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 DNFSHMFSD HALYYTSDINTLIY VCAVPFKVVLAM

 ENYGSLATSEF
WENYVWLFTNEK
WENYYTRLWSNEK




FDNYMNMFARGDLAGPF $\quad$ KA LLWSFVFAAAS VLSTAA $L G L$ NYREMLQDS

YFWNSLGNTLSIWVLSTVPQLLAALL
$N F \square Q\|L T K D \quad K T F G \square S L K N T F F Y \square G V S V P L N T M V S\|$
ENYR\|LLRDGVFWKSVWNTCKYVI ITVPLQMAF
$K N Y \square D \prod F T Q S K V H T A L V K$ T T DQFGLELIPANLILSL F NYRNLLSSDF

F WN A LKKNTFTIGGLISTVPQLLMA I

 NFQRLWNDSNFWAA LQNTF


NYARGY F LiF AFN
DNYロA ILSGET
WENYRFVLGD

ENYLRMLDDP

QNYRLVITDP AFWTS LLNDAF $\square L L I Q V P F M \square F \square A T$
ENF DRDTKDPDF LKSFDNTDK FVVWDIPVQLGAA
 NYAALLTDARFQK NYTR $\square$ FKD P
QNY $\square$ TMAKD
$F K N F Q R L L T D P \square F W Q T F R N T L M Y L F C V V P V L V T L$
WKYFKF LIFQDE
TFYRVLRNTVVMSSTKLVLGFVTAT KNYIDMFHDPK ENYUSMLKNPNMSDAF

F $\square \mathrm{K}$ SVKVTITWTIIVVPSIIFFSL
 FENYKRLLSDP

VFI NALKNTLLFLIIQVPIMVVLAM
 ENFRTLANDPLFVQSLVNSVKYLLVVPVL ENFRKLFADPVFWQTLRNTLLY LAGVVPV LVVAP

DNFVATVKDRVFRGSTWK ENFTRLFQDEVFDGTVFSAFTVFFSMCASL


F

F QHFQKMFAD
 $N Y \square A L F S D A R F L N A D W V S F K W E V I S V S \square T M D T G A L G \square$
$K N Y L E L I S N P$
FDNYANLLFHDG NYENMLLED
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UniRef90_F5LIR3


MFEAASPRMRNVLCVLF IIPVLLPRVCAAFVWKFAF $R S M A L R G V L R T T Y F L P S V V S L V A A G L G F R W L F$



$A V A M L L N N R \quad F R G K G F Y R S A F Y \square P S L V G A S V S \square A D V W K A M$
 VFALVLNA NFPGRAFVRAAVLIPWADPTIVSAKMWAWMM 1 WLAA

 $L G L A A L V N Q K L R G \square N W F R A A Y Y T P V V I S M V V A G I A W K W L Y$

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UniRef90_F5LIR3
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 GRRDF G LVV N WVL


 GQN GVVVNQII T HLGGMENVNFLSNPRTMFRPVIYITTHIWKE








 GRDF GMVNWVLGLLHVGPVDWQAHSWTSHLAI SSIVIWRW
 NGTNGF I NVIL NAL GMES DN F L G N R N TAMMLSSIIVFMMMFC


 GRQP GLL S WL L D T V G L D P DN WQA GE WT S K TAA A SMVIIWR W SPEA GPV N QFL SF L GVVDPPGWTS S QD WAMPALILA S V WR D
 SPGS GIVNRIIVALGGQPIFFMGDGWWFRGVLVFSDVVKE
 DKNTGIINNYLLTCDGMPAVDWLGNPKLAIFSVIMVDVWRM D T N GIVFNQ GL K A I GF E S I R WL T S P QLAA WS V MA V T I I WK G NPSFGMMN Y L L HLVGGLP S I N WI GN S WA A RLA I F L V V T WR W $N P D R G F I N G I L V A L G V N P V N W L A D M N D V L F A V F V V L T W K Y$ NPNSGLLNAIL NKVGIASQPFLTSPKQAMYAIVFVSAWQG

 GQ D G L I N VMM MK L S L E P I Q WL T D P F WA K I T I I L A I T WR W
 Y A D S GLLLN QLLQQVRLPADPWLTSPDWA F SVVMAVTVWKG



 NSNSGMLA YLLKK KI GIV VMPNLMSDPTYAMAVII MVTVWRN

 NP EMGPVVNMLLYT LGGLDPPGWAADRHWAMVTVVILVGVVWK S




S




 A NRGLLNNA LLMMGLKWLSHDWL GSYGTAMGSVIVFETVMW D P T F GMM N K L L D L I GLLDKHA WL G E S S TAA L GS ML FI LIDWA G

 $P$ TS A G L V N D V $M M M K$ L H L I N ITY F L G D Q K WW W L S Y Y I I N V WK D NDQF GI L NDMLVGLGLIPI A WTASPDTAMIAVIIVDVWKT GRDYGLI NWVLSWFGIGAI DWNA GTATSHAAI STMIMMWW
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130
140
150
160

| Y |
| :--- |
| T |
| $T$ |
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| $M$ |
| $V$ |


TGYNALLYLAAMQAI PRDRYEAAADDGASRWQQF LIKVTVP TGYNALI YLAGMQSVPGELYEAAELDGASRWRQFLHVTLP


 T GYNALI YLAAAMQAVPQDLYEAAALDGASRWRQFLSVTVP TGYNALI YLAGMQSIPQDLYEAAALDGANRWQQFLHVTLP
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## $\stackrel{\rightharpoonup}{V}$ <br> -



QUERY
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Y S VA DTIDTFDYRTTFTTG ADFGYMTALGLLKSSVNLV GNQFQTLSLLMYEK
LN QYQTLGLFMYQQ
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FAVSDVISTY YRKTFMTA $\square$ PNYGYTTAVGLFKSLVGCA
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$N N A S L V L M L L M F R Q G F S$
$L N S T T M$
VGQTDDLISMVYKDADESGS
DRQFQTI ALFMYEQGFREF
TMTLGLYLYQQGFRSF
$A Q S T Y V Y G L Y L Y N T A F S Y$


E H QYQT GLYMYDQGWIIG
L
SHQFQTLAGLLYEESFR
LK AT YMLG LLKLYNDGFLYF
YEMADII DTYVYR $\square G L$ GELRFSFTTAAGLFKSDVGCV
DSTEELLVTYAYRMAFEG
STFVI SYLIFDEAFVN
TEMLPS YI Y A Q GLLR
$\square N S S K T V V Y Y V Y E Q A F T$
TETPMLY L Y N $\square G G F Q N Y N$
VNASEVMATYMYRFGF
$L N S T D T M V Y Y \square Y Q Q G F T D R \square \quad V G Y S S S \square A L V F T T L I G M$ SEVMATYMYYQGFR
DATLVYALYVYNTGFKY

| $S$ | $D V$ | $A$ | $S V I$ | $Y$ |
| :---: | :---: | :---: | :---: | :---: |
| $T$ | $M$ | $Q$ |  |  |
|  | $S$ | $Q$ | $Y$ | $Y$ |

GYARDLLVSY
ETQFMANYLYKQAFSSF RYGYGNADSVIFVI DC\|L
SSETIVYYLYNKAF
ANATKVI SFLTYQEAFK
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TMI YNSYSYQK
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F LD F G Y S A TVMLGMFGLLLA
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$\square N S T Y T A L M Y V Y A K A F Q G F$
TMTLVYYI YNVAFVN
SSKTIVYYLYEKAFR
STLVLVYHIYNEAF
$T Q N L T L L V Y K N Y F Q F F$
HSETMAVTMFQYGFKRYQ
STTVMSVLA Y N RG $\square$ A N SQTAPVFMYDQAF
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Y
SEVLGTYLFRSGFRN
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STETLDMYAYSQGF
$\square N S T N L L V F Y \square Y Q E A F A Q F S G G F L G E S T A G S M \square L A V I V A A$ $T L T V G M Y L Y Q N G F K F F B G F L E S T A G S M L A V A$
DSTQFLAVYLYNKAFS ASQYGYANA $\quad$ S $\square$ LIVVIVCLL $T$ T T G GVY L Y Q N A F K Y F
$\square D S T L F Y T L Y L Y Q K G F S H F$
$A N A T K T P V Y L I M Q Q G F N Q L Q$
ANATKTYYTLYLYFRGFR
 NTQTKTMSVYAQENLFQFDNF


## V

ANSTISVAYNIYKEAF GAFNNRYGMATAKSLVFVVFVLM
LINSSKTVVYY LYEQAFSN
ANATESI SVYAYKTGF
L K A T Y F L P Y Y I Y DEAFK


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| UniRef90_S0FFB6 | M |
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WK NF VR $\square$ MT DPG $\square$ QGPFMQ $\square \mathrm{F}$ VWTVIFSAGSVGFT $\square \mathrm{VA} \square \mathrm{GM}$ E Q WLRLWNDARFWQDTWQTLR FGAASVGLEMVLGL NYAALVGDER FWNALLNTVSDFVLSSGPQVVVAV DNYKRLGSDP TFLTATKNTLIFLLEQVPDMVVMAI PDWWRSVWNTLWFTLVSVSLETVLGT NYQEALQDPRFWNGLWVTVKFAVVEVPIQMIV DNFREIVGGQTSVGRDFKGALVNTSIYTVLSVVLILPLSV.

FDNFTRMFTDDP $\square$
YMKSVG $\square T \quad L \square Y$ VLVGTP $\square K \square A A A L$

DNYVD $\square$ LS GAE
GTFYPRLVWTLVWTVTCVVLHYS $\square \mathrm{G}$ L
FENYQRDF VSQSFQASLSNTLRFTLYFVPTNLIICLD ENFRRLGTDGDFGNALYNTFGDFLLSTVP KNYAR $\square$ F QDANVK TALVNTLIYGVMSTVIQN■LGL
DNYTR $\square F D D E F \quad$ FWNAAKNTDWDGVISTVPQLLMAM FAHFQKMFA TAAFWTAFKNTLWLSII KLIITNVSAV FGNY $\square$ K LLKEPFFWEVF LKK ENYSAVLGEPR FWNNVQLSLAYVVCNVLLSIVLGF NYRELDS DSDVWHSFLVT L

Y Y VLICVPGTT\|LS
FDNF $\square K \square F Q E P H \quad F Y L V L R N T \square A M S T M S L I V G Y T V P \square$

ENFQK $\square$ FTDPTFY $\square S \square R N T F V$ R $\quad \square F A \square S T F P M L V I A$
WWEAVRNTDWFALLSVVSETVFGL
DNYRALAGDAQFRTGVVNSFVFTAYAEVFKVVLGLAAAL NFVRLWKDPTFHKSLWNTIIYTVGVVPLTMVC FKHFEMFFEAPE $\quad$ FWT $\square M R N T L V I S L L K L C \square G F P A P \square$ NYAD L LWGPTAYERFWSHFDWTVGWTVACVALHYCVGL DNFTRLAADP $\square F G Q A L V N T L Y$ MTGLLVFVQLPGA FDNYVRLFTEEELSTRYFSAFRNTVVFFADHMLVQNVLGM
$N Y$ VSMFQN $K D D W M S K N N A V Y F F D H L C M$ VVVELD F GNYVELLAANPNYVEGFWDSLLNTYKFSVVSVELETLCGL


 KNFQTFFTDPNA WWALGFTLKYALIVTTGQVAVGY
 HFRELFAEGD FWRVMKNTLGUSFYKLLIGFPLPG

## F Q F L F Q D A

WENY $\$ K $\square F Q D G \square$


FFKSLFNTF TY LLIQVPVMVVGAL FFMLLRNSLTLSLYNLLFFFPAPI

FDNFKQFFSNQDFLILLRNT $\square G \square S L L Q L V L Y F P A P \square I L S L$

ENYTRLLFTD RTFHKALQVT LTYYFVTVPDKLTFAL

WD N Y ARLLS DD


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UniRef90_R6TG51

VMACLVQWE Q L R G R G F Y R V M L I L P Y A





 N R T F C G K R L F R VVVYFMPVLI N R V A I G L L M F T F L


 $G \square A M L L N Y$ R D A G S G F F R S S F Y A
$K$ K $\square$ G G R N F R T VF F F

| $P$ | $S$ | $L$ | $I$ | $G$ |
| :--- | :--- | :--- | :--- | :--- | :--- |
|  | $V$ | $A$ | $S$ |  | V A V

$G L A M L L N R R A L R G R G L Y R M L L I L P W A V P P F V A A F G W R L I L$


 GYALF L N T K

 FLLA L L N R Q L R F K K L

 LFA $\square L L N E$

 $F K G R K I A R A I V V F P W A T T L V V Q A S I W W K I I$
 GVALMLNHPS





 NSRIDRSRNVLRVFFFAPAVITPVVTAYLWKYLVY

 $G V A M L L N$ QEFK GRADVRTAVLVPWAIPTIVSAKMWGWML $\mathrm{GL} A V \mathrm{~V}$ A T R V R A WA R V P L F

 VLAL MLLNAMRSK DKR DF QT IS YLDP H FVSWVVVVTLMQK L
$R L R G K A \square Y R S L L I L P Y A L P G F V T A L V W K G M F$
 $L L A L L Y V F F L K R A S G F V R T V V F F P V V L P T V A V S L L E Q R M F$



$$
\mathrm{K} G \mathrm{~L} \mathrm{~F}
$$





L L N E $\square$



K $\square \mathrm{K}$ G S D T L R K $\square \mathrm{Y}$ L $\square \mathrm{P}$ ML L S S $V \mathrm{~A} \square \mathrm{~A}$ Q L W $\square \mathrm{K} \square \mathrm{Y}$
K A K G A VA F R T $\square$ F F F P Y VA S M VA $\square$ C VC WN F ML
R N $\square$ M F K R F VQ T $\bigvee$ S Y $L$ P H F $\square$ S WVVA A S $\square$ I S T A L
$F \square A Y V L N Y K \quad \square K F \square G F F R T A Y Y V P S \square L G G S V A \square A V L W R Y M$
 $G \square A F L M$

QKVVSRP
QP $\ R G R N F F R V L F F \square P \quad L M V T P V G \square A Y T F R M L A$
$\square A S \square L C S$
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110
120



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 QP D GPI NSAL GLLGLEGLEWLADPDLAASAGLVAAVWRQ FAANGPVDGGLSFLGGIQUGGWVGNVDAVVPMMI ALAVWQ NPSMGVVNSFLMSLGWTNPPGWTSSTTWAMPVIVFVSIKN GLLNGLLAKVDLGPVGFLEQSSLVLPALAVVSVWKG

 NPSTGII NQ $L$ G GSD DQWFNDKHAAMALLVIAGVY LDD ARDLGMANWALGLVGDGPID WRADKLHSWAAIATMVNWKW SPQYGVLNTFLNFLGFESIGFLESNKYFKAVYVLSDDWQE
 DGDFGLVAGI SHMI GVEPPFWLADRNVAMYAVLGVIVWKY
 NYRYGAVNGVLRLFDMSPLPWLSHHDWGWGAVM TNGWLG

 D P DIF G S V N T L L T A S GIVWP A G W L S D P G L A M P S V I L V N V WK G S P TM G P V N N L H WM T GIP P R WAA D K D WA M F T V V L F T V WK N

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 NF G VV N Q M L N VI G L G S WD W L G D P K Y A M VA V V L S T V WK G








 Q GSN G T I N Y F L E CM G LT G V N WL T D P K M S M I S I S L V K A WM D S DV


 S S T GII N E L L M KA G L I D DI F FA H P Q Y F W W I V A F A N C WK E
 NSDYGLI NYVLKVVGLIPPVNWFYGEWSARFAlIIAITWRW

 T P D Y GLLNQL I RVLGFS SHNWL GDPATADPAL MAVTVWKE NTNDGLINMLVKAATGETDP LLSSGKYFWGLIVGQDIWKE DPNNGMLNSLLTMFGVDNPPAWLA
 M K D $G P V N Q M I M A L G V F N K S W T A D S T M A M W A I I L V V V W R S$ $S A D G G$ V

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200
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LLMVSVAPLLVASFAFNFNNFSLI YMLTGGGPNFEGTPII $L L T P Y L L I A V L E R L A Q A D G V F D L I Q V L T G G G P$ AMAPTI RTTVLLT TIWTVNSFDLI YVVTKGGPGV $M L R P T L D F V V V T S T I G G L Q V F T E P K L F B A P A G S S N G G A$


MMKGTLKISVILVLTGSFKVFDLLMSLTGGGPGNA


LLVKPTTIVVLTISTYAGLSMFLESYMLWKG N N S P

 GLRPVSGTVILLGTI WTFNQFPVIAMLTGGGPG
 QI APTFVFVLMTNUKDAMLI S S PV LI LDTEGGPFR
$M 1$ RPVVI FTVVLSTIGGLQQLETEPMLF DLNAQAARGGA GI APTIVTLLILRIGQVMTIFEKAYLLQN LLMPAI SSSTILNLIGGLKLFDLVMALTSGGPGFSTHSLS LL GS TVRLSVFFGVVGSLQLFDMLMPLTGGGPSN
 MLKPVMTPAIVLGTVWTFNKDTVIYLIAGG RNL LVKNHLFIVVLMDTNWTLQDSESCYSLTKGGPGTA QLKPDILLTTIMTTNGNLQQFDEPMNLTGGGPG LLKRTMAFVVIMTTIDADKLSGLVFVLTNGGPN
GIVRPT \MVMLVLSUGWLTS I FEKQYLL GNSUV
 LVVK S S LTVVSTVVLNI 1
LLSPT TLFLSVTVFI NSGGSFDUIRAMTKGGP
LL RPTVI F VLVVSTI TGGQSFTEAQVLTTTAPGSTNSGGA WMLLHDQFGVI NARTLDALRVFDLIYVMTS
SLRFSTIFFVTVTTLI GWFQFFDEPFI MTKGGP



GLSRRADGLCLLLCIVTAFKVFDFVLLMTGGGPGNR

LLA GSLTVCLVLSMI SALKIVDQI AVMTDGGPGFA




LLMPA ITFFDVTMNTIYTFKIFDIAFIMTSGGPGNA
$L V P T\|G I L L I F S D S G I L N A G F D Q\| W L M \quad$ QTPAT
MLRPTILLCTLLSTLAAMKAFEEVVVMTGGGP
LLLVAVGPLLLASFAFNFNNFGLI YLLTKGGPFN GADTS
GIVNMI VMVTIHVLWTFNNFDFIYLATGGGP
LSAPVLLSSI IFSINGTDKVFDSVVALTNGGPGNATTP


GLKP LVVYVVAMDI IFISQGFAEI FVLTGGGGP LLRPTLLYSTVITTDGF $\quad$ TNVFEEPFVMTQGGPNN

GI KPTTMMLLLLMNVGNVLNAFEVQYLLGNG




LI SGVIKTTLILADVGSDKYFDLI WVMTGGGPN
LL RPYVTVVAVISAIAATKVFEEVYLMTQGGP
QI KPTTFFCTIMLVI GSFKIYDTVAIMTNGGPGRA
GLRPVMMTVTLLGVIWTFNKFDVIFLVTEGGP
GLKPVFIILLIVNIGNLLESFEPQYLLGNG



$L \mathcal{L P} \mathcal{L} \mathrm{LV} M V V V V S M$ GSFQIFDTVSVATSGGPGN


| UniRet | VMYY ${ }^{210}$ (IYRTGFEN ${ }^{220}$ |
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| UniRef90-UP1000200154F | AGSTESLALYAYLNAMR |
| UniRef90-UPIOOO36BD65E | TGQYQTVVLYLYQTAFE |
| UniRef90-KoJQV4 |  |
| UniRef90-SoKQ03 | A TTTISQYIYNLSFKY |
| UniRef90-F7KD63 |  |
| UniRef90-LOKLN9 | VGStNVLTYHIRRVGDE |
| UniRef90-UP10004710220 | TQLPSTLLYTAAFS |
| UniRef90-LTVNJ 6 | YKVADVISSTYTYRMGLEEN |
| UniRef90-R9KAHO |  |
| $\begin{aligned} & \text { UniRef90_UPIO00479C83D } \\ & \text { UniRe90_D4367 } \end{aligned}$ | QNIGLTI VGYLYRQGIE |
| UniRef90-Z9JWB7 |  |
| UniRef90-UPIO00479DD43 | GGMTNFYTVYLYKRAF |
| UniRef90-R9BV98 | STTVLVSHIYNTAFK |
| UniRef90-D2B180 |  |
| UniRef90-UPIO004278169 UniRef90 U2CBF5 |  |
| UniRef90-U2CBF5 UniRet90 UTKTY5 | GDATTTMVKYMYDSAF |
| UniRef90-FORUVO | STQTLVYQMY旨EGKSGN |
| UniRef90-F4F9F4 | GGEWQTVAQLIYKVGWK |
| UniRef90-UPIIOO0478C799 |  |
| UniRef90-D9R3J3 UniRef90 UPIooo35F710A | TLVTN |
| UniRef90-D6EXV7 |  |
| UniRet90-R7R5G0 | SDVISTYIYRQTFADIL |
| UniRet90_B8CZT9 | EILVSYVYRSAFEA |
| UniRef90- F5YNJ5 |  |
| UniRet90-UPIOOO4761711 | GTEVATYLIYDEAFRO |
| Ret9-F8FR |  |
| UniRef90-UP1000472DBDO | ANSTETI SVVAYKVMFNQ |
| UniRef90 ${ }^{\text {a }}$ |  |
| UniRet90-R9KNK3 | 俍 |
| UniRet90-A6W4P6 | DEGTTTMVYQVYQEAF |
| UniRef90-UPIOOO34646C0 | GQGGLTMVLYFYQQAF |
| UniRee90 UPIO0036753B5 | VNSTNSVALFVYQNGQNS VA |
| UniRef90-10H4S3 |  |
| UniRet90_UPIO0036816EE |  |
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| UniRef90_G2RTW4 | APDAQLLVT WA |
| UniRef90 Dgulzzo |  |
| UniRef90-UP100047ACF40 UniRef90-UPIO003731EAF | TEITGSYLYAQGF |
| UniRef90-E1RBG4 | GNGTDTLGYFFYRTGIVA |
| UniRef9-UP1000348DEEA | DYSTDILGTFFYRTGIIAG |
| UniRef90-UP1000366A22B | GAETLTYIYKVGF |
| UniRef90-H3NBZ4 UniRef90 R94415 | ANSALTVVYYUFDK |
| UniRef90-B1Y |  |
| UniRef90-R4T9V0 |  |
| UniRef90-R6W914 | AMGTTTLVFYAYDLCFKS |
| UniRef90-UPIOOO47EE837 |  |
| UniRet90-X0ZZD1 | DSVSEILDTYVLKTGDQQG |
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| UniRe990-UPIO003 |  |
| UniRef90-U2T8H1 | TLYMFQTSFTYGDY |
| UniRef90_UPIOOO36D |  |
| UniRe990-V5WG93 | QSA SDVIDVFVYRVGURN |
| UniRet90_UP10003B5F | LGSTTTTNYLIYTEAFQY |
| UniRef90_B8F3M5 |  |
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| UniRef90-G1UB45 UniRef90 R7N6T4 | VSDTPDYYVLTWG |
| UniRef90-F5LT59 | GSNLLLYH\|YETAFS |
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| UniRef90-R77JC7 | AGSTDDLVTHAYQVAFQNDR GDYSENLDDVYKYGQMG |
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NFTKLLADSQ
 Q N Y V D MVVQ D $\quad$ K K


VI


NYKELFSDPD F I GALKNTEIIVIVSVPVTCAFSLL


F D NFYK LFHVPVWSSTFFGVLGWTVIWTVASTLSCYCFGM $D N Y V K \| L G D D \quad T F W L S V K N \quad N V I \quad I M V T G L I G Q \square P L G$
 WANYQRLLFTNEDFYKSIWWNTGYMWTMNFVPQULIGAL
 NYERLGTSES FR QVLFNTALIFTAGSVIPSVGLALLAAV



DNYKFMFQDE $\quad$ VFWKSMKNTVIFTVGTVPVN母ILT F

FWNS F GVT WLF VA TSVT LK I A FS L
F D N F VA F LT E P
$M L F Q S L V N T F I Y G F L T S G L K V V L G L$

ENFVMFFREQS LS $\square$ GF KNTLIYAVVTCSLKVVLGL Q NYIDVFNDVSFNAAFANTFK Y IVGWSVVIGFVVP

DNFKT $\square$ FADPDFK VAD I NT L K WVLIQSTLHVS $\quad$ VG




NFKKLIVLSK FAPTFFK LLGWN LLWAVTSTALNYFA GL NYARLLDDAF FWNALANTVVIGGIASTVPQLLLALL DNYTRMLQDDDFWLATRNSVL

Y AVIVVP LMVLLP

 $F G N Y \square K 』 F Q D P Q F Q A A F T N T F K \quad Y \square F W S L V I G F L I P$

Q N F L T L F Q VE P F N K L F WN A F G H N V I Y F L V E MVV Q N G I A NYASVLTSE $V$ VWWQALAANTVLDTAGSVMMELDMLGF



K N F T K M ENYTS SLLEDED FYRSLYNTIWLGLAS GISSQHLVA I

D N Y K R MF TAD D L F WT S L WN T $\square \mathrm{Y}$ F V VF S V P LT T A G A $\square$

Q N Y F R L F E D T R F $\square$ M A LK N T VF F T V I S V S L E T V L G
FRMFFSNGTQLAQLWQVMKNTFAMSFLS $\square A T S V L P L M$

F K N FVNIIF T L S $\square W R S T F F D V L Q W T V V W T L L A T T L Q C T V G V$

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| :--- |
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UniRef90 H8JKL4 UniRef90-G4FGN7 UniRef90-X6KUH9 UniRef90-U2B301
UniRef90 $\mathrm{W} 4 \mathrm{DEC2}$ UniRef90-W4DEC2 UniRef90_UPI000375C24D UniRef90-R5T786 UniRef90_A7FF71
 LLADVVNQ VRGKTFFRVAYYLPTVTSTVAVSVMFIFRF KAFPG $\square R$ VFSTSYADPMAVASSSGAMTFK IIL CLALLLINSKNFRGNRIVKTIFLLPTVTTPVVVGLIUWVMMY VFALLLNERDMVFKRFVQSFVYLPHFLSWVILGGILIDMLV ALAAFFNRR FPGNGVLDSLLLLPWLVPMVVVGMVWRRIL AMALALDSMKLHGAKFFRISTFLPYAVPAVVSTLVWGFMY
 LQAVILNSECVKFKKVFRTTMILPWAMPGMTCLLVFRNTF LLLALLLNRGMKGSGLFRTIGFMPVVISSVMVSLIWGMVY
LLNEL RNTAFKRVVQT TSYMPHFGSWVVAAGLVSAVL LLAVILTEYGURGKEMFRTFFFMPNLVTAASIGVLFAVLM RFQMALRTVYFIPYVLSAAVIGKVFTAYY


G पAF LIFQMRQSWQTFFKAAMY $\square P G V V S G T \square S L V W \square A F$ RPRVRAVAQA ILY回PHFFWVLVVTVFQQMF

ALALVVTNERVRGKRTMRSVYLIGTSFTDAAPANDFAGEG GL A $V \operatorname{LLTGADFGRGYLRSTIFFPVLVST\square GVGVTFKVLM}$ RGTGFARTVFF $\square$ PSAVGLSTSLLFYGLF

NQNFAGRRFA $\square$ PIIYPMM $\square$ STLVCSS $\square W R S W Y$
$\overline{L L G V L L T T K L R T R D Y 乌 R S V I F F P T L V S T T A V G T T F S M M M}$


F $\square$ MALILRRKPRGWKFTRVAYVIPN\|IPTAATAVMYSLLL
 GKYFKR TOSVMFDPYF SWVVVGAFDYNME


GLALLLNKKCVKGKAFWRAFPVLAYADPGFDTLLAFKFMF GVAHLLDVR LRGRGVFRVVALAPYATSVAAATLVFALFY LMLLAVLVERNLPGTGFFRSAFYTPVLASSVVVGLSWQWLL KPYKFRNVFRLIDTLPLAMPPIAI GAMWKLMT DFMNSDMYFSKFLK FMSLLPWAMQQVAVAVMWKWIL CAALLFNADADSSRWHRTDFALPLMVPPIVAGLLWRFLL
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GVH DKNTDRAMVF DPYVSNMVAVAVIFKDLL GLAGLLNARGIRGMKFFRTAFFFPYVTSLVAVAVVWNMLF

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UniRef90 ATFF77

90 100
100 110 FGSRGAVNSFLELFGFSGVNWIGSTDYALSTLITLVVWQF QPH GLLNQFLALFGDQGPNYFNSPTFALPAI MAMAVWST
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 DPV GPINAVLTKLGLDQILFMTDSKWSMASLVIMETWLT
 NNYYGI FNYLGKAVGLIDDNWLGDEKYALGCIILILLTTS FNSDGLVNQALGPLADPGPSWLVNSHLAMPVVAVFIVAWKQ NGQFGPLNQFLMGWISARIPFLTDPVLAKITVILVNLWLG NTEYGMLNNLLGGLDGWKQNWLGDSTWSMLSISI AYI WQN SVGGTLNQTLEGLGSLAQNWLGNADVAVYSLAVTQQWFH DWRFGTLNMLLLRMQLIPNWLRPLVAQGTVSFDQWWQW NPFYG GYPNGAVNDLLLALKIEPFYFLQNVWATRLSVSTILTWMW HPQ GWVNALTSLAGLAP SSWLSSPFWAMPVLILVATWKQ NQQFGTVNKALGLLGFAAVPWLNDPLWAKVS LLVNLWLG NDQFGVVNDILLRLGLINNTWLGEPDSAMUSLIVADVWKT

 DPRFGMVQDLLGRIGGDSPDFYQEPGWALFMLTATFVWKN GPDGLLNVILGWVGIDGPNWLNDPAWAMPSLILMAVWRN GGA GMLAQTLREHGHEGIDLMTNPGLFKFLVTFEMVWKD GLLNQLLDWLGGLERAWLSDVNTVLAAVS DPEGWRF DQFGLINEMLKALGLDPVRWHSDPVASHAALATMVNFRW DPFDGLTNKSLAVFGLEGPGWLTDPALATYSTALVDVWKG NTNFGPVNRFLGLLGSYPIPWNTDPEWAKVAVLLTSLWLG
N HYDFGLLNAALVSVGLPPQEWLFNPDDA YYAA AFVDTWQW
f

H P T Q KPPTG
PETGLVVNGVLS


 QKGDGVLNSMLTDFGGDPVKFLSTEGLVNICCLVFVSI WRY YGLVNQFLGFFGTKGPNWLQNVHTVKPALTIMAVWKG SYGGPINQLIVGAGGSAVGFLDDDAKWSARLIGLLVNCW GRDHGMANWALGAAGLPPVDWQNGPWASKFAVSSIVVWRW NPGLGLLSRYLEKL GITYNGGQDANQAFWTVVIMDIWHW
 NGQAGLVNAVLGLVGGDGPQWSTDGPWVKPGLVLMHLWSV
ADEHALVNQFLSLLGMDPIYFLSDERSAVFAVTMVKIWRS NPNYGALNTFLAKLGLEEWPWLGDPDTALLAIILVNCWFG DPTTGFINALLNOLDDQPWLEEWSAFCVIIATEVWKT
 DENVGLVNEVVTIFGGSKIPWLTSTTFSKIPVILLNVWRY
 GPKGPIIHLLSSIGMQNPPNLLLDLKLALPTIVCIAVWKG HPTMGPI NQFLKLFTENPPGWTSSSTWALPAIIIVSVWRF SANVGDINKALVALDLMP LRWLEDRLLIKPAIAFLOFWKY NDDFGLLNVI KSLGVINTHWLTDSKIVLASII YVDSWTT SANMGFVNKI A SMGKEQLLFLVDPNYFWP IVLIQSTWKE SPGTGLVNLVLSWFGVDGPAWLFDPSWTKPALIIMKLW QPNGGILNTILGKFGVANPPWLVDTRWARFAVSLVGIWLK GVVNNMLGSMGVQPQVWLSNPKDTVPLLVLTMTWKG HDQFGI MSRLWEKLGI DEPPILGTPGLAMWAI IFVDVWKT YGVINAALATFG| PKVYWLQNPQLALWVIVLVNTWKQ SNTGMVNTLLQNLGLEAVKFLDSDSHTWLSMLLWHTWKS AND GFINTVLRGFGLNPDMWFANAWTARAVIIIALIWRW NQHFGVLNDLLSKLGIDPIA WLANTKFVLGSVIVAELWRG

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| :---: | :---: | :---: | :---: | :---: | :---: |
| UniReef90－Q9K100047A1D21 | VGGFNMVLYUTAGLQMD |  |  |  |  |
|  |  |  |  |  |  |
|  | MGYYMVIYLAGLQNINTELYEAAGLDGANVWQKFKYVT |  |  |  |  |
|  | SGMNFLYFSAGLGNDDDSUYRASVDGANAVQKFFKL |  |  |  |  |
| UniRef90－UPI00028A2A62 |  |  |  |  |  |
|  | GFSTIVFLAALAGI DP SLYEASLI DGANRFKQA |  |  |  |  |
| UniRet90－R9NDX8 | Y |  |  |  |  |
| UniRef90＿D9XKC3 |  |  |  |  |  |
| UniRef90－UPIO0037CCDE7 | MGYNMVIYLGALQSIPADMYEAAKIDGSNRFQTLWYLTLP |  |  |  |  |
|  | TGYNMLI FYSSLST | 1 Phsty eats！ | DGAGEWQUVKS |  |  |
| 88 | FPYMMTI SLGALQSIPDELYEVAAI DGAGRIARFRYITL |  |  |  |  |
| ef90 UP1 | TGYNMMFYISGMQNIPYTT面AARIDGATRLQEFFYVVIP |  |  |  |  |
| 90－ |  |  |  |  |  |
| UniRef90－R5AA51 |  |  |  |  |  |
|  |  |  |  |  |  |
|  | LGF |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  | AGQML：FVA GL QSIPDELYYEVAKIEGATKWQTFRNVTWP |  |  |  |  |
| W4 |  |  |  |  |  |
| H9U |  |  |  |  |  |
|  | VGLDATLIY I AGLAAMSPDYYEAARIDGGATRWQQFWR |  |  |  |  |
|  |  |  |  |  |  |
| Unil | FGYTM1 F MAG K AlP PELIFEAARVDGANKWQTFRFVTLP |  |  |  |  |
|  | MMMTATISALATINEDLYEAASİGATRWQQIQSithp |  |  |  |  |
| $\begin{aligned} & \text { Unire } \\ & \text { UniRe } \end{aligned}$ |  |  |  |  |  |
|  | TPFIIALILLAGLQSIPRDLYEAHAIDGANPWQSFRQI TMP |  |  |  |  |
|  | VGYSFLI YLGTMQSISKDYYDAAAIDGAGTWHQFTA |  |  |  |  |
|  | AGWGIIVFLAALASVNHDLYEAAAMDGAGRWRRMWHVTLP |  |  |  |  |
|  |  |  |  |  |  |
|  | VGFTFVIYLAALGGLNRELSEAAAIDNASRTTMFFRVVAP |  |  |  |  |
|  | MGTLMVIFLAGLQTIPQEVMEAAEVDGAGAWKRFRTIT |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Ref90＿13R20 | VGIATTLI YIA GIVAIPQEYYEAAKVDGAGAWKNFWQI |  |  |  |  |
| UniRef90＿UPIO002 UniRef90－D7BDR7 |  |  |  |  |  |
| UniRef90－D | VGYNALIVLAAMQA |  |  |  |  |
|  |  |  |  |  |  |
|  | MAFL |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  | SGSTMIYYFAGLQSIPKDMYEAAKI DGASPLKSFWMI TFP |  |  |  |  |
| 00 |  |  |  |  |  |
|  | SGFNMLIFLGEMQA\｜SPDIY |  |  |  |  |
|  |  |  |  |  |  |
| UniRef90 X8GU |  |  |  |  |  |
|  | VGYGTVMYLAS VN： |  |  |  |  |
|  | TGFDLVMF GAI QSVSPDIYEAAELDGANRFQVFRYU I AP |  |  |  |  |
| UniRef90－UPI0002885690 |  |  |  |  |  |
|  | APFIGGLVLAGMQLIPEEVYEAAKLDGANAWKQFFS T |  |  |  |  |
|  |  |  |  |  |  |
|  | LGWYMVFYLAAMGNVPRELHEAAQMDGAGAVRRFWHITI |  |  |  |  |
|  |  |  |  |  |  |
|  | TPFVTLAFLAGLTSLPRSPFEQAQDDGNKWQUFWH1TLP |  |  |  |  |
|  | TSFVALVSYAGLTNIPRELLEAARIDGASALKRFWHVTGP |  |  |  |  |
| 㖪14002 |  |  |  |  |  |
|  | GSTVVI Y |  |  |  |  |
|  | AGWGTI FLAALMQVNEQLYEAAAI DGAGPWRRFWHVTLP |  |  |  |  |
| UPI00023757C8 | FPFMLS |  |  |  |  |
|  | TPFMALLLMAGLTLVPQDLLQaARVDGASRI隹FFQITLP |  |  |  |  |
| GP2 |  |  |  |  |  |
|  | TAFSMLVYAAALNEIPKEVTEAAEVDGASGRRRLWH T |  |  |  |  |
|  | SPWFTMILLSGLLNI SKDVYEAATVDGANGWQQFWFI T |  |  |  |  |
|  |  |  |  |  |  |
|  | AGYYMLIFLSALQGLSKEVYESARVDGANGLQTFFR TVV |  |  |  |  |
| UniRef90－E3DRA7 |  |  |  |  |  |
| UniRef90－FOPA76 |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  | AGWGTI FMAALVSI DLQLYEAALIDGATRLQRUWHVTL |  |  |  |  |
|  | VGYYYIIFDAGLKNIPEELYEAAEIDGASAWVKIKNITIP |  |  |  |  |
| 2 | AGATALIYLAALQGINPELYEAALIDGAG的KRIVHVTVP |  |  |  |  |
| Ref90－H8JKL |  |  |  |  |  |
|  | TPFMALLILAGLQVIPEDIYEAARIDGANTIQRFFRITLP |  |  |  |  |
|  |  |  |  |  |  |
|  | GWSAl MYLAA AGVDQELYEAARVDGAGRFKLMRHITLP |  |  |  |  |
|  | VFYLGLKGN EYSVYEAAKIDGASPLOSFFK TVP |  |  |  |  |
| UniRef90－UPI000375C24D |  |  |  |  |  |
|  |  |  |  |  |  |
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UniRef90_COBV17
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UniRef90-U5QMG9 UniRef90-UPIOOO365A589 UniRef90 H1LYP8 UniRef90-L8M613 UniRef90-U2CHW4 UniRef90-UPIO0047D19E6 UniRet90 UPI0002888583 UniRef90-17L9E5 UniRef90_UPIOOO248D847 UniRef90 UPIO004787762 UniRef90 B5HAN7 UniRef90-UP10003FD08D7 UniRef90-B8HA15 UniRef90 - I3R204 UniRef90 UPIOOO2DC6473 UniRef90-D7BDR7 UniRef90-D815V5 UniRef90-UPI0004640463 UniRef90-UPIO002D77D44 UniRef90-UPIOOOO3708A63 UniRef90_UPIO0035E4487 UniRef90-R5KZS2 UniRef90_UPIO002884927 UniRef90-UPIO0028A0B0B UniRef90 R6FUA6 UniRef90-UPIOOO47D1805 UniRef90 X8GUR88 UniRef90_G9RVR6 UniRef90-J8QBL9
UniRef90_R7KWG5 UniRef90-UPIOOO2885690 UniRef90-C9RT67 UniRef90-R7R172 UniRef90-UPIO00464D024 UniRef90-B518U3 UniRef90_D2C7U2 UniRef90-J4UFI5 UniRef90-UPIO0047B114D UniRef90-D81492 UniRet90_R7FSG4 UniRef90-S3ZJGG UniRef90_UPI00023757C8 UniRef90_M8DIB3 UniRef90-UPIO003B418FD UniRef90-G2GKA1 UniRef90-UPIOOO4645BCA UniRef90 R5EXPO UniRef90-D6ZVY8 UniRef90-R5UOB3 UniRet90_E3DRA7 UniRef90-R9PHR9 UniRet90_F7K7L4 UniRef90-UPIO003654D3D UniRef90-SOFKU6 UniRef90-UPIO0047ED8F7 UniRef90 R7DW75 UniRef90-H8JKL4 UniRef90-G4FGN7 UniRef90-X6KUH9 UniRef90-U2B301
UniRef90 W4DEC2 UniRef90-UPI000375C24D UniRef90-R5T786
UniRef90_A7FF71

\section*{| $M$ |
| :--- |
| $M$ |
| $M$ |
| $M$ |
| $Q$ |
| $\quad$ |
| $G$ |}

MLTPVI FFNLI MQTTGGFMTFTQAYLTTGGGP
 GLSPDMFYTLVVNIIQAFQSFGQVKVLTQGGPG

 ELKKGSAALTVIFSSIDGSFQLFNEPSILQNMVPGNADTYYY S 1 RN L I GLLML L LQLIAATSQQGYQSQLAMLDDGGPMNATLTYY QLKEVI LFTSI TSTIGGTQQLFDEVVNITAGGPSNA $M L L P T I T M M L I L R M G S V M S V F E K V V L L Q N \quad N L N$
 SLRPTLIVFVI I TSTMGGLQUFDEPRMFDNTGEGGA $H L L R V T A P L L V M N F S G N F N N F G A V F F L T Q G G P A N P \quad N Y Q F$


 $R G A P$
AI K R T IAFFVLIMMVMWSFLTFDYVYVMTNGGP


 LLAP Q LI SLLLFRFAQSFG\FDLVQVMTGGGP

LI F EVVI K V T I V L A V V G S L K Y F DLI Y V MT G G GP N








 LI Q K Q I L L A F L L R S il



## ,




MLSP TLF FIVTIT FIDSFQSFGQVDILTKGGP
$S$ I R P I I L L Q M L A V K G A l S V Y E I P F


 L L K P V T L TVI FI RLMDALR V VDEVWMLTGGGPGTAT CIK RVVLVTLTVVSIWTFNSFNVI FVLTGGGPMR $M M R P V L A V V V I V R G V D A A K T F D L I W W I Q T Q G G P R H$ $M$ M S GAL F FTLIVQQTIAALQSFDEAY TAFYGSAASATYS HLK GTI T SLEI MQIIS VFQVFYEPMVISNGGPNNASLS S QIKNLSVVVLCMMMTIWSINDFETPFLLTTQGGP
 $L M K P A V A V A D L F R T L D A F R D F D T V F V Q T R G A H G T E T V S V V$



 $K L S P T T F F L L I S S I I T S L Q N F T V I K A L T D G G P G Q A$ S L R P T TFFVVTI MLVI NCFKVFDLVQVMT GGGPGRA






$L \vee M P T T Y F L L V I S V I E A F Q V F T V V D V M T R G G P$





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UniRef90_W8TTQ0



SFWGALGRTALFLCVTLPDEVALGL RYWWTALAVTAAITVVSVACEFVLGL

F WMVLRNTLVIS F LN L A LIF F P T P $\square$

QNFQF LWQSGTLTK LTLNTVGYNAAF $\quad L \quad L G N T M A D$ FKYYAMFFQNPD FWLLFRNTFLLGLYKLVFGFPAPI
$N Y T A L L A D P \quad A F W N A V V N T L A M F V I A T V P Q M L L A L$
 FKN K K T D FMNGVYFWD IMKNT\|VISLYKLLGGFSAPI

ENYLRMFSGRD PAFYTVLRNTVVFALLYTAANLVIST $F D N Y I H L Y H N S L \quad F W K S L K N T I Y F V V V V V T G R V L L G F$

$$
\begin{aligned}
& N Y \square Q M F Q A P D Y \\
& \square \mathrm{Y} S \square \mathrm{~F} \square \mathrm{~T} F \square \mathrm{~F} \text { T VLNMTTVNVMAF}
\end{aligned}
$$

$N F \square F L F S S D S A D R A F R N T \| V L N G L F D A F G V F F E V S L A L$ WS NYRYVLSDNLFWQALYNTFY $M G G L S L D G \square G L S F G$

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    DNYTRDFQKD KYFMKSLGLT FKYALMAVPMKLIDMAL
```

EHFKTMFEYEDARQVIW NTLVISTLK ITFNDADPL


F D Q Y $\square$ R VFEND $\quad$ VF WK VLKNNLFLLIMTVPGS LLAM
$R N Y L V V T D S R$
F $\square G A \square G T$ T A K F T VCS LIVELVLGM RNYQDLLKDRDFHSSLLTTL Y Y T L LTVPVS DGGG


F D N Y VRMDTNDS
FKMFWTDP KHFRMFFDSPE

VF WP S L R R T F T L A G F S M L VQVP VAL
T FWQVFKNTIILSVEY LVFSFPFP! FTNV $\quad$ RNTILISLMKLClGFPAPI

DNYVKDFEDPVFFKALKNTVVWT\WNVVLQAGF FKNFQEMFEDDRWWTSVEVTLKYVLIGTPLKG

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UniRef90 N2ANF2
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UniRef90-UPI00047BD238 UniRef90-UPIO00462E272 UniRef90-B3DUD0
UniRef90_UPI00047EE481 UniRef90 S0FX95
UniRef90-UPI000288D4A4 UniRef90_E3FZ79 UniRef90_UPI000464D966 UniRef90 F5LKZ4 UniRef90-UPI0004722A64 UniRef90_UPIO003489B02 UniRef90_A4IP82
UniRef90 UPI00037158D1 UniRef90-W4D2F1 UniRef90-UPI0003B76694 UniRef90_C2CQ17 UniRef90-LOEHJ5 UniRef90-R6ELW5 UniRef90-R9J7T8 UniRef90 UPI0003474099 UniRef90-Q82N47 UniRef90_UPI0004780D81 UniRef90_GOCWN6 UniRef90-R9MNX7 UniRef90_F3Y8X2 UniRef90-UPI0004770765 UniRef90_K9YMR0 UniRef90_G9RWU5 UniRef90-A0K1U9 UniRef90 A0A059KJ88 UniRef90_D3ED80 UniRef90_D9RAT2
UniRef90-H7F3E8 UniRef90-UPI000381A892 UniRef90-R6RSM9 UniRef90_UPI000478F3A5 UniRef90-C6J3K0 UniRef90-12F7T5 UniRef90-D3ACY5 UniRef90_N9XIF7 UniRef90-G5HSU0 UniRef90-D9WPI7 UniRef90_UPIO002FAFE3C UniRef90_F0GX78 UniRef90 UPI0003659634 UniRef90_UPI00037AC808 UniRef90-D4RXG7 UniRef90_F9TEY9 UniRef90-D6A575
UniRef90_W8TTQ0



M NFFRSAFYVPVLISGIVSGF!WK $\square M Y$ $N Q Q L R F K G L F R T C V F L P C A T S L V S Y A D I F R S L F$

## M F




QKFKGRALIRTVIFVPYVVSEVIVGTGWSLL FAADMLHRTTDPWMRTIARVSLVDPMATTYAVVGLIGRLI $A \operatorname{L} A L V M H \quad R S L V A K G L V R T A V L V P Y G \| V T V V A S Y S W Y Y A W$
 $R N \square G V K K S V Q T L V Y$ V $\quad$ P HF $\square S W V T V A G M M \square D \square L$ AFA $\square M L N E \square R T R F K R L A Q S V M F L P Y F V S F V I L S V I V Y N L F$


RSFFRC\FYDPVVTGTVAVAVVWKWMF

KGSR LLK LLYFLP LLMSSVA LGVLFKYFY LLAELLFNLKRKKASSTYRFLFVLPCLVPGIVTMLLWNKII VL $\mathrm{A} L \mathrm{~L} L \mathrm{LEVYSWFKK} \mathrm{\| VQTITYLPHFLSWVIVYGIMVALL}$

SKDMWGREFFKSSFFLPALTSVAVAGTTFRLIF


$A L A L L C T S E V R G K N F Y R \quad A S F F L P N L I G G \| V L G$
$\overline{L L N E D G N K}$ RFKKVTQSDT LLPYFVSWIVVGVFAYNFF
 NTPKLALRPVYRVLLILPWAMPNYITALI WKGMF IVAM!LNMK LKCDNLFRTVYYLPS\MGGSVADSILWRFM

AFA LLLLNE $\square$ YMKFKRTVQT IVYLPHFLSWVILGGILIDML
 KAGRGLVRAAVLVPWAI PTAVVAKLWQFMF $Y \boxtimes A \square W V N E R M K G N G F L R T A F F Y P T V I P M D A I A N I W Q F \square Y$ KGLRLRNVYRTLLIFPWAMPGYVSILLWKTMF NKKGUKFKKLWRTILVMTVAVPQFVSLLYIGKMF $R M R G K V L Y R I L V V L P Y A M S S L A M Y L L W R D M F$
 NKNVITRSFYRFVFFLPVVTGSVAVTVVWKWIY RKT TRGKAFWRAI FSLSVAVPQFVTLLVLRSML $\square I A H G L A \quad K R \square Y G K E \square V Q\|I D M L P M\| M T P V V V G L I W K M F Y$
$L L S A V L L H R S \square P G \square R \nabla Y R V L L F D P V A V P T A T A A \square A W R W L Y$ $\square L A L L L N E \square G K R F K K \square T Q T A \square Y \square P H F L S W A V I G G \square L V N F L$ K $\quad$ IKGVAMYRMI YFLDAVTMTSAVAMIWKWMF
 $R K D T R G K G F W R T V F M L S A A V P Q F V S L L L M R T M F$
$E R N Q L G K R F V Q T V S Y L D H F L S M V I V A G M$


LMVAILMNTDFKGRKLYRMVVFSPWAFGGMIVALVFSYMF $L G V A L L L V K P R K G Q G F Y R S A F Y A P S L I G A S V S \square G \| V W R A D$
 FA $\square$ A $\square A \square T K G \square K G T N \square F R T \square F F M P N \square \square G G V V L G Y \nabla W K T L I$

R GK WLWR LC F FMP F LLP STVA A N LWQ WLF

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UniRef90_A0PVV7
UniRef90_C7Q3A9
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120 TR GFVFD TVLQWCGFK PYWLKDQR INNYSLVGTSVWRY

 GVVINE LI F A L T GEK I A F L L E P D WF RTMMV S Q S DWK E
 P Q Y G L L E Q I T G S L G L P S S R N W L G D P S T A L A C VV T V V A V WK E NYNFGAI NSI FRSI GMGEQDWLGNPK LAALMVGVVLI WKG AQE GLINTI LVNLHVLDYNFLGNSTSAKIVIII ALVWRW

N E R N GLLV N R F V LGVLHLPQP GWWT DP TWAMPSVI LAS A WKD D P S N GML N HL L T SI G\| Q NPPLWWS DPNVVLFAIVVPIVWQ
 LLGPVN Q A LVA I G L E G F S GH S WT YA K WPA F GL V V WV WC S

 TPGTGYLANLLPQ G DAP LT T Q Q I P S LGIVVI AEVVKT
 N NSE

$\qquad$ G L I | $T$ | $Q$ | $V$ | $V$ | $G$ | $L$ | $G$ | $F$ | $E$ |
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 GIMNAILSFFGDDAQPFINSASQALPSIAIMSAAWQG N Y E S G F L N T ML Q QLGSEPVDVYNKP WVWIF LI I F F Y L W W N N
 GFVNHLLGS YAPDPSWLVNSHLAMPMIAL FVVWKQ NKYTGGENMVLSGAGVIDQNWLGDEKTADWCIILILITTTS

 $N P S N G V I N A V L G A L G L P E P G W W T D P Q W A M A S V V L A S A C W K D$ $D V N F G P L N A L L V G L G A F A Q D W L G D T R F A L G A V I A V V C W Q Y$ F NETGLANAI L MKI GLIDDNPWYAGDKTVLLSLIITNFPWV APGDGLFNMILKDLGVEPDSFLTEPAWGRMLIILSEVWKD $P D F G P V N K V L G$ $\qquad$ GFINGILQQS $\quad$ G GEMSS MMNSL S LFGGA GAPWHVEPFWSH AAIATMVNYRW LFG G FK YLKD Q NLSMAALLTLACWRW

 A WVNALV A WLG ASPVV SWLSSPTWAMPVII FAVAT WGG
 YVWQFIFNKVFPS LVKGS

 ST DN GTI N G L L A S L G I P R V E WY S K P A A WP F I L V M I N R WK I F P RE GLLNYVLGLVNIEPI GWFTDPSYARFSGVMMSLWGA
 NGSFGPVNGFLA SLGLLPPVSWLSDPTMAKASILLVVLWFS $D P N Y G V L N D I L T G M S G L C R G W L T E E K T A L I D A V I I P I I W Q Y$
 SPE G GMVNRVLTALGGIEPDFFGDNDWFRTVVVVTDVWKE SID G GIVNELLLTFQLI PI QFMAKGEWFWGIVTTASDI WKE
 A P D G G V

 NTDFGLFNRML GLDVDWFGTPWSARAAVI LTNVWLG
 QPE
DAE F $\qquad$ $\begin{array}{lll}N & F & V \\ N & R & L \\ S & Y & Y \\ N & N & 1\end{array}$ S G G
D W
A T $G I I D$
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$F^{T} G$ | K |
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ST
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N P T
$G L L P A L L A B L D$
 D P P S G L L L N N S V I K R F F G A E P I S WY





 F N D D A V D K SMS LF GWDVGGW IG D P D WA L P T L T L T V WQ F $N G V V N Y$ L L G A S G L T D T E WL S S P S T A L A A V T F I N I WS G


 NPGTGMVNHVL

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UniRef90_W8TTQ0

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VGYGCIIF LA VGYGCIFLAAITNIIDPQLYEAAYワDGAGRWDQTDHIITLIP FGQNMVLFI GAIMSVDSELYEAAMLDGANRFQQFKYI IMP
 VGWGTI I F L A A L A GVVMQLYEAARMDGANRWRQLWHITLP F GF HMMI Y LA GLQGI P SEVVEAASDDGASPWRRFRSVTLP


| $T$ |
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| $T$ |
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## F



## F A I T

 A G W G T A GFFMI FY LA A L F GF GMIVYLA TI T G I D P $\square$

LGGYNVVVLTA GGLK NGI S

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## A G L

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UniRef90-D3AB44
UniRef90-N2ANF2
UniRef90-D3EQE8
UniRef90_C5CDY4
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$H M R F V I L V M L L M Q V V A T M Q V F V E P Y I \quad L T G G G P E$
$A D R S T V V I L L I L R L G S F L D S F E H V F L$
 PA $\square$ PGSSTP
LIMPQVLIAAVLFRFAQAFGVFDLVQVMTGGGP

LI S P VFKVTI ILALLVGSLKYFDLI FVMTGGGPNHA

ALRPVIALLLVLRVGDALTVGFEQLLLQRDAVG
LLAPTLR WAFLSMDGSLQLFDLVY VWG NYVSTTAG
YL LP GLTAILILRSADMLKMFDAVFTMTRGGPGTA
LIKPAVLVALLIFRTLDAFRIFDNI YVLTGG
M SPTTLLTTITDSGSLQVFAQIQULTAGGPN

CMLPMIIVI ATLSLGNILDAFDQUFNLYN


## 







HL K GT F R T A V V L SVVI GALRRYF DLI Y V M T G G GP E














$Y \mathrm{MF} F \mathrm{~V}$ M T P Y L I T T F TA N V N N F N V I Y M L S K G D P T P I G A S

LLTTP TLYFAASIVGMIHAMT TFGPDILLLTQGGP
$L M K P Y I F L V A V I S A L S A T K V F E E V F L L T Q Q G P R N$
$N$ I K T T V I L MLI L R M G S IMM S N F E Q I Y T L Q N



$M V$ L P I L K


LLAPAAAVVYYTTINS KAFDGVEMTGGGP YGK



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UniRef90 D3EEA1 UniRef90－F3NBG6 UniRef90－Q165F4 UniRef90－W4VKF2 UniRef90 JoN1Y7 UniRef90－R5EFY8

DNYRD【LFGPTAYDRFWSHFLWTVVWTAVCVADHYGDGL FENYVN $\square$ FSDRQF पSSFW■S $\square K$ YAGLVT TGQVF $\square G \square I L A \square$ RNY SSLSDQNYRVAF RNTDLYALVTVPGQMACGL FSNFQLVLTS WDQFNFLFSDERF LRVLRNTLAMSG■NLILGFVTAVILAL

FEYF TKAFQN KDFLDALRNTILLNVLDLVMGFPAPT ENYQADAKDPLABWNSLAVTGQYVVLNALQTSLALD NYVNALTSPR $\square A E$ SAART $\square K Y$ SVFALLAFEFLFGF
NFTDLFGDP\ FWKSLRNTAYFATGTLTLQLPTAL YVKLVEDPI FFRSVINTAIFLVVANNGMLVAL

DNYAK LWDDPDFWKAFRNTFMYLILGTP $\square$ SLVI S
ENYQKM【KDPQVWQASWNT TKYTLLVVP $\square M V I L A$
DNFRSVMRSPAFRRSLLDSFVFT $\square$ STQVIVLVCATALS $\square$ ENYVRMAGDGRFWQS $\square W \square T$ TVTTASVVSELLG


DNYRR $\square$ FGDPE FWAGRNTLYFVAVGGPLSVLVS

DNYSKLLKDEL FWTA乌KNTFYFVLVAGP【S■AVS【
FDNFTR LLDDTRAK KHFEYMWQNDYFLQபTW NTLFFACSKMVMNLI IPF
DNYRSLFTDP■ FYKAVGNTLVMVLWTTVITVGAGF

FANFARAFTDEGLRGPLLQVALWTFTFAVASVATTFALGL FQNF $\square \mathrm{D} \square \mathrm{FSSGS} \mathrm{DFWIALKN} \mathrm{\quad T} \mathrm{\square YYSVLT} \mathrm{\square PVG} \mathrm{\| IL}$ FDNYRTLFSDPVVGKALINNVKYAVISLICQVGFGLVLAA


RNYAD $\square$ FTDARVGKSY $\square F T F K \quad ~ \square A \square A S T \square V V N V I S$
FSNY 1 K ILGDSMYHNSFLLGLKNTVIFTACTTPFLVLGSL DNFINLIFRLSWKNSFLGVLSWTVVWTLVSTTVQVALGL NFGKA $\square$ NKDS $\square$ GQEFWPVLGWT $\square$ CWAVAATFSNF $\square L G T$
FDNY品SMWRGTLVDPAWWNAVWNTVRFSLISVGFETVLGL DNY $\square R \square F T D P D F K K S \square M V T M K Y A L \square S V P S K \square F F$ A

ENFVEAFQDERLLRALLNTLQ
NFKK पFNDP $\square$ FWVSFKNTLL
FTVLTVPATLLIT
$F \quad L L L T \quad \square P P \square 1 V F S$

DEFRQLVANPDFWHAFENTLV
पS FVQLVLYFP $\square P \mathrm{P}$


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 $G L A L L L N \quad Q R L R G R T F Y R L V L V L P W A V P T F V T V F G W R F M L$
FYVLVLKRFSVIIRTGIFFP\|VLPAVAVAQLFSKTFE NKKMRGRNVGRVVAIIPYVLIPAVVGII WNWMY


$\bar{I} A \operatorname{IL} \quad \mathrm{NEDPYRGKRFTQTVAYMPHFDSWVIIAGMALQLL}$ GLAALMHQ VAKSTVIRGALLLPYLMSNVI AALLWFWML
$\overline{L L A} \| L L N S K F V K G K N V L R \square A F F A P V L V A G V F V A \ I F N L V Y$ VLSGFFVTSRWWIKIVSAIFILPBWAMPSIPTILSVRFML F GAFMMNKVTRVVGVVRTAVLDPWAMPGIIVSYMFSYMF $F A L M \square T Q M Q N M K V R K T I Q T \square T Y A P H F \| S \square V V V V G M \square N \square F$
F VIA Y H $\square D K T K \square L H G T \square R A L Y F \square P F L T S T V A M A W V W R W F Y$


$L L \square A L V L N Q A F F G R G \square V R T T A \square L P W A \square P T A L I G L A W A W \square F$
$\square F A \square F L N E L S L K F K K F V Q T V S Y D P H F L S W V V L G G \square L T T W L$ RS L R I I RTAVFLPVVTATAVVGEMWR DMY
RKFRFRKTVRSLI LLSYVTPS $\square S L I F A W K Y M F$
$N F P \square N R \square M R S L L M L P V F V L P V L S G L T W R L M L$ AAALLVNHRLAPFKGLFRSLLFLPVVTTLVAVAVVWRYMY

NKKGVKFKKFWRTDFVMT VA DPQFDS LLYVSKMF QGMKGLAFYRSVFYLPSLLGGSVAI AILWRQM $S V A L L L N S K L T K F K S L F R L A Y F L P V V T T L V A V A D V W R F \square Y$
 LVLAATLNAGLKGEKFFRIVYFLPTLTSSAVLTLIFMWMY

 $K$ VKFKSGFRA $\square Y F L P M V C A P A A \square A M V W R W M F$

NRGDKGDT LYRADFYDP S LLGSSVA DAVLWRQL $F L A D T F N R Q D L K G K R I Y R V L M L L P Y A P V F L S G L V W S G L M$ ALVLAVI LDNVKGKMIYRTIYFMPQVTS SVAICMVWLWMY

$L I L A \square A D N G R \square R A K S F F R G A Y F \square P N \square L G A L V V G Y \square F N Y F F$ $G L A B L L D R L P D K C K G \square F R T W Y F A S Y S V S V T A V A A V F V W \square M$ $F L A V L L N Q K R L R \square K K F F R T V L I L P W A V P S F V T I L V F S G L F$
$\square L A \square V I N R K G T K \square K S M W R F N F M \square S A A \square P Q F V S L L L M R T M F$ IVALVLNA EFKGRALVRAA LIPWADPT VVSAKMWAWMLD RFRNVFKSALFVPALTSTIVAGIIFRLMF LIVALILNMRDKGDNGFRTVYYIPSILGGSVAVSALWRLMM N S RLRGKNVFRLLLFLP Y IVN GVAVAFMFGYV/F $\square T \square A L L A E K A R K G S R \| Y Q V M F A L P M A V S M S S A V M D F Q L L M$

# QRWRGRGAVRALTLLPWALPTTMMALGWRWDF 


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


[^1]




UniRef90 D3EEA
UniRef90-F3NBG6
UniRef90_Q165F4
UniRef90-W4VKF2
UniRef90 JON1Y7
UniRef90-R5EFY8
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UniRef90 F8FGF?
UniRef90 A7VNW7
UniRef90-UPI0003B476BC
UniRef90 UPI00030EA98

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1
10


20
40


NFAYVLK $\quad$ VPGWRVVCNTVLISDQKDVLNDIVPV


EHYRT LL S S GE FWAALKTTVIFTLFSDVLATAGGL

$N F V N T F T D D P Y G K S \prod G N T L L F M L F N A P F V L I G G L$
 ENYKKMFTED PRYWQS LKVT LIYVFAGVPLRLGFAL NYATLLSDTR FWQAVQNTFVFS AGALILETVLG

DNFATFFTD D
A A LHALLVISVVFAVVATVCQVTLGY


FS N Y VQLGF D R R F LTN S VSVS L I WEVLTVTSTMAVAVL

DNFTAALLTGER FWNAFGNTTLFTVTTVTAEVVIGV

E N Y K N V LT DGS $\square$ A A P A VNT $\square$ K F A A MEVVFSNLF GL

E NYREILLNPTFRAGFLYAVRTTVLYTVVVNALNLSLGL D NYRSVVFAS QLFWKSMGNSLVGMVSTTLLQVIFGF


F VE A VK N P D F G $\square$ A $L$ R N T F $\square$ F A $\square$ VT T L G K N G L G $\square$

FANYVTVF QDP T F WPA LIA TATFTLVS VVF QYS $\square \mathrm{G}$


 DNYKALLHDPVFAEVFRNNIVWFAIGTVPVSMVL
$D N Y \square N L L H T P L W K A F G N T C Y F A L V G A P L S \square M V S L$
 NYKIVVENE AFHLLAMGNTLRFILVVCVPLLLICSSL D NFRFAI GDEW FWKSLRNTLWLABVATGVPQHLVAI
 DNFAHLFS GVYGDRLWRAFGHNLAFFAGTMLVQTTLGL F K H F VE F F Y VT P D A WK LI R NTVLLNVYDLLFHFPAP■

F D N Y K T $\square$ F T K P E Y F A VF K V V
Y Y F F A T F VQMGLAL

NF VD LIF LD R R F L N A VWVS VK

UniRef90 F3NHZ1
UniRef90 F5YF76 UniRef90-UPI0004213B07 UniRef90_B2GG99 UniRef90 UPIO00410D195 UniRef90_UPI0002FEEA6D UniRef90-F4GK96 UniRef90 U2RW70 UniRef90-UPIO003B41CFO UniRef90_UPI0002EC557D UniRef90_E7QVY5 UniRef90 14YQS8 UniRef90 ${ }^{-}$K2IXY7 UniRef90-R6MZT2 UniRef90 S9SIP9 UniRef90-UPI000248DEAE UniRef90_UPI00047B6AC3 UniRef90-UPI000477A671 UniRef90 UPIO00248CB43 UniRef90-W4BKS0 UniRef90_UPI00047EE61B UniRef90-UPI0003764B9E UniRef90 UPI000368EA10 UniRef90-UPI0003775544 UniRef90_UPI0004784C90 UniRef90 W7IPA9 UniRef90-K7SJZ9 UniRef90-M2XX15 UniRef90 X6FNP2 UniRef90 C0CWG8 UniRef90_UPIO004759EF0 UniRef90-G7M217 UniRef90 UPI000425DFD4 UniRef90 UPI00047B7952 UniRef90-E6V606 UniRef90-UPI00047D3BB2 UniRef90 A3Z6V7 UniRef90_UPI000464B906 UniRef90-S3JUP8 UniRef90-L5NU83 UniRef90-UPI00036DF8B6 UniRef90-S4GG92 UniRef90-A5EEV3 UniRef90 D3AD21 UniRef90-S3JL56 UniRef90_E1VS32 UniRef90 UPI00030F592C UniRef90- T0LU20 UniRef90-M9R7A6 UniRef90_S1SNE6 UniRef90 F6DJP8 UniRef90-S0FT54 UniRef90-B1QVY1 UniRef90-L7FDQ2
UniRef90 UPI0002894DF2 UniRef90-X1UY65 UniRef90-S9T8K2 UniRef90 E8NEM3 UniRef90-UPI0003642EF5 UniRef90-S2LAV1 UniRef90-R5A631 UniRef90 UPI0003760AA9 UniRef90-R5SEK9 UniRef90-W1TK29 UniRef90_UPIOO03647224 UniRef90 L1KY22 UniRef90_V4PAQ1 UniRef90_UPIO004033436 UniRef90 R1CTB4 UniRef90_UPI00046F3BDB UniRef90-R9IR34 UniRef90 UPI000346A054 UniRef90-R9JPG4 UniRef90-D1APZ2 UniRef90_R6V8P3 UniRef90-UPI00034C2007 UniRef90_UPI00036DF543 UniRef90-W8YKJ1 UniRef90-UPIO00361AB2F UniRef90 A9K180 UniRef90_UPI0003F9616D UniRef90-L8DAB3 UniRef90 UPI00047BFAB3 UniRef90-B7GNW1 UniRef90-R5TQH1 UniRef90_UPIO003619BE7 UniRef90_UPIO00463AB00 UniRef90-F2JIX5 UniRef90-W4EAP1 UniRef90-UPI0003775B66 UniRef90_R9MZ98 UniRef90_Q98D12


$N Q N \nabla K G M R \square F R T L F Y \square P S V V G V A V S M \square W \square W \square F$
$F V A L L L N E \square T L R R K K V V Q T \| V Y F P H F L S W V I L A G L F V D I L$ LLAALMHR LTRSVVLRTTLLLPWLVPNVTTVGLI WLWLL $L V L A V F \square N K K L K G T S A Y R T \square F F L P M V C A P A A V A M V W K W L Y$ $G V A \| L F N \quad R K F R G R R L V R G L M L L P Y V A P L I A V A Y V W Q W L L$ LGTALLVNNKFKGQSLARLLVALPWAVPEVIAVVIFAWMF
$\bar{I} A \operatorname{TMLNSKLDRGRNVFQLATFDPYDTDPVADGVLFMLLF}$ LLNEL RKEWVKRTFQTLVYLPHFLSWVLLSGIVIDVL
 VA $\square A M L L Y R D F R G K N F V K T \square F L L P M V A T P V A M G L V W V A L I T$

$$
\text { R K D T K WK G F WR F CF VLS } \square \mathrm{A} \text { VP Q F } V \mathrm{~S} \square \mathrm{M} \square \mathrm{MH} \square \mathrm{M} \square
$$

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


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

AMALVMH RAMRGRGF RAA LV PWA DPTAVAALLWRWD WRKSVQMVTYAPYFISTVVMVSGLMQFM

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

$K R T F Q T L V Y \square P H F L S W V L L S G \square L I D \square L$ NQKKMRGKT $\square$ YRTMYLFPWAFPAF $I T L V W S N M L$
$\overline{L V A H L L N R P L F D R G L W R S L I L L \quad P W V V P S Y V V G L L W G F M}$

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


KGRKAAQMDTYAPHFDSTVVFCGMDL $\square$ $\overline{L L A D C D N Y V R T W F R K T V Q M V S Y F P Y F I S T I V L V G M I N A L F}$ SLNYLREGLYKKG $\quad$ LQMVTYAPHFIS $I V V M V G \square V K E L L$ $G \prod A V L M Q R \prod S K S S L V R S L L L V P W L V P N V T \square A V I T L F L L$
 GMAMA $\square N V P G \square G L K P L F R T A L F A P Y V A T L V A A A V I W R Y M L$

> NSNFRGRGVMRTVMLVP WAVDTVVSARMWEWML VFA ILLNMKEFYWK FARTVYMFPNII SGAAVGMLFLCMLL
 LCMAALVRQSAHFQRWLKTGFLLPMADPAASVAVFFRMLFF $F \square A Y \square L N F K \square K G V N F F R T A Y Y I P S \square L G G N V A \backslash A V L W R F L$
AFAVLL RHTRAGRRF $\square$ QTAYVLPHLVSP $\square V V G Y \square W S L M$


RK $\square$ RGRNFVRSAVFAPFVISGAA $\square G \square$ AF QF VF $\begin{array}{ll}R \\ R & M\end{array}$


NTEGLRGKGVYKTLLMDPWAMPTYDSALIWKFMF YFAT $\square L S F N V R M K N W F K G 乌 L F F P T L L N G V A D G F I F L F F F$

KFKRVTQTVLYAPHF $\square S M V V C G M \square R \square F \square$ $\square G V L M F E V A S P R D R N V Y C L L F I \quad D V L L P R V S A A F V W K F A Y$

## UniRef90 F3NHZ1 <br> UniRef90-F5YF76 UniRef90_UPIO004213B07 UniRef90-B2GG99

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UniRef90 R6MZT2
UniRef90-R6MZT2
UniRef90 S9SIP9 UniRef90_UPI000248DEAE UniRef90_UPI00047B6AC3 UniRef90_UPI000477A671
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UniRef90_R5TQH1
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UniRef90_UPI0003775B66
UniRef90_R9MZ98
UniRef90_Q98D12

DPAVGILNHILHLKTG WFLDPGTALYGIMMVCLWDG
STTGMFNQLLQNLHELDPDKFLDSDSHTWLKMLMWGUWKG
ESNYGLLNTVLSWFGVKGPHWLTDSSTALLSIIIMSLWGV

DTNLGFVNHLITAMGLPAVGFFTSPALADPTISVVNTWAF



HDQF GUVNDALLRLGGLDVAWLA S SDLA LDWSVVAVDVWK T
DWNSGLINRAGVVSLGUEPVNFLGLDPGARFVVIMMUNWKY
SPSTGVVNQFLGLFGUKPIVFLGDNNWFPYVMVVTDVWKE
DPV GPI NAVLSKLGFEPVSFMTDPSWSMASLVFMETWQQ

DPNFGLGAGF GDDALKQDWLGQPRLAMATLVVVSWQW
EPSIGGLANHVLKAFGLEPQLWIASPTQADPSLVVIDVWEW
NGFVNYVLPLLGI DPVSWYADSGKWPFILSVVYLWKN

GGLNAILLKLGIISHDFLSDPNSALALTVVAAVWRQ


GAVNSVLTAIGLPAIAWHGAGLWPHVAIASMVNFRW



Q P GAVNSVLT AIGDPA』AWHGAGLWPHVAI ASMVNFRW QP D GLI NA G L L GL DWLTMP WLG DSHTALPAIA AA HCWS T


 $\begin{array}{rl} \\ N G T L & N M V L \\ N\end{array}$ H P L F G L L

## 47D3BB2



 QF GLI NQLLLTAASFAPI DWLGNPSTAMLAIVIMSAWQG
 $D \vee C Y$
 $G M F D Q L L T A D G L K P D G V L S D K K T V L P A M A F M Y V W R E$ QP Q Y G V D D T M M K L G I D G PA W L GTP E L AL WTV L A V L T WK Y A Y T G GV A NEVL NVVMGFKSLDDWLTSPKYAMISLI L VN FWLS








 D P R T G LI $N$ N K V L QA F GF QA I N F L G D A S M F K S I Y Y V W S D V WQ H
 D P NVGGVNHLLTTLVHSEPDAFYGNPD DADFTVALVNSWRN


 NP DFGAFVNS HR NGLI NSFFDDETDWLNSNSYAFWDLVI TF LDWKN S K D Y G LV V A V L H S L GMER DN WL N DAA H L K PA A A I VAFR Y

 S PQF GAVNA ALRAVGLDAQPWTGDPALDALPTLILVNAWQW S P S T GVVNHAL E R L F GE P I M F L G E P GWF R T I Y V G S E I WQ K SEADSSVNQUVNFLGMESIDWRYNAWSAMFLMVILASWRW YGPVVNQFLLSIGVNPPNWLADMKWAMPALIAMY DWQN




 Y GFV Q N D F G L L K P E $\qquad$
 $H L I Q Q F L G Q H R F L T I L A A I E D V Q V W Q M$



## UniRef90 F3NHZ1 <br> UniRef90-F5YF76 UniRef90-UPI0004213B07 UniRef90-B2GG99 <br> UniRef90_UPIO00410D195

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UniRef90-S9SIP9 UniRef90_UPI000248DEAE UniRef90_UP100047B6AC3 UniRef90-UPIO00477A671 UniRef90-W4BKS0
UniRef90_UPI00047EE61B UniRef90_UPIO003764B9E UniRef90_UPIO00368EA10 UniRef90-UPIO003775544
UniRef90_UPI0004784C90
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 LLTPTVLYVI CTNAVLAMMTSTPVMIITSGQPG


MLSPTVFFNLI MGLIGSFQVFTQALVMTGGGPGNA
SLTSTIMTVFLLNLGFFMNAFDQVFNMMN NSV
ALMPTIMLMGMLSLGSILNAFEQVY NLYSPQV
LLKPVMALVLVVSLIGSFQDFDTVAVTTKGGPVNAT
$L L S P T T F F I V Q T R V G A D T V F D L M F M V$ VI
LVAPAAT VVVAYTTI QSFKAFDLIFAMTRGGPN
ELKYVLATVFLLRWI WNFNKFADI WLLTT
SLMPILGVTLVLVMLWVFRDFSDIYVLTGGGP



ML R P T I TVAFMLRLI DVLKTFDI I Y STTQGGPNM
LLKPTMVIMVLLAVGRIFNDFGLFYQV PDNSGAL

QLRGILFDMLILQVIATAQVFLEPFLFTGGGP
WLRPALITVTVLNI I YAFLQFDVIFAMTQGGPG

LSLPULLSSVI FSLNATLKVGDSLLALNNGGPGT
LVKPTLLVAVLFRLLDTLKRFDLDFTLIGPG
$\bar{M} L R P T I I F V V I T S T I G G L Q \mid F D E P R M F D T G G \quad M \quad M G G A$
SMKAAIMVAVVFRALDAFRGFDNDYDMTNGQYGTESLSLL
A I RPVTAVVIVLTVTHAFKAFDLI WAMTKGGPVRA
QI S SVVFFNLI MQS $\square Q A L Q N F T S A F V I T G G G P$
MIS SMIMLLQVILQTTAALQTFNQPKILTNGGPGF

$M V K G S I V T N M L V T L Q T L G V F T L I F A M T G G G P G T$
MLKAPLI SLTFVVKMVESLRAFDLIYVMTRGGPGD


$\mathrm{PL} L \mathrm{~N} S \mathrm{GSL}$
$\mathrm{P} \square \mathrm{L} \mathrm{N}$
HLRGAILI ILLVRGlWMFNKFD IIYGSTRGGP
GLRNTMVFVLTTTAIAALGLFTQVDVMTQGGPN
YIFFVMTPYLITTFTGNVNNFNVIVLLSSGEPTPVGSS
LTAHLLFA IFVLRLDMAFKDFDLVYILTFGGPGNAT
LIVPAFTTNATLVLSWGLKVEEYPMVTTGGGPGT
L L AP T T DFVTVTALTDSLKLVDHVVIMTEGAPNNAST
LLGPTLRTWGFLSMDGSLQLFDMVWILTGGGP
LLRRQABFITFGFIFTWNNFYVPFLLTGGGPGIL
$L$
$Q$
$Q$
$M L R P V T A V L L L Y G L L G T M Y S F N Q V Y M M F G H G A G Y \quad P$
LSWDUIKMVIILQTVGALRSFDLVYVMTGGGPNH
LISPTTFFLTIITTINSIQAYDQLQVLTQGGP


LL RPVSAITILLGLVYTLKVVDDIWIMTRGGPGS



LTMPTTLIVAVVAVTNAFKWVDHLWIMTKGGPDHASS
L LSPTLLVASVVGI DNADQVFEQPYVLTAGGPG
GVAPSLWMVALLTVAGYFQLFAEPYVMTQGGP

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





Q

LLTPT IVFNLVMQMDNGFLAFTQSY IITQGKP
$L L L V A T A P L L I S S F A F N F N N F T G S Y M L T G G G P R$

ELTSGMVL NLI MS AGGLLNNVFDGVWLLNG
ELT S I MVLNLIMS AGGLMNVFEKVWLL



UniRef90 F3NHZ

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| UniRef90_UPI000410D195 |  |
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| UniRef90-K21XY7 |  |
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| UniRef90 W4BKS0 | LVL |
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| UniRef90-UPI0003764B9E |  |
| UniRef90-UPI000368EA10 |  |
| UniRef90-UPI0003775544 | $\underline{L} \mathrm{I}$ M |
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UniRef90-Q98D12
 $F E N Y R Q L F S D K E V F Q T F G N T L K Y V V V T V P V G L F L G$


FDNYVQFFREPADASGLWH TVVYAGVTSGLKVVLGM NYAALIKTGD

FENYKRLFSDPAVWQATGNTLK Y VLMVIPF I I IF S
ENFKDLFT GVSSGRFWKAFRNT $\square$ F $\square S F S N D I L G \square V V C V$ WGNYLELLKNHDFWVS $\square$ DRTF YFT ILSVAAELVLG

NYQAVLTAGETWQS LTWNTVKYA【VEVPLG\VI A WDNFER $\square$ FTD $\quad$ RTLLLA $\square$ KNTA $\square$ FAVVTVIGKNLLG $\square$

Q N Y VTVLT DP LWWTDFS
T T F $\square$ IT VAS VA VE LVLG

FSYFEMFMKD
Q S F WR A F F N D L N L S VS Y L I VK F P LT L
$R N Y L T V L S G D A S Y G A F W A T L L R T V V W T A S C V L L H Y G \square G L$

NYEAVLADPL FWSSVR $\square$ T LLFMLVVAP $\square R \square F G A F$ FGDVFASAGFWSSLKTTFLYTAGSTAGSVLLGL $D N Y V N L L G N P L \quad F W T A M R N T A W F A V L G V P A T I V A S L$
 DNFRRLFADP A LTWHSAWLTVLFTLGSVIGQNCLGM YFWRLLRNTLLLSAYSLLFEFTTP■

D N FKR VLT D NY $\square \mathrm{K} \|$ F Q D P


R N Y T K $\square$ F S D A A F RES M WVT $\square$ K
FS $\square$ VVVT $\square \mathrm{EMF} \square \mathrm{G}$



UniRef90 R5NR06 UniRef90 UPI0003158A06 UniRef90-C6IVH3 UniRef90 J1FNX3 UniRef90 UPI00047576DD UniRef90-UPI00047A4B69 UniRef90_UPI00037B47B7 UniRef90-10HA96 UniRef90-UPI00036FF88D UniRef90_A9WNW0 UniRef90_C6JDD7 UniRef90-R6LH17 UniRet90-FIOHO4 UniRef90 FOHFL4 UniRef90-D7BT41 UniRef90_L7VGX8 UniRef90-UPI00041C9279 UniRef90 D7C0L8 UniRef90-UPI00037D88B7 UniRef90_UPI00037B18F9 UniRef90- W4CN93 UniRef90 A6WGC1 UniRef90-UPI0003B3E4D1 UniRef90-B2TQC0 UniRef90 L8EH17 UniRef90_UPI00047BA946 UniRef90_E4NOP3 UniRef90 UPI0003B51349 UniRef90 V2ZHR3 UniRef90-W4CT10 UniRef90-D3E9E5 UniRef90 X5LE34 UniRef90 ${ }^{-}$W4VQM3 UniRef90_UPI0003AD5F32 UniRef90-J9HVQ4 UniRef90 G7VQQ3 UniRef90-G7S9N3 UniRef90-E1RBZ4 UniRef90 UPI00037E6B6B UniRef90- C6IY39 UniRef90-UPIOOO219648C UniRef90-X6KUV5 UniRef90 UPI00035FD4B2 UniRef90-UPI0004722161 UniRef90-G8QVR2 UniRef90 UPI00036DF0C6 UniRef90 UPI0003AD22D6 UniRef90_UPIO0047719E6 UniRef90_C6WGK2 UniRef90 UPIO003B60D94 UniRef90- F7YW79 UniRef90-M1MXW3 UniRef90-R9MST3 UniRef90 UPI0003B6F94C UniRef90-R6G515 UniRef90_UPI00035D3CF1 UniRef90 D7D6B0 UniRef90-M3DST9 UniRef90-U2YTD2 UniRef90-R6P0S5 UniRef90-R9JN60 UniRef90_UPI0004221FBC UniRef90 UPI000365DAC3 UniRef90-17LA04 UniRef90-E4R2Z3 UniRef90 F2RHH6 UniRef90 T2RZ56 UniRef90-K0EV79 UniRef90-L1MA65 UniRef90 UPI000371C2B7
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UniRef90-UPI00036492E6
UniRef90-UPI00035E5D88 UniRef90-N9XEE6 UniRef90-F0YZV2 UniRef90_UPI000372FC1B UniRef90-A9WHM4 UniRef90 WOHTFO UniRef90-G4HA47 UniRef90_F4B585 UniRef90 W7SH18 UniRef90-C6LJA5 UniRef90-A4EGI1 UniRef90_R5YEB9 UniRef90 U2R921 UniRef90-B8CYD5 UniRef90-LOEI04 UniRef90 R5A6Q1 UniRef90-UPI0002ED4987 UniRef90_I7B4P5 RNMDFKRTVQTVDYLPHFDSWVIVGGLFMMD LVTAALLN

[

LLA VLINNKFMWGREFFKSS LIFFPALTSVVVAGTDFRLMF $A L A V L L T G P I I G R G F L R S V A F F P V L V S T \| G V G L T F Q V L M$ ALAKKLFADVFLAR VMRPVI LLPLVLPPMSVALMWTTMM VFAVVVQNKRVKFQGFHRRVIFDPSVLSSVVVAMDWQUVY

$L L V A V L L N Q K \square K G K S \square Y R V I Y F \square P M V A A P A A V A M V W K W L F$
 FFSALLLDQSFKGRTFFRGSIIVPWALLTLVNGLMWNWI Y RKLL RGRAFYRSAFYAPSLLGASMSDALVWRAL $R \square R G K E W F K N V F F M P A V I S S V A V G M M W T F I Y$

| L I LA VLLQ N |
| :---: |
| A $\square$ A $\$ VG $\square$ N M K |
|  |

FAFAFVMYR $\square \square R G R S W V R T G \square L I P Y G \square I T V V S A Y V W R Y A F$
SQK M G $\square A V F R T M F S S T M G V S V T V A S \square L W D F M F$ QKI RGEGI L RP IYYLYPMALSFIVTGTAWKWFI $\square F A L L L N E R R V K W K K F V Q T V S Y L P H F I S M V I V A G M V K E M L$

K L F Y
$G L A V L L N R Q \quad V A G R A V Y R V L L I L P W A D P A F \square S A F A W K Y M F$ $R G L L$

F $\square A \square L L N S P R \square P F A R F F R T V Y F D P V V T T T A D I G V V M R F D L$ $K \| K G G N D F R K I Y I I P M L M S S V A I A Q L W I K I F$ VAA LAL RKPFRGRGLLRAAMLLPYVAPVVAVAFVWEVAL


R A MLL
K G VY A K NA LDRATVFMPYVSN■VAVAVIFKVLL
 K I A ARNGFRA DYF RPRLRAFVQAVLYLPHFFSWVLVVTVFQQLL
$R K \square R G T N F F R T V F F M P N L I G G \| V L G Y T W Q S M L$ RGKGFYRSAFYAPSLLGASMSIALVWRAL VLALLINEVRSRFRNVVQTVSYMPYFVSLIVVCGIVKDLT
$R N V K G S K W F Q \square L F F V P S V T S E V V T A M M F L W L L$ VTAVLLQRKRFGSGLFQGIFFLPTVTSSAVYSLIDWYFIF
 $M M R T V A F L P Q V L S G V I V A F V W R Y I L$
 N QRDLKGKSIGYAFLILSPWAFPGFISLLI WQGLDW



## UniRef90 R5NR06 UniRef90_UPIOOO3158A06 UniRef90-C6IVH3 UniRef90-UPI00047576DD UniRef90-UPIOOO47A4B69 UniRef90_UPIooo37B47B7 UniRef90-।IHHA96 UniRef90_UPIo0036FF88D UniRef90-A9WNWO UniRef90-C6JDD7 UniRef90_R6LH17 UniRef90_UPIo004712E4F

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UniRef90 D3E9E5 UniRef90-X5LE34 UniRef90-W4VQM3 UniRef90-UPIO003AD5F32 UniRef90_J9HVQ4 UniRef90-G7VQQ3 UniRef90-G7S9N3
UniRef90_E1RBZ4 UniRef90-UPI00037E6B6B UniRef90 ${ }^{-}$C6IY39
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UniRef90-M1MXW3
UniRet90_R9MST3
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UniRef90-UPIO0035D3CF1 UniRef90-D7D6B0 UniRef90-M3DST9 UniRef90-U2YTD2 UniRef90-R6POS5 UniRef90-R9JN60 UniRef90-UPIO004221FBC UniRef90 UPI000365DAC3 UniRef90-17LA04
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UniRef90 F4B585 UniRef90-W7SH18 UniRet90-C6LJA5 UniRef90-A4EGI11 UniRef90_R5YEB9 UniRef90-U2R921 UniRef90_B8CYD5 UniRef90-LOEIO4 UniRef90-R5A6Q1 UniRef90-UPIIOOO2ED4987

DT 90 TRKVFHHPFTYSVKDYGFWGLLTVIMCWO 120 DPNLGLNAQUADWLNLSSADLLGSPRGAFAAVLFVTAWQF STNGGIVNKALTAMGMEPDAFFLDNSVFRSVLITSAGWKE NEKMGILNALITSFGGPRI GWLTNPKTA $\square F V V M L V G L W M S$ NGVINNIIKAFGGTPI GFMSDETYFRGTLVFSMI WKE PEFGFVNT TFFGGADIPWLTDPLLAKVSVLVVNLWLG GEMEGLI NSFLGWFGDEPVKFLKGQVTGFIALLALATWRW HPTKGVINQALDLIGVTGPAWLVDPSWALLSVALVDVWQG DPQNGI MNYLLSLAGI RRFAWI SDPNTAMFSLVLIDVWTY NPRYGLANLVLSWFGIPNDDWLGNSTFAMPAVIIYSLWHE NKDIGLISAIMEKDGMEDIVWLDDPKIVIYSLAIVLI WQF SPVGPMNKLL GGISTNWMTMPAAFRTIYI ASGIDWQG SPEQGVVNSILAALGLPQQPFLGSSSQALGSII ADASWKG GLVNKVGAMFGVDPTQWYNNPTYWPLIIGLVFLWK SPQGGL NDTLHAVGLLARPWLGDYDWALPAVGIVGTWVG
 YNDGGTIPNLLDSIGGHTGGWVGNPDVALYSAVVALI WVG DPSMGILNELLRAVGLESWQWLSDPKTAMWAIVAVTAWQF GFMNKTLLPFFGDPIDEWYSQSKYWPGILVIVKI WKE


PQFGVANYLLHLCNGVSRQQWLQSSNTAMGGVIVVIVWKS HPSSGPDNQTLMSLGIENPPWIADPKFALLSVVMI QUWDS | DPNFGVPSQL |
| :--- | :--- |
| NQQFGLDNGGDGNWMGSQSGAIVAVLTFVVGMWQW | GPVNSILMGVIGEALRFMESTLGARTLVGLMNFLMW $\square R S D G T I N R 1$ FEAVGLPSQAWLTNPALVIWTVAFVSVWQH ATDSGFINQLGRMUGUTGPAWLYDTRLAMPVVIVTSLLKN NALVEYFTGEQINFLSSPEWFRPMI IGQVIWKE NPNFGLVDSLLKAVGGGNGNWLGNVLLAMLVVSMIIVAWQF NYDNGFLNTLLLQIGGERVDVYNQPWVWIFLIILFYLWKN NGPI NSIMTSLGMEPVDFMGTSLGTRTLVAVMNFLMW QLDSGLVNQWL G MH LGSAPDPWLASTQFVLISVVLVNRG NPNGSVNELIKSLGGRPIPFLEDTVLWILTYTGAGVWHY NPQGMFSKLLTFLHLPQLNFLSDPTWSLVAIIGTTVWMN

 SLTGPLNNLLASFGFEKDPFLSLPEWFPTVYVASGVWQS NGLLNQALQAIGLLPGYNWLGDPAVALKKGIVMLMNIWST NGAVNELLDAIGGLAHDWLGDPATALWTVVGVMVWMQ NAQYGVLNKLLGY GLDGTSWLANTSIVVYSVIVVVVWQS DPQYGNQVL A
 NSFLRSVGLD GLMNQVIGFFGHGPVRWLRQDTPGLVALLALAMWRY DPGAGPVAAVVGLFGLPPVDLLGDSATALVTTALVYVWKF DPMNGLINSLLSMFGUETPLWLADPDMALYSVFIPUVWQY HPRYGVVNWVGDGFGGPPVDWLGQPETALPAVLAFECWRY NPELGVVELLHDWGFADFDWLIDPDMAI YTVVVAAVWQS DPNFGMPSKM R WLFGDGNVEGNASSAIAVLVFVSLWQF QP SYGPVNEMLKADGFANPPWFADPHYALFTWMGISVWLS

 NPEGTLNNLFAAVGAGEQDW DFSAPMAAIIVLGNVWRG DPVFGLVNVVLKPFGAGQ\DWVSRYPGPAVMADLVWQWTP FNDGGTVDDLLS STGVNMGGWVNQPGWALLVVALLTI WQF RSD GLVNLVYTFISGTDQDMLQQPGGFRGVYVLSEIWQR DYNFGMINYVLAEKAGEDGRPFWLIGDNSFFALVVVSVWRQ ATYNGVLNGYLQGVIGAPVDWLGSSRTAMAAVVIVADWGA LANDGLLNHMLSGLSGLAVNWLADYDTAMGSVILIEGWMW AQD GLLNDILTTTGTPITPLKPQTHFVGFDNYTEMTHD

HYGLLNGLLLKTGLDEQSWLNDRATALLFLIVLVHVWRM GEGTGMINNLIANGGTRDPFLQDNVNWLISYI FIGVWQS VDPYGMMNK乌LPMLHLPRINSLDSTTDAWIELI LTNDWLS LGRLLHVPVPRFLSETWMLGSLSNVVSWEF TSTDNGILTNLGEGMGIQQ|AFYQEAWVWPIIMVVLKVWQA NSTNGIVNTVLLDLGLVSPVSFLGADLALATVIFIRIWKG NGALNTILAAGGGDHNWLGSPDTALASIMAVMVWVQ S LR GFVNRVLGA GGUGPIPFLMHGDWFRFTVIVSDVWKE SLRSG|LNLLEQFGCERVDFMGVPSDFNDDYVWTGIWQT
$H\|K Y G L V N F G L S H L G\| A P \square D W L G D P R W A M P T I M L F A V W K N$



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UniRef90_UPIOOO4712E4F UniRef90-F5LHU4 UniRef90 FOHFL4 UniRef90-D7BT41 UniRef90_L7VGX8 UniRef90_UPIO0041C9279 UniRef90 D7C0L8 UniRef90-UPI00037D88B7 UniRef90_UPI00037B18F9 UniRef90_W4CN93 UniRef90-A6WGC1 UniRef90-UPI0003B3E4D1 UniRef90-B2TQC0 UniRef90 L8EH17 UniRef90_UPI00047BA946 UniRef90-E4NOP3 UniRef90_UPI0003B51349 UniRef90 V2ZHR3 UniRef90-W4CT10 UniRef90-D3E9E5
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 YESTQTVVMLFYRQAFDYG YSVADII DTYVYRDGLTEG RFS $V$ AAAVGLFKSADNFA

$K N \square G L T V V G L Y R Q G \square E$
S DVMASVVYKQ
STSVLSVRAY $\frac{V}{T}$ V AF QN
SSTVTALYAYDVAFK
LPASEI LSTYYYRIGLLNG DYGYST



STSVPAYEVYHRAFE
YDVADVDGTYSYR $\square G M R \quad$ QANYG $L G T A \square G \square F K S V V G M V$
DPTTSVSYDTFNNAFRYF
ADSTQTLGTATYQLSFQQ
ADS DNFYT L Y C LYERG
ANRTQVIA SYLYYRSFNSFEY
YSTTQVIDTYVYQT
ETLLVYAYGLTFDY
PN MYAYNLSFAGQQ
SGSTRTLLYMYYQCAFENFNMGE
LGSTTVIVYFVWEQAF
$L H S T S M L V W H L Y D T A F V N$
$A F Y M Y Q Q A F K S$
$\square N K T Q S I V Y$ LIFTYAFTNSN
DRTTMTLIMYL
SGSTKVLVYNTWERAFKLF
 LS LY GYSEAFGSLN
TTVLAMDMYKQAFAN
YNTTDILDTYVYR


M
A H H T LT $\square P \square Y$ VWQ $\square A F$
ANKTETLSFLAYRQ
$M D V A Q V I S T Y V Y T V G Q S$

YETADVISTYVYRMG $\square$ TGGG NFSYATAVGDFEGVIGLI
NNSTLTVALLI YQYAFKN
$T K L I V Q Q V Y Q V A F$
STVTVLMLIYNYAFQNGDY

A Y F MY T T GF LS F
GASNVLALQMYVYAFRAFDFNR
LNSTMSMALLIYQNGFKN
A HQSELLT SYMYFTVFTS

TEVIASYMYKEAFGKFN
AQSTVTVLYFMYEEGFK
S DVPATFMYSFAFT
A YYMYSTAFK
TTVMSVNVVRTAF
$\square G S T S M M V W Y$ LYDQAFVN
TD D PATFMYAHAFT
GNSASTAVFY!YNK
TETVTY LI YQGGLT GG

PGAAEVLDTFVWWTGLRS QDFSYAAAA
DATQTLPA LLMYDTAFE

YETADVISTFVYRKGLIDF DWSFSSAVGLFNSVINLA
PDAADLI SDHI YQSSF
LDSTMVTLKY I WRQGFEFNN
THVMFSYI FEMVF
$T Q V \square S T F V Y K A F G L G L \quad L G E S S A A S V I L S L I V V C$
ADSTQSTALYIIKCAFT
$P G A T E F V I V Y A Y K Q \ F Q$
SAATRPI QSQDYMTAFQNDN STETFIVYAYQEAFD
Y S TVDV V TYYYRAAF MRTLLNEYGLSTA DGMVQSVLGF $\square$ STEILSTRTNRTA
$\square N \mathrm{~V}$ E LL S I TIIYKKAF $\square \mathrm{N}$
TMVPSYYSYSEFFQSQQ
STYTVMLHDYNMAFK
MNKGD I DTFVYRTA DLEG NFGFATAVGLFKSVVSMV




| UniRe | R5NR06 | $\square T$ |
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## D NFTMVDFDAPVGEALLHSFLVTCAFTILSVGLCWLIGT NWKRFFKDPNAWKS W WN TLKFSLYY LDPTMALGLFFAV

 NYERLLFVDP YFWNAVRVTFTYGAASMVCTYLLGL ENFRWAISDPGFRSAFL WTWIFVATSVTLKVLAGI
 S

ENY $\square$ N $\square$ F K DE $\square \mathrm{F}$ VKS F F NTVK F
VI I I VPCQCDG
ENYNTLFTGDDL F YKVLKNTGYMVFVGLTVDTACTV
$R N Y \square A V L T N E F W V A F G R T V L L L T \square A D N A E M F L G L$

NF QALLGDA L WS KPF WNAFRNNLIFFAVHMCVQNP $\square$ G $\square$ F Q N Y EK $\square$ F G DQM $V$ WQA L $\square$ NTCKYA LVE VPFS $\square$ A $\square$

NY TELFGDSF WKNYQULLKD


NFARMWKDPNFW $\square$ AFKNT LLYTAYVVPAADF $\square$
G

KHFEMFFNSPE FYTVMRNTVVISLLKFFTGFPAPT FAYFRMFLKDPSFWRAFFNDLTLNV SYLLAVRFPL TLTFAL DNFTAVLKDE VFLDRLLWTVTWTVSCVAVTFCLGL


## F $\square \mathrm{E} \square \mathrm{MRNT}$ F V $\square \mathrm{SG} \mathrm{G}$ K $\square \mathrm{L} \square \mathrm{CFPAP} \mathrm{\square}$



DNFVQFFSDPQLSQAFLH T LVYAVITSGLKVVLGL



 QK $\square R$ AEGA $L$ RA $V Y \square Y$ PMA $\square S F \| V T G T A W K W M L$
 LI HSLSKRRWATFFKGVFFLPVVTSFVVISGIWAWMFR

GFALLLN RNFPGRGLIRTLF!LPWA\PEVVAVLIFVWML LLSVLYNSRYVIGKSSYRALLI I PWALPLLVSI TVVWRMM


$K \prod R G R T T F R A \prod F F D P M V V A P A A V A M V W K W \prod F$
 $L L L A V L M D G K \square R G K S A W R T D Y F L P M V A A P A A V A M V W R W L Y$ RAFVRSVFFLPFACSYVVASLVWKMSL

RT $\square \mathrm{FRS} \square \mathrm{FF} \square \mathrm{PY} \mathrm{Y} \square \mathrm{PA} \square \mathrm{G} \nabla \mathrm{FK} \mathrm{G}$ WQW $\mathrm{W} \square \mathrm{Y}$

KKGVRFKSFYRTLFVLA $\square$ A VPQFVS LLVMKNVL
$L L L A L L D N Q E L K G T R F F R T V F F M P M L L S T V A T G \square M W D L F Y$ $I V S A L L T S R F V K F K K L H R V V A Y F P A T I S A V V V G F T W S F I F$
$K \square K G F V Q T \prod T Y M P H F \prod S V V V I V S M D N \prod F \square$ KGREVFKTLYFTPVILASVAVAK IWKFFS

$\square \mathrm{K}$ KALL
VLALMLNERHMAFKR\VQTVSYLPHFMSWVIVAGLVMSLL LLNEL RRVKWKKFVQTVSYLPHFMSMVIVAGMVKEM GLAVLLNRR FAGRAVYRSLLILPWAVPAFVVVFAWRLLY



$M \square F A \square A L T N N F K L N N L Y R G \square I L L P N M \prod S M V V S G F \square W K F M F$


## $R \square K Y E K \square A K S V I F M P M A \square S M V G A G \nabla V W K F V Y$

RAGGFFRTAFY LPEMTPAVAAAAMFLLLL KNMKFKKTVQTIVYLPHFVSWVILANMITNIL $G \square A \square A \square A M G S \square R H M Q A V K S L Y L F P D A M P T A A V A V V W K M V F$ KNERFKKFTQTVTYMPHF $\begin{aligned} & \text { IS SVVVLVGMITA } \\ & \text { V V }\end{aligned}$

$R D \square R F E N T F R T \square Y \square L P M S \square S F V V T A K F W A W M Y$
HRTLVARGLIRTVALIPYGIVTVVAAYSWRYAW $\square A L A W F V F S K I R H Q S F F E A M F F M P Y V T S T I V T G Q V F R Y D F$ $L V L A G V D R K I R F E N T \square R T \square Y L L P M S L S F V V T A K F W L Y M Y$
LLTAMGDNANTKFKNFFKAVYFDPNTLSVLIVGYПFNY ALALA FRRAFPLSNLFQGIFLVPTTLSLVVVGTVLKFVL


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Gl| N 90
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 NPDMGLLNDW GFANFTFDWLVDPDRAIYTVVIAGVWQS

 NYLGMSHSALI ALSSVIGVWKF
SADTGLIYY LLRLGVIPTSFFFNGNDAMLMVILANVWRT QHDNGLVNHVLHDQLGDKPSFWLIGDNSFVALLVVSVWKG $G N S E G F I N Q F L A D F G D K E Q L F L S S S K Q A L I V L A G L S V F K V$
 DAQFGVINYALVSVGLIPLAWLANRDLALPALVLVTSWQQ DPVFGPVNIVLRDLGVNPPDWMNDAFYGFIALNI I EVWLA
 PTYGLVNQMLNGLGLDSIVFLGSNDWFRSVLVTSDVWKE
 YSPEGILNTLLAAHFGUSAQPFI HSAKQALIPSIAIMSVWQG



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ND N
G G NPTMGPLN
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V NTQYGl I N S V V FGVNVKWL AT RFVLFTCAVVQIWSN
 NSEFGLFNHLDNSMGLSSVNWISNPSTAYISVMVVGIWSI FSDTGVVNTVFGWFGGEPQAWVGTVDLYWVVLVTVRLWLQ Q Y G V V N D V L V

 DPAYGLVN NG L FGAEVDWLSEYPL ASVMAQVVWQW

 TNS GDTHVWTAYVYWISEI WQ H TPKT GQFFGDTS L VDPDGVVNSLLELVGLGKTAWLGNA SQSGTL DAFMK WFGDKTA LD WLY
N
NPTYGLLN WT
DPNFGLLGPGF DPNFGLGPGFGGLLGVEPVDWTSQYPVVALLMALVWQWTP STDNGSVNILLLGGLIDEPISFLSLPELVWSILVVTNVWKE VSDTGPI NSFLA WMGFERIPFI SLLPEWFPAIVVASGI WQS
 SPSGGIVNQLLSAVVGLKPVFFGLGNSAVFPYTMAVTDVWKE
 NDQ GPL NAFLEKI GLI SHPFLSDPTWAKI AFVTQVI PAF ADK GPLNGLLLQLGWIKDPFLSHATWAKITVIIVNLWVG
 SKDS GSLYEA TGI ELFNNSWLGDIEUVIYSVVIVSLWQG
 QYGLLNAAL GWVGIDGPAWLYESRWAMVAIVMMSVWAG T Y Q $\square G L L N Q \| L V T F G F Q P G W L I Q G P W D N N L A L I F V G I W D W$ GLLNYWL EHLGGAGQDWMNGKSAFWI LVLSYI WKN NGQQGLVNKVLGWVGINGPNWTTDPNWLKPSLAMVSLWTL G ANGIFNTVRSAFGATDVLPMTDPGDFRQLLDGTDVWKE


 DWQTGIINALFVKMGLEGDYWLQDPWLSRIII A MMIVWRN

D D N T GVIN
YLA QLFAPGEAPLTHRASALSIIILAEVWKT NGKYGLLDFVLKMLHLPAPDWLDDPSMSLISLIIFGI WSS NPQTGGL ANVIPLLGEKLGI DFLSTNDLGKEKWAWIGIVIVAVWQA D PNNGLINPLLTSUGWGSFSWLADPSRALPDLIFFLDVWVG
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H G T S TI I Y｜A A｜LG｜｜ 140 40

A A Ell Ga ${ }^{15}$
150 HGTS IVYLAALLGIDESYYEAAELDGATFWKKDWY\｜VI』P $C G S T M V Y Y Y A G L Q S I P G H L Y E A A K M D S A T G W R T F W S V T F P$
$I P F M G I A L L A G L Q T V S K E M Y E A A M L D G A G A D K R F F Y M T L P ~$

in


 A GYYMLFFLAGLQGIPPSTREAAMMEGASPDQQFFNVTLP


 FPLAMLILLAGLQTIPKEEYEAAMVDGANAWSRFIHVTMP YPFMMTVVTSACLQAVPDILVEAABVDGANYWQRLTRVVIP SGYMDLIVYVAGFTGMNEDVLEGASIDDGASGWVKLKNVILDP
 GAPMV：FLAGVRQ



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 MGYGMTI，Yi AA AL DGFAASUVY A A A A
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| UniRef90_C5CFH9 |  |
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T TMVGLLIGNNAFKYF
Y S T TTIVYYYLYQEGFTS
GTQVLSTLSYTVGFLN
STLLVPSYYSY LNFF D
$S S D V P A D F M Y Q F A F T R G$

Y HSSEVI STGMYRTAF
S D $\square$ S E V I ST Y I Y T L G $\square$ Q G G Q F S

| $T T V L L Y Y$ | $Q N L A W D$ | $T H D L G K A S A A T F L T L V A L T$ |
| :--- | :--- | :--- |
| $T$ | $L$ |  |

$A G D T T T L P Y$ LI R QAGFVNFNFS
PEA A D L S I H Y Y S S F

STEETMLMRVVN ESSFRM

TRSALLYAYQGGFTGG


$S T Y T L V Y D I Y E T G$
FKTSVVANEFYSQTFR
GG T D IL L S M I Y R $\square$ A F GRS G S
GATMFYSLYLY QNAFQY
$P P Y$ A R P P L L V Y L Y Y A A L G Q G Q
MLK T Q S LA Y L F Y K H S F
AKRTELLWTLIGRTAYS
GASNVLALQMYMYGFR
STE TLL T L A Y QE GFKK F N
$T Q P \square N V I T L N \square Y N T A \square R$
LN D A Q SL M S L F Y R Q S F
NFATD L GTFFYRTFFGN
$A D S T L V Y T M Y D Y D R G$
$L V K T Q S D V Y G Y K Y S$
VK T Q S L V Y L F Y K Y S F IE G N

ANSTSVLIVYI YQQ
AKK S MFLS YVIYMYGFE
A HATELLATYMYNSTFS
ADSTSQV STMHMYLATFNSF KYGYGSA $\square$ STFLVVFCLV
A GKT DLL V T W W L Y K LT
A GK T DLLVT WL Y K LTVN S
$T E L M A T Y M Y K K G F T E F F R M G Y$
S S MVMALQVYKTTF

Y S S ELVAT YMYKVAFTSAKY
A G H T D I L I T W W $\quad$ K K L T T L D




 Y S S DLPANFMYAHTFTR SQ
F S T S V VANEFYKQS F
A GSTDLLVTWLYKLTMN

$V$ V V S S YFi Y L E A F R
SEVAMLNI YREAF
$V$ N S A E TMVVT Y L Y K F GLLQ

ST LTLLVY Y I Y D RGF
FKTEVI ANRMYKEMFQYRN
$M M Q H L F N N W F R N F S F$
E E S L VY M V Y L F Q N A F Q

TPNMYAYNLS S A GNQS
F Y V V Y L Y R E A F Q
S S DVIASVI YK Q
DNAAMTIDWKFVNDSFMN
LG S T L T L A L Y I Y Q Q A F

G N S A $\quad$ T S VFF Y $\square Y \mathrm{~N}$ K
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D A T VTAMLLUVNSGFR

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

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FDQFKFLFGDDTFLLVLRNT $\square \mathrm{A} \quad \mathrm{MS} \mathrm{VI} \mathrm{N} M \mathrm{VLGFDTA} \mathrm{\square A}$
DNYLELLHTPL FWKS $\square$ WNTTYFVLLGMPMS $\square$ TVS $\square$ NYKTMFQD KTFLKA LSNTFYMVLFGDP $\square$ TT $\square$ TA V

F G N Y K K $\square$ F S T P $\square$ F $\square$ Q S MYN $\square$ AR $\square$ WC $\square$ GG $\square$ G T M F M
WF NYRYAFRE HSTF $\quad$ VD $\square$ WETVRDTVVNTLVIT $\square$ FSL FENYKRLAQE NVFWVSLKNTLLYTVGSVVFQFAA G

WANFERVFADPSFWSAVRNT LT $\square$ TAFQLVFFFPDP $\square$ A $\square$ A L

FKNFEF $\square$ FNSG VLWN $\quad$ TKNTVLYN $\square$ AF IIISNVLQL

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 GAALLLNSRAARFKGLFRTVLFAPVVTTLVAVALDWRYLF

$F \square L A Y L V S L K L K G S R F F K L T F F L P A V L S V T A V S L M W K M \square L$ NRRLRFQTLFRISLLLPNVTSVVAVVVIFSQLF
 LLADMLNGK FKGRTLVRADFFLPVVFNSEAVQAVLNS SG F LLALLFFSMKFR DAPF $D R G L M M V S W L D P L T V T A L L F K F M M$ $P F Q K \square F Q T I F F T P Y V T N T \square A \square G M V F A D M F$

K F A F
MKAFFRS VFF $\square$ PTA $V$ S F VAAS $L \square W K M F S$

KRFFRAVIY LDPNIVSAVADATMWQYVY $N \square R A E G A L R A V Y L Y P M A L S F I V T G T A W K W I L$

LLNSVLSS $\quad R V R D T V Q S V V Y$ V HFFS WVLVVSDFQQVL
 R S N K F K R $\square$ A Q S $\square$ S Y $\square$ P HFMS $\|$ VI VA GMVLQ $\square$
 S L L F A $\square G \square K R V K L F R T F F I L A F L V A N V S S G V A Y S I I F Q K L$

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

K QRWARD $\square T$ RSMLLAPMFDTP $T A V G L T F R F L L$ KFK L R E A Y K L F YF $\square P V I T N A V A V S L V W Q G \backslash Y$

RKK WYCKFARGVFMDPN I IS S A A $\square$ GMLF LC L L


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 HEKYGAINAIVRLLFGSGPSWLGSPHLAPFSVVLVDAWQW PSYGLLNHALLWLGVIDQVWFNDRATADFLVSLVVVWRM FNRFGLANTVLGWFGIENIAWDSTVDWYWIPLVTVRLWDQ NDKYGLINDLIRRFVDDSLSWLVNTDTARUAVILVDLWKD SVDGGIVNVLLMKLGFDPIMWLSKPHYFWGUVGASHVWKE



 STNEGMLNMLLNNMGLLDASWLTDPDDCFTVITLINTWLQ GRDFGMINWVLSWFGAGAVDWAAGTATSHIALSVMIMWRW NPDFGIVNRLLTSVGLENLTWLADEKTVMGSVVVVVCWQF
 SPNYGLSPAL GWDWLPAQWLGDPNDALLVVIFVVGWCF
 SSTDGI DNNGFG I S KDWI GLNSSY ISKMFVLQLYILWNG

H P L GLAVYPYKADTGQP LDLLANPSTALATVAFVDVWQW GVRFGLANTVLSWF GIVENDA WLADPNWYWLVIVTVRLWLQ
 SPKFGLLKSFFTSIGWERLAQVQWLDHKFMALLLAYCFGM
 Y Y H GL L SPDTGMINHLIRAFGGEPISFLTEPGWFKSLYVFSGVWQQ
 G G A
 L E
R A LT A PNFYNEPEYWPF LVSYVWKN TSVNGTDNQLISSLGGESMPFMQLPEWFRTI YVTSEVWQT NDLLMWL GLLDVLFLGVGHWFWGIFGAS IVWKD $\begin{array}{cc}N P L G G N L N Q \\ P N L G L V & N \\ N\end{array}$

 FA IDNGPLNGLTRAI FGITVPWFSSPQLATLSIAIMVTWKF
 NSQYGVFNAILTDLGMDPVDWLNGPTSQKVAVVMVNVWLG PTNGMVNHVL GLDTPWLTQKSTAMLAVVVATLWWT FSNAGVVNTMLTS LGLQPYDFYLHTAPWKYUIVFFHVWKG
 QPRFGLL NGVLAS LGFSRQGFLYDPSQALASVAVFSLWQM NPSFGPVNQFLKAVGLGDGAKNWFADSKTAFWAVTGTWLIP

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|  | UniRef90-C6LHC |
|  | UniRef90-W |
|  | UniRef90-UPIO0037Es |
|  | Uni |
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|  | UniRef90-A0A |
|  | UniRef90_10R851 |
|  | UniRef9 |
|  | UniRet9 |
|  | Uni |
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|  | UniRef90 UPI000255 |
|  | UniRef90-R6XR |
|  | UniRef90-G9R |
|  | UniRef90-UP10003F\% |
|  | UniRef90 UPIO0047ADC0F |
|  | UniF |
|  | Uni |
|  | Un |
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|  | UniRef90-J2L787 |
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|  | UniRee90-E7NXL |
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210
220
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S LDTRSVI IQQVYLTAFQN
Y R $\square^{1} T$
VDWSQT\D\FVLKYGDQDGBNYSDATAAGDFKTVVS\|V
QFRTSVI ANEMYNYAFRY
YVTADVI GTYVYRRG■
LQSTVSVLYFMFEEGFK
GSSRVLSFYMYEQALS
STMFYS LYYLYQNAFSY
EANMVPMGYMY ITSFRG NDFG
DRQFQTLALYVYEQAFAGSTF
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SNDTVAPMNYMYELVFGSSSSAN
A GATVALPLDMY\|TGFR
EGKGN L LGMYTWRLINDSGLVPYALSTAVGFFNSFVALT
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GF VY DTI
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GETRTLLYLFYQQAFE
KTETLDMYAFSQGF $\square E S G N \square S Y$
STTVLVYYDYQQAFQ
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DTQTI TPMVYLY LQDFGAGNSRNSGVGAAVGVLLCDCVVT
TEVPSTFMFSATFR DTTITFMYKLAFKS
YETRVLI LY IVYEVGFTGGN
$\square \mathrm{D}$ ESSDVFATYVYRSGL $L$ GAQYSFSAAVGLFSN VVNF I
P N
TEVTGTYMYKQGFS
$G V A E V L D T F V Y Y R G V R N G \quad D W S Y A A A A G L V K G V V S L F$
QDHAMVLSWFSYLRGIGNNN
TEILPS YMMDFMFR
YPVT DVID TYVFRA $\quad$ RRVTGD $\operatorname{DGMSSAVGLYQS\| VGFL}$
YETADI I ATYVYRVGDT S S N
$\square D Y S E N L D \square F V L K Y G \backsim N M G \quad N F S \square S V A A S M F K T V V S F \square$
AGSTRVVLQMLYESGFR
AFASETLVYALYREGFVYF
GSTMVLVYY IVHQAFK
DTTI TF MYK LAAKKS
LDSTNSVALFTYQNGFQFS
TYTFQMLI YTTAFQK $\quad$ TNP GYASTLA $\square V V A L L S Y G$ YASGDVLDTYVYR $\quad$ G $L$ D $\square G R D Y S L G T A V G L V R S V V G L I$
NMYT $\square V \mathrm{~V} Y \mathrm{Y} I Y \mathrm{Y} \mathrm{N}$
SADSE DLVTYAYRDAFAG
EESTRTFVQYTLEQGFTS
YNSTDIIDTYVYR
$T T V P S Y V Y Y Q A F R \square G$
ETETLQYFI YQTGDQFF
$\square N S T N V A V L Y Y Y K S A F E Y$


[^4]



[^0]:    

[^1]:    

[^2]:    lupas_21
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    sol5
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[^4]:    lupas 21
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