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 <br> <br> w} M V K S R N H L L L N R L A L L E R MEE G G A R A C L V R HRRAAL Q R MDHRHREILRRQKRRDLLV E S L $M D L T A R S H L L Q N R E A L E R$ MD DR QRK L QRNRA MLVEKL MD A K A WN C L L Q HKEA L E R $\frac{M}{L}$ $\frac{L}{M}$
## M

M
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 $\begin{array}{lllllllllllllll}M & D & E & A & D & R & Q & V & L & R & R & C & R & V & Q \\ M & L & V & R & E & L \\ M & D & Q & Y & R & N & L & L & T & Q & F & R & V & E & L \\ V & V & N & T\end{array}$


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







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 $M \operatorname{E}$ E H H K K A


 MS DSHR DLL R K K Y V P L S R DLLHPN HVIP Y L Y Q E DV LITE E MK







 M T E S H K S R I A K Q R V R $M$ T R A H K Q H L S Q H R D S L V V MEVR HK K A L N S Q F V T L A E EIINP E Y I FP Y L I I E D GI L T P H M A $M D E S H R D L L R R N L V A L T T D D L D P G D V Y D L L I D N G V L T E D E K$


 M E K H H Q D V L T R N WT N L C S DL D T S L I V D Y L L Q E K I L S C D D I


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 E K I M D QP T Q K K R A A M L I R V L L E K D N N S Y I S F Y N A L L H E G Y EEVQRAGTRRDQARQLVTDLQTRGRQAFPAFVSSLRETGQ

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| UniRef90-C3Y796 | THLSNLLMNQRP |
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| UniRef90-UPI0003F06F88 | P WLK D GL |
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| UniRef90-R7TLF5 | GHI AEYLENSDP |
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| UniRef90_UPI0003F09B0F | P HLYKLLT N |
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 $M \operatorname{D} P \mathrm{~V}$ H R A V L
 MERRHQDVKRCMMXLVTELGVASLWDVLLTRQLETPAML M E P E H R A L L R E H R L Q L S A Q L LVVS DI I P F L Y Q E NV L T R T QV MSGTYRTLL LRNYPTIYLELDATRVLDYLHQQGVLTRDDR LSEQRKQLETNRDKLIECUQHGLWSHLRSHGLVTEKDE MTQEHRELLRASRMLLARKCQISPICEYLLEARILTSYHQ MEDRHKECLGKNRVYMCSETSLSGLFAKLTESRVITDEHV MEERHRRAIGQNFTSLVEQTDLDMMVSALYERGVFS MNKHEWD【TRRNRVF VKENVRVDQLWDALLSREGLKMHML MDDWQRQALDSNLIALADSLDLDELLPFLQQKGILREYHV MDVSHQDILSRILRMNIVQDLNIEGILQQLQSEYILKDDDI ELIRKNRMALFQHLTVLPLLDSLLTSGVINEQEH MEADHRELLRKNRMSLSSNMNTEEVCTCLIRDNVFTVNDK MEERHKECLKSNRSFLCNEMSLSAVLAKLTESGVLTDEHL MGSDDLSLI RKNRMALFQQLTVRPILDNLLTANVINKQEH MRRDHQEMLKLYRDDAVTHVNPDRITAFLASRKVRDPTGM MDSSHKKCLLKNRPFLLLKEISMSDFLGHLSAESVITEEQQ

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| UniRef90_R7T5Y7 | P HL H D ML K E G LP |
| UniRef90-C3ZQQ4 | R HLAEGLRQ |
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| UniRef90 F7B2V3 | K N L |
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| UniRef90_R7T6N8 | K HVA D H L K K |
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| UniRef90_K1PWT5 | P A A N Q L E G N |
| UniRef90-E5SPY4 | T HLE Q A L R S |
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| UniRef90-G3WEC3 |  |
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| UniRef90-D1MAR5 | F HLSKLIS T D |
| UniRef90_R7TGT7 | R HVVA E R L K K C L |
| UniRef90_R7TWG3 | K HIS E HLKK |
| UniRef90-V8N7F5 | K DL |
| UniRef90-UPI0003F0D2DD |  |
| UniRef90_C3Y1F2 | Y WLA D T L E G S |
| UniRef90-R7V8E8 | D HVA DQLDD |
| UniRef90_UPI000440F2A8 | HLLT C F L L S |
| UniRef90-H1A3I6 | GHLA EML MQEC |
| UniRef90_V9LAX8 |  |
| UniRef90-U6HC23 | S S LA EK M A N |
| UniRef90 C3YMP1 | P HL E E I L H |
| UniRef90-W5KBH8 | Y L L R E L M Q |
| UniRef90-UPI000258DE6B | E WL S D DL |
| UniRef90_R7VGT0 | R HVA D R L K K |
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| UniRef90_UPI00033316D6 | P L L Y K R L |
| UniRef90_E3VQ35 | NWL WE K |
| UniRef90_C3Z9P6 | P L A A D ML |
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$\square S E$ Q R K Q I L V K R VE L LTEEDKLLDLNRDKLVRDIHVGPIVDRLFATDFVTEQEK
 RREQLMQHQSVLVERMDPD TVLA LLSKRKVETSAMT MEAKHKK■LQKNHELLSNDLDLDSVKRFLFENEILTGEDL MEDRHTECLKSNRDFLCSNNSLSGLLAKLTKSGVITDEHLL
MEKロHK MESHHDECL ME E E C WM R L

MD
MDPREK

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



MEESDLS
S ${ }^{\text {E }}$ MNTVEKAALLRNRDALIVQSVDFTYVREKLVAYGVLTVHQA MKDAQREVVQKHRVLLVAELELTKVLQELKGHELLTKRAD MTYEHRKKLAS QQLKKDLQLGIVLPALEEANIITTEMK IRKNRMALSQHLTVVPILDSLLDAGVIHEQEH MSNAHRKVLKSKLACLVENI QTEPLIPSLMSSNVLCDVTK MRGSDWNKIKEKLSELHNDLEAKDLVEHLYEKHVFTADDK
 D AKARNCL LQHREALEKDI KTSYI MDHMIS DGVLTPSEE MDARDK QLL R S L R LEELSTEVLDMEGVIQYLYQEGILTENHV
 MEKHHQDVLERNWSVL CS E L D P S L V A D H L I Q Q K G F L S L E T K MKPENERKLWRNWMFLK QELPVPEITDKMIAAGVFTEENK MAE $\square K K D V L T$

R L LKNHFN IL ER IV

MTEEHK RLLKTHREFLVTHINTQCLLDNLLENDYFTDE DA LS E Q R K Q L L DD K R D D L A E T I

MEPKHKVLLEKYYQNVVESVDVDRVLDAL AHSGTLLTQSER
KLLLK I N RE LLLVTHM NTQCLLVDNLLENDYESAEAA $M$ N E G Q R A A L K R Y H Q R L A E D I I V S D L L G E L Y Q V G I F E K G M M K D S S L L Q $V$ L $L$ Q L H R L
 $M K D L H K L L L R R Y H R Q L V R D M Q T T R V L V Q M L A$

 MESHHDECLKKNRVFLCDKIS LSDFYAHLSQNDVITTDDEI

MRSSHKE | $D$ | $L$ |
| :---: | :---: |
| $L$ | $L$ |
| $E$ | $A$ | MSTLERALLTVSTLTIQCLLDNLLNGFFCQEDV



 E F E Q K R V L K R R R D S L V L Q H R E Q L DEECWNMLEGFRDKLI SII DPSRI TPY LRRQCKVI NLD DE

 M D K S M L G R V $\operatorname{V}$ A R R K R R P E L L



ELIE
 E E A L WGNVEKNRY ILCRYINPSKLTSSYLRQCKVIDEEQE


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A H
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$D T$ ASLLR
GYLV
CPYSEELLRHCP
ED DGBKL
PHLQSLLLDG $\square$
A HLVE
DDI I EKLEN
K Hi A D H L K K
PVLYKRLQQD
DWLSDEI
KHI AERLDE
PQLYQKITTGKEP
RHVAERLNKCL
SELADDLERQ
K DL
SWI SEKDEQ
GHI VE LLQS

PEVEEVLHR
QDL
D WlAADKLNE
SRLEGVLRAESP A HLVKELE PTLYKRLQQDT QFVADEILAGV
PHLADMLKP
PHLDMDLWEG
GYi AKLLQDEL
PQLYK
RLLVEF LD NTV.
RWLWEK
PDLYKKLTGKDP
P WL S D LL
PWVRDKLK
RSLVEFLDNTV
HLL RDLMAQS
$R \mathrm{HL}$ Y E M

V DLKP WLS E
PHVVSEI
EELAKELRK
P H L H S MLLGD
PWLATAL
PHLPLLL
EHVV
NWLAKD!DDS!
PELARPLRE
GWLADTLE
PHLIMDLEEG
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FDIA
VDLR P WLLE
LF LLE MLN

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PHLYSAL

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PLIKDL
$\mathrm{P} \stackrel{\rightharpoonup}{\mathrm{H}} \mathrm{V}$
CHLAEVLE
S WI A RLL Q H S $\square$
P D L Y Q M V T GKEP

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LE R K E R E I I H T N R VK L T D Y I D A P D
ATVLVPHMKQHGI F
 DWHR $\begin{aligned} \mathrm{D} \\ \mathrm{Q}\end{aligned}$ DWHR $\underset{Q}{D}$ $F L D K N R E K L V V R V T V E R H Y D Y R S K K I L T R E D A$ $\begin{array}{lllll}D & K & N & R & E \\ T & K & L & V \\ S & N & H & R & E \\ L & L & L & V \\ R & E & N & R & E \\ R & 1 & V\end{array}$

K A F L K
E K N R Y IL

| $V$ | $S$ | $R$ |  |  |
| :--- | :--- | :--- | :--- | :--- |
| $V$ | $S$ | $T$ | $L$ |  |
| $V$ | $E$ | $E$ | $L$ |  |
| $L$ | $Q$ | $E$ | 1 |  |
| $C$ | $R$ | $F$ | $I$ |  |

$\begin{array}{lllll}K & V & Q & C & L \\ D & V & Q & K & V\end{array}$
K $L$

RKNYLLIMENLRVDEVMDHLYSEKVIDLVEM
KERITENHRSKLEQNVDVEKLYPLLQQDKAITTKEED



I DRHRKSLIDRVVVSP I LDELHGD VLQPEQY I Q N E N Y L M N N I E A R H Y T S Y L F V N GVVFS E D E M
$N$ IQ NENYLMNNI E A R HY T S


$M L K \square H R D$
$\begin{array}{llllllllllllll}R & A & K & K & Q & R & R & S & T & T & N & G & L & L \\ L & E\end{array}$
LSESHKNLLI
$R$ AL AY R R V E L
MDQKHRET


## R LL <br> LI E E S R F E L <br> $R L$

RHREALISRTNDDPVLDYLLSDFILTQEQY Q T L R DKRK LVV S SVNTNGLLDELLDKRVLNQEEM


 E II I P K H R E Q L V A R V T V D D P L L D K L H G L


 MADKKLKEVRTMFVERVSDGVIAPVLDDLQDKRVLNQDEA

## LD

 Q Y R E A L L V A RMDPKWE
MEKHEE $\begin{array}{llllllllllllll}\text { Q H R E } Q & L & V & A & R & V & T & V & D & P & L & L & D & K \\ L & H & S & L \\ Q & H & R & A \\ L & V & A & R & V & T & V & D & A & V & L & D & K & L \\ H & G & P\end{array}$
D
K L LECWSELVKSMPVDHMKNKLFSKRI
 EH QK IL WT NMGE I S R R LIPVIDP LL DHLIS QGAI TA E E Y MDELQRKA! 1 D

K L H
RHFVVD K H R A E L I R R L N P A K L T P P Y L R Q C R VI

$K L L D Q H R E Q L V A R V T V D V L D K L H G A V E S E E E Y$ MDKA HVRWV D DNF QV L L D E L E L S P SFY R L L Q K KVVFS S E D
$\begin{array}{rl}P & D H L H \\ K & F \\ K & L \\ M & R\end{array}$
KVLMEKRRLVVESVDMNGLLDDLLEVQVL NLEEM
 M N Q K H R D T I D L Y C Q D

HKDLKEKRKVFIVTSGTINVLLDDLLEKKVLNQEEM
K EAIRRRKRSTLLENIPPRAVLDTWFEDEVINNQVL MDAREREIVRRNHRLLVHNIDTEEFFEHLRNYHVLPETMG K K K ME NI L Q K H WT QL K S S V DTE G I L D HL F Q D K I V S DT R K
$K \bigvee L R A K R K Q F I N S V S V N G L L D E L L E K R V L N Q E E M$

 MESKETYALRDVGPMIVQSLDPMDVLDSLFSGKWLSIAE Y ME P K H K E LL L D QCH QNL L E S I D A D R V I E L L I V S G T L S QL E R MTDVER

SLRVHRELL
WQT R K CRKY V T L NPAYILSYM R R E LL L R K E R V

K I L K E K R RLLFI Q SVVEI NGLLDELLLEKRVLNQEEM





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UniRef90 V3ZK32 UniRef90-UPIo0035A09FD UniRef90-L5LRD6 UniRef90-C3YGB1 UniRef90- F7C9A2 UniRef90-UPIO003C28A75 UniRef90-V4BYC4 UniRef90-V4BYC4 UniRef90_UPIO004540E64 UniRef90-EOVT85 UniRef90-UP10002C67EC9 UniRef90_R7UWDO UniRef90-H2DL11 UniRef90_UPIO002063556 UniRef90-G3VMV8 UniRef90-A7SMP6 UniRef90-Q0005W5 UniRef90-UPIO0034FEA5D UniRef90-UPIO001DEBA1C UniRef90-13JPD1 UniRef90-R7TN50 UniRef90-UPI00034F3DE1 UniRef90 UPIO00443882A UniRef90_UPIOOO42AA352
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 EELLCQTSRRKAGDLLDRLAKNPKGLDALDESIRQETQ DTVRSQRTSQEKMRSLYDCVRGWNVACKDKFYAALKKHEQ DSVDDTVEFQERNRLLLKLLTEKGRDGFKVFKKALHKRGY EKILAKDTVVKARDLCDFVIRKGPKACQIFTNFICKED ERVRAEATNPGQMRKLFSFSKSWDWACKDQFYEAL KEDH DRFKKSNTPDEQVGELLDYLEMRTEEDYETFGECLDKDNQ Q VLHEDTDKAKNRKLLDIUKRPDEDYEKFCEDLRDTN EI VGACPTLPDKVRKMLDLVQSKGEEVCEYLIYVLQQDDQ LVLSEKTREHKAGKLGKLEKKDNYSYISFYNALQHEN PTQQQRAALLIGMILKKDNYSYISFYNALDHEGY DTVRSKGTPQERMRQLYAHVRAWGDPEKHELYQALKSHN DELLNSATKNRTSRLLDILHTKGERGYVAFLESLEFYY ER1DHE
DTVRSKGTCQDRMRQ YDCVRAWGDYQKDA DFRA $\square E K H \square Q$
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H L T A M
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P HL I ELLE


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$P$ LLATEL
S YLVEDLERS
PHLI MELWE
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Q V L
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$\mathrm{F} \stackrel{\mathrm{N}}{\mathrm{N}} \mathrm{V} E \mathrm{R} L$ QKDVP
P
LDAF L HRNL
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CY A AVLE
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QLI SDLI NDKL
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RYLAATL
PELYKRITGQDP

$P Y L V S Y L R Q Q$
K QLA E E L N

PN $\square$ A A E $\square \mathrm{Q}$
SHLAEKM GLDP

| $Y$ | $L$ | $A D$ |
| :--- | :--- | :--- | :--- |
| $Y$ | $L$ |  |
| $V$ | $A$ | $D$ |


PLL/AETL
K D

Q ${ }^{\circ}$
RYLAGTL
DFLAEEME

| $P$ | $F$ | $L$ | $E$ | $E$ | $K$ | $L$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $P$ | $D$ | $L$ | $Y$ | $K$ | $V$ | $V$ |

$\begin{array}{llll}P & D & \mathrm{Y} & \mathrm{K} \\ \mathrm{R} & \mathrm{F} & \mathrm{L} \\ \mathrm{I} & \mathrm{I} & \mathrm{D} & \mathrm{D}\end{array}$
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PY VVADLERS
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MDER
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 MKEKRKQFVRS MDDRQQEFLTESYHSLARVIRPQCFYTYLRSKNVRNLCD Q WI L K R H
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$\qquad$ E H F S Q L I D R V T V

L L

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D E K H
 QLA $A$ G
 MKTE
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L E E R HK
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P
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RYLA GTLL
KNLYSELTGGSP
PEHYTR LTGREP
GELADALSEAC
TSLMEKLN
PDQYTQLTGEQP
WD LVRDLDPNSP
RRSAEVLRS
DQLRNAL
CHLARTL
PEL
PT $\quad \mathrm{Y}$
KHLLEDLEGN
SHLVHDLDPS
QLAI SODL:

$D T L A S F L R$
WLI LDLMEK
$V E A L Q V L E R Q R$
$T R L V Q E L Q$
RFLDEELEGN
NELSSTLESDL
SHLAGTLR
E HVADHLK
A F L A A E K ll

| $S$ | $N$ |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $S$ | $A$ | $N$ | $K$ | $L$ |  |
| $P$ | $Y$ | $L$ | $S$ | $S$ | $E$ |
| $S$ | $L$ | $L$ |  |  |  |
| $P$ |  |  |  |  |  |

K HLAY LLS K D


PELAQKMK

RTLSSDLH
PRDQDWLQTG
KFLMQDLQK
PKLYSKILR
QSLYEL
R DLVE ELDEGG
K H
TGMLHADEN

KHTA $\quad$ HHEQL
$\underset{P}{T} G L Y E$

T LVEQL
PALYN
NCLAMIM
PEVAELLDR
P NLY
PDTA
PRLRNWL
D D L VE S L Q QDVP
K F LVKELSE VQVA
KETFPK L HE
T G $\square$ A E A $\square \mathrm{Q}$
$P F$ LVRDLEK
MLIENLIQQNS EQCAKKL

PD $\square \mathrm{Y} \mathrm{T} \mathrm{L}$

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 D DEC WS A L E G F R V K
 E ER WS EMTPHF QVLSHTLE P P KFMANLMAKKVLS DDD F IQ NKREEIVNQMTEACLLDALLARDLIMREDY

 EPECR VLSSAFDTDQDINPMEILPELAS VFSDTDK
 E E T L WD TL E S H R CK V V S DCP S R L T P Y L R Q A K V L G Q L D E

DLI R K N Y A ELLVQRMIABVQI TNDLIFTRNI L SMGEM


 Q H K E Q L I Q Q V S S V
Q L L K
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Q I IERE
$\square$ Q T K RED $\square$ VH QM T D T C C L L D A L L A A

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EKEDA D
KL L R

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T S L VK D ID DHF LVD K L LE H KIVVNARE K



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$\qquad$ L

## EETLWEM

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AR GIL LK K NEAFL RRHLVLSSVLEKLVDVGLI GDVMK


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 E ENKLRTEDKVKVLLELLVSKDDQAFYVFRDALRKTGF E LENITDPMKKSWKLLILVQKKGEVSGQLFLDCLLST EIVGACPTQPDKV
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DELLNCLTLINRTGHMLDLLRDQGRNGAMALLESLMDH Y NNI KD DTRSKQARDILDYVILKDNKHALTFLKLLK ESI AEEPSRADQARALI DTVKKKGDNASWKFIAHIKRRD VLVSCTAARDEKNSRMLSULVSRGERACRTFFYPCLKSAE ISIDKIENSYQKVRADLNTVLKKGEAQCESFLLLLQD DVVYHLHDTSKKWDLILAVLQQRGERAYQAFLVALLQSKY ESILEKQTRADKARCLI DTVKKKGNKACRDTINHLR
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| UniRef90-R7UTF3 |  |
| UniRef90_G1KJX5 |  |
| UniRef90-UPI00042CCAF5 | P $\square \mathrm{L}$ Q E $\square \mathrm{H}$ |
| UniRef90-R7TCV6 | R D A A K |
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| UniRef90_UPI00045494E8 | P DVY TLLQP Di |
| UniRef90-F6R2G2 | E DL |
| UniRef90-R7TMJ7 | R F L |
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| UniRef90-G9KDL0 |  |
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| UniRef90-B0S6V5 |  |
| UniRef90-Q5GAJ3 | Q ${ }^{\text {L A V L M E }}$ |
| UniRef90_F1NDV4 | ESLA DDL |
| UniRef90-F7G3D4 | P DI Y T L |
| UniRef90-V4AYV0 | GWI A DVLLD |
| UniRef90_UPI0003D0D9FA | CLL A |
| UniRef90-W5NM19 | P DL Y N S 1 |
| UniRef90-F7D911 | T QAAAYLSEGRP |
| UniRef90-R7UZD2 | R HVA ERLK K |
| UniRef90-F6XPF0 | D DLAESL |
| UniRef90-W0TYJ3 | NDIFEKMDS |
| UniRef90-UPI0002BCDA03 | P F L F ELLLK |
| UniRef90_UPI0003502EAB |  |
| UniRef90-J3SD76 | $C L L L R R / L Q$ |

UniRef90_W4XSL3 UniRef90-F6PXA2 UniRef90 UPIO0038EA3E6 UniRef90-UPIOO04443315 UniRef90_B3S614 UniRef90 UPI0001DE69CD UniRef90_UPI00038BC33D UniRef90_UPI000457157C UniRef90-UPI0003BD24AC UniRef90-G3PU63 UniRef90-UPIO0035947E6 UniRef90-X5A4D8 UniRef90_A0A044RH28
lupas_21
lupas 14
lupas_28
jnet conf sol25 sol5 sol0 jhmm jpssm

UniRef90_W4XSL3 UniRef90-F6PXA2 UniRef90-UPIO0038EA3E6 UniRef90_UPI0004443315 UniRef90-B3S614 UniRef90 UPI0001DE69CD UniRef90_UPI00038BC33D UniRef90_UPI000457157C UniRef90_UPI0003BD24A0 UniRef90 G3PU63 UniRef90-UPI00035947E6 UniRef90- X5A4D8 UniRef90_A0A044RH28


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lupas_21
lupas_14
lupas_28
jnet
conf
sol25
sol5
sol0
jhmm
jpssm
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UniRef90_W4XSL3 UniRef90 F6PXA2 UniRef90 UPI00038EA3E6 UniRef90-UPIO004443315
UniRef90-B3S614 UniRef90_UPI0001DE69CD UniRef90-UPI00038BC33D UniRef90-UPI000457157C UniRef90-UPI0003BD24AC UniRef90 G3PU63 UniRef90-UPI00035947E6 UniRef90-X5A4D8 UniRef90_A0A044RH28

