLG
 AVALPECGAMGPETAEGSVTGEGLDRDSSYDDRADAILVG QLLIPEAVLSLYRE FQEELEALLEEQEFRWADLCVMG
ALAMPEARVVDPETDAGA $\square A P A A A D \square L N G M \square A K F D T V L \square G$ A CVNPEVI YEVFEDDNFYD RFHVPEAVFGPGRVQAWLVGPGLDPQVAADDS

LPCDPLQPELMLRDAAGLYRAGILPIDAWVAG LE QRPEVVAVSEFAE AGTVQAWVVG KTYSPNLMVHPGMRQTSSDGSSTANPDIQMDSRMEVMLVIGG LAARPEVVPAAGRVQSWVLGPGVPPVPGPDDDPVDDGGQH LTAVPEAVIGKGHVQS WVVGSASADETGDDAQRST\|AALL LAAAPEVVL HPDLNERDTPDS $\quad$ RRSKLESGAGQAQALVMGG
 KTYSPDLIVVGULDPSKSVEDVRSELEGDMSRLHVMVIGG

 $L A A R P E V V P T A G H A Q A L V L G P G D D P A D T T R A D E V R T V L R S$


PGMQDEQGSCAFVMALLPHLNGAKLVAVDATCHPQQRYVS $N G I V D S K K$ EEALD FLL S N YKGKLI I DADALKNDGLNKLK $\square G A A Q V A A A R E A L A A P E P C V V D A G G L D L L E B G P R P$ $C G L G T D S L S Q T T L C G L F A Q Q A D T P L V L D A D A L N L L A A A G A L$ $P G S G T D A R A E H L L A Q V L E R \quad P V P V L V D A D A L T V L A P H L L T$ $P G \operatorname{L} G R M Q A T C A R V V A A A R E R N M P L V L D D A D A L Q Q L Q R D P A L V$ ERVRYASAATGELSAGVVGGRVPVVVDAGALSLDPDRCPP A HYSTGDELQDDPST』EAYDMPAI CVDAGALDLLPAHVP P

 $P G L G R S E H M Q N F A K V A F E L A K K M E Q M D A D G L W L V Q N D P D W$ CGCGGGAAVADVLPRVLAQA GR VVLDADALNAIAADRA Q PGMGAPVAALRAALLEAAPSAAVVLDAAGLSDDPAQAEVR PGRGTGAEAAEEVETLLLKRPE PLVVVDADALTVVAE HK E L
T LAP PSDGGRQ
UniRef90_M7Y552
 HGYTKAVLTPNVMEFARLCNTQGIDPKAGDPAQKLAES F G H L Q G S A V L T P N N L A E LLAA I V L G A E P E E V $H L D G R A I L T L N P S E V T Q T L G L E D E Q V A D P V G C T R R L A T T E S$ $R G Y R L A V L T P N V V E F G R L T R A L G V D E Q V R A A A Q A L A B A B L G$

 Q GYRECILTPNVVEFGRLCGIDTAGLDAGQGAEKLSKAFG
TAQVVLTPHAGELARLLTRLLGHAMSRPWHCDRLAAQET ATYHRCILTPNHRELLKYILHQPTDNMNASGQETSLLKAKFP K GYREAILLTPNVVEFGRLWDALGLAEKNVEPKTERARALG $R L L K R T V I T P H A G E A A R L A Q P L N L P T D D P G Q L A R S L S L A L$ FPTAP LI FTPHQMEWQRLSQDADADQTDDQNQAVLACWRQ
 $\square P N T Q L I L T P H Q M E W A R L S G V A \square E Q Q T V A A N Q A A L A A Y P$
 K GYKNVI LTPNAMEYARLCAT TQLLPNVDVAQAAKVEALG A $\square$ A GAALV TPHEGEFARGLFGPPAGRLGAARAAAARLEGAM


 $R G Y G L A V L T P N V V E F G R L T G A D G V D D D D Q V R A A A L A R A L G$
 Q G Y P K A V L T P P N V V E F K R L L D T D S S T S S D P S L L A A G K L A A K A L G






 K GYKE IVVLTTPNVVVEFKRLWDKDPGAAK ET DKVVESMLARA LDD
 DM HP QVV MT P HE GE LRRRMIDPDVVFARTTCRRVSLLAVSAA QTM

 E LIPDDCLLTTPHAGELARMLGVDRDEVRENRESAMQAARRF RCSAGHVLTPHAGEAAA LLSSALEGSVVTRAEVEAAPAARAC
 FPSRGRILT K K GYKNALLTPHRKEFEKL FKVKSQKSKVDEEYVQEMAKKY PNWKNA LTPNAMEYARLCAITGLVSSVDVAEAAKIEABG




 K GYRRAVLTPNVVEFKRLSEQVGVDPDAPPDERAGVVSRM HLLAGRVVLTPNVVEAAAMLEREVEEVEDELGAARELADGS

 K GYK D CI LTP NVN E F S R LAAKALGGIDVVSQA Q IAA QS QALG


SRKDVVIT
 MLHADCVLTPHGGEFARLFPDIARD LNSKDGASQAAAGRA



UniRef90 K2S5T0 UniRef90 U4L314 UniRef90-A6WEC4 UniRef90_W9GKS5 UniRef90_G2QY89 UniRef90-UPIO002B457D1 UniRef90-R8ZWGG UniRef90_K1X1T9 UniRef90-UPIO003B66A07 UniRef90-17IFT4 UniRef90-M1W7H4 UniRef90-F7UVP4 UniRef90-XOPIE5 UniRef90-18QNT2 UniRef90-E2QUG8 UniRef90-G6CDF6 UniRef90-T2WTU8 UniRet90-C7YKN8 UniRef90-G4YQN1 UniRef90-UP1IOOO35D3F5B UniRef90-W5EDC2 UniRef90-G4TLW4 UniRef90 ${ }^{-K 8 G 3 L O}$ UniRef90-G2Q5U8 UniRef90-D1MLM7 UniRef90 ${ }^{-}$A0A009W6M3 UniRef90-U5HF01 UniRef90-Q7SHU9 UniRef90-UPIO003B4A374 UniRef90-H3EPD9 UniRef90-17LCG2 UniRefo-B8LL57 UniRef90-LOP9H4 UniRef90 M6CRO3 UniRef90-W4JYW7 UniRef90-H2W2X4
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UniRef90-K2ATX5 UniRef90-DOMVYO UniRet90-J4QKV1 UniRet90-FOM268 UniRef90-M5E6S9 UniRef90-A0A017SG00 UniRef90-S7ZJL7 UniRef90-D5NWP2 UniRef90-V4PA86 UniRef90-A8N8Z0 UniRef90-UPIOOO47C0118 UniRef90-D9XVD3 UniRef90-I3L8E5 UniRef90-V4RYX5 UniRef90-E7SCV0 UniRef90-O4X1F88 UniRef90 S6F777 UniRef90_UPI0003B5E366 UniRef90-x0WMS0 UniRef90_H7S4N6 UniRef90-R7S218 UniRef90-X6L672 UniRef90-A0A024GZK2 UniRef90_U2W1D1 UniRef90-A3CLQ6 UniRee90-UPIO001AF2B76 UniRef90-UPI0002FE7AD9 UniRef90-R7FL08 UniRef90-K6W4LO UniRef90-UP100047EC7CB UniRef90-L7L641 UniRef9-LIIYC9 UniRef90_UPIO004630CE5 UniRef90-UPIOO040568E0 UniRef90-DOYRX6 UniRef90-L8WIW0 UniRef90-J2GGW7 UniRef90-UPIOOO3F48F8B UniRef90-UP10004678693 UniRef90-B0U8B7 UniRef90-X5DJT1 UniRef90-E7N7Z6

410
420
430
440 GIITII IQKGPKDY\| SNGEHTLVSDGEGGILKRSGGQGDTLTG GVTVIQKGPKDYISNGKQTIVCDVPGGLKRSGGQGDTLTG RCAVAAGGGESWIAAPDRLWRDSSGGAGLGVSGSGDVLSG GVMIVQKGPKDQI SDGKVTFTVDLEGGRKRSGGQGDTLTG GLTILRKGRADLISDGETVKSVSIYGSPRRCGGQGDILSG HVYVLVKSFVSLLVCPDGSYI WESPNPKLATMGTGDLLSG GVT VQKGAKDYI SNGEQTLVSDLLEGGLKRSGGQGDTLTG GATVLLKGAVTMVAGNDGGTLLVRAPASLATAGAGDVLTG GVIVIQKGGRDVISDGETTLVNDLEGGKKRSGGQGDTLTG
 HITVVLKAHRTKVYDPDNSVWENTGNPGMATGGSGDTLTG GVVILLKGTRTLIVEPAGVAWVNTGSGWLGTAGTGDVLTG NVTVVQKGERDVISDGKQVLECTQEGSSRRCGGQGDLLSG

GVTVIQKGAKDY $\operatorname{VSNGETTLTVDLQGGRKRSGGQGDTLTG}$ FPVVIQKGSVDTFSDGKDTITNDEFGCPRRCGGQGDVLSG LLKGSDTIIAAPDGRAADTADAPWLATAGTGDVLAG GVTVMKKGKADVISDGKKVAQVSTFGSPRRCGGQGDVLSG RSVVVKGADSF SGPDVWMHRGASGLGSGSGDVA GVMVLQKGPKDHLSDGNVTFTVDLEGGRKRSGGQGDTLTG DVTVLQKGTDDIIYSGSNKMVSVSGGSGRRCGGQGDILSG AGQWVLKGAGSLL LEDN LYI CTQGNAGMGTGGMGDVLAG GVTVLEKGTVDRIVNNDQAWINETKGSLRRCGGQGDVLSG GATVLLKGAMTLVPDGARTMVSGAGPAWLSTAGSGDVLAG HCHVFAKGPND FVTPKKMMMFVHPGSPRRPGGIGGDCLAG GCVVLLKGARTVVAGGGETTVIEAGHGWAATPGSGDVLSG GLT LQKGKDDLISDGNTVYGVSMFGSPRRCGGQGDVLSG KTNLLWKRHSSFLIDSNGSVFWETPEPKLAVMGTGDLLAG GVTVYMKGEEDLVVTQNGEVRCSTDSSLRRRCGGQGDVTAG NVYVLLKSFVSLLVCPDGSYVWESPNPKLATMGTGDLDSG GVTVIQKGQKDFISNGKATLVNDLEGGRKRSGGQGDTLTG NLTVVQKGERDLISDGDKVLVCSHEGSSRRCGGQGDLLSG KCTVLFKGTDTIVAQPNGDHSVVSSQAWLATAGSGDVLSG GVTVLLKGRVTLVAESDGTVFGNDAQSSWAATAGAGDVLS QAWVVLKGHESVIASAQGFRINRSGNAGLATAGSGDVLAG GATVVLKKGAIDQWVADGNTNLVVIEEHSSPRRCGGQGDIMSG GATVLLKGCSDGPPDAADLLSVDSGPGWLATAGSGDVLAG NAVIALKGARTVIAAPDGWQHEGAGNDGLADSGSGDVLAG GVTJVLQKGEADRI CTNTGKASKEEAQGYKRCGGQGDVLSG KCIVVEKGTEDKIFSPKPFQDNSVEGSNKRVGGQGDTLTG NCVILKGKEDVVCSPTECVRIIGGNAGMTKGGTGDVLAG NAWVVLKGAGTIVCSPDGSRRTNTGNPGLATAGTGDVLAG RAVVSCQGPPGDAPEEPELWKDTTGYGGLGTSGSGDVLAG GPTVLEKGRVDRDATAEDVVECDVEGGLKRCGGQGDFLSG GVTIIQKGPHDVISNGVTSLISSVQGGLKRSGGQGDTLTG GCHILLKGRDTVTSPQALPVSVNTGNSFAATAGSGDVLAG GVTVLQKGAKDII SVDTTGEEADMSASHTRCGGOGDVIAG GAVVLTGAEVSYVVAPARGSWS LSASAGLATAGSGDVKAG GATVLLKGSTT LASGAAVRVNPTGTSWLATAGSGDVLSG GVTILQKGKSDVISDGTQVLECSHEGSSRRCGGQGDLLSG ASILVQKGPQTKI WQQGQYYQLTVGGPYQATGGMGDTLAG GVTII QKGPHDVI SNGVTTLISDLKGGLKRSGGQGDTLTG RAVVVLKGHRSLVCGGNGMLYENSGNAGLATAGSGDVLSG SCVLVEKGQQDKVFGNGDCLVNESEGSLKRVGGQGDTLTG GAVVVLKGSDTVIADPDGTLHYGGGGTGLATGGSGDVLAG DCVLVKGANPLDQKEKDFVVNTGNEALAKGGSGDVLAG GVLIVQKGPKDILAANTKGSEANAALSKKRCGGQGDILSG GCTVLFKGAETVIAAPEGVVWVDRAAPWLATAGAGDVLAG QAVVSCQGLIARPSGGDAPWQMTTGYGGLGTSGSGDVLAG DLLLIVKGSHSLLFSRERYFQNRTASPALSKAGSGDVLCG GSiVVQKKHGTTUYQSGQEQVFTVGGPYQATGGMGDTLAG
 $N$ NVI DLKDHESII TDGVNSYLIDN NGNAGLAKAGSGDMLAG RATVLLKGATTYVVPPTDVFAQADAPPWLATAGSGDVLAG AAWVVLKGPGTLVCRPDGHCWRNTGNAGLASAGTGDTLAG GGTVLLKGRVTLVADPDGQVLGNDAGSSW
GVMMVQKGGKDVVDGGDRDVVDLEGGKKRSGGQGDTDTG GATVLLKGSATVVVGPGGAW
GATVLLKGADTIVVGDDGDGGTRTAPAWLATAGAGDVLAG GATVLLKGEITVIAAPDGEFVVTHGTADLATAGSGDVLAG AAHLSAVDNIDVVHVQVEEIKEPG GLKRCGGQGDLLSG GAVVLKGGASLI ADTSGAFAYGEGNVGLATGGSGDVLAG NCTVIQKGETDIVSNGRPDPESEVRGGLKRVGGQGDILSG GCTVVLKGSGSVVAPGQIPITPTGNALLATAGTGDVLAG SCVVLLKGRHTVVTDGEDVQCTDAGTSWAATPGSGDVLSG $G A T V L L K G A T T L I A A Q Q R P V V S V D G G P W M A T A G S G D$
$R A V V V M K G A R T W I V D P Q G R W Y E G G D G A T S G S$

## UniRef90 K2S5T0

 UniRef90-U4L314 UniRef90-A6WEC4 UniRef90-W9GKS5 UniRe90-G2QY89UniRef90-UPIO002B457D1 UniRef90-R8ZWG6 UniRef90 K1X1T9 UniRef90 UPI0003B66A07 UniRef90-17IFT4 UniRef90-M1W7H4 UniRef90-F7UVP4 UniRef90-XOPIE5 UniRef90-I8QNT2 UniRef90-E2QUG8 UniRef90-G6CDF6 UniRef90-T2WTU8 UniRef90-C7YKN8 UniRef90-G4YQN1 UniRef90-UPIO0035D3F5B UniRef90-W5EDC2 UniRef90-G4TLW4 UniRef90-K8G3L0 UniRef90-G2OS5U8
UniRef90-D1MLM7 UniRef90_D1MLM7 UniRef90-A0A009W6M3 UniRef90-U5HF01 UniRef90-Q7SHU9 UniRef90-UPI0003B4A374 UniRef90-H3EPD9 UniRef90-17LCG2 UniRef90-B8LL57 UniRef90-LOP9H4 UniRef90 M6CRO3 UniRef90-W4JYW7 UniRef90-H2W2X4 UniRef90-K5C810 UniRef90-E9E5V4 UniRef90-UPIOOO350B353 UniRef90-B7RKJ1 UniRef90-H5TH49 UniRef90-UPIO0047E090E UniRef90-A0A024GH89 UniRef90_U7JY26 UniRef90-F9EF11 UniRef $90-$ KgDU73 UniRef90-R7SQJ8 UniRef90-G8ZVG9 UniRef90-K2ATX5
UniRef90- DOMVYO UniRef90-J4QKV1 UniRet90-FOM268 UniRef90-M5E6S9
UniRef90- A0A017SG00 UniRef90-S7ZJL7 UniRef90_D5NWP2 UniRef90-V4PA86 UniRef90-A8N8Z0 UniRef90 UPIOOO47C0118 UniRef90-D9XVD3
UniRef90-I3L8E5
UniRef90-V4RYX5
UniRef90-E7SCV0
UniRef90-Q4X1F8
UniRef90-D4DRE9
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UniRef90-UPIO003B5E366
UniRef90-XoWMSO
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UniRef90-R7S218
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UniRef90-DOYRX6
UniRef90-L8WIW0
UniRef90-J2GGW7
UniRef90-UPIOOO3F48F8B
UniRef90_UPIOOO4678693
UniRef90-B0U8B7
UniRef90-X5DJT1
UniRef90-E7N7Z6
UniRef90 M M Y 55

SLIATLLAWRLISPSELLALAAYTRECSRLAFKEKGRSLQAG TLVTMLAWTLDALSAYGAAADTRTCSRLAFEKKGRALQALL VVGLCRGADPVQAAVWACHLHGRAGDRLASGRLGFLAR IVAGLLARGAEPAQAACWGGQLHGLAGEQLARGPVGFLAR SI ATFLGWRKAYLDAFGGSA TRECSRLAFAKKGRSLQAS SVAVF SWAQRQLGC■AGSALLRRAASLAFENKKRSTLTT
SLATFLGWRपDAVELLALAAFTRECSRLAFANKGRSLQAS LLGALLAQAACMPEIVAASAAYMHGRAAALASGSGRPIVAG SIATFFAWKDTSSIJAYEACRMMRKCAKEAWMKHMRGMLAS SVATFLAWRKAYLDAFGGSALTRECSRRAFLARGRSLQAS


STATF पGWRKAY乌DAFGGAATTRECSRLAFAKKGRS पQAS AIIGTFAAWGNPLLLAAYGGSLVRASSSLAFDEHQRSMTAP IAAALIAQGMPPWEAGCAAAWAHAAAARGAGAY MDAE SVAVFSSWARHPKETSVNPMVLGCIAGLAFEKNKRSTVTT LI AGFAARGCDALTAALWGVFVHAAAGRQLARGPVGFLAR STA TFLAWRLKEEELVGLAVFTRECSRLAFAKKGRSLQAS MIALFYWWTLRAKEAAKIASYVKHLNSETFKLLGRSMTAN AVGCFLA WGLSYLQAYAASTITRTASRLTFEKKKRAMQTS SI ATFLGWRLNKEELIGLAVFTRECSRLAFAKKGRSDQAS LLGSLLAQWRASRESAAAGAYVGGLSGRMASGCDVCADAE SGAWAARGRALHRAAVTAAAVHQRAAWLAATTPRGVTAD SVAVFSSWARQGEEA IVGSVLMRKAASLAFEQHKRSTVTT TLSTLLAWRKAYLEVFGAACTTRYCSYLAFKDKKRAMGAT I LCFFLSRGFTVSETVQLSFSLLNRAAKKSKGFPRGTAS SLGLLLFWAKRHHEAGTASSWLVRTAGRAFEKHGRSMNTP ILARYLSLDLTMPESVQLALLSL
SVATFLA WRLMGLAAFGGSALTRECSRGAFLKRGRSLQAS SLGVLAHWAFMA
T1 TGLTAKGFDVSDAAS GI AGALLAAGLPPDWAGAAVHAHSAA LASGGAPIGAS LI GSLLAQG\|AVEQADAASVWLHGVAAEWLAAGPDGLLAG $\mathrm{C} \mid A T F A A W A K N Y L L A A Y A G S L L T R M S S Q A Y Q A S G R S M L A T$ QAGCAAA
ILGAVLAAGRADEERTALAVRLHAVAAELASGCGRPLAAL I AGLLARGAAPEQAACWGVALHARAGDRLAQGTLGYLAR AVGTIMAWGKCYEEAVGGSMLTRTASRRAFGKQGRSLVTQ TI ACMLAFSFEWLDYAMLSCYVRECAKLAFTAKKRAMQTS LVAA LYCKNDAFLSACAGSYUNKKAGELFEKVGYYFNSS AI GTFAAW
MLGSLIAQKDPFEQAVSGAVWLHGAAADALVAGPTGLTAG AI AGLRARGTSEAQAACWGTHLHAAAADRLASGPLGFLAR TLGTFLAWAQRYEEALGASMVTRTASKDAFARYRRSMLAN SLGTLLAWRMSPTTTYLLAAWTRECSRRAFKSKGRSMQAG SLGTMLAWRMSPATTLLLAAWTRECSRRAFEKKGRSLQAS IGALVAHRAKQSEAPRPAQHSMQRTADNAPAGYAPTTAM IAGGLMAQGMPVFEAACAAAWIHAEAARLFAGGPGLISE AVAGLVARGASPEKAAALGA MAHARAGERLGRDGPGFLAR LAGSLLAAGDPAVDAASAAAYDHGLAGR FAADGAPVGAH SLGVLVHWALQAVAALGACALTRQCSRQAFQKHGRSTTTT SVAVFLSW
MIAGFAGQFVGDYERVAVATYDHSADANDDSKEAYVVLPT SLGTLLAWRAAYHNAWAGSGTTRECSRRAFNAKGRSLQAS I GSLLAQGDEPFQAACGGVWLHGAAADASGAGEDGLLAG Til ACLLAFSLEWLQHAMLSCYTRECAKLAFADKGRAMQTS A 1 VGFRAQGLPAYESAVIGAFLHGRAGELAEESDASVLAG MI ATLLGVKFSALEAAKNACLAHALVAKKYKFNKNSFDAI



 MI ASFIY IDCSLLDAVSMSHFLMNEACKLVSKLKHSTTAS


C $\square$ ATMपA WRKAA $\square \mathrm{DAFGGCAVTRECSR} \mathrm{\square AFAKKGS} \mathrm{\square QAS}$

## TTGALLAQSSLCVEVAAAAAYHGMAAGTASNSGHP\|VAS

 $V$ VGFLLARHLDLATIAA 1 GAWLHAEAGRLAAPTP SAT MTGTFLAWGKSYVEAAGASILTRAVSHDAFEKLGRGVITG TAAALLARGCAPLEATLWAVWLHGEAGRRCAEGPLGFLAS SVGVLLAWGDPLLAAYGASTFNRTVSMRGWQAKGRSMVTG LVGARLAAAPHASHAAAGACWQHGAAADAWSADQALTALL MIAGLLARGAAPAQAAVWGVYLHGEAGRDLADGPGGFLAR| Un | $D_{1}^{T}$ |
| :---: | :---: |
| UniRef90-U4L314 | DLSTEVPTAFEML |
| UniRef90-A6WEC4 | ELPAQVPAV |
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| UniRe990-K1X1T9 | DLTDEV |
| UniRef90-UPIO003B66A07 | DVVEA PAVFEA |
| UniRee90-171FT4 | DILGFISPNFNQ |
| UniRet90 M1W7H4 |  |
| UniRef90-F7UVP4 | DVVDC:PAALAEL |
| $\begin{aligned} & \text { UniRef90_XOPIE5 } \\ & \text { UniRe90_IBNT2 } \end{aligned}$ | DLPDLLTRVMGDL |
| UniRef90-E2QUG8 | DM M A |
| UniRef90-G6CD | QVIQ |
| Re |  |
| UniRef90_C7Yk |  |
| UniRef90_G4YQN1 | VLH S VGK |
| UniRef90-UP100035D3F5B | DLADHLPRVLAAV |
| UniRef90-G4TLW4 | Mi AEIG |
| UniRef90-K8G3L0 | ELGLEVPGILDRLS |
| UniRet90_G2Q5U8 |  |
| IRe90_D1MLM |  |
| AOAOO | M Q A |
| UniRef90 O5HFO1 |  |
| UniRef90-UPIOOO3E | P ${ }^{\text {d M M A A PV }}$ |
| UniRef90-H3EPD9 |  |
| UniRe990-17LC |  |
| niRet90_B8LL57 |  |
| UniRef90_LOP9 | DMMNFIGNAYQL |
| W6CR03 | DMLKELGK |
| UniRef90-H2W2X4 | LLLDE\PSLVRDVE |
| UniRe990-K5C810 |  |
| iRef90-E9E5V4 | DLT DEVHGAFMGL |
| UniRef90-B7RKJ1 | D |
| UniF | LLGALR |
| UniRef90-UP100047E09 UniRef90-A0A024GH89 | ELPAA! |
| UniRef90--U7J |  |
| UniRef90-F9EF11 | DLTDRL |
| UniRef90_K9DU73 |  |
| UniRef90-R7SO | DLFPELG |
| UniRef90-K2ATX5 | DLIADE】PKVMRHLL |
| UniRe990_Dom |  |
| UniRef90 J40kV1 |  |
|  | ELMMDEVGPA |
| UniRef90-A0A017SGOO | DLT DEVY |
| UniP | DLTEEVH |
| UniRef90-D5NWP2 | A ARAISPAI AKLS |
| UniRef90 ${ }^{-}$A8N |  |
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| - ${ }^{\text {R }}$ efo- |  |
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| UniRef90-V4RY |  |
| UniRef90-Q4X1F8 | T |
| UniRef90-D4DRE9 | Ela |
| UniRef90-S6F777 | DVNTRVGDAYQKL |
| UniRef90-UPIO003E | EVPAEFPRLL |
| UniF | DVA |
| riRef | KLI K GL GNaFAEV |
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TGQTAGAPAAARHTLALLT $\square K S G L F T G H G R D A A G S V W F D D$


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$\square$ RAWPRPAKDSYGEDNGQV RAWP
K T $\quad$ — DRK $\quad$ NANKGNFGHI
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K EN NASAI A G G LQASPEVVAYEQLNGK\IPDESHCNDETALSQRKY IASIL KGFSPNLMVHPDLQSSTTLSDTDAKPIISFLPRLHVLVIGG
 LS HWPEVVAAPTPAAT KA Y S PEL MVT PVYSAKS LQVARMVQRDTPFFPKLHVLVVG DTQQPELMFRRFDT KTYSPNLMVHPQNDTPNKSVSDHVKPIVDFLPRLMVLVGVG

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$G C T A L L K G S G S V V A T P Q P P R I N P T G N A V L A T G G T G D V L A G G$ GCTALLKGSGSVVATPQPPRINPTGNALLATGGTGDVLAGG AA AV IVKERQLVVCTDDEVYYSADACADGLADDDPDSLAG HLITI MK GSETIDRTGEKLFKNTLKSPALSKGGSGDVLSG $N$ N $\operatorname{SILLKGANSVADSKKVWQLFGTDSQTARAGLGDLECG}$ ECIIVVMKGPETVVYSPAESVVVKGGNAGLTKGGTGDVLAG $R A T V S C F G R V A S P D G R L L T V G N G D P G L G T S G S G D A L A G$
 GATVLVKGATTAVASPSKLHSPQYAPSWLATAGSGDVLAG


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| UniRef90-D4AQF8 | S L G T FMAWRKAYHDAWAGSAlTR |
| UniRef90-A0 | TVGAVIARGASPGEAAASAVWLHAAALAVAAHGGGPIVA |
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