## QUERY

## UniRef90_F8AGT2

 UniRef90-FOLLL1UniRef90
U2RG88 UniRef90- G8ALB9 UniRef90-C5A747 UniRef90-B5YBF8 UniRef90_F3KDK8 UniRef90 B8FI82 UniRef90-S7UFD4 UniRef90-COQRQ0 UniRef90- K2MII4 UniRef90-F5RI48
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UniRef90 H9UDG3
UniRef90_A9CLC3
UniRef90_K4MAX2
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UniRef90_L8LIG9
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UniRef90_UPIO003661BB8
UniRef90-K9F745
UniRet90-X6FQHO
UniRet90_U4ZZR4
UniRef90-E6UVA7
UniRef90-K2JKG5 UniRef90_UPIO003605E5F UniRef90-J2U3A6 UniRef90-UPI00046D4DB3 UniRef90_A9BH38 UniRef90_W81AG7 MDPRDTLDRLFEAAVGAADPLQVMQDYLPEQP
$M T$ Q L R E H A M E I F R A GLLA A A D P E Q A V L K A L H L Q S G V L S V $T$ DL K R I A S E I F S A Gl K A V D P E I CVVRR HL R L D A G V L Q I

MTPSRDTLLQLMDAALKAADPAVQIPRNLPTKP
MSTPEPKEFLRKLLFQAAFDAANPDLCVPANLPP

MKIDEPQDLLSKMFQAAVNAA QPEHCI PPYDPDAP E L I S A A L K A A D P Y LAV DE A L R F R K G T L S
MRS D A L E V E A GI A A V LP E SVI A N S I Q L N G DVL D I

 M A A T P Q Q Q L L R R MF D A A 1 A S A Q P A R CVVP P QL P S WQ D L G T M
H $\square \mathrm{D}$


M V

$D V E R L L Q D M F E T A D A T A Q P A D R V P G F L P$
MKTNEARSLLRNMFEAAITTAAQPAHCIPPHLPTAP
NARRDALDDILLDSAVNVVDPYKVVTSSRRFTGMLVF
MTFRENRSFLQSLFQTAVSAADPLQVLPPALPERPS

M S S L P

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

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

 A HTAAREILQNMFAAAVASAQPGRCVPPHDP

Q M R T E A K A $\quad$ F R E S L

NPK E F L L E L F N T A V K A A H P A QVL A N Y L P P D R
 $M D \square E$

R A D A LDDI L K A Gl E AVVMP E NVI R N SVV R L E R NVLDV
M R N G L K K DAA A I L K S A I E A V E P S VA V K R A L A R D K N TLL R V
$M N L P P R E D L L D S$ L D A A V D A A R P E T C L P P P Y L P S R P
MRDTNPRQLLRDLFQAGLDAANPRLAVPGFLPS
MTDRELLQALFKAAVKAADPLTGIVKHLP
MNDKEFFT QLLFRAAV DAADPERTI A S HLLP P K P
M MTTPPRALLQAMFQAAI A A A QP SHCI P P H L P P P A P M N E K M R N D A Y A $\square$ M S E A I A A VDP K A CII Y R S V VK N G L E L L I MSADPRALLRSMFDAAVAAAQPDRCVPPFLDPRP

MRDDTARKLL RDMFDAAI A A A QPALTTLPTYLPERP
M A A A R R L L R NLF D A A V A R A H P E S C L A A Y L P E


 S L K K L A A I E I V K K S I MTRPDSRHLLKEMFNAAI AAAQPALCI PGHLPP

 MGDRNLREDIKRI DEKVKQE LLPDSTVKFWLEKN


MTVSDPRAFLTS L FDAAVRAADPMTGI RAHLPAKP
Q A HL H H V V R TI N A V S P D P A I R S A L K LDD G D VLTV
$M E Q L L K L L F G A A V E A A L P Q K L M Q G F L P G L P$

 A A D PVGG L R A L F DVA VARA QPREVMA A F L P P MMLE P RP LL A S L F E A A V E A A D P L A A A I R A H L P A R P

TMSSADLL RELFDAAVAAAMPQEQVARALEP

 A R A LIFE AL F R A GL Q A V DP Y A A VVCR QVVR F R S G QL T L
PRAFLEHLYRVAVVRALPLS TLGAHLPRPPD
DSRAFLLSL F EVVARKAADPAACVPAHLPPKP
MTPSSPRDFLASLYTAAVRAADPLTGIRSHLPARP


MRSDAVVR FRAAVAA A GPHDAVRRHLA WED GAVVV MKNLREDAFRIDKSSIDSVLPEKAI QQEL


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UniRef90 Q1PYP3 UniRef90-14CEW7 UniRef90-J1EJL3 UniRef90-H1XP71 UniRef90_UPIO003699FE3 UniRef90_S0G685 UniRef90_UPIO003B2EC3C UniRef90_G8PPM7 UniRef90-UPI0003B35522 UniRef90-F0FX98 UniRef90_C7RN00 UniRef90-M7TUB8 UniRef90-UPI0003B4469C UniRef90-K9DD10 UniRef90-R1GYX5 UniRef90-UPI00026291E0 UniRef90-F2JZYO UniRef90_COQCA4 UniRef90-A6FD58 UniRef90-Q21W06 UniRef90-E6QVY3 UniRef90-Q5P1S4 UniRef90_F7XMG6 UniRef90-D8EZU3 UniRef90-S5ZCN9
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UniRef90 E6UVA7 UniRef90-K2JKG5 UniRef90_UPIO003605E5F UniRef90-J2U3A6 UniRef90_UPI00046D4DB3 UniRef90-A9BH38 UniRef90-W8IAG7
 Q GKVF GVRGRIVVLAFGKAACEMARAVEDVLGIASGIAVT MGKEFPIKGKIVVLAFGKAACSMAKAVEEILRLEEGI AVT EDKSFPIRGKVYVLGFGKASCPMAKALEDLMKIEEGLVITT

PPKGRTVVVGAGKAAASMAKAVEDHWKGPSGLVVT AGKNFPVEGK YLLAFGKAACSMARAVVDTLRDEEGVIIT KDREFEIKGDIYLLSVGKASFPMTEGALE LGGVKKGYVVV

GDRK】S LA GRTVVI GAGKAA
GD R K K D Y EFPL

\section*{| $\mathrm{P} P \mathrm{P}$ |
| :--- |
| R V S | <br> KEEKFRVS}

GGESFPVC
 GGKTYDLYNNIVLTGFGKVSGFMAAAVEKLLKIKKGIVNV PGESADLRDYVLVVGAGKASAAMAKAVGEILYDVRGVICV GRLVVI GAGKASAAMARAVEDHWDGPSGLVVT $G R \square K R \underset{\sim}{N} \backslash$ RHI YVL GAGKASAAMAQALEKLLR DS GGLVIV RRVGAGKASAAMAQA EANWKGP EGLVV
 QDKKYDLDGRLIVI GAGKASAAMARAVEDNWGGDSGLVIT PPRDN YLVS IGKAAPFMAKS LE LRVKEGI I I C RGRLLVIGAGKASAAMARALEENWPGESGLLVVT QSQQFD DDKNVFLAGFGKASVSMAQAVCDTVP TTKGMVLT SGRCVVVGAGKAAASMAQALENAWGEDEGIVIT KGRLIVI GAGKASAAMARAVEDNWDGPEGVVVT SGNLVVI GAGKAAASMAQALEDEWEGPSGVVVT QNNE KMPERUIVLGAGKASAAMANTLENHWKGTSGLVLT NHQTYKDDKRIFIVGAGKGVAPMAGVLKQILYGYRGMVIV GSREYDLY AN K K
A GAKYD


$\qquad$ GGRTIVVIGAGKA
 GRAIVI GAGKAAASMAKAVE

## ```A GEVY D\LY``` <br> A GEVY D D

 \begin{tabular}{ll|l}$A H$ \& $H Y A 1$ <br>
$G R$ \& $V V$ <br>
\hline
\end{tabular}

PGKTVVI GMGKSAAAMAKTV SPPANGKTVVVGAGKGAAQMAAAL KGRTIII GAGKGSAQMASAFEKAWSPDEGLVVT KGRLIVI GAGKASAAMAQAVERHWPGPS GLVVT
NGRSYDLS

MNKS $\square \mathrm{ELS}$

PPKGRTVII GAGKASAAMARAFE
$P$ PKGRLVVI GAGKASAAMARAFE

DKTGKAIVI GAGKAA $\begin{array}{lllll}K G R L I V I & G A G K A S A A M A R A V E D N W A G V S G L V V & T \\ D R V I V V & A V G K A A W R M A K A A Y E V L K I R K G V V V\end{array}$
P P SGVGAGKAS SGRAVVI GAGKAAGAMAEVV $\begin{array}{ll}R G K T V V I G A G K G A A Q M A S A L E \\ K G R T & G\end{array}$ $K G N L Y D V A D G K A A W R M A K A T N E M L R V I H G V V V T$
$K G R T V V I G A G K A S V E M A R A F D A L W K G S E G V V V$
$T$ GSRSYDLYDHVYVVAFGKAS DGTRVGLR K GR
AEREYDL KGRTIVI GAGKGS

GTTQ $\square \mathrm{P}$ F $\stackrel{R}{\mathrm{R}}$

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PY\P P
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            DKT GAGKAGA K \begin{tabular}{c|c}
    $R$ <br>
$N$ \& $Y$ <br>
\hline
\end{tabular} NNIYV 1 AF GKASVPMSKAL E

 V
 HWDGP
K $\square R$ I S QAWGTV

QUERY
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UniRef90_C0QRRQ0
UniRef90_K2MII4
UniRef90_F5RI48
UniRef90_B6YXA3
UniRef90_J0AZ35
UniRef90_B7R051
UniRef90_H8I5Z0
UniRef90_Q1PYP3
UniRef90_I4CEW7
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UniRef90_K4MAX2 UniRef90_A1RWN7 UniRef90_B9J8W1
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UniRef90_A7HMG7



## QUERY

 UniRef90_F8AGT2 UniRef90-FOLLL1UniRef90 D 2 RG 88 UniRef90 G8ALB9 UniRef90-C5A747 UniRef90-B5YBF8 UniRef90-F3KDK8 UniRef90-B8FI82 UniRef90 S7UFD4 UniRef90_C0QRQ0 UniRef90-K2MII4
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UniRef90_A0A031GFD3 UniRef90-W9DQD7 UniRef90-UPI0003F9030E UniRef90-B1L6E4 UniRef90_ROE6K4 UniRef90_UPIO00476A1B3 UniRef90-E8WU75 UniRef90-J2VZR1 UniRef90_Q6LPW8
UniRef90_Q2W2E6 UniRef90-Q9X1S1 UniRef90_UPIOO0475057E UniRef90_V9U6K4 UniRef90_UPI00047B7605 UniRef90-U4V4NO UniRef90-H9UDG3 UniRef90_A9CLC3
UniRef90-K4MAX2 UniRef90_A1RWN7 UniRef90-B9J8W1
UniRef90 ${ }^{\text {M1 WR82 }}$ UniRef90-L8LIG9 UniRef90_S9TC76 UniRef90-W817J9
UniRef90 UPIOOO UniRef90_UPI0003B52379 UniRef90-E6PVT2 UniRef90_UPIO003661BB8 UniRef90-K9F745
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A K TH 180
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AKIHEINTVRKHISKVKGGKLAKMIKGTGIVLIISDVVGD



A K I Y E $\quad 1 \mathrm{~N} T \mathrm{~V}$ R K HI I S A V K G G K L A A K R V R G R V I S




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

| $A$ | $K$ | $I$ | $Y$ | $E$ | $\square$ | $N$ | $T$ | $V$ | $R$ | $K$ | $H$ | $I$ | $S$ | $K$ | $V$ | $K$ | $G$ | $G$ | $K$ | $L$ | $A$ | $K$ | $L$ | $V$ | $K$ | $G$ | $T$ | $V$ | $V$ | $S$ | $L$ | $I$ | $L$ | $S$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $A$ | $D$ | $V$ | $V$ | $G$ | $D$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | $G$ | $E$ | $M$ | $N$ | $T$ | $V$ | $R$ | $R$ | $H$ | $L$ | $S$ | $A$ | $I$ | $K$ | $G$ | $G$ | $R$ | $L$ | $A$ | $A$ | $A$ | $C$ | $A$ | $P$ | $A$ | $R$ | $V$ | $N$ | $L$ | $L$ | $I$ | $S$ | $D$ | $V$ |

A T I R








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A S I N E E M N A $V$ V
$\begin{array}{llllllllllll}A & T \\ A & T & A & E & M & N & C & V & R & R & H & L \\ G & E & L & N & A & R & K & H & L & S\end{array}$

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| $A$ | $N$ | $H$ | $E$ | $I$ | $N$ | $T$ | $V$ | $R$ | $K$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $A$ | $H$ | $L$ | $S$ |  |  |  |  |  |  |
| $A$ | $G$ | $E$ | $M$ | $N$ | $C$ | $V$ | $R$ | $K$ | $H$ |
| $L$ | $S$ |  |  |  |  |  |  |  |  |

$\begin{array}{lllllllllll}\text { A P } & \text { S A } & M & N & V & V & R & K & H \\ A & D & V & S & M & N & T & R & K & S & L\end{array}$

| A D | V | $S$ | $M$ | $N$ | $T$ | $V$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| A P K | $I$ | $S$ | $V$ | $M$ | N A | R |
| R K | Q | $V$ | $S$ |  |  |  |

A A I D E M N CVVR K H L S
A TII Q E M N A V R K HVVSCA

| A | $H$ | $G$ | $E$ | $M$ | $N$ | $C$ | $V$ | $R$ | $K$ | $H$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $A$ | $L$ | $L$ | $S$ |  |  |  |  |  |  |  |
| $A$ | $E$ | $M$ | $N$ | $C$ | $L$ | $R$ | $K$ | $H$ | $L$ | $S$ |


| A | $P$ | $I$ | $S$ | $A$ | $M$ | $V$ | $V$ | $R$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |$K$


| A $N$ | $I$ | $F$ | $E$ | $M$ | $N$ | $C$ | $V$ | $R$ | $K$ | $H$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $L$ | $L$ | $S$ |  |  |  |  |  |  |  |  |
| $A$ | $A$ | $G$ | $E$ | $L$ | $N$ | $A$ | $V$ | $R$ | $K$ | $H$ |


| A | $A$ | $G$ | $E$ | $L$ | $N$ | $A$ | $V$ | $R$ | $K$ | $H$ | $L$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $A$ | $N$ | $V$ | $E$ | $I$ | $N$ | $T$ | $V$ | $R$ | $K$ | $H$ | $L$ |
| $A$ | $P$ | $S$ | $A$ | $M$ | $N$ | $A$ | $V$ | $R$ | $K$ | $H$ | $V$ |
| A | S |  |  |  |  |  |  |  |  |  |  |



## QUERY

## UniRef90_F8AGT2

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UniRef90 Q9X1S1 UniRef90_UPIOOO475057E UniRef90-V9U6K4 UniRef90_UPI00047B7605 UniRef90-U4V4NO UniRef90 H9UDG3 UniRef90_A9CLC3
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UniRef90 $\times 6$ FOHO UniRef90-U4ZZR4 UniRef90-D8PAL2 UniRef90-E6UVA7 UniRef90_K2JKG5 UniRef90_UPIO003605E5F UniRef90-J2U3A6 UniRef90_UPIO0046D4DB3 UniRef90_A9BH38 UniRef90_W8IAG7

 DLEAI AS GPTVKDPTTFEDAHRVLRLYGLWAKVPESVKAH
 NLEVIASGPTVKDPTTFRDAYRILKLYDLWDRIPESVRRH DLSVIASGPTVPDPTSYADADAVLEKYGVSSPRPVMDH PLEA ASGPTVKDPTTFQDAYRILKLYGVWEKDPESVKRH

 DLFTI GSAPDYYDRSTYEDAYNIL
 PDEAIASGPTVVDPTTFEDAHRVLRQYGVWDKLPEAVRKH

QPMDIASGPTVADPTTCAQALDII QRYGI

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 $P L D V I A S G P T V A D T S T F D D F Q E I V D R Y G$ DPALVASGPTVPGAGTRAEALALIRKYYRI YLDVI GSGPTAPDESTFFDCQAILDKYGLCG DLCAI ASGPTVGDSITFFDDAKII ERYKI NPVDI ASGPTVADPTTRADALAIIERYRI DPSVVSGPTIPSAGNSSDAMAMLDRYRL
DLDIVGSGMTAPDRGTKKDCRDMLVKGL

 DPAQVASGPTVPDGSNREEARALVKTWGI DLSVASGPTVPDTTTRFDAMALERYQV
${ }^{\circ} \mathrm{P}$ D P
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D RPGVIASGPTLPDATTCADALAVLRKYKVWD



 HHKDPVSI QQH MMKDAPESV LSW


 $A V P P A A L A V$
$V V P B D V R H$ EIPQAVRER EVPAPVMDM PVSDNVTSW PDSDTRAN LAPVSILRH AVPNNVLSW EILSPARVADM ELPGAARELL
 DVPENVLRH $K A P Q S V L D W$
$M E Q P P S I R D H$ YA EALALVLERYO PLDVVASGPTVPDSSTFEDFNDIVERYH11 NPAFFASGPTVPDPTTFADTRAMLEKYS NPAFVASGPTVPDETMREEALAIVVRYGF KGDIASGPTVGDATTCDDALA:VVRYGM
 $R L D S I A S$
$D P A L V A S$

DP D HVIRH CGETPAAVLAH $V L$ S S R V R D Y AVPDNVRAF DLPENVDRH Q $\begin{array}{lllllllll} & P & K & P & V & Q & N & R \\ V & P & A & A & A & R & A & G \\ & P & E & A & V & M & R & H\end{array}$

 \begin{tabular}{lllll|lll}
\& $P$ \& $N$ \& $H$ \& $I$ \& $R$ \& $D$ \& $Y$ <br>
$K$ \& $P$ \& $D$ \& $R$ \& $I$ \& $E$ \& $S$ \& $W$ <br>
$E$ \& $T$ \& $P$ \& $R$ \& $S$ \& $A$ \& $F$ \& $E$ <br>
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$K$ \& $V$ \& $P$ \& $A$ \& $S$ \& $V$ \& $R$ \& $R$ <br>
$V$ \& $R$
\end{tabular} ${ }^{w}$





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\& $E$ \& $V$ \& $P$ \& $A$ \& $P$ \& $V$ \& $R$ \& $R$ <br>
$R$ \& $R$ <br>
$E$ \& $P$ \& $P$ \& $E$ \& $A$ \& $V$ \& $R$ \& $R$ \& $H$

 

$K$ \& $L$ \& $P$ \& $P$ \& $A$ \& $C$ \& $I$ \& $A$ <br>
$C$ \& $H$ <br>
$E$ \& $I$ \& $P$ \& $P$ \& $S$ \& $V$ \& $Q$ \& $A$ <br>
$R$ \& $H$ <br>
\& $V$ \& $E$ \& $P$ \& $V$ \& $R$ \& $R$ \& $H$
\end{tabular}

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## QUERY

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UniRef90-K4MAX2 UniRef90-A1RWN7 UniRef90_B9J8W1 12
UniRef90-M1WR82 UniRef90-L8LIG9 UniRef90_S9TC76 UniRef90-W817.J9 UniRef90_UPI0003B52379 UniRef90_E6PVT2 UniRef90_UPIO003661BB8 UniRef90-K9F745
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## QUERY

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 A SGVHPVLL GDSVEGEAREVGKVMAGIALSVAKHGQPAQA ELGGNSTVITTTLEGEAKEVALAVGSIIEEIVKRDRPLKK
 ALGYNTLILSSSVQGNTAEAALLHGAIAREISASENPVSP
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 A A G DVVHILGDADEGEARDVGTVMAGIARQVNRRGQPFQA
 EAGMTPLILGNALEGEARELGRVMAGIARQVQEHGQPAAP






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 G M GIL S P $\quad$ L I L L G D R $\quad I \quad$ E G E S S R E S H GIIT P V L G D S L E GE S R E V A K V M A GI A X Q VA N H G Q P A Q A





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 S A A GYTPYI L G D SLE GEARDLGLVAMAGI ARQVVQRGQPFAT SKGLRAVI LS D S L E GEAREAGAFHAA I AREI EHNGRPFER





 HQ GII DAVI L S D S I E GEARDVA LVLSAI AREI EARNRP FA K



## QUERY

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PAVLI A GGETTVTHEGBAGMGGPNQEAASDARK AB

$P C V L I A G G E T T V T I E G E S G L G G P N Q E F A L S V A R K I A G L R G$
PCVLLSGGETTVTVRGK GRGGRNAEFLLALTVALDGMKG
PAVLIA GGEWTVTIEGKAGLGGPNQEFALSLARKI DGLDA
PCALI FGGETTVTLKGDGLGGGRNQEDALSFADEI QGUDG
PCVILSGGETTVTVRGN GQGGRNAEFMLSLLCSLKGERV P A CVLS G GETTVTIIKGK GKGGRNMEFALAAAIIAI Q GVEG


PCVLLSGGETTVTLPGQKPRGGRNSEFLLSLADADDGMKG
PAVLIA GGEWTVTI EGEAGLGGPNQEFALSIARKIAGLNA
$P C V L L S G G E T T V T L R G Q \quad G R G G R N V E F L L S T A D A L N G A A D$

PAAI I S G GETTVVTVVGS GKGGRNQELVLGFLQNYA QGT

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PAClILAGGETTVTMKGKG
PAALLSGGETTVTVRGK
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PACILLSGGETTVTIRGE
PCVILSGGETTVTVGRTA
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PCVILSGGETTVTVKGN
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H GK
$P C A I I \quad L G G E T V V H V R G K$


QUERY
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UniRef90_G8ALB9
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 S LGYNTLVLSSRITGGAREI AKVLS GMAQDIALGNLPPQP QQGLAVMVLSDEVEGESSEVGRVHAAMARACRRHGQPFAR
 D A GLLA A Y I L S D E M E G E S R E VV G K VV H A A L A R A V A M K G Q P F Q K TLGYNP LLLLTTHME GESSKEVAAKVFT A LMKDIMRSHDTPPLSP ELGYNVRMLTS RLQGEAADAADMLWA A Q DEREWELLLEK K AAGFEAAILSDAIEGEAADVGAVHAAIAREVVLRDRPFTG S A G L P A HV L S D E ME GE S R EVVGKVVHA A LAR AV A RR G QP FA A


 A A GVT A HI L S D Gl E GEARDVA IVHAA LAKQ DHGRGQPFTR

 KRGワKAVILSDSMEGEAREVAGVHAAMAREIATRGRPFEK $M E G V F P$ I L G D A L Q GEAA R E L A R SHA G LVLDH K LR G H T L Q T
 Q H HV A A HI L S DAI E GEARDVGKVMAAI ARQVARGDKPFSA RS GI T P LL L G DALE GEAREAG ILMAGIARSMRRHGHPLAG




 A H GYQPMILGNDI E GEARDVARVHAA IARQVAHYGQPGAA



 QA GVTTPYI L G GSI E GEAREVGKVMAAMALQAVDHDAPFD K D A GYS V S TL S D A I E G E A R D I G L M H A A LAA K QV A D K N A P F K K QAVVNPAVLSDAME GEARDVGQVHAACLAREVVTRNRPRTA A A GI Q P VI L G N A LE GEAREMA LVVHAGIARQVAEHGQP GRT


 D A G I A A HIL RLGLESIIT S DALQGEARDAAHSLAQTALSELALMKPG K $K$ Q GIT PVI L S DAI E GEAREVVGQVHAA IAREVAQRDRPFNK


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

 $K L G L T P L I L G D S L E G E S R D V G A V M A G I A S S A S R K G L D V V K G$ EAA DQP L L G D A
 DAGI A CHVLSDEMEGESREVAKVHAALARAVALHGQPFAR A L GVQQAHILSDEDEGESRVVGQVHAALARQVARRNRPFAR
 E L G I T P L L L G D A
 $R$ R G Y Q T L I L S S K ME GK T R DVA RMH GTMAKEILLKTGNPVCP



 ARGYDPRILTTDSMTGEARHKASELVVDEAFRTADTGVVAE G A LGFHTVVLSSGIRGEAREVAKVFAAVGREVIEAGHPVAA

 S C Gll
 E LLGYN T L L L $\operatorname{T}$ T S I L L N A
 E A K




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D PRA 10
A DPRARLDFDTAVASVSASHCLLPPQL|P

 RALLVELFGAAVGAADPMTALQNALPD LL RSMFDAAVAAADPFKVLAKYGPEKP


MRALLEASFRHALAATHPTDLTRAALPEERPAL
LRSGAMADFRAALKASAAGTAMERHVKFRGHILRV SDPRAFLQTLFHEAVRAADPYEALVRHLPD

DVLDDAVEAALEAADPYNAVLSKVKDLGNYVEV

TSARATLRRLFDTAI RAADPRADLAAHLPERP
STHPRAFLEHLYQAAVRRALPDHTLAPCLP MNSPEAHAFLRQLFEAAI AAADPARVLAKKLPEKPE

ADPRAFLESLFSVAVAAADPDKVLAANLPEKP KNDLMHVVENAIGAVAPEAAMRRAVRRQGDMLAV
PRGFLEALFLAAVRRAQPGQGMAALLPP RQWLTRLAQTVVAAVHPDTLLPNRLPE
$M \square N P T P F L R E L F E A A V K A A D P M R T I P D A L P A K P$ RDHLLA VNRAIEAVAPEGAMRKAISRHGD\|LNV ARRTVRKLFEAGLRAADPRAVLARHLPEKPR
SNS S DREDALIIVEESIIKAVLPEAAVDKALQKK


MTEEKRFLTSLFTEAVAAADPERALRAALPEKP

MTLKNPETLLRSLFDRAVEVADPMQSLARFLPPKP MSDLDPQSTLRRLFAAAVASAMPER LADHLPP MT D DDASALLRRMMTAAIEAADPASVLAAHLPEKP

REHALEDWRAAVDAVRPQPLVRAAVESDP
MTDPQS LLRRLFDRAVAVADPMQSLAPYLPARPE


MSADRHQDTRDTFNTATS SVLPAKMTTRALTVKDNTLHV MNAHPKDMLHEILGAALTAVAPDKAVKKFVSLDGEALLI MRQHLTQSLHTALEATHPYRLTQAHLPPS N $\square R A A L Q R \| F D A A I$ HSAQPARVLARHLPS


T L R QQSEY I DRHALVS VLPDEAVKAVLITGDRFRSVV
 $M T \square D P K S L L T A V F N A A B A A A D P E L T I R K H L P E R P$

MRKKAEE IFLAGVESVLPEKLIQRQDKRNGD LQQ TAARDLALDCIEAGIEAGDPERAIAESVSDDGDRLTI $\square D R T A A R A L L L E S Y$ A A AVGAADPGKIVADFLDPPH

SMSLREHGQY LFRSAVDVVLPARMLRRALELRGPQLVV MTLKDHGLHFFRSAVDTVLPGP LLKRALVLDPGRLLL MSASDRAVLEALFQAALGAAYPETRMRHLLPE

AADARALLLDTFHAAVAAADPDRGVADHLP
QAASELRRLT DAALSAVAPDGAVLRHLHDDGGKLTL MTPRALLTDLFTTAVARADPMLCLAAHLP PRP TVNAKTLLRDMFDAAI TAAQPARCLIPPYLPD $M S V E D H S H A E A D F R A G L A R V D P L A M M E R L L S D S G D T L T L$
 MNPRELLLDSFRAAI DAADPQKIVPAHLPE MS LRSDADKIVEESLRAVLPDQAVKRALK
 MG $\square R E D A K L I I D A S I N S A M P D N A V K K A L K Q \square P D C$ I I R NA K K DVLPDKAVRTVLNDRKNM
MSS $\square N T R$ ARAVFSAAVEGVHPDMVVRRGLERHGDKDHV
MNNEKSLKLIMSAALAAAKPKDKFKK
EARGFVRRLFDAAVASADPLHVLAAHLPDPPRD
MN DRNDAQLI DDAAI KAADPDNAVKKALEGHGFS
A $\square$ A D PRAFLEGLFDAAVAAADPDRVLASCLIGKP
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$M T \square S D P R G F \square S E L F D C A V R A A D P H D T \prod A A H L P E R P$
MDQAARDFLSRLFHSAVAAADPVEALRGKLP
MAS ITRQDAFNI FQAGI A A A D P YQAV KRHLVPE
MEPLEADLTGLFTTAVAAVDPASLVRSALSLEGNLLTV
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T P P L S GRLLVI GAGKASAEMARVVEQHWPGPSGLVVT $P P Q G R T V V I G A G K G A A Q L A N A L V Q L W P G P T G V V A T$
 $K$ GRLVVVVGAGK GAA QLAAA A F E D L L W D G P E G VVVV T
GS L S LK L NERDFVV GAGKA GAAMAA A LI
 E GKRFE $\square$ GRA V $\mathrm{H} V \mathrm{~V}$ GF GKASARMAEA LVE $\square F G \square A G G V V I \quad T$

PKGRTLVVI GA GKAAAAMALDAVENHWQKDA GVVLTT K GRRVIVVVGAGKYSASVVMAAA V E D A WP D A D G L V V T
$P P R G R T V V I G A G K A S A A M A S A L E A A W P G P E G L V V T$
 $K G R T V V I G A G K G A A Q M A R A F E R R W D A P T G V V V T$ A GREYDLS QRVLIL GAGKAAAPMTLALEDILDLAGGVVAT $P P R G R T L V L G G G K A$ G GAMVHALVALDPADS GLVAT P P A GRTTVVVGAGKAAAAMAHALETAWQRHS GLVVVT
 S GRVLVLGAGKASALMAQALEEAWPDVSGLVVT
 $P P T G R T L V I G A G K G A A A M A R A L E R L W P G P E G L V V T$
D GRTVVVI GA GK A S A R M A E A V E A A W G A S E G L V I T A GRVVVVGAGKASARMAEAVEAEWGPCE GLVIT
P P
 $M \square R A A R R V L V V G A G K A G P G M A A G L E D R L D R V E G L V N V$ ENKEFP GRVVVI GAGKASARMAEAVVAEWGPCEGLVITT $G R V I L V S V G K A A W Q M A N A$
GGREYE
GGREYELDKNVYVVGFGKAVAGMARAVEDQLHDIDGGI SVV $D \operatorname{DV} \operatorname{Y}$ Y L

D D

| $A$ | $H$ |
| ---: | :--- |
| $P$ | $R$ |
| $P$ | $K$ |

PPRGRTVVI GAGKAAAAMAQAFVEAAWP P LAEGVVV T



 SGRCIVVGA GKASAAMAAA LAEVAWPDVVEGVVV
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P A R P K TVVVVGAGKGAAQMAAAFERLWGDCQGVVVTT


 R GRTIVLGAGKGAARMARAFE ATETERFSERLLVLGAGKASARMALGL
 $P \mathrm{P}$
YAPGNTLVGAGAAAAMARAVETHWPDLE
 $K G R T L V \vee G A$
E NVVYVVA $\operatorname{A} V G K A A$ A WKMA Y T C Q
G GQS FTLT $N$ N L Y L V GF GKAVLGGMAAEAE VP T R P E GKLIVI GAGKAAASMAREFENNYEGPE GRCVVVGAGKSAATMAAALERAWPDVDGLVVTT K GRTVVVI GAGKGAAQMARAFERQWDPVSGVVVT GEREYDLDDRLLVLGGGNAAGHVAAALETCLRDDDGLVVT
 $K G K T V V V G A G K G A A Q L A A A F E R V W G G P E G V V V T$ GRCVVI GA GKA SVAMAAA LDAAWRDVEGVVVTT D A DLTG NVYIVAA GKAA YSMAKAASEHVSYKK VGAGKASARMAEAVEAVWGPCEGLVI TT TV
R GRT TVVGAGKAASAMAAALEALWDGPEGVVVDD A P PKGRTVVI GA GKGSAQLAQAFEALWE GPEGVVVT



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D P TLI A S G P 210
D A 220 LLA VIV A R Y Glı ${ }^{230}$
230
D/L P RV|RA 240
D
 $\qquad$



E A R A H

$\qquad$ EAVLAA
PA AKAH
 NPAFVASGPTVPDGSDAEEALRVIRDYRI DLPARMIDC RDDTIASGPTAPDATDKTFAVAVLKKYGLWDSLPERRRRLD APTHVASGPCAPDPSTYLDALEI LERYRI DPLAI A S GPTVHDPDAAADLSEVVRMLG
 P D L P P E A A R R R AEAQAILARYD A D L P P A V VMAV
$\qquad$
 DPASIASGPTLPDPTAHEDLSHLVERLG NPALVASGPTIADETTRADALRLI ERY

 R



 DPAQVASGPTVPDRVDGQAALKLIESYGVR D RV PLPAPVVROA DI PD S VRRH REA A $\stackrel{L}{\mathrm{~L}}$ | $L$ | $P$ | $D$ | $N$ | $M$ | $M$ | $A$ | $H$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $V$ | $P$ | $A$ | $S$ | $V$ | $L$ | $A$ | $V$ |
| $V$ | $P$ | $A$ | $N$ | $V$ | $R$ | $E$ | $H$ |



PASVAAA
PRAVATA $P D L_{1}^{L}$





 DLSAI ASGPTVPDATTFADAIDVFKSKGVWDKVPANVQRY NPALVASGPTIPDAASRADALAIVAAYRM KLPDAVMAH DPAQVA SGPTVPDANDRA
 DPTHVASGPCAPDPTTYADALTI IEYHGIU QAPDAVTEL PLDMI ASGPAYPDSATTEDALEI VRRYDLK
KLDMI AS GPAYEDSSTCSEAINII NKYGLK
PLDLI ASGPTVRSDSSPEEVWAI LDNYKLSDSDPSSVKEV
 PLDMI ASGPAYPDNSTSEQAREI LKRYGLT
NLALVASGPTDADTSSRLDA贝RLIVRYGLRDDPDAVIRY DLGAVASGPVSPDPTTYGDAQAVFDRYTI EPPEPVVRH

 PDDMI ASGPTVVDSSTCEMAKNIVVRYGLS DPAFI GSGPTVGDPSRPDDALAVVDQWKV A $\square$ PGGVREA
 APGEVASGPTVPGRPASADVQEMLNARGD VLPDKLLTH DLSSI ASGPTVADSTTYADAIDDLKAKGVWDQVPDNVRQH

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UniRef90_A0A021XAL6

LIESGA GETPKPGDARFAGHRAVTLIATAQQA|LIEAAAARAR LS GKTGVLQPDDPRLARDSNVIVAAPSQSLEAAARDGR LK HE A D RTMGHTPDVVA EGNS VVTMI A T P F LLA L L A A A A E R A R L E S G A GE SVVK P G D P R L Q G Q QV QL V A T A Q Q A L Q A A A QVA R II A S L L Q A N A P H P D DP V F A S N S V R V I A S A R Q S LL A A A A A L A K
 LERGAA GELLETPPKPGDPRVTNRILLDNADLLEATAGFWR L S A A
 I RNA ARAPTAGDSVFANNEDHVI ASARVSLEAAA DRAR



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 L 1 A DSSAPRRDDPGFARDEAAVLARAHDALQQAARESAK L K S K S C C W V I P V V D D P Q L L K H V HLAAAAADAVPKPGDPRLARSEFRLIDATPMMALQAMVAGAAAA



 L A K G S Q V I A P E $\quad$ D Q R L T Q V K N Q I Y A A P A Q S L D A A E A L A V


 L S P D A E K L M E VVE T P K K L D NV T T L I N G S V R E L C N A A A K E C E LK SVEFAKMPSTPWSKF QHVKNVIVGNNSMATKAARDRAE MK K GAE GETPKA GDPVVFDSVVQNLLVATNEQALHAAAAKAK LERGARGALEETPKPGDPRVENRLI GTNQDFLEAARTYWE L M R P L P P Y GQE
L K D A AQRPS LDDA P SNTRTDDVI A SAGQSSLAAAA EAAR LET GTE ETPMP GAAHWARVETRRI I A T P WQSSLEAAA ERAR LATPMTPAAPHPRAEVKI I AAPMMALKAAADEAR

 L NSAA A EAPRPDDPRFARNEVVHVIASAAVSLEAAAAEAK
 $L E E S G A G E T L K P G D A R D A R V E T H M L$




 LERGARGEVAETPKPGDPRVENRVIATAHGSLVAAADHFR I E G G L Q G G RTP E T P K A D EP R V R N NVLV A S V K Q A L EAA A A D E A A
 L T A G L LSNGGEGETPKPGDPVFRNVKNRIIATARQSLAAAA QFFQ



 I Y K N TLDPQLIDK S P Q

 LKD GCQGGHPETPTEDHPSVDVHVLADNGTALESAAEVAH I R S Q A S R R A P H P D D A CF A R N EVVRVV A S A R L S L E A A A Q A A R I GR EKAPNPSDE DFRRNEVHVI ASARVSLDAAA EKAR LD GDLGQAPRPDDPAFAGHEVRIVASAHLSLEAAAAASW LA A N
 L A R G $\quad$ S $\quad$ S E S P K P P G D P R L L S T N T Gll M L



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A 290
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310
320
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 AEGLHPIILGDALEGEARELGTVLAGDARSVSDHGDPAPK KLGYKPMILSSTLDCEAKDAGKFMAAIAREIKLNNGNFTP AEGVTAALLSDALEGEACEAGRFHAALAREIALRDRPFAK EAGVTPWLLGDAITGESRVVARDQATLARRIAAGEGPVQP ARGYRPLPLTSTLTGEAREVAKALYAIARDVRDHDLLAAP AEGVPAVILSDAIEGEAREVGLVHAAIAREVAARNRPFAA
 AEGLTVIRGNDVEGEARHVAQEHAALALAVQAELGPNDP RLGLVLQLGDS EGEAREAAKVHAGIARQIAAHDSPVAR ALGYRVLDLGAFVEGETREVATAVAGVVRSIVRDAEPLSG A QGlSVQULGDALEGEARDVARDHA ALAREVQAGLAPGAA KHGFESVILTDQLCCQAKEAGSFLASIAKTHCHGN AAGVPAVILSDAI EGEAEVIGQMHAAI AREVVAQGRPFRA ELGLLSUVVSASLEGEARNVGELFVDIAKYIARKARNCRK DLGYTPRII TSKMTGEARTVAKDIAKQAKKAAGAKKEK GVGYRTLILSDRFQGEARELARFHAALVQSDRAHHTPVPP TLGUTPLILGDALEGESRDAAIVMAGIAQSARHHGIVPVAG A RGVNAWVLSDAI EGEARDVALVHAALARQAAQSGFPHRA AMGLEAHILGDGIEGESRDIGRMHAAIARSVAQRGQPFRS NAGLQTLVLGDA EGEARELGTVMAGIALSAKLKGLPLRG ELGYESVILTDRLDCEAKEAGAFLASIAKTHCCNMQGNRN ALGYQPTLYSDHLCGEARDEAEKWVIHAKRLIANG DDK $K$ QGVEAIILSDSIEGEARDVGSVHAADAREI ATRDRPFRK TRGFDVI SLGAD EGEARTVGAEHGRMADEIAEKKEAGSP TLGYTPLILGDALEGESAQLGVMMAGDARSVKYHGYPDRP EAGVAPLLLGDRI EGEARDVGKVLGGIALQVRAHGQPAPA ELGFKTYIITDKLKGDYTNVADFIILKTIENYQQAA GKK ERGSEPLILSSSVRGEAREAAKTHVAMAEEVQRTGNPLAAA RHGLAAHVLSDAIEGEAREVALVHAAI ARQIAQHGRPFAK ALGYLTLILSAAVCGEVNRVAKLYGLLIQFVCLSGFGPER QLGYLTILLSDAMGGEVSTVARFYSLLIQFVCAGNRPDRN AQGLQPVVLGDTVTGEAQEVARVYAALVREDRAYNAPFAV
$R C G F V P R I V T A M S G E A R T A A Q L V A E A R A Q A G L R P G D A$
 RLGYNTMLLTSHLTGEAREMASLFCGUAKDDAVNADPVKR ELGYHVYASDKLVTGETQQEAKQLIGSLLQCR G KLGYEPVFLTDQLSCEAREAGRFLASILLKSHQREGR
DLGYWTLILSAGVCGEVSRVAKLYSQMI QFVALQGLESER TQGDPAVILGDSVTGESRDVARVFAALDREDRRYGHPWRP A GYKPIILASLDCEAREAGKFISAI AREHAYDGESL ELGYKPYI SDTLDCEAREAGKFIASLARAVVGKNEYTLKK KEGYDPI LSDSLEGEAKDEGKKMAELADKDKYKNDSRSK AHGVTP ILGDALEGESREVGTVMAGIARSVRDYGQPVEA ELLGYEPVVLTSSLSCEAREAGSFLAS:AROVBHYNTEK EHGYEPM LSSHVRGEASEIAKVHVGLAEEALAAKRPVEP
 NLGI PAVILSDAI EGEARDVGKVHAAI AREVSIDRNQPFQK GLGLTPLILGDAIEGESRELGVAMAGIARSVRRNGHPVRA SLGYQVVFLTDRAGGEAREVGRMLGEIAFSHACDGE EAGCDVRILGDALEGEARLVAEVQAKEALTLQHSDRAGDP SRGYTPVILGNALEGEARDVAQVHAGDARQI ARYGQPVAA



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UniRef90 F7VGU4 UniRef90-A6UKYO UniRef90 UPIOOO36491C4 UniRef90-UPIOOO46B0A56 UniRet90-S6CXQ7 UniRef90-E4U9Q4 UniRef90-UPIOOO469601E UniRef90-D7BEW5 UniRef90-UPIOOO38248A3 UniRef90-W6RTSO UniRef90-A4WI53 UniRef90-M5DFU9 UniRef90-UPIO004632535 UniRef90-HOA4H7 UniRef90-Q0K9U2 UniRef90-F5XY40 UniRef90-AOAO21XAL6 UniRef90_UP10003B61F12 UniRef90-UPI00047CBF75 UniRef90_S2KFE2 UniRef90-A3JUS7 UniRef90-E6VWS3 UniRef90-UPI000474D08D UniRef90-A6TL35 UniRef90-UPIO00475EE3B UniRef90-Q0A919 UniRef90-S9SE64 UniRef90_S9QEP9 UniRef90_U7FU18 UniRef90-HOJ4RO UniRef90-B7RQU4
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 PRILMSGGELTVTRRGDGDGGPNAEFSLALALALNGAPG PAVLLSGGEMTVTHREKPGRGGRNTEF LACAQALDGEQG PCVLLSGGETTVTLSSRGGKGGRNGEFVLSLADAIDGLDV PCVLLSGGETTVTVRGAGRGGRNVEFLLALGLALRGAAQ PVVILSGGEDTVTLRGKAGRGRNTEFLLSLAGLHEGAAG PAVLLSGGETTVSTRAKPGKGGRNTEFLLSCALALNGQAG PVVLVSGGEASVTVRGT GRGGRNQAFLAWLAHFLGPDGA PVVILSGGETTVTLRHKGGRGGRNTAFLLGFAQE DGDAG PVVLLSGGEATVTVRGS GQGGRNQEFLLGLLYQLGPEGV $P A C V L S G G E T T V T V R G K$ GKGGRNQEFALAAALSLSGTPN PVAILAGGETVVTVRGRGRGGRNQEMCLSLAMAIRGLNA PVALISGGETTVSLRENGGRGGRNTEFLLSLALELNDVTG PALLLSGGETTVTIGARPGRGGRNTEFLLAMALALDGLPG PCLLLSGGETTVTIPRGGRGGRNTECLLGFALAAAGAPGI PCVLLSGGETTVTVRGAGRGGRNVELLLSLSLTRRGEG PCVILSGGETTVTVRAHPGRGGRAGEFCLGLAQALQGQPV PAVLLSGGETTVTIGNNPGKGGRNTEFLLSLALALKGDQS PVVVLSGGETTVTIKGKGKGG RNGEFLLSFACGIDGDPG PLCLLAGGETTVTVRGK GKGGRNQEMALAAGLALEEFPV PLLILSGGETSVTVRGDGRGGRNVEYLLGLFETLKGAEG PVLLLSGGECTVTRRGDGDGGPNAEFTLAALLALDGCRG PVCILLAGGETTVTLKDGGGKGGRNQEMALAAAIRLDSARI PCVILSGGETTVTIRPSPGRGGRNTEALLGFALAAAGRPG PCALIVGGETVVRLDGNGKGGRNQELALSAALGDEGEDV PVVLLSGGETTVTLREPGGKGGRNSEFALALALAGEGLPF PVCLVAGGETTVTVRGR PVVMLSGGETTVTVRGEGGRGGRNQELALLAFLLAEMRGEGII PVLLLSGGECTVTRRGKGCGGPNAEFALALAMALKGADG PLLVLSGGETSVTVKGD GRGGRNVEYLLGLFDSLKGAEG PVVLLSGGELTVTRRGDGGGGPNAEYCLALALALDRAP PALLLSGGETTVTLRGKG PACVLLGGETTVALGGAM俍 KTAYi AGGETVVNLTG GVGGPNAEYALALALALQGAAGU PVVILSGGETTVTLRHKDGRGGRNSAFLLAFAQAI GGQGA GVCVVSGGETVVKVKGQ GKGGRNQEMALAFGTGLENARV PVVLLSGGETTVTLTGKGLGGGRNQEMALAAAVALDGCPN PAVLLSGGEMTVSLRAPP PLVLLSGGEATVTLRHK PCVLLSGGETVIVRATARGGRNSEFALSLALGLEGQED PALLLSGGEATVTIGADGGKGGRNGESCLGLAQALGGAPG PAVLLSGGEGTVSI GCEP KLAFIAGGETVVHLHGT PVALLAGGETTVTLKGN PVLVLSGGETTVTLRAK PVLIVSGGETTVSVRNAA PCVLLSGGETTVTVRGQ PVCILLFGGEPTVKVSGN PAVVCSGGETTVTLRGD PVALTSGGECTVTIPPTG PALLSGGETTVTLRGQ PICLMAGGETTVQUGGS $P C V L L S G G E T T V T V R G Q$ PVALISGGECTVTLPQGG PLCLLAGGETTVTIQGS PMLLLSGGECTVTRRGN PCVLLSGGETTVTVRGQG
$\qquad$

SICLLAGGETTVQLQGN PLALISGGETTVTLGKKRGRGGRNTEFLLSLALEELGGAEV

AYIMGGETVVHLTGKGL GGRNQEIALSAAEGIGGREV
 PILLLSGGETTVKVTGN GKGGRNTEFMLSMAITLDKAKN PAVLLSGGETTVSI GMTPGRGGRNEFLAGLAVALAGARGI SLAFIAGGETVVHLKGNGLGGGRNQELVLASAVGIAGQDV PAVVLSGGEATVTVSGD GHGGPNQEFALSAALELDAAGV PVVLLSGGETTVTLRGDAGRGGRNTEFLLAFAHAIDGVAG PLVLLSGGETTVTIGGKYGKGGRNSECLLSAAMDLQGLAQ PIVLLSGGETTVTLRGRGRGGR NTEFLLSFALAAEGLPV PAVLLSGGETTVTIKGPAGRGGRNTEFLLGFALADAGEDV KTAFILGGETVVHLKGNGLGGGNQEDACGAAKALAGFDN PCVLLSGGETTVTVRGHGRGGRNTEFLLSLGIALRGHPG PVVMLSGGETTVSLGGTYGKGGRNTEFLLAFAKSIQGVEG PVVLLSGGETTVTLRHK GRGGRNSAFQLADALAIENLPH PMALLAGGETTVTLKGN GRGGRNQEMALAFAIAAEQQNW




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UniRef90-L9×3×8
UniRef90-A3U256 UniRef90-D5AN55 UniRef90-U2USIT UniRef90-Q0BV90 UniRef90-R9M9J5 UniRef90-X1RT29 UniRet90-J3JHRO UniRef90-A7SEK0 UniRef90_-F8E9P7 UniRef90-V5BFA3 UniRef90 $=$ E1V7D8
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$1301030 \quad 30$
 HKY $\square R\|I F R A A V R S V D P K V L V R K N V R\| V D K E G S F$ LRQLAATAVSAVHPDTL
TSSTAQRALQL WKAGVRAVDSETLVSRSTQVTDQDLT



LREHAQTVIDDTLKQVQPHAAVQRAL KGKQFQ
TSAHQTALKCLSDGVNAVLPDRIVRDAVSLNDNTLSV LVGALEEALSAADPKAVASHVKRAGGALEV EDASKIINASIKSALPDTAVKKALENMPLC MTPDAARTVLHDMFMAAVAAADPGRALAQFLPDRPQ MSDPDPFLRRLFNRAVEVADPMQSLAQALPERPE促 SFKMQADARLIWEAGLGAVDPERLATGAVSVVAGKLII

SQDPRGFLETLFAAAVARADPMQVVAAYLPPRPE MEAVKLRNHAFELFNVSLKSVTPCTMMLNSLKDSGNILSV NHREWLERWFQAALTAVDPARCLPPMLPE ATEQARALLRRSFDAAVAAADPRQMLAQHLPDLTGYRRV MNARALLLNSFEAALAAADPLRVVSPHLSVSSCALAV REDATSTfQAAVAAVQPAHपMHQHVRCRDGVLSV SSELRDLALRLVNQALTASDPAPVVRNCVRQVGSSINV
 MRQDDKTLLTQLFQAAVAAADPAEALRGHLPARP MAFLTPTDLLHRLFETAVAAADPMQVLPRVLGPRPP MEEHLRKEADT DAASLKAVMPDEAVQRALKEFKSG

$\square A G T P A H E A L A C D E A G T D A A H P E Q V V H D S V S D D G D T L T T$ SPNLRSDAIGIFRSALKAVTPQEMVKNALSLSKTRLRV MNLKQDTLNILYEAVNSVKPDNDFDDVNFNGGNLNI DLRKSASNL FQAGVAAADPYQAVKGCLLAENDKLQL DERTPAHALALDCLVVGMEAAHPEALVEETVSVRDGLLRD MT LREEADY DVNADSSALPDEAVRQALKTKDFG TAAHEVADECLLAGLEAARPENRIADTCTVSDDADTV KDCLTEVF GQAVLAAAQPDQALKEA WQEQDMPW TARDLLRRMFDAAVASANPQEAVMRHDPPKPQ
MPEKLET LKESVRLADDQYYMKKRVRLEGECLII
TSQLRRQALAI FQAGVAAADPYQAVKHHLHSEGVLLAII SARQVLRRIFDAAVASADPKDAVVNNLPERP
mTARARELLLGAFQAAVRAADAREALASFLPEVPSGRTV SFLETLFQAAVDAADPGQCLPPHLPEPVE MRRMFDAAVASADPAKVVAYHLPE

K■

$M \square E R \square H K D A E F \square I K N S \prod K A V L P D S A V K K A L S N F T H T$ MSNESMRRDAWKI IRKTLKEAMPDQAVEKALRARSFT MTEPGDLLRRLFAAAVAAADPAVSLAQHLPS KTFLDSLYEEAVRVSKPKHCLPQYFS
MSHNARRFLYALFDTAVAVAQPGRCLPRHFP
TTDMATWLRRLADVAVTAVHPDSLVADLLPD
■QDHATDTFSTATNAVLPQSMVTKTLKLNGDQLII
DPRALLRALYDTAVRRAMPGHVTAAHLPPPPD
MNPRTLLLDSFHAAVAAADPARILPPHLP
TATLRELVTRILAAAIAAVEPGAAVRRFLRREGETLVA
LREHCLALFQAGI A AADPCAAVEQCLVVDDDQLKL
MTDHDRAFLVRLFEAAVKAADPALALJGGLPQRP
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DPQALLRAMFDAAVASAQAGNCVP
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MKDYRADLGRI FMSAVEYADPEYMVRSRVLNDDGCILI
EMREVLESI LSAGLAAADPALAVERHLGVREGEVAS
MGLREDADRIVRESI RRVLPDEAVSRAL

 RAFLLHLFDSAVGAADPMAALKAHLP
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UniRef90 A6LJ61 UniRef90-J8V280 UniRef90-U2YL03 UniRef90-T1FPC6 UniRet90-A1WWIO
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UniRef90-L9X3X8
UniRef90-A3U256 UniRef90-D5AN55 UniRef90-U2USIT UniRef90-QobV90 UniRef90_R9M9,5 UniRef90-X1RT29 UniRet90-J3JHRO UniRef90-A7SEK0 UniRef90-F8E9P7
UniRef90 V5BFA3 UniRef90-E1V7D8 UniRef90 M0B6P1 UniRef90-F2JIT6 UniRef90-D3T032 UniRef90-K2C5H6 UniRef90-A6GR07 UniRef90 W1LCL9 UniRef90-10A1V5 UniRet90_UPI00035EF86D UniRef90-Q44472 UniRef90_UPIO003684767 UniRef90-B9K314 UniRef90-A4T037 UniRef90-F4X9U3 UniRef90-V9KL14 UniRef90_B9JOS1
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GQLPPRPAGRTVVIGGGKAAAAMAAAFERTWADTSGLVVT
 AGRVVVVGAGKASAKMAQAVEAAWGPCEGDVIV GGDEDPWDNHIYVVGAGKGSFPDAQALDEDFRTRAGTVIV DGAEYDLYDDVVLVGAGNAAGQFAAALEDLLRLTAGAVVT


NGKVVLIAAGKAAWQMAAAAVEVLHVDRGIVIT KPVTLFSITGKAAWQMASAAERSLQIKQGIVLT PPPGRTVVVGAGKAAASMARAVEAAWPGESGLVVT STDKNQRVCVLGAGKAAADMAVEAYNYFDNAYGLVVIT
ECPTDGKIVIIACGKAAAGMARIAEDHFSRTTGVAI PPPGRTVVVGAGKAAASMAAALERAWQERTGLVVT GDETY PPLGKTVVVGAGKGAAQMAAFLEQTWQKKGGAVVT $P A K G R T L V L G A G K A G G A M A A A V D A L W P A D S G L V V V G T$ GDVTYDMRDRVWI GAGKAGAPMAVAAAGIVRLTGGTVVV RLEPHSSQQKIHII AFGKAACAMAGAARRTIPPHQGLVVTT
 TAVDLDEYEDVFLIGGGNAAGHFARALEDELRDTDGAVVT ADTTYDLYDDLVVLGGGNAAAHVAAALEGLLRIDDGVVVT
 DSEYVCDPKKIYLEAFGKAAVGMAKGFMSVCDVDRGIVVT GDGTFP ARRVFVLSAGKAAGAMAEAAERVLRPVRGLVVT AGKDFG NGRVYVVAAGKAAWQMANTAAEILRMEAGVAVT GDATVDDDDYGEVVVVGKAAAQMANVIEDVLRLTDGVVVT GAHLLF $\underset{A}{N} \underset{P}{D} G$
 LGRVLVVGAGKASGPMVQAMERVLRLAGGVAVT

DGSVVNLD KGRTVVVGAGKAAGAMAKAVEDHWDGPEGLVVT

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UniRef90_A6C6Z4
$\qquad$ KYDHVKD ${ }^{1} \mathrm{P}$ G

## 90

T C C A GHP 100
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120 PSGT RYGHNSPESRIVQI EAGGHPVPDQAGMDGAKEVYRGVGQQQ
 PYGGALPTEGVEVEARHPVPDAAGEAAAGRVLNKVSGGG
 RYGYGAPCERIDVLEASHPLPDESGLKASRRLLEEVGALGG
 PEPTSGD PRGSGR K RYGYARPCKGlVEVEAAHPVPDTAGLQATARMLELMRGLG RHGHGVACRSVQVMEAGHPLPDLYGQQAATHMVEMVRDLG

RYGHSGRRIDDNFDI FEA GH



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## \section*{}

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NYH $\qquad$

NY D NVK P V V R GVVNV D DPAGASVVVELDGDH



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 RYGHGAPTARTEVVEAAH
RYGYEQPTGNIEREAAB RHGNSEPDKKLKLTEAAHPVPDEHSVEGAKALLSLLASQVE RYGHAEECEVIEVLEASHPMPDDLGEKAARRMLEAVASAK RYGYGCQTTNIEVLEAAHPVPDENGLKASQIMMKLVENLH PVGSQEDMRRI QVIEGANNVPDEMAHKAAMKIYSLLDSLT
 KEGHLTADHQVELLEAGHPLPDTRGVAAGEREAALLTQQLG TYENVEAVEGFEVLAAGHPLPDRNGLNAAQRLVERLRTMP RYEHGAQCEKIEVLEAAHPMPDNDGEQAAKRMLASVEALGG KHGYGKADERLEVYEAGHPVPDDDSYAATEKVLELVKPLG RYGHEVPCKRIEVRSAAHPVPDQNGVAATLEMLARLEGLT
 NHGEKFP DNIKVIKAGHPLPDKGSMDGAEAMLDLARMAD KYDHRPGPEVYRTLFAAHPEPDEAGVEAARRVTEAVGELE KYDHVKPDPGMKCFEAGHPVPDANSFAGTQAALELVENLR NDP QETDRDAVVEGSHPTPNEAGEEGARRVLSLADDAT RYGYARPTQQIEVVEAAHPVPDAAGAKATKHLSRLVSEDG KHGHGVSTDRVRLLEAGHPVPDDASDQAGRAI AELADEAE RYGYGATCKTVRVMEAAHPVPDAAGIDAAQALKDMVRDDG RYGHGAPCRRIEVIEAGH RYGYGRPCQGIEIVEASH NPENAAPGDGCRVLQSGHPVPDRAGVLATKRLLALLDTVG RHGEGGDCGPLRVIEAAHPV

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UniRef90 Q28KB9 UniRef90-S9QK47 UniRef90-S9QUQ8 UniRefo-SyQUQ8
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## 77

 END LFVLISGGGSAACCMPKPPLTGSEKRQUIQQUSKAG ENDLVVALISGGGSALMTLPAPGLTLQQKQADNKTLLRCG EGDLALCLISSGGGSALMAAPGEGLTHADKQAVNKALLSCG EGDLVFAAVTGGSSALVNKPAGGUTLENLRQLNLDLLNCG


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 K E D DGDLVLALISGGGSALMTDPHPDLTLADKITVNRLLLRSG ERDLLI CLLTGGASALTPAPAPGLSLADLRQTTQLLLDCG


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## - A

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 ATI QELNKVRDRLSALKGGKLLKHTKAQVISLLILSDIVGD
 ATI QELNCVRKQISAVKGGRLAQAAGYRQLALIISDIVGD
 A S I
 A DIVEINTIRKKLSAVKGGKFAKCCEPASVSVILSDILGD AHI GELNAVRKHLSTLKGGGLARLAAPATVILVFSDVVGN



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UniRet90-W4YMC5 UniRe90_W4
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 R R G G D A A A P R P S DMRFARNTVVRLV A SAA VSVLEAAAAAMA R L Q L S S Q A R Q L L L E T LERGARGELSETPMADDPRVTNHVLAADTHTALSAARETAR FE G G E $\quad$ D TVVK E G D A LL L A K V V Q N V I V

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 $L P \square P A D D E S P K P G D P R L Q R A E A R V I A T A M A S L N A A C T V A Q$ TKGANGA $\square$ QE T P K S L P P P S I I N LV L G N NVVALAA A E E Q A S
 LNNPA SETVKADDPALARSHFQLI AKPQQSVEAAAVKAR LERQGEQGPDRPDDPRLARSETRIVAAPAQSLEAAAEDAR L N DRS QSEEFKKDSEHCRNVVNVII GSNVIDALNSALLKYA D
LI R A
 L K T P A A E TP K P G D A A F A R TT T H L I A T P R M A L TA A A D F A R L Q Q GCA GK I A E T P K P GHA HVH N F L T G S N H I A L E A A K K Q A I


LET RPEDAPPPDDPAFARNEVRVIASASRSLEAAAALAG
L R A G S GVVLAPGAFALSRCETVIVAAPA QSLAAAAALAR
I S P K A E S L L D DE T P K QL D NVT T RVVTGSVKE LDCAA A DK K C R
$L$ D R A A A AKP A APQGDFRMIDAPLMMALEAAAAAAR
LTPEARRLLGEETPKELDNVCTEVTGSVRELCAAAAERCR
$L$ Q M AT P E L E T P K D F S G L P V V H T F V LV K S A S I C E A A A K K A K

L K S EKM TESSRRSLLKHYILGNNNRALLKAAEKAE

L E E G D R GVVHPETVVK P T DP TVVS FHIILGGSGRTAIIDAARAVAS



L E S G
HETPKSHDMASDVRMIA T P SLLALLEAAA EVAA
I E K G L R G E DRE T P K K V V F E R A H N F L I A A P S D L L A K E V S S Y V S
LQQGELGNVPE
$L V Q G N$
$L Q R G A L G E L P E$
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$L$ K Q G L A G E K P E T L K D D D A Q V A N H V I A T A Y K S L L A A A A E Y V R


L S D T T L L K L L E V V

L N Q A L P LDP KV S G D
 LEQA QGAPSPDDAAFARDDSVTLARAHDALLEAARAAAE

 L E A DAR G DTPKPDDPC FSRMENRVVI GCAHDSSLVAAMVGVFE L E S GVVR G E IAA E T P K P G D P R V G N LI I G S N R L A A EAA A A A A H


 L E A GAR GERPETPDPAFERTSAHVLGSGRTAGLEAARDAAR L E R GVA G E IAAETPDTAFERVVTHVVVA DGMTVLAEAARETAA

 LSEKARELLLGQETPKTLLRNVETVITGGSVRNLDRAAACACR LENGDDGERSETPDPAFERTELHMLANGFTALAAARSVAE
 AVE S P R LDP GVVETGCEEQPP HV LTTDF LAARQEADATAAANDPRRITTTI A SANDSSLDAAAAAAAR


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UniRef90 $\mathrm{EPPLT5}$ UniRef90-E8PLT5
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 GLGYEVIMLGDSLEGEARDVAEMHARLARRCLDAGR AAGVTVKVLGDDLEGEARELGRAQARLALEARDE KKGVEAVILSDSI EGEAKDIGSMHAALAKNDANNNQPFQK ALGYLPYL SSSLVGNADTTGEMFAKVARMLATESDNTNV AAGLAAHLLSDEMEGSREVGKVQAALARAVARRGQPFAR QHGIPALLISDSISGDAQAVARQHAALVRACLTGGA REGFNALILTTFLQGEARVVGRVLAAIARETADNNRPDSR AEGVPAVI LSDAMEGEAREVARVQAAMAREVRARNRPFPA AAGLEVRVLGDDLEGEARELGAEHAALALGLQEEAGRQ QAGYEPLILGEAVGEAREVAESQADLVKSLTERGSSPAP EEGYEPLVLAAGVRGEAREAADTHVAI AEECRDTGGPASP ERGYEPLVLSARIRGEAREAATTHVAIAEEVRATGNPVSP RQGYRAVILSDRFGGEARALARFHAELVETLRAHGLPFKK MLGYKVRMYGQLDCCAREAAEDMA ARVNENLINASDT ELGYEPVVLTDQLSCEAREAGAFGAAIAKSHQES EHGYTPVILSSQVEGEAREAAKTHAAIADEALATENPVSP AAGCSVRVVGDALEGEARDAAAEQATLAMQVRDALKRGDQ ARGVAAWVLSDRIEGEARDVAQVHAALALQTAQSSFPYPA AAGAAPLILANDIEGEARDVALVHAAIARQVYHFDQPAPA

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K LA Y I A G GE T V V H|L|K G T G K G
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KA A G G TV P I CVLVGGGETTVVTVTGE GKGGRNLEMALAAGMALEEQDV
 $P L L I L S G G E T S V T V S G E$ PACILSGGEPVVDLSPHPGKGGRNQELVLAAMQRLWDEGF PAVLLS GGETTVVTVRGGAGRGGRNSECLLSFGLHAAPE GVV $P C A L L D S G G E T V T I Q E N C G S G G P N Q E T V L G F A G K D R H R A G$ PAVVLS G GETTVVTLGNQYGRGGPNQEFVLASALALENDG■ $P V V I L S G G E T T V T I K D G A G K G G R N S E F L L S L A L G I D D G L S G$

 PAVILTGGECTVTVRGD $P$ L A L L A GGET$V V T V R$ GDGGPNLEYCLSAAREL DTDA

 GL CLL A G GETTVVTIQ GR GRGGRNQEMALAAALELE GQPV
 $P \vee C I L A G G E T T V S G V A P G G K G G R N Q E L V L A A L E H L S G W G M$

 $P \vee L L S G G R C T V R R G Q$

 $\qquad$ $K$ GRGGPNAEFVLAAAIELAGDPR
 ALS GGECTVTLPGVKGRGGRCTEFLLSLACELEGMPG

 $R G V \vee L A G G E P T V T V R G N$



H L G $P$ LVLLS G GECTV SLREN GK
$P G L$
 $R$ LAF S G GETTVVTI GQSTGRGGRNTEFLLSLALLTM GASN
 $P A V I L A G G E T T V T V V R G D$ $P$ LCVI GA GETTVTIIKGT $P L C F I A G G E T T V T V K G D$ $P$ I A L L A G G E T T V T L K G N $P L L L L S G G E T S V T V R G D$ $P A V L I S G G E T T V T L A D$ H
H

P | $G$ | $S G G P N$ | $Q$ | $E$ | $A$ | $L$ |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $G$ | $A$ | $A$ | $A$ | $L$ | $E$ |
| $L$ | $G$ | $E$ | $S$ | $G T$ |  | $G K G G R N Q E L A L A G L L E M S G L G N$ GRGGRNQEMAFAFAIAAEQAN W GRGGRNVE Y L L G L F S T L K G A P G

 K

 $P T A L I L A G E T N V K V K G S$ $P L A L L A G G E T T V T L Q G K G$
 PAVI L S G GESTVVSLGATEGRGGRNTEFLLSLAVALKABS G $G Q A L L S G G E T T T V V Q G T \quad G R G G R N L E F L E A L A T E L A S G R E G$

 $A F L A G G E T V V Q L T G S$ G L G G R N Q E L A L A A A P GIA GM D T $P \vee C L L A G G E T T V M L R G K$ $P \vee V L L S G G E T T V T I K N Q G$ $K L A F I A G G E T V V H L T G G$ $P A A V I V G G E T V V E L K G K$


 PL L I L S GGETSVTVHGD
 $G R G G R N V E Y L G L F E A L A G A E G$


 $P A C V I A A G G E T T V T L R G D G R G G R N Q E L D A L A A V A D L A A A P G A$ ATAMIA AGETTVTTLTGT GKGGRNQEMALAFAMAAERHGW $P \vee L M L S G G E T T V T L R G R G R G G G R N T E F L L S L A L A D D E G C E D$

 P AVLLS GGETTVTTLCDTP PAVLLS GGETTVVTI RGD $P$ L F L L S G G E A QVVQVRGK $P \vee V M L S G G E T T V T L G G Q T$
 $S L A \stackrel{L}{A} A G G E T V V H V / T G T$ PAVLLS GGETTVTLDGD

PVVLLSGGETTVVTLRHK

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

| $P$ | $V$ | $L$ | $L$ | $L$ | $S$ | $G$ | $G$ | $E$ | $T$ | $T$ | $V$ | $T$ | $L$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $P$ | $V$ | $G$ | $S$ | $P$ |  |  |  |  |  |  |  |  |  |

GR G GP N Q E F V

 GMGGRNQELALAAA QGUAGLD T GS G GPNQEFVLS GALTSTSADV

 GRGGRNAE F LLA L GVALD GHK G
 $G K G G R N Q D L A L R I A L E H D P G D W$

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# MTAILREDARF\|LERA\||EAVLPEPAVVNF|L| 

 KQ LLHELFHAALNAATPEMS S $\square R E D A D Y Y$ K K K S I D A VLDP DEAVK R A L E N K N F G
MKAFME LLYE EAVKRADPF QMI RDRVRYENESVY $\square$
MRSPETDLRRMFDAALAAADPMRCLSSFLPP
LATTPARDLALDCVEGVEAAHPRQVVRSSVSGADERLTV
KKDLENVF LSULDDIHPKKLIKKQCKFENDKFY
MRQKLLESFRFALEATHPYHLTRQALPQTPP
PQRLLRELFDAAVLAAQPEHCVPPWLPEDDG MK $\square R N D C D Q \| V R R A L A A V Q P D A A V R R A L E G N P F Q$

PRRAVLSVVKRRGDVAEV
$M T L R E D A E T \prod M Q K A D R A S L P D A A V A K A L$
MA GQDFAREIFSSAVSSVLPGEMIINKVKYENE!LHD SFLQQLFRYTIEEASPVNKMSNWLPQTNPC

AATPRAVARSCIDAGVEAAHPATVVVEAAVS LTEDGDED
TKDPAVFLRELYEAAVAAARP
MTNPKDDLKGLINEDLVKSDLS IHVKEYLKNDNDNNVI LIA ATPAHDVALSCIEAGIEASTPKAVLREALSVEGGVLTVV1

MTDKRPLLRA TFDAAVAAAHPDR\LAGHLPP

MTPDDRALLTDDFDAA RAADATAALGBNDP
MTLREDAQUIMDKALAASLPDAAVEKALK
LIRKIVEESIVESSLPDKAVTRELKNDPEV
पMTHS
MEA DLRE
ARTALRRRIMAAAL


 MRTLLE GTYRAALAAVSPEVLLKGH
SLRADAEADFQRAVEAADPANAVEAALRDRHAQLLD MSIRQDADQI LQQALHAAQPDTAVAKALT
TRPNEFLRDLFMAAVARADPMLCVPAHLPPKPD
$\square A A S P A H E V A L D C I E A A V D A A A P A V A T R S A I K R D G A T \square T \square$ MNRNGRKQADADVQASIAAVLPDRAVRRAL
ATTDARDVALTCLEAGVDAGHPRRVI HDALLSLEGDTLRV SMTLPEQAWRLFESAVSAVQPGPMLHRALLALDPSQLKV A MNPRQLLTDSFHAAVAAADPLGIVAGFLPPLP

T $\square R T L L H D L F D A A V A S A D P V K T L G Q H V P D$
DANTLITRSI A ANDPG!AVKKAL
MEALLKEAF $\square Q A L E A T H P Y G L T A R R L P S W K P D L$
TQARHWLRSMFDAA A SAQPAVCLPPHLP
ADALA IWWHAGVEAVRPEVLLPGFLQGDADFRES ARLDARA MLD A A A A A S A D P A R I L A A H L P P P
 MNLRDDI GTIFAGALDRVDPSRLVADAVRIEDGAVII


QVLKEDFTKSVESVQPQNLITKQVSVSSGHLTV SMALAGQARQLFESAVGAVLPGPMLHRALSLDPDQLKV $M S M D S R \quad V R E V F A A A V E A V Q P D A V V R Q S V E R K D D S V A G$ MNAADRRDADVILRSSLNAVLPDEAVRRALRDLR

MAPEALLRAAFQAALDAADPK LSLAAHLPPRP

MRNEDARSLLWDLFSSAVDSARPGPVVPPALPEKP
$L R S G L A A V E P G A L I R R V V K R R G G C L Q \square$
MSMDSR ARKVFAAAVEAVQPDTVVRQSDERKEDSVVI
E LLVESFYVA VDAADPHKVVPPHDPST
MKYHA FLLD LD NTAVAACKPSACMAEQLS
MRAEQAQALLRQMFNAAI AAADPAKSLAAHLPE
DAYDTALECLRRGI EAARPETLVKRRLVVVAGTLSV MTPDDPRPFLEELFRDAVAEADPMRVVPRALPPRPE MSMDSR AREVFAAAVEAVQPDSVVRKGLERKGDWVCV PRSVLSYLGAFAI RKSLPGPAVHNFLTNSK
LR RYALD A A A GUAAADPGTAARRAVNFFGNALHD M $\square$ YMELKTLAKKI DFDTLEDDQPEKLVKEKLK

SMSLLHEHVLSLERSAVGTVRPAPMLKRAVKLQGDQLIV ATRDQRALLDS LTAALRAAHPDLCLPPHLPE

MTRNPTDADRSAFQAA DDQADPEAA $\quad$ AR R MT MASMALSERARLLLFESAVGAMQPGPMLQRALSLDPDQLKV RETLSTLEETAYRTAHPAVCLPAHLXKVPEGGRI M DDAEALLRRMFQAALDAADPK CLLPAFL
 LRRDDIDDAENVLDYVNPGLITRKIVVQL NDNQLII

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HSRTPP 50
70 $G \square L P H P P K G R T I V$ G AGKAAASMARAFEDAWRPCE GLVV T $N G R V R L V A V G K A A W Q M A Q A A D K V L R D E A G V I V T T$
 GDATHDDLSAYVLLVGGGKATGTVATVVAEVLDRLTGGAVVTV GGREYRLVGRVLLLADVGKAAGGMAAALEEILIDIAGGLVVM
 MAA A L E KV WN GP E GVVVV T $T H V L A L G K A A F P M L K A V G D A Y G R V P G L G V T$ $G P L L V L G A G K A A A A M A R A V E A H W S G P S G L V V T$ $G R V V \mathcal{V}$ AVGKA A WSMARAACDCVRLDGGIVI

 GRVIVVGAGKAAAAMAAEWERIWP QDSGVVVTT

 R GRTVVVVGAGKSAAVMAAAVVDANDGS D GVVVVT $1 \quad 1$ $D L D P T K P A L V L G$ S F

P PRGR I LCLAA GKAAGALAHAAERHYLDG
 FKF D E VA AAGKA SERMAA GAE R NKK F G
$G E R L R P R$
K
P
 $G G E R L R P R$

$G E Q R Y D L T$ $R$ R YVVAAGKA A GA K GR CVVV GA GKA GAPMAHAAA | $A$ | $A$ | $A$ | $E$ | $L$ | $L$ | $R$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $A$ | $S$ | $A$ |  |  |  |  |
| $A$ | $V$ | $E$ | $Q$ | $W$ | $D$ | $D$ |

MRHEDD
GEKKWDLK K
GEDDGDLGSRGILI
GDATYPLQKNVVIVAMGKAAHTMVEALMTHLGGVTGVVAC




WK GDRPDFI LAF GKAALPMARAADKAYPGVPTVIVPB
G H T F R P

G
GEATYDLD GRVIFV GA GKASARMAEALEATWGPCD

A D ATYDCS

GERR Y D L R A R I WLV GA GKAGAAMA QAAVQVLRLHGGLVVV




## LG R

A P PRGRTVVI GAGKASAQMAQVLEAHWPTPS GVVVTT
AKRILVVGGGKAGAAMAAAFENALPKITGLVNV A S E R F D D D GARY

PPKGRTLVVAAGKAAASMAAATEAAWPKD
CGHTYPLHKPCYVVGFGKAVLGMALELEKLLKDKLGVVVV RDRSF QLHQNLYLVGFGKAVLGMAAAAEE\|LHMVQGVI SV G GRRF T L K H N L H L V G F GK A V L G M A A E V V

PGK GRVLLV A A GK A A WQMAAAVVETGRVDGGVVV T $G D L R D A L A A K V W F F G A G K A S F Q D A R G V E D R D R D H G G L V V C$
 $G G K V V A R C V V I$ GA GKASAAMAAAVDAAWPDVDGVVVT GGKVVELRRDFVIVGGGKAAEGMAAAMLRDLDGLDDVRGVV

$P I A G K T V F L V V G K A A S Q H A E V A Q Q C L G D I K G L C I L$
$F Q G D V V V V G A G K A A A S M A A A V E Q A W P E K D G V V I \quad T$ $K L D T S N G \| C V V G A G K A A A E M A A E T Y R V L G D K Y G A V V T$ $P P S G R C V V G A G K S A A A M A R A V E D A W P D V D G V V I T$
 D GHQFALKRNLHLVGFGKAVLGMAAEAERDVVHVRGUI SV

PS GRI LL L S $\square$ GKAAEEMSAAAYEILQI FAGMILTT
 K GRAFPVKRNLVLVGFGKAVLGMAAAAEEILHLLIRGIV SV
$P S P G R L I L A A A G A A G S M S A V A S R F Y R Q K H G L A V A$ $T L S H N A N G R V I V I$ A A GKAAPAMLRGAMAHLGEDEALCVT RDRTF QLQQNLVLVGFGKAVLGMAAAVEKLLHLVQGVIVV I I G A G K G
PLATAPCA GRTVVVIGAGKAAAAMAAATAADWTAAIEGLVVT RDQSFELRRNLYLVGFGKAVLGMAAAAEDILLHLVWGVI SV


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UniRef90_V4YIU3 UniRef90-UPI0003744407 UniRef90-M0MZC6 UniRef90-UPI0004776E36 UniRef90-UPI0003657295 UniRef90_LOAB77 UniRef90_C7NMI1 UniRef90-H6SRW1 UniRef90-K8P3A8 UniRef90_UPI000372F3D9 UniRef90-A5FXP0 UniRef90-A3VAZ9
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UniRef90_H2LFU7 UniRef90-C7H9B8 UniRef90-K5YHH3 UniRef90-UPI00047E3713 UniRef90_I3D2R8 UniRef90_Q9YDB7 UniRef90_UPI00037D6F72 UniRef90-E6P950
UniRef90 Q2W4Y3 UniRef90_G3N8J3 UniRef90_UPIO00262CEOA UniRef90-R5ZVU5 UniRef90-F4AK59 UniRef90_UPI0003B48087 UniRef90-M0LYP8 UniRef90_Q2CHIO UniRef90-H3DBB7 UniRef90-V614W4
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KY 90
100
110
120
KYGHSQELPGLEI YEAGHPLIPDANSLAGARRALIELVVDLIG RYGHSAPTRHVEVVEAGHPVPDDAGMAGAQRVFQLASSAG KYGYNKPVANYTCIEAGHPVPDENSFKATQAALALVKGLS KYGHTAETEFDRLKEAGHPIPDEHSVQAAREDSSLLETAD RYGHGAATRHI EVVEAAHPVPDANGVEATARLLASLENLT PE SVSDPGVESFEGGHPVPNREGVAGARRVLELVDGTD


 RYGH GLLPTRHI EVVVEAAHPVPDEAGERAARRILLELARAAG K H GHA Q P I G S L LI REA GH PVV D Q D T F S A T E E A L A L T D G L T

 RYGHTTPTKHI KVLEASHPLPDSAGQTAAQALLNAVSGLN RYGHDPPVQRIELLEAAHPVPDQAGMDAATRMLALAQTAG NRENLAPVVGVVEVIAGGHPLPDEGGVAGAYAVERAARSAE $D V P$ EPLLSTI DVVTGSHPTPNERGVAGAERVLAHATGAT R D G H A V P TR SI A V L E A S H PVVP D A R S EAAARRI LAAVVQGLG



 KATHYPHDGKIHVLEAGHPLPDKWSVECGDALQSRABRAK RYGHAVPCARIVVVEAAHPVPDEAGLAATERMLGLAASAG $R Y G Y G A K T R T I V V M E A A H P V P D A A G V D G A E A L F A A D V Q G L T$ KYQHAKALPPLEIVEAGHPVLDANSVAATARAIDMVKDLG

 RD GH T A P T R R I RVLLEASHPVM DNRNEAAARAMMAEVVAGLG PK GTP G N L R K I R I L E S T H P L P T E A S V N A G L K I L D L L S N V R
 P A GS STP L S NLQ II Q GGRNLP DSNSMMAADS IMKMAN S L D D P V D TERRVTVLEGGDHPVPS QRGVESTRELLLAAAADAA D K Y G H G G D V A GMMHI I E S G H P VVP D E K S L E A GKA ALLD L V H S T T P H GVD Q F L K R Y T I YE GANNI P DEESLKAT K E IEEEMAS NLK PAGTADAPPDASVMPGSHPVPDERSVAAAAAALRRLAALK
 RYGYGRPCQGUEI VEASHPVPDRSGVNATRRLLEDAGGLG


 $R Y$ A H GMP A GRI R V I E A G H P V P D A A GEECAAAAA I LA QV R A L T
 K Y E H S Q S $\square$ P GME I I E A G H P L S D E N T I K G T E K A L A L A E S L G $P$ K G $\quad$ Q E A G G L


 R Y G H G Q I C D H D

 K Y GHVVK E DP G V A C Y E A G H P V P D A N G FA A T Q K A L E L V Q G L T
 PRGMTGNVEGLEVVVEGSHHPLP DEWSLRRAGRRLLE WAGSA G $R Y G H A V P A G R D T I L Q A A H P V A D E M S E S A A R Q V V E A D Q G L T$




 R Y G Y A R P C A G I E I V E A A H P V PHGGQQENSRI RVME GAHNLPDVDAQEAAEEV KNLAS QL T K Y G H GK K F P P L E I L E A G H P I P D A N S I L G G K R I L E L C S L L K
 $P L G \square Q K P H S R \square Q V I E G A N N L P D D P E A L R G A G A \square Q E L A Q G L T$ RHGYGQDAPGI HMVEAGHPVPDEAGISSATEALRLATEAG
 $P K G G L K P H S R V K V F E G A D N L P D R D A L R A A L A D Q H L A E G L T$



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UniRef90-A8TJ31 UniRef90_G1KFJ3 UniRef90_X2KAC9
UniRef90_M0IS50

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ADDFVL|F|LV|S
GSALEALP E GVILD DLQAVNEQLLRS G



 PSDHLLVLVISGGGSALLPAPPAGLTLADEDAVVNEALLASG P A D R V L $\quad$ C L

ERDTVLEL I S

| $P$ | $D$ | $D V V Y$ |  |  |
| :--- | :--- | :--- | :--- | :--- |
| $A$ | $D$ | $D$ | $V$ | $V$ |
| $P$ | $C$ |  |  |  |
| $L$ | $V$ | $S$ |  |  |



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A D DLL L L VL I S
PADRLI ALISGGGS
 A G D E L L F L I S G G G S A LVF K K P L P G G L





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| P |  |
| P | L |

LPAPLPP




$\left.\begin{array}{ll}L \\ L A & L \\ A & A \\ L & A \\ L & A \\ A & A\end{array}\right)$

| LP |
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| LS |
| MC |
| L | LMAPP


LF VSPAEG
TFELLQDG
LLPAPIPP

| NWIAPAG |
| :--- |
| $M V E S P A G E$ |

LPAPAQGU
 ${ }^{\top}$
WAAPVPD

S |  |
| :--- | :--- | :--- |

 LLQSUTEVLLETCG KlREVVNVLLKSG TLADKQ KQAITASLLHSG
$K V E A T S A L C A B G$
$K$ K

 RMVTAEELACG KMAVNAALLASG IS WNSKLLASG KAETNRVLLGCG D ㄴ K

$\qquad$ TKMLASRG | $K Q A$ | $T$ | $R A M L R S G$ |
| :--- | :--- | :--- | :--- |
| $K V T$ | $N R L L L N S G$ |  | LPAPADGVT

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UniRef90＿A3VAZ9 UniRef90＿G4Q604 UniRef90＿F0GY30 UniRef90－Q1AS62 UniRef90＿UPIO004785CA9 UniRef90＿W5Y572 UniRef90＿V6IVZ5 UniRef90＿Q1ISV4 UniRef90＿B3RWV9 UniRef90－D2RV98
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AN｜VEVNAV｜RKR｜L｜SLV｜KGGRFAQRAAPAR｜V｜T｜L｜A｜LISDVLGD
 ADI HELNTLRKHASGMKGGRMAEIAHPAVVNILLSDVVGD AP I SEENCVRKHLSLVKGGRLRQAVGPARLTLAISDVEGD MEIHDINAVRKHVSAIKGGNLARRAAPAAVTLVTSDVVDN
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 RPDMI ASGPTVGRPPPRADALAI IRHYGI K I P P TIAAF $R L D S I A S G P A A P D R S T A E E A L A V A A R Y K L ~ K L S D T I L E Y$
$D P S V I A S G P F H P D P S T Y A E A L A V L D R Y G ~$
 PLDVI ASGPTAVDPSTFADALFVIGKYGLTEKTPAAVTDA DVASIASGPSVPDPNADADLDEVVRALG DQDPBAADHR $D P S V V A S G P D S P D T T T Y E T A R T A L E T Y D V G D A P A A V S T H$
$P V E V A G G P T A V V A E D G S S P E A V I R R D G U W N A L P E P V R F A$

 PVEVI ASGPTVASTHSVQDCLHILNHYGLRAALPRSVKTV|
 PLDMI AS GPAVPDTSTRAQALAAAEKY DAAAI ASGPVVADASTワADAKA ILAHYK
 RLDMI A S GPTVPDPTTYGDALAVLERYGLRDSAPPRVVALL NPADVASGPTVADDSTPQQALALLDRYQI PLPDAVRRH RVDVI GSGPTAPDPTTFRDALDVLRRRGV EVSENVWRR
 RVEFIASGPTVPAYTNQADAIGVLTRHKIV DVLDELTPW


 DLSKVASGPTIPSRIENNSULRIFKKYNLSTDLDRRVQEN RLEYI T C

## D L R Y

PLIIAS G
F LA D
PVVAI AS GPTVAPLGTKTSARERLKQVGAWDTLPASI QNH
 DLDVI GSGPTVPDPTTLADARAVLAKFSVAPPAAVARA
 ALDY: T

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UniRef90

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250
ETPKTLD 260
260 PDSTLGSGEIHTIATPRMALEAAAARAR RETPKQLDNVGTVITGSVRELCTAARNAAE LANPA SEHSAGVAFAEGRFELVAAPGLSLEAAAKAAS
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 VESGAN
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I N - L PT

LERGTEGDLAETPTPDFARVETHVLANGLTALRAAADTAA LDRAEDETPKPGDPRDAGAAFRMIATPQMALEAAAAKAR
 LEAGAAGERAETPPGVLGHVDNHVLADAWTTGAAARDAAA L LNDP RNESCKPGDAAFARADFKI I ARPQESGDAAVAVAR $L A R D E G G V R P$ DDPRLA GQSAHLIATPRLALEAAADVAR I EACV APDPADPAFAGNEVRVIAASARSLDAAAARAR LESARKCDNEETAKRLDHVGVVGSVTEAKAGKRAAE LREG PETPKPEDPLFRRVTNVVCGGGRASVEAATRRAR L QQGCAGQQPETPKPGFARVQNVI $A$ A S NADAAEAAAEAGH LMR PPVASTLSPRNRYTLVSTPFMADQAAARTAR LEQGLKGDIEESPKELV NTWNYVIA SNMDVLTADANYAK LLMNA GPEKETPKEFPDNTYYLINTLPDSGDYAKKDSE LFS GKTCSD\AKNKQTFNNVQNVLI GSNKVA】HAAFEKAS LERGAADEDDETPGPDDPAFENHVVADGLTVLEAARDAAA LSRAEKEALKTETPKTDEKVVTDVLGDVSRLCSAAAEKAK
FASGTLD

LR
Li R Q GTSE TPDALPNVTNTVVGSNRLLLEAAQKHDA

ASGPMVADDPRLAGVQNVITAAPSQS AAAABLCL L EAGRDGEDPETPFPDDPRVTNLLVGDNATALEAAADVAR LSPAAQELLGQETPKALDNVTTRVTGSVRELCAAAAEQCR LMAGSRGDHPETDKPGDPTVQNILI GSNAQAAQAALIAAR
 $L Q A G A R G A V A E T P K P G S A H V C N T V I A T A H Q S L Q A A A G F F R$
$L$
$G Q P D D R V D Q V N A L D D V R M I A S P T L M L Q A A S G F A R$ LERGARGEYPETLKPEDPRLSWRLVGTVLDLCRAAAEALR LDTAASESDKPGDTRDGPITTHVIATPDLALQAAAQVAR LRAGAAGEIPETLKTLPANVRNVLLGNSAVALNAAQKEAE $L D Q \quad R P V R P P T P V R Q E F R L G T P A A A L E A A A A A A R$ LQAGEDGDVAETPDAAFDSVSVCVLADNFTAVSAAADVCE R
L D H S A ETPKQENP $\square F Q N T T$ LQMIATPGSVLRKTVDGMG

FARA DSDPHGPHTCGHVLNVII GSNVLALAEAQRQAE
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LEKGAKNEKLESSKK SK DENFIIANNSDCDEAMKKTAE
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LSQTVASES ADDNAQTHLIATPSLALQAAADAAR
L R R GAEGDYPETPDPCFRRVVNVVVGGCVDSVVKAAADEMR
L GRPTQRWRENKGESNTSRVLNTVI GSNSVALKQAGRRAR
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## LAT

PEVPPAQEDFPVDYRMI A TPQMASDAA AKVAE
LL DGGDGDHPETPDSAFDRTDVRILGNGRTALEAAADVAA
L GG S S VVAPGDPRLAGALTEVVAAPSASLEAAAEAAR QRPTMSRKTDQP EAPGHVLNVVIGSNSLALKCAGLRAR QRPTMSKENPKSTPFDEKRNSVESIGNVSQTLAHLQEECK

LSS SPTKRAAPEDYSHVCNVI I GSNALALDEAKRQAE
LNDP NNETPKAGDPAFARAEYRI I ARPDDALNAAAEAAR

LSQA D
LSDA K D S DPRGPPSCGHVLNVI GGSNTLAALAEAQKQAQ
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GRGYTP LTLLTT TLDCEAREAGRF LDAADARTVVRTEQKP LP P

 GLGYEPI I L GDAI E GEARDVARAHAVLARCLSHGLQPGDR EAGYRTLVLSSSRLRGEAREAAKVHAGVAEECHATGTPDEP A QGFAAACLTS TLQ GEASQVVGLVLGNILREAALHGRPLPR KENLNPDI IVDEKI D D DVE VVCKNLLQFCKE KK R Q GIE AV I L S D S I E G E A R DV G S V H A A $\quad$ AA R E VA T R D R P F R K


 $K L G F V P F I L S S S L E G E A R \square M G N L F A H L A K Y C C E M A \square N S ~ Q S$ NQEVEVLYLGDRIGGEAREVAQVIAGIALFQQNRHQR SK
 D HGYTPLVLS S RVVRGEAHEAA KTHVGMAEE DRATGTPDDP
 RAGVNTVI FGGDDIDGEARDVGARHARAADKYASGECDVKL N M GYK T I I LTTS RI E GE S R EVGY A LLA S I T L D C DN K G L P P I S P E A GYE PLVLS S RI R GEATEAALSGLLAIAEECAATGTPVEP
 NAGYEVV ALGADLEGEARDVAAAHAQDALKAHAEGR $\square L G F G V E R N A D W V K G E A Q E A G R R D F H K A L E \square R Q D K S V D K$ H H GVT PVI L G D SI E GEAREVARVMAGDARQAARHGVPAAA
 DEGYKTDILTTGMDCQAKEAGY\|LSSIAKSKSAYKE E LG Y GA LL L STT LTT GEA RGAAAVVAAMVREASLASGNPSPP RLGFR P L L L T T Y L E GEARVVVGGVLAAAIARE IVAAARPDAR EL GLLATLVLGDA LEGESRDAGTLMAGMADSARQHGMPVAG

 HS T TVCGEAKDVGKTYCQMLL ENGRLCR ERGYE T LI L S S RI R GEARDAAT THVAVAEEVQATGTPVST HLGYETEILAAEDLNCEARQAGSF LAAAIARKRGRDN
 $N Q G V G S L I L G D T F E G E A R E L A R F N A S V V R S V Q A Y G S P A R A$ E LGYVTVDVVDGWLDGDVA DAA QR L R E L L R R NHSS G G
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 DAGFNAML LTTY L E GEAREVGHVLAGIAREVATSGHPLAT


 Q A G DE P TL L G DA LEGEAARDMGTVVA GVARYAAKAPSPDHR

 KAWGSVASL GADLE GEARDMGRAHAMMAVTA N N

 $N$ L GYEPVLLT D QLCCEAREAGSFLLGSIVRTQAGQG


 R R GYSVVVALTS GVVVGEA RTVANLVAAVVARDVVVRHGVVPHAP


 A A GVTP VVLLGDALEGEARELGDAMAGDARATATHGTPARA E R GYEPLVLAAS GVRGEAREAA LTHVAADAEECREHGSPVVEP


 $G L G Y V A L I L S A A V C G B D G H V A A L Y C H L I R L L A L R G L G P E B$ AA GYEPI LL GADLE GEAREVAAEHAAEAKRHKAA GR
 $L L G Y R A V V L S A A I Q G D V K S V A Q F Y G M L A R V A G A H L T P A Q S$ DLGYRTI MLL GDDLE GEAHDVARKHAEMALEAKAK GE
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 EGCFIF GGEATVNVAGK PVLILSGGETTVTLRAK $P V V L L S G G E A G V T V R G$ PLVLLSGGETTVTVTGK AFLAGGETVVHLTGSG PAAVLAGGETVVTVRGN KMAVLAGGETVVHLHGR GlCIVTGGETTVEIKGT PLLILSGGETTVTLNRQQ PCVILSGGETTVTINKAR $P V A V A \operatorname{GGEPTVRVAGT}$ PAVVLSGGETTVTLSTGS PCLLLSGGETTVTIKGPA | $P C V L L S G G E T T V$ |
| :--- |
| $P V A F I$ |
| $V G G E T S$ | $P A V L L S G G E T T V T V M G N$ PCVLLSGGELTVTVQG K A AVLS G GELTVTVRGN



RLAYIFGGETIVKIKGN $P C A L L S G G E L T V S V R G$ $P A L I \mid A G G E T T V T V R G D A G T$ GKGGRNSEFLLAFALGDEGLAG GKGGGRNQEFLLWDAYCLDEGGV GRGGRNAEFLLGAALSLDDVPG G GGRNQELALSAAAGIAGEDT
 GKGGRNQEMVVSAGLVLNDCDD
 G $\square G G R N Q E L A D R F A$ LLNEKRPW GAGGPNQEFALSAAI ELDADGI
 GUGGRNME LALSWGLKUSENRT AGRGGPNSEFALALARADDGAPV $G R G G P N Q E Y V L A L A S L L F A D T A G$
$G K G G R N Q E L A L A F L D E M K K E G I I$ ARGGRNVEFLLADALELDAQPG

 PCIVI STGETTTEILDNRGHGGPSQELTASFAASIAAVPG RVCLI S GGEVTVKVTGEAGVGGRNQQFALYCATKIADEDI KVCI LSGGETTVRVEGS GVGGRNQEFALSASVQMKKCPA PAVILSGGETTVTVRGDGA GGPNQEFATSAALDLKGGG PRALI LGGGETVVHLKGEGGKGGRNQELALLSAAVGMEKVDN
 PIAAIA GGETTVVLRG GGTGGRNQEMAMRFAMLAEAEPW KLAFLA GGETVVHLTG HGLGGRNQEDALASAPLLDGLPD $P V L L L S G G E C T V T R R G D G V G G P N A E F V L A A V V A L K G H P K$ $P A V L L A G G E T T V T V T G D G G Q G G P N Q E F V L S G A L T H D G D A$ KLAFLAGGETVVHLTGQGDGGRNQEDALAAAPGLAGLENA $P A V L V S G G E T T V T V S G D$ GCGGPNQEFVTSAALSL EAGLD
 $P V A L I S G G E C T V T M G G N E G G R G G C A E F L L S L A L E L D G M P V$ PLIVLSGGEGTVTIGRVGRGGRNTEFLLGLALALQGERRV PCA 1 LGGET VVLKGK GKGGRNQEIALAAAEGIAGDAN $P L F L L S G G E A Q V R V V G R \quad G Q G G R N L E F L L A D Y A H L E S P D L$ PHVLSGGESTVTLRPTP

 $P T$ TV $\operatorname{SGGESTVTVGTPC}$

$P \vee C L L A G G E P T V Q L Q G S$ A TCLLA A GGEPTVELTMK K A YI A G GETIV HLTTGKGL
'
PAVLLAGGETTVTVGGGG
$P F A L V A G G E T T V T V R G R G$


RVML FS GGE LTVVTVGKEY
PAVLLSGGETTVSGIGNKP
PILLLSGGECTVTRRGD
ATCLLA G GEPTVE LTTGM

$P V C L A G G E T V V R L R G T$

H
$P \vee C L L A G G E P T V Q L Q G S$
$K \vee A \operatorname{MSGGEDTV} \operatorname{T} V R G N$




UniRef90 UPI0003748520
UniRef90-R51N33
UniRefefo-P70788
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UniRef90 UPIO0037B66A1 UniRef90_UPIO003701312 UniRe90_UPIOOO3A8FC64

10 20 MTLRDTADQ\| $\square$ RASLRAVQPDAAVQRAL
$S P Q T V A L D C D H A G \prod D A A R P R H V V R R T L S R D G T T L T V$ MTPRAILLDLFHTAVAAAQA $V T A A H P R G C L V P E L P P$
MREDAYK I IKETLADCLPDKAVRDAL
SPQSTLFHLGGMAI RKSLPGAAVRKFL
MTDKRTLLRALFDAAVSAAHPDKMLRRHLP
MSMDTRAREVFAAAVEAVQPDTVVRQSDKRKEDSVVI MTPDERRQLLRRAFDAGVAAAHPAVCIPAHLP

LK NYVKLVYKNCVESVNPKI LI SQELQKKGNSLIL
TTAHEVALECLLA GI EAARPGERIAETCTVSNGELTV LARSPAHEVALDCLTAGI AAADPAQLTRESVSRDGDTLII MRNDQAAT LEDIFKQAVDSARPGPVVPAALPQKP

LREDALE VRRAI DAVLPEAAVREALGBGREDA

DGDRLLV
LRSDADATVAGALRDVLPDAAVEKALT
MMRDLARDSQAIFSAGVDAVRGETLMRDCVRLESSELLL SDAKKIIHNAI QTSLPDEAVKKF
$\square A N T E V K K K A L R I L E A G L T A A Q P K N L L K T F V N K N Y \square L L G K$
S SREHAAAI FRAGI AAADPYLAAVKHYLRVDSEALHD KSFLIDLFTTAVNACKPSACMSKYL
 DFLESLFAAATAAAAPARCVPPHLPDDRH
$\square A T T D A R D L A L E C D E A G D A A G H P R R V I R E A V S D E G D T \square R V$ MNDEQARGIVENVFRAALDAAMAGPAVLRHLPEKPQ LVLGALEAAVDSVMPAALVKHAVKFEKEVRD I ADAKAIFRAAVRRVQADRLLNST DPDAW MRNAQAAE ILQDDFQRAVDSARPGPVIPPALPEKP

DPRALLEATYHAALQATDAGDLVRARL
$S M A L Q E Q A W Q L F E G A V N A V M P G P M L$ RRALALDTGQLKV
TALRRLALSI AEAGI AYADPGNALPRFVALEGDTLVV

MEDQK\REDARKI MDAALHAALPDTAVEKALAEMP $M M S L Q T D A K Q I F W K A V S A V L P P N M L G R N V A V V K D N G L Q C$

NPRELLLGSFRAAVAAAAPAAVLPAHLPQ
MLNCETKHFLRLIFKSMVQSVKPRELIRSQIKVFGNTEI L
MDFHSPQS LLFHLGR $\square$ A $\square R S S L P A A A V R K F L$
$\square A R T P T H E A A L D C L A A G I E A A L P E R L I V R D A V S V R D G T \square R \square$

 MRSSRDLLELFYRDAVAAAHPSVCLPPVLP MTDHRPLLRADFDAAVARAHPDRVLAQHLPS
$\square A T S E A R E I A L E C V E A G I V A G H P R T V V R D T V A L E G E T L R I$ MALAEQARMLFENTIVGAVLPGPMMHRALSLDDPGQLKV
TESRRIVLDDTEKTLRRLDARERIKS IMKLDGDTLHI MGPARELATKLFHAALDRADPYAAVKGQLARENR

ESRKKIT E L LERMWAKVDAY HLI K E LLMSVDGNRDT D $R V Q L D A L L S T A L N A A G V E G K L E R F L P S V P L$
MNLTHLKHLARTLFLEGVRAADPKSAVQRALTAEP
MTDRRPLLRALYDAAVAAAHPSTILAPHLRPAP
MEALLKEAFDEALRATDPYRLTAKALPPWRPDL
MTGHRKLLHA $\square F D A T V A A A H P D N I L E A R L P P A P$

MRRRALLSAMFDAAVARVGADRCVPPNLPPRP
TARAALRRVFDAAI RAADPRAMLAGHLPERPSGRVV
LKEAARQAFKAAVQRADPALAMRAALVRHPP
$M V T L R Q Q A E T V W R A G V D A V D S A R L V V Q S L R R D Q D W L Q \square$ AESRAVLRRLFDAAVASADPAAAVLRHLPEKP P DHLVVKKTI QRCGNQLIQ
MRENADEDFRHALDAVHPERAVSS ILRMDGDQLVA
 $S \square N$ KK S DATE

LK A NAVEAYRAAVERANPFTAVQSCIKKNGDPTPK



## ELLRGALAHALEAVDPARVLGAHLPP

MMNLRSDADGDIKEAL GAVDPDAAVRRAL
AHANLKSDAEKMFKYS $\backslash K S V H P Q Q M I E G V L H F N R A T \square R V$
ADSPAHELALGCLEAGDDAAHPRRAVARHCSVDDGTLTV MNEKSRGFLRELYDAAVAAAHPDVCLPPHLPE APVDPAAFLRRLFAAAVAAADPAEMLARHLPERP



UniRef90_UPIIO003748520
UniRef90 R51N33 UniRef90_R5IN33
UniRef90_P70788 UniRef90-E7QVYo UniRef90-UPI00034B2F46 UniRef90-B0ULQ1 UniRef90_F7KES1 UniRef90_Q04S94 UniRef90-D6V3W6 UniRef90-V2J782 UniRef90-UPI000381533A UniRef90-R4FMF9 UniRef90-M0A6E4 UniRef90-U1NZX3 UniRef90_MOM9E6
UniRef90_UPIO002554829 UniRef90-D4M7W0 UniRef90-A0A023F7L8 UniRef90-G7QNH9 UniRef90-B8G8V8 UniRef90-K9CXD8 UniRef90-M5UAY3 UniRef90-R5A913 UniRef90-B3TCM9 UniRef90-UPI00037871D6 UniRef90-W1Z514 UniRef90-T1AJI6 UniRef90_UPI00047BB580 UniRef90-A0A011NQH1 UniRef90_L9VR60 UniRef90_A4XFC3 UniRef90_KOIHV6 UniRef90-D5H9G4 UniRef90-E6WMD0 UniRef90_UPI00036BE9DF UniRef90_F6UZ82 UniRef90_UPIO002E65E38 UniRef90-S3UXX0 UniRef90_UPIO003805758 UniRef90_R5ELF7 UniRef90-F7EB67 UniRef90-Q3SLM1 UniRef90_UPIO0037D67D9 UniRef90-M6CRY8 UniRef90_B9LSD8 UniRef90-N2BCZ4
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110
120
 KYGHSRP $\mathrm{K}_{\mathrm{G}} \mathrm{PL} \mathrm{L}$ I FEAGHPVPDEAGLRAAQAALELTRGLR RYGHAVPSGRIR DEASHPVPDDMSVEAAVRVI GAVRDLG RYGHAVPCRHI RVLEAAHPFPDENGIVAAREIRAALAGLS RHGYGEPAGLIAVVEAGHPVPDQAGIDATRRSLACAASAG
 RHGHAVPTRRIVVIEAGHPVPDEASVRGAEKALALAAEAG
 RHGHARPTEWI KVIEAGHPVPDAAGLQGAADTIALAEQAG PEGUISPPKIIKVFEGAKNVPDEKAFMASKSDVNIIKALT D N P V F S D $\quad$ D DDP AETDRVDVLRGDHPVPSERGVEATRRLLDAADAAG



 PEGCDQDPANIDWRPA GLNEPTEASDRGTDRILEWVHGAG K Y N H A K Ell P D F T I L L A A G H P LLP D E N T I L L G T Q K I M D A V S G L T P K Y T K S S I K K F KVVFY S G H P L P D K E S V RAAKAVQK FVVNCS NYDNDDMVENCQVFGAGHPLPDAAGLHAAKTVASRLRDCK
 ARGYPRPRHGI R CVVWGSHPVP DRRRSRAAGRALLLDYVRA VP $P$ Q LP QK R N WRI R Y FTGGGHPLLPNRDSFEAAETAL K LL K RAR

 P Y G $\square$ K A K $I \mathrm{~K}$ GI S I T Y A S H P V P D R S GME GT K K I L N V L K K V Q PEGYPEHLPASAVVEGGHPLPTETGVRGARRIVEQAEAAG
 P K Gli R K P H S H I Q V $V$ F E GA D N L

 R H GH S VVPA G R

$R Y$ A H GCATTTRDEVVEASHPDPDSRGEAAALRMLEMA GELGG PEGHLT DKSNYKVVGGRDNIPDMNSYHATEEVMKLIDTLTV $N$ EVSSDETDRVQVFKGSHPYPDEDSUSASYELWQL AS NI P


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


## K

 NPENN $P \mathrm{KG} \square \mathrm{R}$
D DP REVPE LTVYA GTHPDPSHENMTATA DLLNSADRYD KHPTDGD RVVRCVTGDHPLPSERNVRATTDLLELVAAAD RYGYARPCAGI E IVEAAHPVPDAAGAAATARMLDLLRDLS $R Y G H L D P P E R L E V V E A A H P V P D A A G V E A S S R D L A L A A A S L D$
 PRGGQEEPNTKILVYE GANNEVDEASHNASKA ILLSLVNK LT RQEELPATEDLRVMAGTHPEPGEASVRAGKAAFQAVQNLR
 RYGHAVPTERITVVEASHPVPDVAGEAATREVLAAAGTAG


UniRef90_UPI0003748520 UniRef90-R5IN33
UniRef90-P70788 UniRef90-P70788
UniRef90 E7QVYo UniRef90-UPI00034B2F46 UniRef90-B0ULQ1 UniRef90-F7KES1 UniRef90-_Q04S94 UniRef90-D6V3W6 UniRef90-V2J782 UniRef90-I3J7Z1 UniRef90-UPIO00381533A UniRef90-R4FMF9 UniRef90-M0A6E4 UniRef90-U1NZX3 UniRef90_MOM9E6
UniRef90_UPIO002554829 UniRef90-D4M7W0 UniRef90-A0A023F7L8 UniRef90-G7QNH9 UniRef90-B8G8V8 UniRef90-K9CXD8 UniRef90-M5UAY3
UniRef90 UniRef90-B3TCM9 UniRef90-UPI00037871D6 UniRef90-W1Z514 UniRef90-T1AJI6 UniRef90_UPI00047BB580 UniRef90-A0A011NQH1 UniRef90_L9VR60 UniRef90-A4XFC3 UniRef90_KOIHV6 UniRef90-D5H9G4 UniRef90-E6WMD0 UniRef90_UPIO0036BE9DF UniRef90_F6UZ82 UniRef90_UPIO002E65E38 UniRef90-S3UXX0 UniRef90_UPI0003805758 UniRef90-R5ELF7 UniRef90-F7EB67 UniRef90-Q3SLM1 UniRef90_UPIO0037D67D9 UniRef90-M6CRY8 UniRef90-B9LSD8 UniRef90-N2BCZ4
UniRef90-M0B3V6 UniRef90_UPI0003661DBD UniRef90-A9A4M9 UniRef90_J5PJR2 UniRef90-W3RJY9 UniRef90-l7BR25 UniRef90_S7MM50
UniRef90_UPIO003751F03 UniRef90-G9PTZ7 UniRef90-A0A037ZJ92 UniRef90-R5FG72 UniRef90-UPIO002DDD417 UniRef90-C7D7M8 UniRef90_G7DK66 UniRef90_UPIO003B794AD UniRef90-A3WRM2 UniRef90-D3P9M0 UniRef90-V4JHXO UniRef90-W0AFU8 UniRef90_D5RGL4
UniRef90_Q160B7 UniRef90_UPI00029A9FE7 UniRef90_B9JN14 UniRef90-H2XUG1 UniRef90_UPIO003B6D60B UniRef90-F9CXR5 UniRef90_UPIO00359F3C1 UniRef90_UPIO00371F735
UniRef90_UP1000367CCD2 UniRef90_UPI000474D799 UniRef90-F7IB60 UniRef90-U1NQC9 UniRef90-C7P4S6 UniRef90-W8SKT2 UniRef90_D7CW89
UniRef90_G5GN89 UniRef90_UPI000359B3A0 UniRef90_C1D215 UniRef90-M1XPF3
UniRef90- V4T997 UniRef90_V4T997 UniRef90_UPI00037B66A1 UniRef90_UPIO003701312
UniRef90_UPI0003A8FC64

130
G G G S S 140



 | $P$ | $D$ | $D$ | $L$ | $V$ | $L$ | $A$ | $L$ | $V$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $K$ | $S$ |  |  |  |  |  |  |  |
| $K$ | $N$ | $D$ | $L$ | $I$ | $F$ | $V$ | $L$ | $I$ |
| $S$ |  |  |  |  |  |  |  |  | $\begin{array}{lllllllll}A & D & E & L & L & L & L & V & S \\ P & D & D & L & V & L & A & L & I \\ S\end{array}$ A G QHL L V L GS

$A D D L L V L I S$ A G D $\mathrm{E} V \mathrm{~L} L \mathrm{GCF} \mathrm{C}$

A
H
K
S






| $P$ | $D$ | $D$ | $H$ | $V$ | $T$ | $A$ | $L$ | $I$ | $S$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $P$ | $G$ | $D$ | $L$ | $F$ | $I$ | $S$ | $V$ | $I$ | $S$ |
| $H$ | $D$ | $D$ | $L$ | $V$ | $I$ | $A$ | $L$ | $M$ | $S$ |

H
K

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

$\begin{array}{llllll}A & D & D & L & L & V \\ K & L & L & F & V & Y \\ Y & L & L\end{array}$
 $\begin{array}{lllllll}A & D & D & L & V & M C L & L \\ G & E & D & L & V & L & A l \\ L & S\end{array}$

| $S$ | $D$ | $D$ | $V$ | $V$ | $A$ | $A$ | $L$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $D$ | $N$ | $D$ | $L$ | $C$ | $C$ | $V$ | $L$ |
| $P$ | $D$ | $D$ | $L$ | $V$ | $V$ | $A$ | $L$ |
| $S$ |  |  |  |  |  |  |  |


| P | $D$ | $D$ | $L$ | $V$ | $V$ | $A$ | $L$ | $I$ | $S$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $E$ | $S$ | $D$ | $L$ | $I$ | $L$ | $S$ | $L$ | $V$ | $T$ |



EKDLL I VLCS | $K$ | $D$ | $D$ | $Q$ | $L$ | $F$ | $L$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $P$ | $E$ | $D$ | $L$ | $F$ | $V$ | $V$ | A D V P V V FL I S

## G G G S

AET LVIVGIS G
A E TLLVLPVVTGGTSALLTAPA G D
EDDFVLAALI SGGASALLLTAPAGEVITLTELRETTALLLDS G
 A E DTV L F L L $P$ E D

|  | $D$ | $D$ | $L$ | $V$ | $L$ | $V$ | $L$ | $L$ | $S$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $S$ | $D$ | $D$ | $V$ | $L$ | $A$ | $L$ | $I$ | $S$ |  |
| $P$ | $D$ | $D$ | $L$ | $F$ | $I$ | $A$ | $V$ | $V$ | $S$ |

140
150
160
PE P |L S L L E D|I Q A T T S LLL L G A G








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

 $M Y A K E A K Q F L N L C V E Q A L Q A A S C V V Q L Y E E Y P K Q A P K G K V$
 MSDVSARAFLDRLFSAAVAA $A H P S T C$
$V Q P D S V V$
 ATAAAFLRGLFARAVEASQPGARIP
ATRSPRDTARQLFMAGVAAADPSGAVRRALQEAP
MCDNK TS DALLE I IDA G LVAA QPKYF LRKF IKKNK L LVRS AESPRALLRAMFDAAVAAAQPARCLAAHLPP
$M D P A P P A K F L R A L F D R A V A D A D P M R S L A Q H L P P R P$
LS A P E A L R WL R GLLA D T AVVAVHP D D L L P
SMALLAE QAWQLFESAVGAVLPGPMLHRALSLDPRQLVKV LR A L F D A A L A A SLLP D GRF E GRLLP L A P
LE T S P A H A VA L D CLLEA GLAR GA DP E T A T A S A V T A A D D T QLR $\square$
S ALKLQ G D QLLV
LKAFAEKVFQQALSAVDPERSVREALQLTERFLVV L H GVVLDD SLLEAAL E HVVHPS S VI P R WV R F D S G C V K V M H K I A F E S I S K GL E S V SA Y N S L K S S C I I DE D G C L $\left.\begin{array}{rl}L A & S P P A\end{array}\right)$
 E L R S E AL A L Y R A A V K A A DPRRLVV DRALE E
 SATPQECAVTAVTAGVNAAHPDQVLSETLTREG

$M D L E R A R A D V L A \square F R A A L R R V D P E A L V R D A L V L D G D A G V V$ MNPREALTTAFRAAI QAGHPTRVLRDVVL MSFAEKGNLMRAMFARAVQAADPNQFMPEALQ

$$
R R \square A R E C A E A G \square E A A H P A S \square \square R E T V T R D G B E L R \square
$$

VEPGAAVRAGLQLQAEQLRV
MT DHRKLLRS IFDAAVAAAHPDGILDAYLPRAPKGRVV

$\square A S T D A R A A A L D C L A A G T E A S L P E R L L P S A V T V E S D T V R V$ ASDPARELALDDCVTAGVEAAHPAGVVADALAVED GRLVV H P R L CLL P Q HL P
LRK L $A \square E V L E K A \square H A V K P Q N L I G K A L K \square K D D V L F \square$ MPAGSLLKDAQAMFSHGVEAVLGDRLIIDSVSFDETAMRI MDAAA I AKFSE QLIA TAI A SVDPQRAVLQALDWDCTRLS C


A GI EA A HPRRVVRSSVSLDGD DLTI MS L WEHGLHLFRSAVGVVLPAPMMRRALAL EGTRLVV S V V D K IL E Y A D P Y N A L M E K V K V E N G K I I V
 $M T D R R P D L R A G F D A A V A A A B P D R I L A A A H L P B A P$ MTSRKVMK T AF ERCLKA VNPREAVEKA IT DT PTHLDF

$$
D P G L A L T D C L R R T G
$$

 ARS QLLUHDFKAGVASVVMPADLI EKKVRLVDNHLVV MEAAAKTIFFSAGLEAVKPGNLLHHALELQKCAGED A E L R EHAK DMFAAAVKRADPEE GVVRAQLAVSP
DCATAESTLLDLFGSVLDCCDDGRAFDRCLPRLEDMMVGLV



MS S GREDALDTFRYALNASRVAAAMDRRVRFDGATLTIT MPSPRQDALSIWNAGVDSVRARERVLSQIQLESDQLCV

LLASTPERALDALDCDETAVEAADPETATLAADVRRDGETLLTVV MAK R Q T WE QMRQ I FVVQAVNAVHPEKVFADF QKF D D I S I K L


M N D T N A R K H L LA $\square Y$ YT A LDAVNGHKVVAA Y L
$R$ QL L R E A F G K C I E A V Q P R P I V R D A I K I S A D H I K I A ESKS DLS D $\square F R$ S A V K A V S P N E I I K R R V K L R N N T L Y V

T A D R R T A A VD C LT A G ID A A H PRRRVVEETVT LDGRTVVV MAKK QA WTHMRQVF Q Y AVNSVHPEN| FANYNRYDRVYI KI
UniRef90 K1Y6Y5 UniRef90-H2UF55
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| UniRef90 G5ZZH2 | UniRef90 A9D007 UniRef90_U2YRX8 UniRefofo-U1N4B3 UniRef90-E1IEQO UniRef90-L9XBC1 UniRef90_B7G663 UniRef90-WOSLQ6 UniRef90- X7EF60 UniRef90-UPIo0037B26FC UniRef90-MOP5K0 UniRef90-MODPY2 UniRef90-UPIoo0474EBBD Uniinefon - XorXZ1 UniRef90_F2AU30 UniRef90-A9AVP9 UniRef90-F2IWJ6

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AGVDLDAYDRIVVLGGGDAEVDEALVVT ALPPPPANGRLILLAAGKAAGSMLEVAEKHYLDEAGEGVA DGRSFRLSNNLHLVGCGKAVLGMAAEAERUVHLVQGLISVV
 KTПSTSKFRRПYLVSVGKAADSMTEFACTKПNFDGGПT川! PPRGRTVVVGAGKAAAAMAQALETHWPGESGTVVT AGRVVVVGAGKASARMAEAVEAAWGPCDGLVIT GEDPPPPAGRTLVVGAGKAAAAMAATLERAWQAHEGLVVT RDRSFQLRQNVYLVGFGKAVMGMAAAAEELLHLVQGVISIT $K G R T L V L G A G K G A A R M V R A F E D A W P A P E G L A V T$
$D D R V V G G G K A A G V V R A L U A E F G D V L V D G L V$ GDQS品PDDRVLVLGGGKAAAGVVRADEEFGDVLVDGLV KGRAFPVKRDLYLVGFGKAVLGMAAAAEEILHLVRGIVNV RGVPHRLESQLVVIAVGKAAASMARGALAVLRVTRCVVVP RGAGGFCPGAVYVAGFGKAAPSMARALINVLGVEAGMVIG EDSGYDLNRRVFLESFGKAACDMAKFFAERI EVYKGVVAS GEAEYALNGRLFVVGGGKAAGGMALADERLIRVTAGMVVT NDDSYSVPGDVYVVGFGKAVLNMALEVENLLNLKEAVVSV EAPALAAARRVVMVSVGKAGLAMAEAARPHYRLRHAVVVT SGQEYKVDHNVYVVGLGKAVLGMARAVEDCLHLVRGVISV ANNQYDLSKYVSIGGGGNAAGRITOYATTVVHLTGGLVIT PKMPASPRGRLMVLGAGKAGATMAAAVDELPMRPEGLVIV VEEHWPGPSGLVVT RGTRYP ATRLVVA GKAAVGMARGATAALRDDRGI AVT PEVEGRTVIVSIGKAALSMASTVQQRLGGRAGVVVA SLLP
AEATFD $\square S$ DYVVVGGGNAASQVAAADEAVLGLAGG\|VT GGVAVD GTQHYNDTGRTWVVAVGKAAHPMAAAAAAVLRLHAGVIVA AAAMAAAAERHYLDAAGLDPARLT AVDEYDLDSYVVVLGGGNAAGRIASH GNLSLSDYDHILVVAFGKASSAMATALLERLTEIGGLVIV MAHAVEDHWRGDSGLVVT GRTVLIAFGKAAPQMMQAALARVEGVDALAVT
 ASRDLNGYDRVVVVGAGNAAGHFAAALEGLLRIDGGAVVT HNDPPANGRIILLAAGKAAASMTVVAEEFYESEYG|AVT ADHA $\mathrm{B}_{\mathrm{K}} \mathrm{KDDRVVVVGAGKASAAMAAGLSHVIRPVIGHVNV}$ GDWQWAGTGRIIVLGAGKAGAPMAAALESLLRDDRGLVVV GDATYDLSAYLLLVGGGKATGSVATVLADLLGDRLAGGAV GDRAFPVRRNL HLVGFGKAVLGMAAAAEEILHLIRGVVSV
 D GHS Y DLLS D R ClV LI SMMGKA A E P ML L S S F L L R R S GAAA E GV I V A $\square N Q S S V L K S K I I I L A F G K A S \square Q M A D G A Q D V L Q N \square E K V Q K K$


DEHRYS DDARVVLIADGKAGGTDTEAFDQRAGREEGGVVA AEHLLFSLADRIIVVGAGKAATAMAAAVGDRLPDKGWINVV RVRIVSFGKASTAMARSVAEVLSLSDGVVIVT
KGRVICLAAGKGAAAMAVAAERHYLDASGI ATT
 GDQRYDDYDEVLVVGGGKAAAGATRALESVLRLSGGVVVT QGHPYDL RRVQ1 GRTLVIGAGKAGASMLAAGMQRIPDVRGLCSS
QKHPYNTP ALIADGKAAYQMATGAYEVLQDTQALVIT GDTHFARATKIVLVAFGKASLLMADGAKDRLSAPKTLIIA DDKSFLLRENVYLVGFGKAVN


HRENQEPVAGAEVFRAGHPVPDE\|GHHAARRVRE\|LAETT PQGSGAAPGGFTVIRSSHPVPGQDSVAAARAVQKILHRRR
 PRCSKMHCNRSSVVEAEHNQPDANSAASTELIVVELVENLIT PAGTA $\square P M D N D Q I V A C G N N L P D D G S V A A T D Q L L Q T M H A I H$ NPENMCDLVGTTVIAGMHPVPDAASAHAGRCVIDBGLASR P R RTPESHMMDTEFYE GANNLPDEDACDNAERI ENMARRLDD PVLNGWSHPRFQTFEGGHPMPNTESMAAARTALTMMNGMT K H G H S R P L P P LT I I E A S H P V L D E T S L T A G H A I L E F A R R L K D D P V V T D RVA VLA GDHPTPSETGVESAREVREVAVDAG N P EN R A DVP G A EVVMA GA H PVVPD Q T S A A A G A R V L S L X X X X X $P$ E G TV $V$ GPDLP R L PA E G S E LL R R H I H V H P A G V NEP TAAD GVVFGTE Q L Q LVVR QA T K D GHATDDDYN I RVREASHPDPCERSVVSSAE E IMEVVASSSD
 KEPAAVEGVRNAVGDHPLPSARNAEATADLLARLDAAG PVNTLKQFQGLVVHEGANNLPDENALKAAREI KQLAEKMT



 HSDNWNEVPGATVLTSGHPDPNERGLKAGRQII ALLSAAR


UniRef90 K1Y6Y5 UniRef90-H2UF55
UniRef90
T11KW8 UniRef90-K2BQN6 UniRef90 A8PK64 UniRef90-G1UT37 UniRef90-UPI000363EA72 UniRef90-MONWW3 UniRef90-D7A7F2 UniRef90-W5LCK2 UniRef90 V4Y4D5 UniRef90-AOA059IIA9 UniRet90-B5SG69 UniRef90-V6AT82 UniRet90-UPIO003B3F2E3 UniRef90-C8S2U2 UniRef90-U7NNC6 UniRef90-F7B665 UniRef90-UPIIOOO477E5A0 UniRef90-G2MIY4 UniRef90-B6WSJ3 UniRef90-UP10003990726 UniRef90-B9L027 UniRef90-A2BJE1 UniRef90-UP10003B52D38 UniRef90_D8JZU4

UniRef90-G8NUN8 UniRef90_J9k550 UniRef90-AOA017HWJ6 UniRef90-UP1000359CBF4 UniRef90-Q09235 UniRef90-GOLH10 UniRef90 A7HUR2 UniRef90-I3TVZ1 UniRef90-G8QKL1 UniRef90 D1C123 | UniRef90-LOA9L2 |
| :--- |
| UniRef90 G5ZZH2 | UniRef90-A9D007 UniRet90-U2YRX8 UniRefofo-U1N4B3 UniRef90-E1IEQO

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| :--- |
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UniRef90
D3PNW1 UniRef90-D3PNW1
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UniRef90 E2AUU7 UniRef90-UP1000237A5EA UniRef90_MOAJZ9
UniRef90_B4JAU4


 SNDLFLVLVSGGGSALLSAPISSMSLDDKRKTINAMTSRG SGDLVVSLISGGSSALMNCPAEGMSVDEESRLTELLLTAGB

 ERTLVLAVLAGGGSALAPAP EGVSLGDLRETTERLLSAG
 PEDLLVIALISGGGSALLVAPPPGLTLADKQRVNAALLRSG

 PDDLVVFLMSGGASSLLALPAAGVSLEDKQALNRALLKSG ERTLVLAVVTGGGSALLATPAGELTVEDLQQVTRKLLDAG

 AGDTVVCLISGGASALMAYPVPG:LLEDKRRLTELLMGSG RHDLLVLISGGGSALLCSPDNVPLHDKILATNLLSSGG EDDLVLLLVSGGGSALLAAPPPGVSNDKVRLANALLRSG DGDLLVVLISGGGSALLPAPDAPVTLDEVMDVTRRMARAG

## V


A D DL MLVLV S

## A

ADTLV A A V
A D D L V F V C C T
A D DLLL VLL

| P | $R$ | $T$ | $L$ | $V$ | $F$ | $A$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $A$ | $L$ | $L$ | $S$ |  |  |  |
| A | $D$ | $D$ | $V$ | $L$ | $V$ | $L$ |

PDDRVI ALVV

 K E D L V L V L L S G G G S A N W I A P P A G N

 $P$ GD HVVVVL L S G G G S A N W




ARDVVLALISGGGSALLPAPPDGVTLPTKQALGQALLRSG



## P

## P



## 

 AGDLLLVLISGGGS PRDLCIALISGGGSALLPAPIPGUTLEDKLAVHRAMSSSG
## 


$P$ Q

A D DLL L C L L S G G G S
E H T

| E | $A$ | $D$ | $T$ | $L$ | $V$ | $L$ | $V$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $K$ | $Q$ | $D$ | $Q$ | $I$ | $A$ | $A$ | $L$ |
| $A$ |  | $S$ |  |  |  |  |  |
| $A$ | $D$ | $D$ | $L$ | $V$ | $L$ | $A$ | $V$ |


| $A$ | $D$ | $D$ | $L$ | $V$ | $A$ |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $D$ | $V$ | $V$ | $T$ |  |  |
| $D$ | $K$ | $D$ | $L$ | $F$ | $V$ |
| $F$ | $I$ | $S$ |  |  |  |





290
300
310
320
K LG YKAK ITTDKLLQGEARKVGLKILT

## UniRef90 K1Y6Y5

 UniRef90-H2UF55UniRef90-T11KW8 UniRef90-K2BQN6 UniRe90_-A8PK64 UniRe90-G1UT37
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UniRef90 G5ZZH2 UniRef90-G5ZZH2
UniRef90-A9D007 UniRet90-U2YRX8 UniRefofo-U1N4B3 UniRef90-E11EQ0 UniRef90-L9XBC1 UniRet90-_MG663 UniRef90-W0SLQ6 UniRef90 ${ }^{-}$X7EF6C UniRef90-UPIO0037B26FC UniRef90-MOP5KO UniRef90-MODPY2 UniRef90-UPIO00474EBBD UniRef90-X0RXZ1 UniRef90-F2AU30 UniRet90_A9AVP9 UniRef90-F21WJ6 UniRef90-U1QR38
UniRef90 K7FSY7 UniRef90-F4B6M3 UniRef90-R4VZL3 UniRef90-E3T652 UniRef90_B3QA16 UniRef90-A8XLQ1 UniRef90-D3PNW1
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UniRef90 E2AUU7 UniRef90-E2AUU7
UniRef90-UPIOOO237A5EA UniRef90-M0AJZ9
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 ELGFNALI YSDKFQGEARFVGKELMD KNGYQCHVVNTAVMEDANLFGFQLANTANMTSNNTAPYGD AEHLPVHVLTSGLEGDSRQAGMFLAAVAREVRDRGEPFAP NQNVDVWYLGDQUSGESKEVALVMAGIAKHIQASKAANSK保 ELGGRTVVLSPGVCGDVRTVARDYGLLSAYACABGKAEGWC ERGYEPVVLAAGVTGEAREAAHTHAAVARQTAETGEPVAP AEGLAVHVLGDALEGEARETGRVLAGIARQIVLRNQPFAR EAGV ARGIHTAVLGDTVVGGEAREABARVYGALARQDRQHGTPFAA AAGTPAHILGDSLEGEARELGVVLAGMARQVASRHQPFTP EAGCEVRLLGDALEGEAREVAAGQAAQALRLQAALRPGAA RSGREVRVGGDLEGEARELGRAQARLARSSEGGMGTR A 1 GLTPLVLGDAGEGEARDVARVLAAlGUYAAAHDQPVAK
 GLGYATLILSAADCGEVSRDAALYCQLVQLQAMRGLGPER AWGLPSVICGTRYTGEAREFGRFWAALARSVRSDRQPWAP EKNFEVMYL GSQI QGDVNCVADFVSSVAKEMLNGSIEDKK RAGYRAVI DDDGLNGDTEGKAVE AAAIRSGRYAGYD ADGFHVTVDMCDDWFVEEAARYLLKRISDGEESG KSGRRVLRVPGWLEGAVAQAAERLVALMREAADGG ELGYQSILSTEQEGEAREVSQMFATLARQLADVAKEMQR SSGYNSTIVTSSGSGNAAEIGKKFAEIDTEKSITSSHLDK AEGYDPVALGDAI EGEARELAAEHAKRVFQARAEGR
RLGLTPLVLGDRI EGEAREVARVMAGMALSARABGQPVRA AAGLTPLVLGDRVEGESKEVAKVMAGLALACQDHGTPLAP ERGYHAAVLGTRFAGEAREFARFWAELARYDRAGDGPFRP QHGWQARI WQENVTGPA WIEAAKAHAAQATFGHS QVGYEPVILGDALEGTSRDLAAWMADKARTA DAGYEPLVLSTRVRGEAREAAKTHVAVAEEALATGDPLAP
 DAGYEVLDLGADLEGEARDVAADHAKLADQARADGRTL RAGFEPLLLSSSURGEARAAATTHVAIAEEDRRSGRPVSP RLGYHPVILGTRTEGEARQVARWLVQLAQHLALPETPSKQ RAGFAARIVSDHLTGDVGDA AREVLTHLATPDA KQGYTTWVNSEPYEGSVMAVSKKDCSRADQVLSGNDLLKK DRGYEPLVLAAGVRGEAREAAMTHAABAEECAARGSPASP ERGYEPLVLSSRVRGEAREAAKTHAAVAEECRAAGDPVD KEGFDVEYFSSDIMGEAKDYGULLLQMIGDSALHNENFKK ALGYNHVMHCHRQEGEAESVGRHLADLTLTMLQADPAVHR AQGWQVI HDQQPITGEAQVVGQQVGQRLCQLA QSVQQ AAGYVAVLLGDSLEGEARDRAAEHARLAREMAGAGR
DAGYRTLVLSSRLRGEAQEAATLHAGITEECHATGTPDDP DAGYPSIVTSQVVGEAKDLGKFITASYYKSISQYSUPF K DAGFDSLVLSTRIEGEAREVGTVHAAIADEVRASGRPDEP ELLGWHVVVDNTCDDWSADKAATYLVDRLRDLRSAQQ TAGYEIADLGADLEGEAREVAAAHAQLAREARAHGR SSGFNTTVVTSSLSGNAAEVGRHFADLITGKTRDNRDLKY AQGYPAVILSDRFQGEARELARFHANLVQSDRAHGQPFRP EFGYEPEILS VVGDVSDAAGMIAARYRAAQE EGG
 DYDFDSAVLSSVVEGDVKNVSYAYAKLAHDACHSGLGKGK
 ESGYSCHIASTTAAQDATLFGEQLAGLIKSULGGTKPEDA RHGYPAHIVSAAVTDSVSSMAKRLTK ACEETQKGLASNE ARGYEPLVLSSRVRGEAREAAKTHAAVAEECHAAGEPAEP A AGWHVPDLVDDLTGDVSDAAQRLLNVATSAT EMGWHVEVDNRCDDWSAQRA RFAAMLLERLREDRGEQE RLGYNHIMHSATVCEPAEQVGREFAEMLVSMLRSN DKHR KLGYSPAILGTRFDGEASCVGGSLVAMADHLCNKDTMYPT EAGYDIIDLGADLEGEAREVAADHARLALQARANGR
RHGFHAALLTTTLRGEASQAGRFLAALLRQMAESGDPLPR AAGYEPVVLTSRLRGEAREVAKPIVAVAEEVAASGDPVDP RLGYIPCVVSCAVQGDVAQVAGDYQRLLHGI QEAKQHGIIK ARGLDPLPYGDPMQGEAREMARRVVALAKRHVEARRGDR D
 SSKFDVQUVTSSLQGNATEVGCQFADFIAGDQEDPVSGSL




 A $L S L L E A G L R A V D P A E A V R R S V R R E G E S L W A$ MSNKK LLTEEIVNQAKKAVKADTII RKNI TLDEKDLTI MMPNVYRQHLLAFYRAAL $\square A V N G R N Q T A N F L R$



MRADADAAFKRCCDAVSPYVCVEKALKDTDDRDTV QNLRHIFQRSVDSVRPAQALRPQLSEKDGQINI TENLRARAKSIFDCAVAAADPAEALKRTLVTHPLDIPA MTDLQANARTLFEAAVKRADPALALRAHLVRSP


TAALRADARATYDAAVDAVEPAKAVRAALERRP I RKVLLEVADRTLERI GADK II SENVRDENENLIV AKAQVLELTMERVLHRLDARKRLHEMMHREGSELVI

MTEMRTMAQRLFAAAVSAADPALAVRRHFQRHPDT
E LDKK K NLETLEKAINAVKPEKLMKEADMDQGSKLII
$\square A \square T K Q R A G V L D L I E T A F A S I Q P Q N G L D K N F V L E D P \ L K V$
MHKRALLESAYDAAVAAC KRPETII
MKDLHETAKALFKAAVDRANPATADATAFQKTPPEPPL

$R T D L L Q T Y R A A L S R V A G D T A V A D W L R$
MSSRSDIIKI YEAAVRACLPEEAVFEHLHEYAGALKS EVRKILEFSDPYLVLKEKVKIEGNKLTY


QMRRQAREVIVLTGVASADPAHAVEDALK
MAKRQTWEHMRQVFAQAVNAVHPEKDFADFQSFDGDCDKL


QNLKN $\square \mathrm{F} \square \mathrm{L} K \mathrm{~S}$ VESVRPHNLLRNNYNLEPRS DQL MREVLRGTFQAALAATDPGRLTARHL
MTGLLTTAKALFQAAVDRADPARALRAQLTASP
VNPKKLI KENLCLIGNDLLV
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1 RNTLIPMVDSLLRETRADKULKEKIKUEDNULKD MSEALRAVARQUFEKTLQAVDVRQAVKQQVVADAETLRLC

MEAF IDRLIAAALAAVNPYNADQNHLRLDGDDLVI


> MS A LRRRHASFLEHGTEQVLPNALVTKAVQREGDALRV ATDPRALARA QV YD A

SPAHE LIVEC $\square$ TAGVRAAQPKRAVERHCD $\square E G S T L R \square$

MS T LRRED DEALF DEGVRAATPKYLS LEFWNQHSDLKRT MAKRQAWEHMRHVFQGAVNAVHPERILHDFRPREQDQ\|KL TQTARARILDCLAAAI AAVDGREATRRAL

$M V S T A Y R Q N L L V Y E A G L E V K G H H A V Y Q A L M K Q D L$ MPASLRHAS IRI FEKAVQQVQAEAVLAQADLWD

KI IE K IL T F SDPY IALLDERVV DKKNE!IV MNDPRTRLLEMYAAGLAAVNGEQAVYRALHARGE
MAKRRTWEQMRHVFQCAVRAVHPEKILRPSAKNQSVYDKL MSTDPKALLKDMYFAGVNAVSPKTLMLNKVKFKDGILYV
 MTARKAVEAAFKACLKTVDPRTTVRDVI RLSD RRDVLA $\square M E A G L Q A A D P Y Q N T C R L L R R E G Q F D H V$ ARQLFSTALEDCSVQQAFSLKLRGEMTH GUC
LKK $\quad$ L $Y$ TILYYSSLENVAPEQLVKSAVHRTGDSLKC $N P K G Y A Q W L F T Q V M L R V N V P R S M R D S F V L E G S E L R V$ $L \vee R N S F A A A L A A G Q P D R \square T R S A F A A L D$

E LIFRSAVSAVLP $\square G M V R R S \square R V E G D T \square S A$
$M T T L L Q D A H A L F D S A V A R A D P A L A D R E T L R S T P L L P P S$ MSSLRSEIQNLFQLGISAANPFHFFPEFWNKNPELLQ MEE IKS ILKNMYFAGUKAVSPKTLILNKVKVENG』LHA

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UniRef90-СЗMQC1
UniRef90-G3GZJ2
UniRef90-H91U97
UniRef90-C7FPJ3
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UniRef90-WOTM18
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 QGKILDLTHKCHVVGFGKAVLGMAVQLEKSLNLVSGVLSI E GRTFLISDGKAAPEMLRALPHVVGERQALLVT


 KNYSDPLEGDPYVVADGKAASAMAGAARDRGARRGL VT GSRRHDLSRYRHVYAFGKAGNHMARAFEDLLYLTLGVTII NGEQVDIDKRCHIVGFGKAVLGMASKVHQDLGLSGGVLSV

 H G H RTIVLAVGKAAPAMVRTVLPRUDGPRSI CVT
KQQSFAAP AVVADGKAAPAMMAGASKVLRLVSGLVI T A $R V V V V A G G K A A G M A K G A E H S V V V E T T F V V V$ GNFSVTFE RPLLISVGKASYKMAKFFILERVKPVRSVVVT GDEELDLARHDKVVGAGKAGAGMARGFEQALGPKGGWLNV QGKTLDITRKCHVVGFGKAVLGMAVQLEKSLIRLVSGVLSI KEQLHIPGKRYHVVGFGKAVLGMAVQIDRILRDASGCISD GRRFNAP LLI AVGKAARSMAEAAMRQVDAARVIVVT NGEQHDDSGKCHIVGFGKAVLGMANKVHMDLYSAGGVLSV ADNQYDLSKYVVILGGGNAAGSDAQHLTTVVYDTGGIVIT
 ADWSGPGPARLLAF CNKALPEGGSNVLLAVGKAAVPMMREALDLIPGTQALAIT FDPDKRLTVFSVGKAALPMARAAESVLRUAKGLAVT KGNDVQLNESVLVIAIGKAAVPMFEAAAERLQGVRAVVVA NSYRFQFQKPL LLALGKASVKMANFFLSKLUNKYESLVVK

SDRVINTKNKDRCVAVGKASVPMARSLHELLRTPQGLVIT NNEKYPLQENVYIVGFGKAVMGMAVELERILTLRKGIVST PHLPPPPKGRTVVIGAGKAAAAMAEAVEAHWPDESGLVVT NNOQPGGRLILVALGKAAIPMILRAMAMLPPPDAI AVT GHPLVRPEGRTYVTGIGKAAGRMVATLLPHIDGPRALAVT EGSRFQFSKPD VISVGK HAVA $\square G K A A A$ MAQGARAGLGGKLKRALVIJT
GDGSYD $\square D A Y \square R\|L G G G K A A D G \square A A A D E G L L R \square D G G\| V V T$

PQVDCHLIADGKAAESMYQGAKNYLEVKSALLIS Q LPNGRAVRLLTIGKAALPDAAVAGRRLRLHGGCAVV DGNHFPYTKPA I I AVGKASYKMAKFFDDKLKDVKGLVI L RSPRHVAA GKAAEAMFSGAYRYLCLRSGLLI T


ENFELNFT RPLIIAVGKASYKMAKFFLDRVKPVQSLVVS WPDSSRIVVISFGKASIEMARGAIDSLRILRTVILA GNPDFEAEHHIYVVGAGKGVQRVVKALEEIIARSGGEVIAA
 DSKEYVLNKNVYVVGFGKAVY RMFCGLYY YIGIVKGILSV GEDRFDLRKRIFLVSDGKASVPMAEHADQTLALPLTGVVV RQPTAVI AL GKAAGAMAAAVRNSGYDGSGLVIT GRTDLI A UGKAAPRMLAEARAHVTPVVALAVT GGRRFPDRRNVTVVGFGKAALGMGRAAEELLHVVRGALSV A HLPPPPDGRVVVVGAGKASAAMAAALDAAWPGADGVVVT D G


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UniRet90 FOSM 25 UniRef90-FOSM75
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 PLGTTLQYSNIKVIEGAYNLPDPPAETAARELLQLVGEAS PPGALLPPLSLPVREAGHPLPDEASRSCAEEVARLLGGAR HQE GECRFIEHHTSTHPLVSQKSMEGADKLIEAMQAMG KYGYINQAFGAVCLESAHPVPNVDSLRAGEELLQFIHALD PKGDEGQVQGAEVISSGHPNPDRDSFKAGRVILNAVKSTE PVGTRVPRDPVQVYEGANNLPDDAAMVAAMAIVTLISRLQ PSEDRNPK $\square R S R V F Y G A H N D P D E A G L A A S A A L L E T V G G L T$ PMGTRQQFNNIDIIEGANNQPDEHAFVAAQRIKEVAASMT HYGNQADVPGVEII RSSHPLPDANG\|LAGNRVLELLETTR NPENHRPIAGAEVLAGSHPVPDQASAAAGCKVIEFLAPAK PADCDEPLKADTLHPAGLNEPTEAGVLGTEKYLQLVQGAS PKGTKGNENN VIEAGHPLPDENSIEAGKRIIELLTTE
 PMGSLDVFNKSRNVEAKDNLPDNSAQNTALKIVKNLITGLN NMANKAKLNRDEVNLASHPYPDARTLQSSQKIIDELLEEAD KTRDEEDVYRTEVYVGGHPLPNEEGIRGCQRMIIIAEQMG
 HEGNETETPGARVLTASHPVPNEAGLRAGREILAALDGAG HEGNETEVPGARLLTASHPMPNEAGLRAGREMLAALDGAG T DEAG FEKIEFTLGTHPLPSKENLEFTQKTIEQLSDLT RTGYGGPLRRIELVEASHPVPDAAGQAAAARCLALAESAG NPENLPDAGATVMAGAHPVPDADSVAAGECLRDAVADLT PKGTLKHYRHDKIFEGANNLPDEEAFNAAQEIRDIALNMN HRENSEKTPGAEIFRAGHPVPDSVGAAGAMRMQEVLRGTE RDGYALDAGPDPVVEAGHPLPNAHGLAATAKVVALAEAAG
 PHGSEGESAGLSDFYAGHPIPDENSVQAARTVLAFVQGGR PADCVEPLETDTLHPAGKNEPTPEGVFGSQSILEAAGKCG PQGTSERFRVIDVIEGANNQPDEQALEAAKRLKALAAQMT
$P Q K P A R R D R I R Y Y A G H P L P N D S F A A Q H A L R L L R R A S ~$ PQKPARRDWR RYYAGGHPRPNRDSFRAAQHALRLDRRAS NYENARPLDGAEMRAAAHPVPDFEGARAALLI KDALAGAK NOENARPLEGAEMRAAAHPVPDFEGARAALLIEDALAHAK DNPVDADP VDVVTGTHPLPSTANMTAAEQMRSYARDCA RYGHVPPAQRIEVVEAAHPVPDAAGMAAAQRMLDLTAGLT PKGSQQQFRVFRVFEGANNQPDTTALQAAKEIKLLAESLN PDDAALPAAVAALLRAAHPLPDHRGVQAGEAALAEAERLP NPENHTEDPGAKVICGSHPVPDENSAAAGQAAIELAHALG PEPTDKENSVIEVYEGANNLPDEKALRGTEADINLVKSLK KYGHTGDFRSFEVTEAAHPVSDGNSIDAAQTALDI ACSLG PY KGSLKRTKVMVASHPFPDERTLEASEETVELVKMAE PRETFPAEESALFLVGEHPTPGEHSRRAADTILALLPAAT PRGNLKLNGNAEVI ESSHPYPDESSFEAGKKVREYLLN K KYDHLKDPANWETIESAHPVPDDRSLTAGDRVWELLADCT PRNSMDUVWKПKYREGGNNQPDGESFETTHDI IDLVEKLT RYGHGKPLGRIEVVEASHPVPDAAGQAAAARILAMVRGLT NPENVADLSDVEVLAGNHPVPHHMSLAAGDALRSALSNLN PQGTRQPSGPIKVLEGRDNVPDDRAVAAAAAIVALMQKRK HHENRAEVPGARVLRAGHPVPDEAGAAAAREVMALLDQAG PKGNLTVEGHAQIIHSSHPYPDDESFRAGKLVREAL MTW RHGHGDEAGRFLCLESDHPGPGEASLAAGGRLLAFIEETP GHRTAAP DRVTVREGNHPSPGPDSVDGATALLERAEAAD

## NNLPDENAFKTAQA $\square$ KDLVVN T

KYNHTPEETKWKCREASHPTPDTNSEDYSREVLQDLSS $\square \mathrm{D}$ PHNSLQQCQNLT TYEGANNLPDETALQAAQTI KKLAESMT
 HE
$K F G H L L A N P R V K A D E A D H P V P A S S \square Q A G S \square L L E H \square K R \square P$ PDGYPEPPPTIRVLVGGHPLPTRQSMAAADALRTQATAAA PKGSYISLPKVEVI ESTHPDISEDSEKAGTEVIKFLKNE
 PSASTDSMWKVKYYEGSHNQPDDRSLETTHELIDDVESMT
PYGTKDDDDS NVIYAGHPQVDENSTKAGEMAEKLLKE E PESQKSDYENVVRFGAKNNLPDQDSVSSTYSLTRAIQEDD KHGDELILNRVHVTYGAHPVVPDEGCVRGCERIVELAGKVT PSAALQPKPGFSYFTGGHPSPNRESFTGAQTALDLLASAA
 PHEFSQRLSNVRIVGAKNNLPDQDALYNAAEVSALVKSLLD TDENHRQDDGFDCFASAHPVPDERGLAAADAVENWVKSLG
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UniRef90_R8ZM36
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UniRef90_13Y7T7

## -

P

P

 DLNTI GSAPMM
DLQVI GSGLLVPSNH EHDPSHLPDW DLSSVGSGPTIADPTTVEDAMSVLKTDGFDDKF
PLDLIASGPDLPTPDEFQAALETLAAFAEHHEVAPEVWNA


 DLRVVASGPTAAAI GSPVDAMHVLKKSNLANRVPSSILAA
 PLETIASGPTIPVHPAPGEAVSILEKDLGAD
PLEVI ASGPTVASAHSVQDCLQILNRYGLRAALPRSVKTV
PLDLIASGPTVQNTDGANKAVDVLKKYNLIDALPKSVQTL APEAI GSGDAAPDPTTYRDALRVLERHGLLGAVTQAVRNH PPKFVGSGPTYPQKY DVSKI LKKYGI EIDNI



I


DLS SI GSGPTAPDPSTVEDAREDLSRDGLEKYSP
Pl DLI SSGPTCMGSATPRDALAILETFHALEDAPQATHY

QADAVASGPTLEDPSTVDDCRELVGRYQLLEKFPRSVRRF



DPAVI AS GPTVPDDPTTFADARAVLERFGVAA PEVARH


## D

 DLATI A S GPFVADPT TYADAS DVLDRYDC EVPDAVVRR PI G SI A S GLT
$P$ I D L I A S GP TVVYS A R A P E Q A VA I L K K Y N L Y Q S L E G D L K K V
 DLRAI A S GPTV A P L G S R A MAR R CLL LS HNL WE GL P HAVRTH P L A S I A S G P T V
 $D P A V I G S G L L T P P$ R $L$ R P S P LPTLPA GLLSEM




 DLNTI GSAPMY
$P V E V I A S G P T V A S V H N V Q D C L H \square L N H Y G L R A A L P R S V K T V$

 $D L S A V G B G P T L P D S S T V D D A K L I L D N K V G L$
D PAVI GS GLLEPAAPVEDF D
PLELI A S GPTVIQPS GRGESAKDILIDKHEVWNELSTELQQF

 $N L D T I G S G Y T V A D S S T V V D A S K I L N Q M D$
P D YE GL L K GNVWP E GSTFADAARI MDKYNGWEDCPAS I GA F QLD A L S S G P T LAA D S T T DE D C R K I L Q K F S L P S Q FA P S V Q S F

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


P I DL I A S GP TVVYNNKAPK DVIDNVLKKYDLFQKVESDLKKV


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UniRef90_C7FPJ3 UniRef90-B5IBP7 UniRef90-R5D112
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UniRef90_Q29KY9 UniRef90_U1MMK0 UniRef90-C5TD22 UniRef90_UPI0003C38DF6 UniRef90_UPI0003B4B44C UniRef90_V9VY89 UniRef90-EOW3W1 UniRef90 R6NJ48 UniRef90-I3ZCV6 UniRef90-F4FZ73
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UniRef90-A4YIA1 UniRef90-W8L3E7 UniRef90_C3YV93 UniRef90-Q3IT62
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UniRef90- ${ }^{-10 S 9 G 4}$
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 $A L P E T P K N L R N S W A F K V L D N G E L L \quad S K L S$ L $\quad$ A GTAQQLTLPPVVAEDSHHLL ASNHQAVQAAVQEAQ LERHLQQQMNQP QTAKAFNFLI GNNKVAARAVCAMAR LASDAAARAPRPDDAAFA GNEVHVI ASASVVSLEAAAARAR
 L G S NQEEGF R N S IVVNHLI $L S Q Q$
$N Q P A P F M K L P$ P E ETASSSAPPEPDNHLI LEKYSKY LT ETTPKSVGRCEYRNILLGSNQTALNAAAKHAE

 $L E L G D A G A F P D T P D A R D P R \square D M T I$ $\square \mathrm{IN} D \mathrm{D}$ LP DHECKN』 LLD Y DPAQETTPQTMTNDVVDYYIV NTDPDSSCQAA LDEAA K
 L ETPAVPDSQEMENNHDH


 LQ A S
 LR R A T R T S I P G D TV NHLI GGNRESVLAATESDR LA EA R PVCNRED VPNPVFEHAEYKIVGTPAASLDAAAKVAB P E L S R N S T R II

 F

 LQEGTD D TPKPEGGVFAGHAVHLVATPWQALEAAA DVAB L 1
 AT T SNRLSL A A ARHLR
 GKGCMNILIADDNRYALKKAQKLAR FCSGRRLPETPKEGDAAFRRASFDVI LSGDHLAQAAAEAAR
 L D R G A T G E L D E T P D P VF D SVVT T TV I GD GMTAVGAAA DRAS NHPRAHNVLVGNNLQACQAVEQAAR
 LARPE AETPKPGDPAFARAREIVMIATPFASSLEAAAAVAR
 LERVVSHL
QLNLD LVQ TDAPPPEPLPEATNVLI
 LTRQYQRKSSK DQDFSHVQNVLVATLEDACRAAGDAAR
 LASAA ADAPRPSDPRFARNEVRLI ASAGVSLEAAASRAR LEDTRS $\quad$ TE FWP K S KVENII VGSNNLSIIEAAT LEAK
 $F E R D T \quad P Q P Q L G A L D S K V Y V V G S N K \square A T T A A A B E A A$ LN D QVH R G L A E R GQSPAPGPE EELI A D DATAMQAAA ERAS $L$ K S Q QP A A P QP T C V

LAR A
DSDPHGPHTCGHVLNVI LPAFNPLQTPHD F QWH GSNTLALAEAQRQAE $L Q R G C N G Q R P E T P G P G A P N A S T R R L A A T N D T A A L A A A A A Q A A R$ GEYSKY L I E T K K E V H N S FN F L I LD DN V V L R K L R D V V

 LERGAA GEAAETPKPGDPGVDFRVVASARTALDAAREVAA

 FAS SHPALPSNMPSHDQQLQSENTILVGNNHAAVMAAAAMAE


TTSKETFKDRPGRKKQFKHVNNVVL
ITSKETFKDRPGRKKQFKHVNNVVLGNNLVAVAAAAFAAB $L S R A B C D P B G P H T C G H V L N V I I G S N S L A L A E A Q R Q A E$

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UniRet90 O29KY UniRef90-O29KY9
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UniRef90 - V4Z7K4 UniRef90-KgUBG0 UniRef90-E2BSQ6 UniRef90-A5G134 UniRef90-17E180 UniRet90-L7MK64 UniRef90 W4HG84
UniRet90 A4Y|A1 UniRef90-W8L3E7 UniRef90-C3YV93 UniRef90-Q31T62
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 SLRYNVNYFSNEITGEEAREGNNLLSVIKKELAKKNKTNR AHGYTPEI TEKEATGDARLVARRHARDAVD
AQGWNARVVNDALEGDVADAAAEVIAAAKSVETEENTTS RDYDAHALETPLTGDVGEAAVSDFRTLRDSPASDRPR RLGYKVVSFGADVEGEARDVAAEHAR】ALEAVEAGD MLGYKTTTDLPFLQGDAAARGREFGQTMLGAA RLG PNP
 KRGYHTMHVARELEGAAEEVGRYHAAQARYMCDT PR
 KTGIVALPLTSSVQGNVAPLGKAYAEDAKTVAQLGKSLHK GGAAQGVHVFPPLEGDVAEAARTUVESAIE
KLGYDPCVLSCSVQGDVGQVADDYQRLLKGDQEARQSSKM KAGLAAHVLSDELEGESRDVGKVHAALARCVALRGQPFAR
 AEW GPKLVSHRLTGDVAEAAETVVKAAEAA PBGNK NQGLKSTGLSSELDGNVQCAADUYQELIKQLITNDDPGNK

 EAGFDPLVLSSRVRGEAREAAKTHVAIAEEDAVTGEPTSP YKKLTPIILRNDVEGNVRDVSLGYVHTVNEDYHY\|VNNDG AAGVTP PL G GAAEGEAREVAAVMAGMARSCAAHGAPLAP QTGYQSYLLTTSLVGESRHVGRAMAQLAFY LCYGDFDMGR EAGLSTRVVNDALVGDVADAAAELASVNTILDSFDAPEG CPVTVVG KLGYRTLVHSTCLQGEASTVGEMYATMALQVAVEAESQKK AAGYQTCIVLSTHLEGEAEQSGRFHAAVATDVALRDVPVEP N TLDYEVKVTSDSWDYSSEYTAERMFSELLNAKKND QLGYIPCVLSCSMQGDVSNVAADYQRLLHGDQEYKQSTNA RRGYHAMTSARQSEGQAEAVGRHLAEMAL RMRDAKG DKVAVAKIITTTLDCSSEEATQUVKKHTQEYDAKHQSF ALGYRAVVLSAAI QGDVKSVARFYGLLAKEALETVAGARG NLGFVVRISEDVLQGDADECAQVCVEQLEQ
$N$
A AE NPIILSSEDRGD
K

\section*{} | 11 |
| :--- |
| 円 | GA G F K P I I L T T E L L S GN A A E I G R K M A D L I H E F L R G H S N L Q Y



 TAGYRVIVDNTCDDWDYSDAAKYLVERAREESVASIPDLKM K DADWQAHIVSDRLTGDVADAAAR YSR VLSEMHVPDR RLGYEPLALSRSVTGDVADAAEFYSRLTAYACRRDRSRGG AAGLLPRLLGDALEGESREAGRVMAGIALGVQRHGHPLPA

 VLGYHAMVLSTAMQGDVKRVARFYGLLARVAAAHLTPAKG
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UniRef90_A4ESD2 UniRef90-F0SM75
UniRef90_C3MQC1
UniRef90-G3GZJ2
UniRef90-H9IU97
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UniRef90
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UniRef90_A3XFL0 UniRef90_R8ZM36 UniRef90_UPI000258DBBC UniRef90_Q8K0R5
UniRef90-13Y7T7
$G \longdiv { V } L | | G G G E \stackrel { 3 3 0 } { P } | V \overline { V } V | T G Q$


340
350
360
GK G G R N Q E L A L R F S LDD L VE Y DV GKGGRNQELALSFAKHIHHLNV
 GE GGRCQMLA LSAARVLLGQF G $P Y T L L L G G E P E V V T V K P A G K G G R N G E V C L S L L L W V S G G R F$ $P$ L C W S G GEP T V K L V P GPRKK G GRN Q QV A L A AV CE WQ H WD A $P \vee C V V A A G E T T V H V R G S G L G G G R Q E M A L S A A L A D D A D D P$ $P \vee V L L S G G E T T V T I S G R Y G K G G R N S E F L L S L A L D I D D G I G G$

 K QAL I F G GETTVVR LR G DGRGGRNQELAA RVARRGSEENW
 $P \vee C L L A G G E P T V Q L Q G S$
 $R \| A L I A G G E T T V T I T G R$ K GLVIWWGETAVKTQG GGFGGRNQELSSLYAKEMKRHMG PCFLFSAGETTTAIPDSSGHGGPSQEMTAAFAVAAE GLNV
 $P$ TALI F G GETTVTLLRGS GKGGRNQELAARVAEAMQGQDW
 HSLLLTGGETTVKVMNK $R T A L I S G G E L T V T V T G S$


## UniRef90_F4WQG1 UniRef90-l1EWF4

 UniRef90-UPlooou6772D6 UniRef90-12K7W8 UniRef90-I3CDOO UniRef90-H2C957UniRef90
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UniRef90 A4ESD2 UniRef90-FOSM75 UniRef90-C3MQC1 UniRef90-G3GZJ2
UniRef90-H9IU97 UniRef90-C7FPJ3 UniRef90-B5IBP7 UniRef90-R5D12
UniRef90
B4MU01 UniRef90-D3TQA8 UniRef90-UPIO0047769D4 UniRef90-X0YT58 UniRef90-UPI00037A5FEB UniRef90-G2IKH6 UniRef90-B7QVK6 UniRef90-B3N1Z9 UniRef90-X6L517 UniRet90-Q1YGY3 UniRef90_WOTM18
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UniRef90
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UniRef90
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UniRef90 UniRef90-B4LUD9 UniRef90 G2DZ05 UniRef90-A3ZMR6 UniRef90_UPIO002558E6F UniRef90 J9P671 UniRef90-UPIO0035E08BE UniRef90-UP10003B3C98E UniRef90_Q96YZ3 UniRef90_13BS40 UniRef90 B4KGU6 UniRef90_UPI00021A6FE1 UniRef90_MOF6B7 UniRef90-A0A031LK70 UniRef90-GOMWZ3 UniRef90-G5IGN9 UniRef90-E8X6Z9
UniRef90
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370 MMLISAGTDGQDGPTDAAGA

380
390
400
信
LFCS GTDGQDGPTDAAGAl VNGESWSNALRQGLDPDRFL LLASLASDGSDGSSEAAGVLVDGESWMRAESTGLDPASLL


CFLSAGTDGMDGPTNAAGALACSEVVQDFSKETSDLIAFV WGLSAGSDGLDGNSGAAGAVLTPDTLARAAALLGLDAAACL LIFLSGGTDGRDGPTDAAGG\|ATPATWNADKAAGQDPDALL QFLSAGTDGDDGPTNAAGAVANADVIDEAEKSNLCVMEYL
 VVAAVDTDGIDGVTDAAGGIVDDTTVDPAVA WIITLATDGTDGPTDAAGAIVNETTIDRALALELDAKIAL MMLSAGTDGQDGPTDAAGAFGYPAIVPIDMQNL
HALAGDTDGDDGTEDNAGAVLAPDTLARARALGDDPASCL VVLAAGTDGQDGPTDAAGAMVHSTTVPEASANGGNADGLL AFLSGGTDGRDGPTDAAGGVVDAGTAGRASEAGGDAAALL TLYAVATDGDDGNSEYAGCVVSGGMDVPKREMGDDRKAL


## Y

 $M L S A G T D G Q D G P T D A A G A F G Y P A$$A V A S V D T D G I D G A T D A A G A L V D D R$ A ASVDTDGMDGATDAAGALVDDRLVGDDADGGGGAERPL VFLSAGTDGQDGPTDAAGALVSQEDLHVPTENGESSEYL
 VAMSVGSDGQDGNSPAAGAVVVDGSTWQRALRAGMNPQNAL VILAGGTDGRDGPTDAAGGlV VFLSGGTDGRDGPTDAAGGVVDAGTRARDEETGADPDALL WALAGDTDGDDGTEDAAGATVTPTTLARGRAAGRDPHADL $V$ F L S G GT D GT D GP T D S A G GVVVD QD S Y F MMDQK G WD P L K K L I MLSAGTDGQDGPTDAAGAFGYPA


UniRef90 F4WQG1
UniRef90-I1EWF4 UniRef90_UPI00046772D6 UniRef90_I2K7W8
UniRef90_I3CD00 UniRef90-H2C957 UniRef90_D5SYD3 UniRef90-W0X9P9 UniRef90_U6P102 UniRef90_W8C5D1 UniRef90 F3L277 UniRef90_A4ESD2 UniRef90_F0SM75 UniRef90_C3MQC1 UniRef90_G3GZJ2 UniRef90_H9IU97 UniRef90_C7FPJ3
UniRef90 B5IBP7 UniRef90_R5D1I2
UniRef90-B4MU0 UniRef90-B4MU01
UniRef90-D3TQA8 UniRef90-UPI00047769D4 UniRef90_X0YT58 UniRef90_UPI00037A5FEB UniRef90 G2IKH6 UniRef90_B7QVK6 UniRef90-B3N1Z9 UniRef90_X6L5I7 UniRef90_Q1YGY3 UniRef90_W0TMI8 UniRef90-H2CF31
UniRef90_W7L8L4 UniRef90-D2R6A1 UniRef90-A0A034W9L1 UniRef90_UPI0003715D05 UniRef90_Q17JZ2 UniRef90-K2JR27 UniRef90_Q29KY9 UniRef90_U1MMK0 UniRef90 C5TD2 UniRef90_UPI0003C38DF6 UniRef90_UPI0003B4B44C
UniRef90 V9VY89 UniRef90_E0W3W1 UniRef90_R6NJ48 UniRef90-I3ZCV6 UniRef90_F4FZ73 UniRef90_V4ZZK4 UniRef90_K9UBG0 UniRef90_E2BSQ6 UniRef90_A5G134 UniRef90-17EI80 UniRef90_L7MK64 UniRef90_W4HG84 UniRef90_A4YIA1 UniRef90_W8L3E7 UniRef90_C3YV93 UniRef90_Q3IT62 UniRef90_UPI00035E9A4D UniRef90_G6CX09 UniRef90_X0S9G4 UniRef90-N1W0E0 UniRef90_B4LUD9 UniRef90 G2DZ05 UniRef90_A3ZMR6 UniRef90_UPI0002558E6F UniRef90 J9P671 UniRef90_UPI00035E08BE UniRef90_UPI0003B3C98E UniRef90_Q96YZ3 UniRef90_I3BS40 UniRef90_B4KGU6 UniRef90_UPI00021A6FE1 UniRef90 M0F6B7 UniRef90_A0A031LK70 UniRef90_G0MWZ3 UniRef90_G5IGN9 UniRef90_E8X6Z9 UniRef90_B8BXK7 UniRef90_T2MA08 UniRef90 E8V1R8 UniRef90_UPI00037194DE UniRef90 X7F3B2 UniRef90_H8GSF6 UniRef90_A3XFLO UniRef90_R8ZM36 UniRef90 UPI000258DBBC UniRef90_Q8K0R5 UniRef90_I3Y7T7

K E NDSYSFFSTAQGHVK LGGTGTNVMD■HILLI
A S ND S L A F F Q A A G G L L R TGPT GTNVND FS L L L K N S D S Y T F FNAMDA DFS DGPTGTNVMDFII L QKANA GQFLEQTNDLIYTGATGTNVMDVLIGLVTE
 ENNDSHGFFRAYADHVVTGPTGTNVM
A GHD A WTAFAAS GDLFVP GPTGTNVNDLRADLIR
NTSNSYEYFKNGKNHIKPGSTGTNVMDIVQILLN
Q NS DSYNFYKNLK SHVLTGHTGTNVMDI QLLLI
E N N D S Y A A LLK S S G D L L V T T G A T G T N V


 ADNNSHPALDAVGALI RTGPSGTNVGDIVTLL MAHNSYTVLKKIDDAIFTGYTNTNLADICI REHAA YEAL E P L G D TVVLTGNT GTNLCDFNVLY IGT Q

 D
S Q N N S F NFFKNVQDGUVTDRLPSNVSDLIIVY A N N D A GSALGEIGALEVPGPTLTNVNDLRMILVDP
 RNCDSYNFLENGNYHVLTGHTGTNVMDMHFLVVP D N N D S N A A L R L S D D L LITGATGTNVADVQVLLI AANDSTSFFEA $\operatorname{CHGGLVPGPTHTNVNDCRIILVDP}$ NRADSGT LLEATGDLVVTGPTGTNVMDLLI GL
A D CDS YPAL DAADALYRRGYTGTNVNDLIVSVDS A NHSSYELLEKYGVTVKTGLTYTNVNNVYLLI ARCDA YPLLTASQGLVITGPTHTNVCDLRVVVVD




 A N NDSNAALLKAADALLMTGGTGTNVADVQI FLLRRP

 E E H S S Y Q L L L E R T K S T V $\operatorname{K}$ T T GP T G T N NV A D ND S T A A L A A A D A L V S T G P T G T N V N D L R V V V V P

A D ND GYGLFAPLGDLVVTGPTRTNVNDFRAILIR $R N N D S N A A L K L A G D L L I T G G T G T N V A D V Q \| M L L S P Q$ ERNDSHHFFRTFNDHLI TGLTGTNVMDLHMLLLRRK A NND S Y R A L D L A G D L L K V E A T G T N V A D V V A A L V L




 RNCDSYNFYS QLADHVLTGHTGTNVMDLHFLVVP DA ANS GQLLEAS G D L I RTGPTDTNVVMDL I L G L
 SHNDSHTFFRCFRGLLHTGGLGTNVMDVHFLLLRLR

 QAADAGTFLDDACDLI HTGPTGTNVMDVVI GLL RNCDSYNFYS QLLEDHMVPGHTGTNVMDLLHLVVP

D RHDAYPALDGAGALLRTGPTGTNVNDLRAVVV K Q H S S Y E LL E K Y S LTTVNTGBPTYTNVNNNI Y L L I K NS DSYNFWANFN GHLLKTGPTGTNVMDVQVLVL
 QSFDSFRLLNRLGAATVTGPTGNNLRDLRILLADS

 LSHNS YDYLKAHD QRLMVGATGTNLADLVLI I ANNDSHAALEAGDALVRIPATGTNVADVQVLLLAP $R R N D S F G F Y S A L G G L V V T G L T G T N V M D V Q L V L V R P R$ A A HD S Y S Y FA ALLGDLLMTGPTRTNVVNFRAVLVLP ANNDSYAALKAAEA L LDCGGTGTNVADVQVGLRRA SNSNSYP $\square L K D \square G S T L D T G P T G T N V N D L$

T N N D S Y T F F C R F R GLLHT G LT G T NVM DV HL LI L H P Q E R A D A G R L L E S S G D|L I D T G P T G T N|V|M DL IL GL

UniRef90 N1VKD5
UniRef90 Q97AL3 UniRef90_K5D340 UniRef90 X1YGZ8 UniRef90 A1B443 UniRef90-TONGE7 UniRef90-N6SZP5 UniRef90-B0SCY2 UniRef90-T1H373 UniRef90-X1G5Y7 UniRef90-A4EJW4 UniRef90 C7DDV5 UniRef90-X11445 UniRef90-T1JYJ1 UniRef90 M6PS67 UniRef90-UPI000377F524 UniRef90_UPI0003F0D74B UniRef90-H9K697 UniRet90 UPI0003B7A09E UniRef90- D3RNS3 UniRef90_SOARM1 UniRef90 T1BSL5 UniRef90 Q6KZ25 UniRef90-S6HRW2 UniRef90-A0A011PER7 UniRef90_A3V819 UniRef90 K1YYZ8 UniRef90-H1FZZ8 UniRef90 V5AKA8 UniRef90 XOZGI2 UniRef90-D3PJ75 UniRef90-M111A8 UniRef90 UPI00023796E7 UniRef90 F2L2W7 UniRef90_F9U5C5 UniRef90_UPI000477C334 UniRef90 UPI000471CC1E UniRef90-I0IMC1 UniRef90_-Q9HKZ0 UniRef90 A4BRW4 UniRef90 UPI000362AE5E UniRef90-M3AFD2 UniRef90-A6VRW1 UniRef90 U6P2J0 UniRef90-LOGVI1 UniRef90-X1SL96 UniRef90 UPI00037A9A8A UniRef90 ${ }^{-}$T1E9Z6 UniRef90-K1ZUK6 UniRef90 X0S4D2 UniRef90 UPI0004767033 UniRef90-UPI0000164CE6 UniRef90-W0RLZ9 UniRef90 W9VCG2 UniRef90 A6GGC1 UniRef90-TOMTB7 UniRef90_R4VLP7 UniRef90 UPIO0047E2262 UniRef90-V4XVQ4 UniRef90-K1XVE8 UniRef90-TOYZK0 UniRef90_M0CBY5 UniRef90_C6HY74 UniRef90-J9ZCE3 UniRef90- T0M2A0 UniRef90-F7DD90 UniRef90-G1V3J5 UniRef90_B9Z5Y2 UniRef90_x1M4M4 UniRef90-W0E149 UniRef90-D5BQJ7 UniRef90 UPI00037BAFB7 UniRef90-UPI0002064B91 UniRef90-U6DB76 UniRef90-X0RH06 UniRef90 A0A011Q6X6 UniRef90-B9NMP3 UniRef90-K1SY83 UniRef90-E2AFZ3 UniRef90-B3T8L2 UniRef90_A9UXS4 UniRef90_UPIO00258E3A2 UniRef90 UPI0002376FF3 UniRef90-A0A016V1L6 UniRef90_G2D9W6 UniRef90-B8GNT0 UniRef90 W9TL50 UniRef90-D0LKI4 UniRef90_Q168K6 UniRef90 DOCW00 UniRef90_UPI00047E8A90 UniRef90_G4RPE9

MNS LTRED ${ }^{10}$ I $E$ T LTF WE G VR MAS P D Y L
$\square R K D I E E L F W E G V R S A T P E Y L S S D F W N Q H S D L C K I I$ E KL R DLYAS GVESVKPK SLFQHCSAREDGQQSLL MAPRDRAMAL DRAGIAAADPGAAVVR GMGEV

A NLRKLFAGAVKAVQPASLINNQVKLADGHLTV MNS L K E EI L Y FF RLLGVHAAD PNSLFEDF WEDHSLL
 MQNPRDEVQR $\square$ G A GVAAADPFAAVQSGLDDVPV

AMRFFEAGVAAADPYAAVSDALK
 E LVNKALK L S DPRYWLARKVEVRGHEDTV VLP K T L I I N K V K F K N G $\quad$ LY V

VD G A H A VR R A LMAR P
$R \square Y$ A $L E K \square Q N A \square N N L H P S A A M S R N F N V D T E K F$
 MDTK $\square K Q E L V D I F Y$ AGVNAVSGFQATHNAL

MNDMRSTARRLFDAGVQAADPVAAVTRHLD


 M Q A S Q Q $\square$ Q D IWW A GVA A VD G Y TA T L E A I Q M ARCLLLDVFAAA $\square R A V E G R A V V G Q A L V A R P$ $\vee D G E T V \vee R E A L T$

KHSRDA $\square$ KR $\square$ LET $\square$ SPRS LIFKH LIP LDPDK MNPREALLDA $\quad$ Y Q A G LD A VRGDRCVRRWLRQHPCDNA I MYRAGI RAVAGRPAVREWLR


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

MMTNNPAAVLENLWWQGVNAVRGFSAVSTALSKS
MDPRALLEQAYRAALDSASPARLLAPHLSGPPP $M F S S A L A A V H P G P V T A D V G D G \square A L$

D P Q T C VRRHVHLKGASVVV
R DVLVE S $\square$ V Y AFE Q N S P D $\square R$ V Y S F L K QL P L G
DPREALRGFHRAGVVAVEGRAAVARAL
MRATCAAAFQAGLNAANPAVAVRKAL GKA

$R R \square L E K \square F M A D \square A \quad P G N L L R S H L K D H P$
TS PMRKYALEK\VQVMNK LNPARVMEGNFD\DLNS
MALQKEGRQLFEEAVRVVLPGPMLHRALILEPGGLRV QAASELRRRLDAALSAVAPDGAVLRHLHLDGGKLTL MNTPPRDLLAKMFAAAVNAAQPEHCLPPFLDPE

MT DDQRLL!DCFMAA I A AVGGTRAVTRALEAR RDLLI AAFHAGI DAGRPEPVTRDAVAR TALRRLALS IAEAGIAYADPGNALPRFVALEGDTLVL
 MQDTWYAGVSAVDGYRATDAADQ
LMNKELRAVADNIIDAAI KAVLPDEAVKKTLK


 PRDFLRALFDAAVRSAQPLEGMRAWLP
$R R A L L Q \prod F S A A L Q A V A G D D C V A A A L Q R R S$ $L L R A A L S A V E G Q A V V R Q A L S$

Q $\square$ Q Q Q $\square R$ A A F A A TVACLE P AEHTARA
MTMQDQA TA TIWKAGVAAVDGYGAVKAA LP
HKLSLKLWQHGVARVHGRHSVHDCLKLSS

UniRef90 N1VKD5
UniRef90 Q97AL3 UniRef90－K5D340 UniRef90－X1YGZ8 UniRef90＿A1B443 UniRef90－TONGE7
UniRef90 UniRef90－Boscy2 UniRef90 T1H373 UniRef90－X1G5Y7 UniRef90 A4EJW4 UniRef90 C7DDV5 UniRef90 ${ }^{-} \times 11445$ UniRef90－T1JYJ1 UniRef90 M6PS67 UniRef90－UPI000377F524 UniRef90＿UPIo003F0D74B UniRef90－H9K697促 UniRef90－D3RNS3 UniRef90－SoARM1 UniRef90＿T1BSL5 UniRef90 Q6KZ25 UniRef90－S6HRW2 UniRef90－A0A011PER7 UniRef90 A3V819 UniRef90 K1YYZ8 UniRef90－H1FZZ8 UniRef90 V5AKA8 UniRef90 XOZGI2 UniRef90－D3PJ75 UniRef90－M111A8 UniRef90 UPI00023796E7 UniRef90－F2L2W7 UniRef90－F9U5C5 UniRef90－UPI000477C334 UniRef90 UPI000471CC1E UniRef90－I01MC1 UniRef90＿Q9HKZO UniRef90 A4BRW4 UniRef90－UPI000362AE5E UniRef90－M3AFD2 UniRet90－A6VRW1 UniRef90 U6P2Jo UniRef90－LOGVI1 UniRef90－X1SL96 UniRef90 UPI00037A9A8A UniRef90－T1E9Z6 UniRef90－K1ZUK6 UniRef90－X0S4D2 UniRet90 UPIO004767033 UniRef90－UPIO000164CE6 UniRef90－W0RLZ9 UniRef90 ${ }^{-}$W9VCG2 UniRef90－A6GGC1 UniRef90－TOMTB7 UniRef90－R4VLP7 UniRef90 UPI00047E2262 UniRef90－V4XVQ4 UniRef90－K1XVE8 UniRef90－TOYZKO UniRef90＿M0CBY5 UniRef90－C6HY744 UniRef90－Том2A0 UniRef90＿F7DD90 UniRef90－G1V3J5 UniRef90－${ }^{-} 1 \mathrm{M4M} 4$ UniRef90－WOE149 UniRef90－D5BQJ7 UniRef90 UPI00037BAFB7 UniRef90－UPI0002064B91 UniRef90－U6DB76 UniRef90－X0RH06 UniRef90 A0A011Q6X6 UniRef90－B9NMP3 UniRef90－K1SY83 UniRef90－E2AFZ3 UniRef90－B3T8L2 UniRef90＿A9UXS4 UniRef90＿UPIO00258E3A2 UniRef90 UPI0002376FF3 UniRef90 A0A016V1L6 UniRef90－G2D9W6 UniRef90－B8GNTO UniRef90 W9TL50 UniRef90－DOLK14 UniRef90 Q168K6 UniRef90 Docwoo UniRef90＿UPIO0047E8A90 UniRef90GG4PE9


#### Abstract

50 60

70 80 RNALNNPDKKNYVIFAILGKAAYSMAVISFQKFIISVDQGFILT NEIDLNKYAGVYVIGFGKAAYEMYLGVREHVKRKAGII  SDQSFPDAKSCHVAGFGKAVLGMALELERTDRLKRAGVVV QETFHTSKKNLFVFSVGKAAYPMAMSFVHDFPIKNGYILT QNVQDPTYKNVHMVGFGKAVFDMAAEIERLMKLASGCI NV EQDKYDGKKRULIVGGGKATAQMADALDELLKTSEGFLNI

DAP回GPTLVIAFGKAAHAMARAAQK VVPITRMIVVT


 EGKSYETS RTLLIAVGKASVPMAEYFVNKVPLVRA VVT
GDQSFE $\square K E N V Y \square V G F G K A \nabla M G M A V V L E H M \square Y \square K D G \square I S \square$
$\square A G P V W \square A A D G K A A E M T G G A D D V G D R G G M L V T$ DRVYVIGFGKASFSMYSGDRERVLKKAGII IP
$N \square K F D$ SKR $\square F \square G F G K A A F K M Y S G R P F\|L K D A S\| P$ SESHFTPD FIIAVGKAASGMAGALTAMADPCPALLIT

D DPAPALIVAVGKAARGMAHAALSRFAGVPADVVT HSFGSYER\｜FVIGTGKGASKMAEAVEKHLEVTEGFITIT

ETCHGDNVTVIGFGKAVYSMAVAVESAVQVLKGTIST NGVDYEFQNPL LISTGKSSPKMAKFFVERLKVSRGLIVS MERPDQILAVGKAAGAMARAAANQFGAVPTLVVT AAKAGNLDGEVRAVAVGKGALSMLKGLEAVADVIDGVAVA


GLTPPFFLLSVGKAASGMTEAIAPRWNISPEMTVT GDDDVRYSRDFVMGFGKASYEMSEGURDHVRKKAGDVP
 APAPDSGRTLVI GAGKAAAAMARAVEDHWSGPSGLVVT PALPAPPPGRTLVIGAGKAAAAMARAVEDHWSGPSGLVVIT
NSFADFTPDQUI AVGKASGMCAGALAALGNDPALLV
$P \square A G S \nabla R \square V A \square G K A A Q A M T E G A \nabla A A \square G \square R G V V V S$
QELT
VIS $\square$ GKASVKMA $\square$ GA $\square K F Y R \square K R C \| I L T$

NПKAPD【I IAVGKAAGDMALGARNHFDPTQT\VVT AFILAFGKASLPMARAALAAYPGVPTLVVP PDPPGGVHLLA $\square G K G A H A M A G A V E A \square C P A G G V V V A$ GEFVFDLAGRVWIFGAGKASERTAAALVERLRVAGGLVIA DFDGELRIIGFGKAGRGMYRGAKKFF GEII S NEPSA TPHGPFHLLADGKAAVAMAHGVADQRDVLGGRVVT DVPMPGPGGALYLAALGKAAVGMAEEAMALLSPRRALII T EGVDLGAYDEVRLLGAGKAADGMADALAGRLRLDGGVVVT


PDSFLPGA LSMGKAAGFLTEALAEFFSLSSALS L FLLAVGKASKGMAEALAEKRSIPRVLVIL YARVYI। GFGKASFNMYAGIRDKVMEKAGI।IP RDRSFQDHHNLYLVGFGKAVLGMAATVESLLHLVQGVISV DDESDDAYRRIRVLGAGKGAAPMAAALENLLRISDGLVIV AAMADTLEQLRLAEGTVNI
APPHPVEDFATGKAAAAMARGACDTLGITGGLLIT QQAGAGAPAPTA 1 A IGKAACAMADAARQAGCLAPG1 IVT EGRRYSLADRVFVVGAGKASFP DAKALDGLLRI HKGLVTC KGVKYRLKNNLHIVGWGKEAVTMSSAFERIVQLRKGWMVV

$T \square E Q P D Q V A G K A A G A M A H A A A E R F T V P C L V T$ DRKFD GKVILVAVGKAAWQMAKAASDCLRINEGIVIT NNVKYKIKNNLHIVGWGKEVVTMSSAFEKVVQLKRGFIVV NR\｜FLSNYGKIFVVAYGKAADSMAEYVSKKปNVSQGIVVV PAYSIPRTGRVHLVGFGKAVAHMAAALLEATQVVGGFLIV KDVKYRDRNNLHLVGWGKEADTMSAALERTVQLKKGWMVV APPKGRTLVLGAGKAGGAMAQALEALWPGDSGLVLT MAAAAE ELLRLHEGIVIA DPDGVRLVAVGKAAQSMADGAALGGRLAAALLI S

GTVQLSGRLTVVAAKAAEAMSAGAMRVLDARGGVVIG I AVGKAATAMAIDAHEKFPNAPVLIVT DVPRPDRILAVGKAAAAMMNAAQDHFGKTPGLVVT GLE F NPSA

UniRef90_N1VKD5 UniRef90_Q97AL3 UniRef90-K5D340 UniRef90-X1YGZ8 UniRef90_A1B443 UniRef90-TONGE7
UniRef90-N6SZP5 UniRef90-B0SCY2 UniRef90-T1H373
UniRef90- X1G5Y7 UniRef90-X1G5Y7
UniRef90 A4EJW4 UniRef90-C7DDV5 UniRef90-X11445 UniRef90-T1JYJ1 UniRef90 M6PS67 UniRef90-UPIO00377F524 UniRef90_UPI0003F0D74B UniRef90-H9K697
UniRef90-M111A8
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UniRef90-F2L2W7
UniRef90-F9U5C5
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UniRef90_Q9HKZ0
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UniRef90-T1E9Z6
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UniRef90-WORLZ9
UniRef90_W9VCG2
UniRef90-A6GGC1
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UniRef90-R4VLP7
UniRef90_UPIO0047E2262
UniRef90-V4XVQ4
UniRef90-K1XVE8
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UniRef90-MOCBY5
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UniRef90 J9ZCE3
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UniRef90_TOM2A0
UniRef90-F7DD90
UniRef90-G1V3J5
UniRef90-B9Z5Y2
UniRef90 X1M4M4
UniRef90-W0E149
UniRef90-D5BQJ7
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UniRef90-X0RH06
UniRef90_A0A011Q6X6
UniRef90-B9NMP3
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UniRef90-UPI0002376FF3
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UniRef90_G4RPE9

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## PVG $\square$ KCHHHN $\square$ TFFGAKNN $\square$ PDEDS VVATNA $\square$ DD LIDSVI

 P VFVS DRDAEVIVAEHPVPGEGSDRAGEVVVEALKK E DENKLAVSGRVAKMAE WNF PSASTEALWESECEGSTNNQPDERSLETTHQI DDGVESLTKPGHADPGRGDEVHFGGHPLPDAGSLAAGERLLANLDDLP DDEHNESYPGLEVLRGTHPYVSSLSVESSKKLLSHLDRLNN

D DEKTNDYNELRTLRGTHPFTGD【SVSSSDSMLSGLKNLN KYQHTDQMMTVTVIESAHPVPDKNSLLAGQAMLNAVSDLS

NYENAQPDDGAAVFAAGHPVPDESGAAKAALAVIAADRA PEGETPPLKK $\mathrm{P}_{\mathrm{K}} \mathrm{KL}$ NASHPLPNANGVKGAKEILKIAKKAD RHGHADP RQRFDCLQADHPLPGADSLLAGGRLVDFDRLTP

II IEAGHPIPDQRGVNATQE\|IALLKNSK
 KDGHSDLPAHVDVI ESSHPVPDDRSLAGGRALRETIESME



 RAGYGDPDPRVEQLESAHPVPDTRSLVAGERLVRFLEAAP

 KAGHLDERWGLEA $\square V G G H P V P N A G S L A A G E A L R T M L A E P D$
 PDFHLSPNSVLEVIECRNNLPDEGAVLAATKI RSIAQAMT FKK】F F T LGTHPLPSEENVAFTEKVLRETAGMT

KYDH\SELDECETIEAAHPVPDQNSLIGGARVLECVKNMT PAGTADAPPEAVVMPGSHPVPDERSXAAAEEALRQLGALR ATPGAPPHPALEAVVGDHPVPGPGSRAAADAVVRAAARVR





PEGYPRPP LNFPFFEGAHPDPDRRS LEAFERDRNF DNGDP PSGYSCP ERYGWKT GNHPDPGEDSLDAAKAALDFVENIP

 RYGYAVPCQRIVGVEAAHPVPDAAGLAAAGRLLDTVRGLTV

 K Y GQEGSSLDDHD


KDGHGHDPTHDKVLEASHPVPDARSLTGGQADRETVQGMG KYGHVKPDERIECFEAGHPVPDENSFKATQAAIEMVSGLN PRKSI S MMWRITFVEAGMNQPDEKTVEITQKIVNYCKRLLK PKYTNSLIKKFKVFYSGHPLPDKESVRAAKAVQKFVNNCS
 PRKSIFMMWRI S YVEAGTDDPDEKTVDATRKIMNYVKKLK
 KVGHLDRRRGWQALESGHPLPDAASLQA GQQLI RF EA
$R Q G H L C S D P R \square R C V E A D H P V P G P H S L E A G R Q L L A F I D S T P$
RASQPGEGDEARFVPSSHPRADARSLAAARTADRRVREAG KHGHADAPAHAEII EAAHPVLDQSSLRAGARMLDVVSRMA K D GHAELPSHLQVIEASHPVPDARSLKGGQALRASVQAMK


## UniRef90 N1VKD5 UniRef90-Q97AL3 UniRef90-K5D340 UniRef90-A1B443 UniRef90-TONGE7 UniRef90 UniRef90- Boscy2 UniRef90-T1H373 UniRef90 $\mathrm{X} 1 \mathrm{G5} 57$ UniRef90-A4EJW4 UniRef90_C7DDV5 UniRef90-X11445 UniRef90-T1JYJ1 UniRef90- M6PS67 UniRef90_UPI000377F524 UniRef90_UPIOOO3 UniRef90 H9K697

 AETRLLFLLSGGASALDEAPDAGEEAERRAWNAWLLASG

END LVIVLISGGGSS AGSQLLLLVSGGTSALSELLPAEMSLAEWQNLTQKMLACG
AQGPVLALTSGGGSALLPAPAGALTLADKMVNRLLASG KNDLVISLISGGGSALMPRPAKGISLKDKIKITSSLLKSG EQGHMVFLISGGTSSLLVEVLPPGAGLGELQRVNGWLLGSG
AKDLIICLLSGGGSALLVSPVPGVSLGEПQQLIELLLASG AEDHLVILISGGGSACLSGVISPMSLDKKISIDRELSVSG DYDIVIFLLSGGASALVEYS DVPLEVLKEIINDKLVTSG HDSSLLLLVSGGASSGAEDLMPGFSLDDLEALNQRLLGDG RGDTLVLLVSGGASSLMEAPLAGSEDDFLKAWELLLKSG SQTEVLFLLSGGASSLVEVPVAGLDGADLRRMNRWLLGSG
 PETTLKSALSGGTSSLLSAPIHPVTLKQKVQVITALMKNG PNDAVVVLISGGGSSGLFEMPEEGITVDQUSEVSKKMMQAS EADRFLVLI SGGASAEMERLPGGAGEAELAALLNRRMLAGG PDDLVLCLISGGGSALLARPAPGVTLAEKQALTAALLRSG ADDVVFFLVSGGGSALECAP DGLSLDEKLSAGRGLTSNG GGDWLF LLSGGASSLVELPVAGLGUADLQRANGWLLASG ESNPLFLVSGGGSAMLEYPRVNDDEYNRDKCLMDG


ADQSLLLVSGGASALVEVLEEGHSLQSLKALNQGFLAEG $P D Q E A L I L V S G G G S A L L A A P D G V T L A E K Q A L T R E L L R A G$ PDDLAVVLLSGGASSLVGAPVPDVGPDELAALTGVLLGAG
 KDDVVVLISGGGSASLFEVLREGVELURYNETVNCHMRNG NDARFVCLISGGASSLVEQLADGADPQALSVLNEWLLGSG ADDLVVVAVTGGASALFAAPVAPDGVADLRAVTDALLASG


PSSPMVIALSGG
PGGVLIAAL
PGGVLLFALSGGS

ANDLLLVLISGGGSALLPAPLPPPDTLDEKRMLAK

S



TGSRLLLLVSGGASSLAEDLVPGKTLDDLATLNRQLLAEG KNDTVLFLLSGGGSALEEKPK KRDLLLVMLSRDLDDLLCCPQNTITLKDKLRVLNRLKAAN KGDFVLFLVSGGGSSLLACPDDKITLTEKKHVTKLLLQCG
 K


EGEVLALISGGSSALLADPAPGLEELSEKNAVDAALAAGG A GSHLLMLVSGGASALAEAPVEGLDLAGLKTKTTEMLGSG PGTHLLLLVSGGASSLAEDLVAGATLEDLARLNAQLLSEG $P H D D L L V L V S G G A S S L V E H L K P N H D W N S F V G R V T E M I T S D$
$R G E R V V F L V S G G A S S L A E V P L$



UniRef90_N1VKD5 UniRef90_Q97AL3 UniRef90-K5D340 UniRef90_X1YGZ8 UniRef90_A1B443 UniRef90-TONGE7
UniRef90-N6SZP5 UniRef90-B0SCY2 UniRef90-T1H373
UniRef90 $\mathrm{X1G5Y7}$ UniRef90-A4EJW4 UniRef90 C7DDV5 UniRef90-X11445 UniRef90-T1JYJ1 UniRef90 M6PS67 UniRef90_UPI000377F524 UniRef90-UPI0003F0D74B UniRef90-H9K697 UniRef90-UPI0003B7A09E UniRef90-D3RNS3 UniRef90-S0ARM1 UniRef90_T1BSL5 UniRef90_Q6KZ25 UniRef90_S6HRW2
UniRef90 A0A011PER UniRef90-A3V819 UniRef90-K1YYZ8 UniRef90-H1FZZ88 UniRef90-X0ZGI2 UniRef90-D3PJ75 UniRef90-M111A8 UniRef90_UPIO0023796E7 UniRef90-F2L2W7 UniRef90-F9U5C5 UniRef90-UPI000477C334
UniRef90 UPI000471CC1E
UniRef90-10IMC1
UniRef90_-Q9HKZO
UniRef90 A4BRW4
UniRef90_UPI000362AE5E
UniRef90-M3AFD2
UniRef90_A6VRW1
UniRef90-LOGVI1
UniRef90-X1SL96
UniRef90-UPI00037A9A8A
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UniRef90-K1ZUK6
UniRef90-XOS4D2
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UniRef90-DOCW00
UniRef90_UPI00047E8A90
Uniret90_UPIOP 47
UniRef9_-G4RPE9

## 62AE5E

$\qquad$<br>

DNMI ASAPTYP
D D S I A S GP LA ENK $\square$ DPSAVYAK
DPNVIASAPSYP
ELI A S GPTVVNVGCQRNAREVLMKYNDWNRDPASVAGV DLRVI AS GPTVAPVGTRAQAADLAQSLGI WERMPEAARAA


PVDLI ASGPTVKP F LDNGREVLEKYDLWNSLLPALXXX KLDSI ASGPTIPDLTSFNDAYNVLDKYNLDDRIPMSAKAV DLSAI ASGPTVGPI GTVLDAVSLLQEAGLWAELP VVVRTH DLRAI ASGPTTDPLGTRDEAIALLRRYDLWETVPEAVQDR

P
D SKVASGPTI PSKDEKNS L L R FFKQYNLHKKTEQSIKIS
 PVESI AS GPTVYSPKRPKEVI AVLKKYNDFEHLEGDVKKI DPALI ASGPTIADRATRHDALKYI EHYKM QLPEKVMAH
 DPTVI AS GPTVADPTTFAEARAIVEKYGLQDQVRAYAH
D LSII A S GPLTR $\square \mathrm{DYR}$ YED $\square \mathrm{METLKKYLGNDE}$
DISVI GS G
DPEVIASSGPTVGDPSSCADALAVLDRYM DLSSIA S GPLSPDPTTREDAFK ILKKYGK
 HPI DI A S GPTVADPTTRDDALAVLARYRVGAVPASVLAH


## DLGVI GS G

$N P S D V G S G P G V P D D T T P D E A Y \square Y \square K V R G L W G R L P E S V R R \mid L$






## 



| $D$ | $P$ | $R$ | $I$ | $S$ |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $D$ | $I$ | $A$ | $L$ | $I$ | $A$ |









$N$ L N I I A
A
 RLDTHASGPTVA DPTTCADALEVVRRYGUTAALPAGARRC
 ALD YI T DPSVPDRSTFADAQAVLDKYHDWDRMPVA I AAY
 NIESIA SGPFFPDSSTYLDVQRI LEKYNQNESGPSHVYNI DLGVI GSGDALPDRPGFEAA
PLDMI A SGPACADTTTCEEAWHIVEKYN
PLEQLGGGPCVYDPKN QKALLALLDKYKLVDKVSQNVREL
 $P M T E I S G G P C D Y D P K D D A A B G I I A K Y R L L N R L P D S V R E L$
 $L I Q G I A S G P T I L Q T G P M M E M S R A L T S S P K W T S L P A K I L D K$
$D P G V G G S G L L L P D P T$
$D P A V$
$V$
 LLCVI GS G
DI GVI GS G
$\square \mathrm{I} T \mathrm{~T}$ GS GLAMM$\quad M P A R Y Q A S \quad P P A$


UniRef90 N1VKD5 UniRef90_Q97AL3 UniRef90-K5D340 UniRef90-A1B443 UniRef90-TONGE7
UniRef90-N6SZP5 UniRef90-B0SCY2 UniRef90-T1H373
UniRef90
X1G5Y7 UniRef90-A4EJW4 UniRef90 C7DDV5 UniRef90-X11445
UniRef90-T1JYJ1 UniRef90 M6PS67 UniRef90-UPI000377F524 UniRef90-UPI0003F0D74B UniRef90-H9K697 UniRef90-D3RNS3 UniRef90-SOARM1 UniRef90-T1BSL5 UniRef90-Q6KZ25
UniRef90 S6HRW2 UniRef90-A0A011PER7 UniRef90_A3V819 UniRef90-K1YYZ8 UniRef90-H1FZZ88 UniRef90-X0ZGI2 UniRef90-D3PJ75 UniRef90-M111A8 UniRef90_UPI00023796E7 UniRef90-F2L2W7 UniRef90-F9U5C5 UniRef90_UPI000477C334 UniRef90_UPIO00471CC1E UniRef90_IOIMC1
UniRef90- $\mathrm{Q9HKZ}$ UniRef90- A4BRW4 UniRef90_UPIO00362AE5E UniRef90-M3AFD2 UniRef90-U6P2J0 UniRef90_LOGVI1 UniRef90-X1SL96 UniRef90_UPI00037A9A8A UniRef90-T1E9Z6 UniRef90-K1ZUK6
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UniRef90 B9Z5Y2 UniRef90 X1M4M4 UniRef90-W0E149
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UniRef90 K1SY83 UniRef90- E2AFZ3 UniRef90_B3T8L2 UniRef90_A9UXS4 UniRef90_UPI000258E3A2 UniRef90_UPI0002376FF3 UniRef90-A0A016V1L6 UniRef90_G2D9W6 UniRef90 W9TL50 UniRef90-DOLKI4 UniRef90-Q168K6 UniRef90-DOCW00 UniRef90_UPI00047E8A90 UniRef90_G4RPE9

VENSS DED D
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 NQK IK SKNFSAEYK IDPNKNSVHCI GNDTQALDAVQKECI LE GYEKYDRETPKE DDNSDFFLLLDAMTVLKEGFS LQSHSNQLTKNSGDANFKHVQNVLVGTNKVAVQSVVNEAE LMSTERFKDKETKKKQFKHVTNIILGNNTVAVEASSLEAC LRS EKADAPQPDNAVFARHSHHI I ASAAQSLKAAAKLAE | VARGL |
| :--- |
| I EKVD | L $\quad$ CAA AEETPKPGDPRLARTSTHLI ATPQHSLEAAAAVAR

R $\square K M Y R N D D D \square Y F N N V K Q Y I I D K N R D F L D Y$

 L RGDAAESIKPGDVRLRASTVRLITAPQDALEAAARVAR LQDGKDEDTPKPGEEFFTNVHNTIVGSNRTAAQAAVAQAE


TESRRGSRDTPSSFP

AQ SASNHARNAAAQTAE LT TMARSTPDLPRAEEMRSDRSEI I ARPADARMA AAAF DR




RESPQPSLRYSEP
VRRGLAERGDDPGSAPP LDGAAGKVSETPNTDDPAFENLII GSNFESLLAARQEAK

 LERGARGE $\square K E T P K A G D P K T Q N V I I G S N I L A V K A A R E K A Q$ FQSGA PDTPDTDPRVVIEAASNAVARQVIESAAQ LQSGA $V$ VQGL AERGEMSVRGPEDELIADLETALDADAEHAR PTTRAFLDDPPPLPEPPRDVHHVLLARNGDAREAACATAR
 LSAPDEGEAGPVL ADNRVI GGNAASVAAMAAAT LRAGAAGERSETPDAAFERVRTFVVANGRTALDAAAATAA SGGGlTLKETPKEEFKNTKNVLFVSNNDAVVAMAETAK YSEPVIPKDL RNLLVLRNYDFVSLISNLLR LDAETGGETPDASDPAFDRVDHHLIADNMTALEGAADAAE
 LAEKAVSGNLE DKYFDRVKNTIILKNLDFVDSL YS
 WSPATARPSSRTT
LRNGVRGAIPETPKECFRNAYYK\|IASNADALEMAVEAGR VRHGLAVRRAPTG PGPE LRSGKVQAPLGADNPVFDNVQTEI LASNTDCRAASRRLLEE V REPVEDETVRAE ELAHLTCQDVILVAADAACDGASNEAR VEETVPWDKQLDADKNYKFVREFVI ACNADAMECMAMESY LRKGLKGE DEETPKKNDAKVHNYVLGSNK乌ARKA DSERAK LHSGA GES $\square K P G D R R \square A R A A T R M V A T P Q M A D Q A A A A V A T$ STII ASNAHARDAAARAAG

LSRKMRADAQLNEKKRYKFVQQYVIACNADADECMAREAL LKRGLNTKAMRPNRLT I K NKII ATNQDCLNAMVLK S R IL KETMAVAPRAQAQPINLLVGNNCDARDAALAAAQ VEETVPWDRQLDENKKYKFVHEYVI ACNADAMQCMASEVF LEAGTL ETPKPGDARFAGHCLQLI ATPWQALEAAAATAR LQDPSPSPSVQP HNII GSDSTALSALKEYLS $V A N G L S Q R R R P R R D P P P$
$L$
$L$ LEDPRRSETLKPGDPMLSRSHFQLIATPQQSLDAAAQAALD LDAGVAGHLSETPERARPGDRALLAAGTGTLVAAARAVCG I A D APEDPPFSF $\quad$ TAQQ VA A

UniRef90 N1VKD5 UniRef90-Q97AL3 UniRef90-K5D340 UniRef90-X1YGZ8 UniRef90-A1B443 UniRef90-TONGE7
UniRef90 UniRef90-Boscy2 UniRef90-T1H373 UniRef90-X1G5Y7 UniRef90 C7DDV5 UniRef90-X11445
UniRef90-T1JYJ1
UniRef90_M6PS67 UniRef90-UPI000377F524 UniRef90-UPIo003FOD74B UniRef90-H9K697

STGYEATTLSDSWDQSTETTAKपMFDELLKAKKNEN RINEPIVSFGSNDQGDVTEVSEAFV RSMYEDSKDKGK SUGYEVKTVSDSWDYSSESTAKGVSEDFGVGANGGRKK EDGSVARVAYYPVTGOVVHKVSEFFVEVARTMYAGQDGHR
 KHDFEDDYFSNKISGEAADFGKGLFYLITEKLKKKEPEKS DADAQVVTKPLDGDVTD

A ALAVAKLA EDGFTPFILTTMLEGESREVGDMFAGTAKEDKHYNRPLSP QLDYKIIDLGNQISGEASTLGSRFAQIAR TSEKGEG NLN $\square P V L L L T S S L N C E A K E A G F F L G E I A K$ ENLKNKNS
 NYKLTP ISLRSDVVGNVHDVSLAYAHITSLICLASLPATK SRGWHVRLHPDPI EGEAADQGRALARTLIDGA
 N NDDAVNLGSNFSGNVEDLSLILHNDLKNUYSSKR


 AAGYTPHILGDSLEGEARDLGLVMAGMARQVARRGQPFAA
 QAGFVVLANAEALHDDYLSVATALGERLRH ELGTPMP GR

 ALGLPVSNHEEFISGEAAVEGRRUAEELVYL RAGLMPLLLGDALEGEAREMAKVMAGVVKSDRAHQQPVPF ELGGHVIDNKENLYDDVEVLSSYUGQQLINA SRGLLAQRHPSF| GGDAATRGAELGRWLCGAQAG


 AAGFHTVAHDERLAGEARALGAAIGATLR AAAESLPLGG RSGLSVHLHPEPIQGQAATRGRELARTLDDMPE DLPVRE SHGLDAVVLLPALSGPAADEGRRLGQLLVDMPEDLDVRS
 AAGYEPLVLAAGVRGEAREAALTHVAVAEECAETGTPATP K LGFKSKIKSVTFEGEAKEA LFPIVRTCK SDGCDVVDLGSNMRGDVSLFVQELISILRSTA RTRNR AAGYEPLVLTSRLRGEASEVGTTLVSMGAEAAATGTPVEP ASGLPGHLLTDELCGESREAGRVLASMIAWQASSSPSVHT NLEGEKINLGSNVNGDVKLVSQDITDILKRLYNKGQGF GMGYRALVLSSAVQGEVGRLARFYGLLTRAASARLGEASG

KLGLSPLKLNSTCSGTVEEFAQEYVKDAMYEQMKESP■CP SLGLTT
ALGWDSSSVDQDVEGPAPEVVK DMLHHVTADPAPLKR RAGLFPVKLNSTCYGDDQEFAKEYVKIALFEAMKGSPVCP AAGLAVHVLSDETEGEACEVGRVHAALAR
SQGYDAHIVTSSLEGNATQRGEDFAELIMSPKNGQQQLRD A LDYAVRVEPEFIAGDAAEAGRRLAARLR DAGUTPLILGD hEGEAREVAKVHAGDARQVVLHGQPDAA QRWPALSAHPEALVGDIDAVAERLLGUASELGQGGAGACA



\section*{UniRef90 N1VKD5} UniRef90_Q97AL3 UniRef90-K5D340 UniRef90-A1B443 UniRef90-TONGET UniRet90-N6SZP5 UniRef90-Boscy2 | UniRef90-T1H373 |
| :--- |
| UniRef90 $\mathrm{X1G5} 7$ | UniRef90-A4EJW4 UniRef90 C7DDV5 UniRef90-X11445

UniRef90-T1JYJ1 UniRef90_M6PS67 UniRef90-UPI000377F524 UniRef90 UPIO003FOD74B UniRef90-H9K697

KQATLDGGE ${ }^{330}$ CFFV/HGDG $L^{340}$ GGRNQETA| ${ }^{350}$ RMVI QSKDRQW SFWFVAGGETTVNVKGNGGGGRNDEDALRFMKLANFSDF
 PFFLVAGGETTVTVHGNGMGGRNCQLVMVSTLFSRDEEF KMLLIFAGEPTVRVTGT GKGGRNQQLALAFSLQLLNKQ KQMVLIGGELVCPVNGN GVGGRNQELALRDTVLLENRNW D CF:VSGETTVNINGT GKGGRNQELSLRMSKMFFENEL GTTVWGGETTVVLRGNGRGGRNQELALRVALEAARRGW PCALIAGGETVVKGGKCGEGGPNQEFALSAALQLAASYOK KTCWI GGGETVVTLTTTHGKGGRCQEMALQFLIHDDQLTNF PLLILCGGETTVTHDGS GKGGRNQELALAFSKRDSGCQG KVALLAGEPEVRVEGKAGKGGRNGEVCLGYYLGRRVKDF PVCI GAGETEVTVTGK GKGGRNQELALAAAVCMDEYQV PLLLLSGGETTVTLGSGSKAGKRNSEFMLAGALNWAGHAN
 PFWFVCGGETTVTVTGN GSGGRNQELAVRIMEDVANNDF PFYFMLGGETTVDVKG HGSGGRNQELVLRFMKNSSNSEV
 KAI Yi LTGETTVTVKGKG
PGI HI WGGETTVILPADPGLGGRNQHLALAAARVLAGHPG PCVLLSGGETTVTLRGN GRGGRNVEFLLSLAVALDGLPG PACIVVGGETTVTIKG HGMGGRNQE
PVTFI GGGETVVSMDPSDGGGGRNQEVVLGFTQTDSKYKV
PGLSII AGGE
PGVHVWGGETHVRLPDAPGRGGRNQHLALAAALELAGHDA GHVAGEHPGRGRNQHLALAAARVLAGHDG GDAHLWVGETTVRLPPNPKRGGRCQSLALAAARQIAGKAG NQLFVGAGETTVSLGESKGKGGRTLELALALSQTLHDHSF PGVHIWGGEPTVSLPENPGRGGRMQTLALAAAMALAGRDIG $P G V H L R G G E$
$P A V V L S G G E$
KVALL F F G GE

| V | H | C |
| :--- | :--- | :--- |
| C | W G G E |  |
| C | S | L G E |



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

 $G G \vee V 1{ }^{\prime} G$ GGVVLF G G E PAVVLTGGETTV T LGDDPGSGGPNGEVVVAAAGAADDRD GI
 GFWFVGGGETTVIVHGNGKGGRSQAAALHLLRSMRDEDF PAVLLAGGECTVVID GAGGSGGPNQELALSAAALEGEPD
 H G H


P

KVNEपFPGRPTVNपCPTPGRGGPNQELA पYFS पY पRGYTV

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

KVWEMFPTKPTFNLGENSGKSGPNQELALYFSLYLRGYTV

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

AGGG A G $\mathrm{H} \| R \mathrm{GG}$
A GM A P
PGAM FGGEPTVVLPENPGRGGRNQALALALAREIQGCEG

UniRef90 N1VKD5
UniRef90-Q97AL3 UniRef90-K5D340 UniRef90_X1YGZ8 UniRef90_A1B443 UniRef90-N6SZP5 UniRef90 BOSCY2 UniRef90 T1H373 UniRef90-X1G5Y7 UniRef90_A4EJW4 UniRef90_C7DDV5 UniRef90-X11445 UniRef90-T1JYJ1 UniRef90 M6PS67 UniRef90-UPI000377F524 UniRef90_UPI0003F0D74B UniRef90-H9K697 UniRef90 UPI0003B7A09E UniRef90-D3RNS3 UniRef90-SOARM1 UniRef90_T1BSL5 UniRef90 Q6KZ25 UniRef90-S6HRW2 UniRef90-A0A011PER7 UniRef90_A3V819 UniRef90 K1YYZ8 UniRef90-H1FZZ8 UniRef90 V5AKA8 UniRef90 X0ZGl2 UniRef90-D3PJ75 UniRef90-M111A8 UniRef90 UPI00023796E7 UniRef90-F2L2W7 UniRef90- F9U5C5 UniRef90_UPI000477C334 UniRef90 UPI000471CC1E UniRef90-I0IMC1 UniRef90-Q9HKZ0 UniRef90 A4BRW4 UniRef90-UPI000362AE5E UniRef90-M3AFD2 UniRef90-A6VRW1 UniRef90 U6P2J0 UniRef90-LOGVI1 UniRef90-X1SL96 UniRef90_UPI00037A9A8A UniRef90-T1E9Z6 UniRef90-K1ZUK6 UniRef90 XOS4D2 UniRef90 UPI0004767033 UniRef90-UPI0000164CE6 UniRef90-W0RLZ9 UniRef90_W9VCG2 UniRef90_A6GGC1 UniRef90-T0MTB7 UniRef90_R4VLP7 UniRef90 UPI00047E2262 UniRef90-V4XVQ4 UniRef90-K1XVE8 UniRef90_TOYZK0 UniRef90_M0CBY5 UniRef90_C6HY74 UniRef90-J9ZCE3 UniRef90-TOM2A0 UniRef90_F7DD90 UniRef90-G1V3J5 UniRef90 ${ }^{-}$X1M4M4 UniRef90-W0E149 UniRef90-D5BQJ7 UniRef90_UPIO0037BAFB7 UniRef90_UPI0002064B91 UniRef90-U6DB76 UniRef90-X0RH06 UniRef90_A0A011Q6X6 UniRef90_B9NMP3 UniRef90-K1SY83 UniRef90-E2AFZ3 UniRef90-B3T8L2
UniRef90 A9UXS4 UniRef90-UPI000258E3A2 UniRef90 UPI0002376FF3 UniRef90-A0A016V1L6 UniRef90_G2D9W6 UniRef90-B8GNT0 UniRef90_W9TL50 UniRef90-D0LKI4 UniRef90_Q168K6 UniRef90_DOCW00 UniRef90_UPI00047E8A90 UniRef90_G4RPE9


MFLSAGTDGTDGPTDAAGGVVTNNT\|ALMKEKKWDP\|VQL $\underline{V F L S A G T D G \square D G P T D V A G A V G V G E A \| V D \square K K \quad C E D S L}$






VLLSAGSDGSDGPTEDAGALIDGTSCARARRLGRDPAEHL


WF $\square$ GGSSYGKDGNSDAVGAFGAYATWWK $\square$ NEER $\square L P G R A L$
$\square A \square M A D T D G V D G Q E E \square A G A C D G P D T \square A R A R T Q G \square R L L D S L$ $L V I V G G T D G T D G P T N A A G A I V T G Q T W T A G \quad A R N Y L$

WF LGGSSYGRDGNTSASGAF
YFAAFGTDGQDGPTPAAGAADHAATVADAQAAGLAAQAALL WFSGGSSYGRDGNTDMVGAFGTEQTAAEDEMKNLKPHKVL

LF LIAAGTDGQDGPTDAAGACDTNDVREDUVKQ ASEYL
 VALAGDTDGIDGSEDNAGALMTPDSFARAEALGLLRADSLL SALAAGSDGID GNSPAAGAVVDAFTWRADRARGR IVLVAGTDGTDGPTDAAGAIVDGETWDA CVVVGGTDGTDGPTDAAGGVVTGATWADG

400
SS GTDGT GPTDAAGGVGPETWEKMRAKGWDAEKE
 AFASVGSDGRDGPGEAAGGLVGPGTPAAlRAGGIDPAAAL AFASLGTDGDDGVSPAMGGITDSVFRNRVTEK EVEASL
 TVIVGGTDGTDGPTDAAGAVVTGETWSD AVLALA ALLASATDGTDGPTEDAGALVDGATLERIRDAGLDAAHGL MLLAAGTDGSDGNSDDAGALVDGGTVARGETAGLDAGQAL


$\|V L V A G T D G S D G P T D A A G G\| V D G S T A K D L H A \quad V R D A L$
 VVLSGGTDGNDGPTDAAGAFSD

$A V F A M A T D G L D G N T G V A G V W A D P G L L G E L V K R G$

UniRef90 N1VKD5 UniRef90 Q97AL3 UniRef90-K5D340 UniRef90_X1YGZ8 UniRef90 A1B443 UniRef90-TONGE7 UniRef90-N6SZP5 UniRef90- Boscy2 UniRef90 T1H373 UniRef90-X1G5Y7 UniRef90_A4EJW4 UniRef90 C7DDV5 UniRef90-X11445 UniRef90-T1JYJ1 UniRef90 M6PS67 UniRef90-UPI000377F524 UniRef90_UPIo003F0D74B UniRef90-H9K697 UniRef90 UPI0003B7A09E UniRef90-D3RNS3 UniRef90-S0ARM1 UniRef90 T1BSL5 UniRef90 Q6KZ25 UniRef90-S6HRW2 UniRef90-A0A011PER7
UniRef90 A3V819 UniRef90-K1YYZ8 UniRef90-H1FZZ8 UniRef90-V5AKA8 UniRef90- XOZGI2 UniRef90-D3PJ75 UniRef90-M11A8 niRef90 UPIO0023796E7 UniRef90-F2L2W7 UniRef90-F9U5C5 UniRef90_UPIO00477C334 UniRef90 UPIO00471CC1E UniRef90-101MC1 UniRef90_Q9HKZO UniRef90 A4BRW4 UniRef90'UPI000362AE5E UniRef90-M3AFD2 UniRef90-A6VRW1 UniRef90 U6P2Jo UniRef90-L0GVI1 UniRef90-X1SL96 UniRet90 UPI00037A9A8A UniRef90-T1E9Z6 UniRef90-K1ZUK6 UniRef90 X0S4D2 UniRef90- UPI0004767033 UniRef90 UPIO000164CE6 UniRef90_WORLZ9 UniRef90 W9VCG2 UniRef90-A6GGC1 UniRef90-TOMTB7 UniRef90-R4VLP7 UniRef90- UPI00047E2262 UniRef90-V4XVQ4 UniRefefo-K1XVE8 UniRef90-TOYZKO UniRef90-MOCBY5
UniRef90 C 6 HY 74 UniRef90_C6HY744
UniRef90_-I9ZCE3 UniRef90-Том2A0 UniRef90_F7DD90 UniRef90-G1V3J5 UniRef90 B9Z552 UniRef90 WOE149 UniRef90-D5BQJ7 UniRef90 UPI00037BAFB7 UniRef90_UPI0002064B91 UniRef90-U6DB76 UniRef90 X0RH06 UniRef90 A0A011Q6X6 UniRef90-B9NMP3 UniRef90-k1SY83 UniRef90-E2AFZ3 UniRef90-B3T8L2 UniRef90-A9UXS4 UniRef90_UPIO00258E3A2 UniRef90 UP10002376FF3 UniRef90 A0A016V1L6 UniRef90-G2D9W6 UniRef90 B8GNT0 UniRef90 W9TL50 UniRef90-DOLK14 UniRef90-Q168K6 UniRef90- Docwoo UniRef90_UPI00047E8A90 UniRef90GG4PE9

KNSNSYPULKDTNSLLFTGATGTNVND DRNDAFTLLSAYHGAIMTGRTGNNVSDПMVGYVS口R LUNNSYPLLKDVGALLFTGATGTNVNDGLILLLAER EQNDSYRFYETLADGVKTGHTGTN
ARNDSTPALAAGDALVVTGATGTNVADLAVLV
DKNDTFTLLDKYRSAVISGFTGNNVSDIFICY
EDSNSYP\|LKDVNALVMTGPTGTNVND\|LILLVEG NENDSYNYFKNFED
ANNDSYAALKEAGDLLMTDATGTNVADLGVMDRTG DNNDAYPALKAADALVMTGGTGTNVADLGVLIRT LA HDASK L L S LG DA
SNHDAYTFWSENECMIDTGPTGVNVMDDYCLL
KTHNSYEVLAQVNSLVFTDATGTNVNDIQFLLDT E LDDSYGLLERYGRAI RTGFTFTNVNNFYFLLRHSR K DNDSYHFFNDGKDLLVTGLTGTNVMD $\square$ MLLLDS P

A GHDSWSAFNASSDLFVTGPTGTNVNDFRAlLIS ERADSGRFLEASGDLIRTGPTGTNVMDLILGY ANNDTYTALSKAHGAIITGRTGNNVSDGMLGY TNNDGYGFFAA LDDLVI TGPT LTNVNDFRALLDP NRNDSYNLLDKNHGAIITGRTGNNVSDIIIGL


A GAAAHVLLKACGDLVTTGPTGTNVMDLVI
DNNDGHGFFQALGDAVITGPTLTNVNDFRAIVIDG

ESHSSYELLEKTGNVIQTGFTGDNVNNIYVLHIN NNADSGSFLAKAGALLVTGPTGTNVMDLVIAIRN EENDTFRPFEATGRAI YTGSTGSNLN
RHADSGRLLEASGDLIRTGPTGTNVMDLIL
ARADAGRFLAASGDLVHTGPTGTNVMDLVIGVV RNADAGTWLEAACDLVVTGPTGTNVMDLII AL

 RRADAGGFLSCSGDLI ETGPTGTNVMDLVIGLREAE

KRADAGTY LREQDA $\square F \square T$ GPTNTNVMD VVA $\$ NTSNSYEFFKNGKNHIKPGPTGTNVMDVQVVLLN RRADAGTFLEASGDLVDTGPTGTNVMDLII ALL
ENNDSFTLLTLMDDA I ITGKTGNNVSD\FMLI ERNDSYRXXESLADGVKTGHTGTNVMDVHLLL KNDDSAGFFEKVGDGULTDKDGSNVTDDMMUL RENDSYHFFKPLGDLLITMPTYTNVMDLRLVIV TAADAGTYLSERGALLTTGPTGTNVMD\|VLVL
AAHRSHAALDAAGALLRTGPTGTNVADLVIACV
AGADSGSLLEASGDLI RTGPTGTNVMDLILGL

 ANNDSNHALALSDDLWVTGATGTNVADLQVL
ASHASLDFFKKNGNMDSVKTESFNVADLMLVI
RNDDSYTLLSRTGCSIMTGRTGNNVSDIFFGYYSP SANDTGTYLAEVGATVETGPTGT
RHHDSGHFLEENGFGI RTGPSGTNVNDLLLVIVYP ETHNTASLVHEEEDGLSFGPSGTNLNDLLRVYLFP


DGADAGSLFAATGELLRTGPTDTNVMDLVLADRR AAHDCYPFLQASGQLVMTGGTGTNLGDLAID

ANNDAHGFFKA $\square E A S V V T G P T M T N V N D F R A V L D T D$ DRADSGSFLDTAGALLVTGPTGTNVMDLVIAI

DTSDSFSFFERAARHLCPGDTGTNVMDDLLLLRVP AKNNTHLLFLSVNDQLKSGYTFTNVGDLEVIRI

ETSNSYQFWSTYNNH\KPGPTGTNVMDワQ\|VLLN
RVCNAGELLQASGDLLSTGPTGTNVMDLMLGL EKADSGRFLGAAGDLI HTGPTGTNVMDLVIGVV ADNDGYGYFAAALDSLIVTGPTRTNVNDFRAILILP RACDAHPALEAVGATVRPGATGVNHADLFLMVRAP DRADAGTWLDARGALLRTGPTGTNVMDLVIAL
RDADAGSFLDRAGALLVTGPTGTNVMDLLV
ERAASFDALSEAGALVITGPTGTNVMDIIVAV

UniRef90_UPIooo21A75EB UniRef90 X1KLH6 UniRef90-V3MPF9 UniRef90-B4UGK2 UniRef90_Q6W213 UniRef90 H1RZ60 UniRef90_D0LM78 UniRef90_UPIO004674E2C UniRef90 X1LQE5 UniRef90-B0VGX9 UniRef90_BOVGX9
UniRef90_AOA026WD16 UniRef90_Q5LP57 UniRef90 W1K137 UniRef90-UPI0003817474 UniRef90-L1JCZ8 UniRef90_T0LSN5 UniRef90- U4UMQ4 UniRef90_UPI00037EBEAA UniRef90-S4XV81 UniRef90 C1AA69 UniRef90-TON3X7 UniRef90-E2BDT1 UniRef90_X1PBD5 UniRef90 A7H7H1 UniRef90_A0A017SVS0 UniRef90-E5S7U9 UniRef90 H3FT68 UniRef90 ${ }^{-}$A9GFI1 UniRef90-H2PAK1 UniRef90 H9K319 UniRef90 M3HTY6 UniRef90-H2KT25 UniRef90-UPI0003C48D3 UniRef90 R6FM35 UniRef90-D6MLZ9 UniRef90-BOWCH9 UniRef90 UPI00046618C9 UniRef90 U6IJN8 UniRef90_C8T6D8 UniRef90-S2KEQ9 UniRef90 U6HZM9 UniRef90-UPI00047B9D70 UniRef90-U1QQX4 UniRef90-LOEOS2 UniRef90 E3LX47 UniRef90-T1B6T3 UniRef90-E3LX46 UniRef90-E3NJJ8
 ARRAPRVSARRPLAAACEAV YRAALARTAAARLVTEA MA LIKMRSDARD $\square \mathrm{F} L A \operatorname{GVEAVDPARAVDVALRQKQAALAK}$

## RATLEHLLLATVAQLNPSERTVAADES DDWQ


 $\square R R D L G A!\square E A G I K C V Q P S A \| L P K K I K Y D G R T L T I$ MTTAHDQALAA WQAGVDAVGGHAATGAAL MTDRRPLLRALYDAAVAAAHPNTILAPHLRLH LF QS S FEKNMPDVMVKNA乌HLNDDQLIV
$\square L N\|L R T T F L K N E P G R\| V A K R L E N V D L$ ANLRKLFAGAVKAVQPASLINNQVKLADGHLTV
$\square R A A L V S A F R A G L A E L D P A G L V E R A L D A E A G A R R$ VQGAAPYLHTTRAVDRWLIAQRA MS GNMKE $\square$ NEK $I$


E LR A A LVAAFRAGLTELDPARLVERALDAEAGA
MAAALQVLPRLARA
SPQS $\square$ LIFH $\square$ G GMA $\square$ RKS $\square$ PGAA $V$ RKF $\square$

MTSTS $\square R E T A L K D F H R T L V A D D V E T V V S S Y Q R D N G N Q L M V$ SQLKHLFAGAVDAVKPGAMFERYLRDESVLRQL
RNHMAQLLEAGLSVCDPYLGVKRFVRLEGSCLIF
 M MPRSNPRALLTAFHEAAVQGAAPFARTRDALHRW WAA LARSPSHAVALDCLTAGlKAADPARLTREAVSVADTILTV

LF QATSLT P T S LK
YEAAVKAADAYHGVRDALQUEGDTMRV
CVQSFCPKTGKADTE
lupas_21
lupas_14
lupas_28
jnet
conf
sol25
sol5
solo
jpssm



[^4]

| $\begin{gathered} 90 \\ \mathrm{vRl} \end{gathered}$ |
| :---: |
|  |  |

PEGARPPMPGARCTAAGHPRPTAGSDEAGRALLDWAGAGG DHENLRPVEGARTLCAGYPA DDPGGMLAASEVELAVSAAT

GVIAVDDTSMPALLPSGHPLPDVGSVRAAQRAWRAVAQAP
KKGEKRR\EK TKVVEAGHPVPDENGYKATRE\|VD DAQKAG KYGNVTIIPNLIVREASHPIPD DNTIKYSREI LSWLQELH PRRSISLMWRITF! EAGTDQPDEKTVEDTRKI ANYCKRLK KDGHGAELPSVQLI EAAHPVPDARSLVGGRALRQAVEAMP RHGYGVPTRRURVVEAGHPVPDEAGLRGAADTLALAGEAG $H D N N A Q Q Q L N K N I I F S S H P F I T S L S L D A G K K A K E F V K A G E$
$Q P E S D A T G L R S E V H G S R G N I P D A R A V Q A A T K A L N M A R Q C G$
 $P K G L K Q E N S K I A F D E G A N N M P D R D A L V G A Q S G K K L A E E L Q$



 PEGTRPPA GARAIAAGHPRPTRGSLAAGEAI RAW ADAN $P R E G L A D G P K V E V R A A A H P V P D E R S V A A G E L A L A D A G R L K$

VDPEEAA LR P DRVMRAAHPDPDARSVDAAEAADAVAAADG $K P H S R V Q V F E G A D N L P D R D A L R A A D A D R Q L A E G L T$ PRKS IF MMWRITYIEAGTDNPDEKSVRATRQI

 PVGTLERFRGDQVLECANNLPDEAAVEAAQRIQSVAASMT KHGDPLDCKKI GVVLLAGHPIIPDDLCVEGCKKIYE WSEHDT CAPQPTEHEIKEFNGPRTNEPNAEVVRASLKMAKDASSMK RYGYAVPA GRI R DEAA HPVSDAMSEVAAMLIVVETRGLTT
 RYGHGPECRMIEVMEAAHPMPDGLSEQAARRMLVAVAGLS
$P Q P T D R E L K V F T F Y G P R T N E P N E E V V K S S L K M A K I A A E M E ~$ RDWHDLPVPEVRVRQGDHPVPGPNSLAAAAEADEDLLFDME $P A D A Q V L T S G V Q R K A G E H P V P A A A S F A A G E A V A A F L R T D P$
$P E G E L G N T T K I Q W F G A K N N L P D E N S V Q A T R L I ~ Q E V R E S D S ~$ $\begin{array}{ll}P E G E L G N T T K & W F G A K N N L P D E N S V Q A T R L I ~ Q E ~ E ~\end{array}$ GPNAKKSMERCEFYNA PKKFEDSCFATDKVIEELQKYD

[^5]|  |  |
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| UniRef90- X1KLH6 |  |
| UniRet90 V3MP |  |
| UniRef90_B4UG | GAPALVVLLSGGGSALAVAPAEGVAAEEKAEADAALM |
| UniRef90-H1F |  |
| UniR | EDAEVLVLLSGGASSCLAAPAPGLTLEDKNT\\|VHAVAARG |
| iRef90 xila |  |
| UniRef90-B0VC | ANEELI 1 LLSGGGSSL |
| UniRef90_AOAC | KCDLL VMLS |
| UniRef90 ${ }^{\text {W }} 1$ K13 | PDDLLLVLLTGGGSANWIA PVEGTSFAQKQAVNKALLRSG |
| Ref9 | DVLLVLISGGGSAMMALPSDTINLKDKDEFDTNVMHMS |
|  | GLRSEVH |
| -T4 | EENLUVLSGGASALEELPESGDDQTFSNITKCLINAG |
| UniRef90-UPI00037EI | ANEEII LLLSGGGSSLEEVP隹 |
| UniRef90-S4> | PDDLLLALISGGASALLAAPPEGVSLADKQALVAALLEGG |
| Ref | PGALVLVLLSGGT AALCAAPTAALSQAHDANLAQTLLESG |
|  | FLL GGSSS |
|  | KRDLLIVMLSRDSNDLLCCPRDTVTLRDKLRVLNRLKAAN |
| iRef90 X1PBD5 | ENDLVLAG TGGSSALLALPVDGVTFDDUKKVNQLLILSG |
| UniRef90-A0 | VSGGASALLAVPPAGVSLGEKQALLVSAMLIDAG |
| niReef90-E5S |  |
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|  | S A |
| UniRef90 H9K3 |  |
| UniRef90-H2KT | VDDLLLVALTGGGSALLTLPKDRLTLDDL |
| riRet |  |
| D6 |  |
| UniRe990-D6MLZ9 |  |
| UniRef90-BoV | ANDVLCVLVSGGGSALLPLPKSPINLTEKLTVIMRLASAG |
| Ref90- 611 l N8 | V VCTGGGS |
| UniRef90-C8T608 | ADDLVLALISGGGSALMALPAPG |
| UniRef90- | EDDLVIALISGGGSALVSLPAPG |
| niRef9 | AGDLLLVCl SGGGSALLTLPSPRLSLDA VKTSKLLSLEG |
| UP | , |
| UniRee90-U1QQX4 |  |
| iRef90-E3LX47 | ESTLFLFLISGGGSALLTAPRDTVSLEEKLKTIKIMQAHG |
| UniRef90-T186T3 |  |
| Ref90- |  |
| niRef90_E3 | GGEDYFFSPREPVLLEEKVKIVSKFKDH |

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| UniRef90＿UPI00021A75EB |  |
| UniRef90－X1KLH6 | KLRYNSVILTSTLDCEAREAGAFLS A $\square$ A REI T S R NQPAKR |
| UniRef90－V3MPF9 | QHGLTPLILGDAIEGESREVAVVMAGMAKSAKQYGHPDS G |
| UniRef90＿B4UGK2 | GMGMEAAVDPVPLTGDVVSVAARLALWARERAGRP GARG |
| UniRef90－Q6W213 | KCHGPALMGQHRVDEDAAVAAEQLLVLA |
| UniRef90－H1RZ60 | ARG\QPVVLGDTVTGEAQEVARVYAALVREI RAYNAPFAA |
| UniRef90－D0LM78 | DSGLNARVFARDMLGAAEEVAQR VAA A M HRVAAAQPGQG |
| UniRef90－UPI0004674E2C | ILGF GVERNADWVKGEAQEAGRRLFHKALEDRQ DKSVDK |
| UniRef90＿X1LQE5 |  |
| UniRef90＿B0VGX9 | ELPPPVYVQPRYFSENVENVAEF $\square$ A D F A F |
| UniRef90－A0A026WD16 | KLGLSPI RLINPTGAGTVDEFAQEYAKDAMYEQMKESPVCP |
| UniRef90－Q5LP57 |  |
| UniRef90＿W1K137 | EAGFETIDLGADLEGEAREVAADHARLALEARAQGK |
| UniRef90－UPI0003817474 | D Y GF D GA S S $~$ S NLS C T P E Y A A Y LIK E F L K $\square$ Y N S S K P G |
| UniRef90－L1JCZ8 | RSVYEETRHM |
| UniRef90－TOLSN5 |  |
| UniRef90＿U4UMQ4 |  |
| UniRef90－UPI00037EBEAA | A LT SPVEVQ T R Y F TENAENVANSLT K F A P F S A K |
| UniRef90－S4XV81 |  |
| UniRef90－C1AA69 | GQGIDVVTDEDPLAGDADALGSALAARADRQARTMPPGTS |
| UniRef90－TON3X7 | ELPYEKIFLGN L L D G DVKICS DRLLDLLRNQYKK TGK |
| UniRef90－E2BDT1 | RLGLSPMKLK STCSGTVDELAQEYAK】ASLMULYEQMTES |
| UniRef90－X1PBD5 |  |
| UniRef90－A7H7H1 | ERGDSAEADPAPDTGDVAAVAARDGAWARANAGRG |
| UniRef90＿A0A017SVS0 | A R GWA A RVAPAE A GEAEVVAARRVAQASMLA |
| UniRef90－E5S7U9 | QFGFTP I LT SELRKQTSMFGSFLAELVLRIFDSYRDNYK |
| UniRef90－H3FT68 | NGGFTSAITTSTRVGDAGDFGREVADTVVQLKNRD |
| UniRef90－A9GFI1 | DRAGLRATAAPAEDGDARA |
| UniRef90－H2PAK1 | ALGYQAVVLSAAMQGWGTPAA |
| UniRef90－H9K319 |  |
| UniRef90－M3HTY6 |  |
| UniRef90－H2KT25 |  |
| UniRef90＿UPI0003C48D31 | DLGYWTLILSAAVCGDVSRVAELYSQLIQFVALQGLGPER |
| UniRef90－R6FM35 | EMG】EAHIMT T Y AEGESKDFG】SMASLAREVVKNNRPFSA |
| UniRef90－D6MLZ9 |  |
| UniRef90－B0WCH9 |  |
| UniRef90－UPI00046618C9 | E L G Y K P $\square$ C |
| UniRef90＿U61 |  |
| UniRef90－C8T6D8 | Q H GFTPPYFGGC |
| UniRef90－S2KEQ9 | A E GVEVRLLGD |
| UniRef90＿U6HZM9 UniRef90＿UPI00047B9D70 | A A G IIETVQVDDPMEGDAAALGDWFARRMLT |
| UniRef90－U1QQX4 | AAGHETGQDDPMEGDAAALGDWFARRMLTLA RAVPAGE |
| UniRef90－LOE0S2 |  |
| UniRef90－E3LX47 |  |
| UniRef90－T1B6T3 |  |
| UniRef90－E3LX46 | VHYDTSTPFGYKRGKTKNIGRLFTEMLCSQHLGDLPTTF |
| UniRef90＿E3NJJ8 | $L H Y D T S F P F G Y K R G T T K N I G R L L T E V L C R N A T S P L P T K F$ |

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| UniRef90_UPI00021A75EB UniRef90 X1KLH6 <br> UniRef90_V3MPF9 UniRef90-B4UGK2 <br> UniRef90-Q6W213 <br> UniRef90-H1RZ60 UniRef90-DOLM78 <br> UniRef90-UPIOOO4674E2C <br> UniRef90-X1LQE5 UniRef90 B0VGX9 <br> UniRef90_AOAO26WD16 <br> UniRef90-Q5LP57 UniRef90 <br> UniRef90-UPIO003817474 <br> UniRef90-L1JCZ8 UniRef90-TOLSN5 |  |
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KGMYПFGGEAPVKVTGN GПGGRCTHDA LDLAKKDAKKH QVWEMFPTRPTVRLGVRPGKGGPNQELALRFALYLRGYTV QGVLVLGGEPTVILPPNPGRGGRNQALALALAREオAGDPG
RHLIISTGE $\square Q$ VKVEKSNAKGGRNQHDA DFMMKFKPAFDF QLTESRRQRGRCSHMALMVAAELQG
PFWFTGFGETTAKVNGN GKGGRNTELSLR】MLEMNKNEV
KGDYПFGGEASVQVTGKGKGGRCTHLALLMAKKDAGKKH GEAVVDPCEPTLALPARRGAGGRAGWIALAALRDLPPDV TVLLAGGEPVVNLRATPMLGGRMQVLALSAALALEQWRL

PRLLALGGEPT TSVPAAAHPGGRAQALALLAAKELAGLPA GEALVIACEPTITLPARRGEGGRAGWVALAALQRLPPDA PVCLLWGGETTPCVRGK GKGGRNMETILYFIKAVQTQMA KMAILYGGETTVNLPPNSGKGGRNQHAALTAMIELKDLNF GEAVVIPCEPTLALPAHRGAGGRAGWपALAALRGLPPDV
KVNE $\square$ FPGRPTVN LCPTPGRGGPNQE $\square$ AYFS $\square Y$ YRGYTV
G VFLLGGEATVVVPHKSVEGGRCSHDALSAATRWFEDDT SVCLLAGGETTVQLQGS GKGGRNQQLALQVALELURCEV PCFVISAGETTTYINNNDGHGGPSQEMVLSFAMASKDLEA

SALVVCGGEPVVHपRDTDERAARTDEFASATPLLIQPRRV AGVHVWGGEVPVCLPARPGRGGRARHपAAELLLLWAARGW

PMALISGGEFGPMDAESGGETTPVQEQMQDCMAFEGYEF PMALICGGEMDAKIGGEDFKSTPIQELMLDCLMAFEKYEF

[^9]|  |  |
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| UF |  |



| UniRef90_UPI00021A75EB |  |
| :---: | :---: |
| UniRef90-X1KLH6 | NNNDSYHALEAAGGLLKTGPTGTNVNDLIILLL |
| UniRef90-V3MPF9 | DGHDSYCYFHALLDLLDTGPTLTNVNDIRAILI |
| UniRef90-B4UGK2 | AEARSGPAAVALGAAIPRFETGTHLCDLVLVAV |
| UniRef90-Q6W213 | TAGDASSVLATSGDLLLDGDTASNVTDIELILLL |
| UniRef90-H1RZ60 | DAHDAWGFFEAAGDLVVTGPTRTNVNDYRAILI |
| UniRef90-D0LM78 | DACDSHAALSAAEATVNTGPTEDHHGDLILI |
| UniRef90-UPIO004674E2C | SRNDSYTFFDACGYLFKTGLT GTNVCD\\|QL I I IT |
| UniRef90_X1LQE5 | $A E C D S Y S A \square K T \square N A V V P A F Q N P \square N \square N D \square Y \square \square$ |
| UniRef90_A0A026WD16 |  |
| UniRef90_Q5LP57 |  |
| UniRef90_W1K137 UniRef90 UPI0003817474 |  |
| UniRef90-UPI0003817474 UniRef90-L1JCZ8 |  |
| UniRef90-TOLSN5 | DKS DSAGFARRYSVQVETGFTGTNVSD\\|I IGY |
| UniRef90-U4UMQ4 |  |
| UniRef90-UPI00037EBEAA |  |
| UniRef90-S4XV81 | A GFDDAAAHRALLGTRVETGPTGHNLTDLHIV |
| UniRef90-C1AA69 | D T GRSWFSLDAADALLRTGPSGTNVMDVVAVLIR |
| UniRef90-TON3X7 |  |
| UniRef90_E2BDT1 |  |
| UniRef90_X1PBD5 |  |
| UniRef90-A7H7H1 | A EARSGPACAALGVADPRFETGTHVCDLVLVAV |
| UniRef90-A0A017SVS0 | GRFDDGPLLHRRLGTQLVGDPTGHNLSDVHAVVRGP |
| UniRef90-E5S7U9 | LENDSYNYFQSVDCLVKTGPTGTNYVRVYILI |
| UniRef90_H3FT68 | LQA S S Y NFFKGGKCHFKPGLTGTNVMDI TII L C D S |
| UniRef90_A9GFI1 | ARFDDAVVHRALGGTRVETGPTGHNLTDLH\\|V |
| UniRef90-H2PAK1 |  |
| UniRef90-H9K319 |  |
| UniRef90-M3HTY6 |  |
| UniRef90_H2KT25 | RRCNSYGFFRKTGTTLPARLTNTNVMDLLI |
| UniRef90_UPI0003C48D31 | SNNDSYTFFSKFQSLLLT GLTGTNVMDLQVVLIRAR |
| UniRef90-R6FM35 | MDHASYEALLSMGDVVITGNTGTNLCDFNVLYID T Q |
| UniRef90-D6MLZ9 |  |
| UniRef90-B0WCH9 |  |
| UniRef90_UPI00046618C9 |  |
| UniRef90_U6IJN8 |  |
| UniRef90-C8T6D8 |  |
| UniRef90-S2KEQ9 |  |
| UniRef90-U6HZM9 |  |
| UniRef90_UPI00047B9D70 |  |
| UniRef90-U1QQX4 |  |
| UniRef90-LOEOS2 |  |
| UniRef90-E3LX47 |  |
| UniRef90_T1B6T3 |  |
| UniRef90-E3LX46 |  |
| UniRef90_E3NJJ8 | D P NEFWCLFS K S E Q L |

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[^0]:    $R L D T \| A S G P A Y P D S S T S$ Q Q All DVI E K Y K

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[^4]:    lupas_21
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[^5]:    lupas_21
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    lupas_28
    jnet
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    sol5
    sol0
    jhmm
    jpssm

[^6]:    lupas_21
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    jnet
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[^7]:    lupas_21
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