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A Q A
 IT A L RE TGNTSCELK

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AQA $\square A E A \square R E N R A L T S L H L Q W N Q A E A A K A L G Q A L Q L N S S L$ ATAFAEALRNHPSLTNLSLAFNGDSTEGSLAQALQHNTTL A $\square \mathrm{CVATALSGNHGLRHINLQGNHIGESGAI}$ SEAI KTN



## A

A

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 C G AL A SVG KRNENL TVLD
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$A L A L G E A L K \square N N V L V H D D D S N N K D N E G R \square C R G L E V N G N L$ LY S L V C ALLK F NTV L K E L Y L G E N S I Q S A D GA H QLI L N N F T I $V L S L V E A F A T N L P L Q T L E I G F N G I D A A G V T A L A$ 1 N A L
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A $\square \mathrm{F}$ I A T A L R GNH QL T Y I N L Q GNGI GESGA
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 ALCRMLRGTPQLGCLHLENVNRFGRN RYSLVC LVLVLHGNKRLTHLNLSSNNGGPVSTMIFKT
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 A $\square S G Q A L D G C P R V E E S S A E N S L A K G V L H E C K$
 TAAALTSNERLQTLKLGNNGLRDAGARRLCA EDLAAALSTSPSLTVLDLSYNRGLGDGSMQQLCQ ALSLGGALDGCPQVEEISLAENGLWESGLPRFSK EWMGQALAANEA:|ETLNLCNNHLRLLGGALAVCA EDLSAALIANKNLTRDDLSGNGपGLPGMTLLCE MASVLSTNQHLVELDLTG NALEDGGVQELCR
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 HLNLNHGLGPQGAKAI AI DEGLKVLCGALTLPDSVLISLSVRYC LITTSGCQDLAE
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| UniRef90_A9UZG6 |  |
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|  | GAT WLA EGLRTNRTLRG |
| UniRei90-W4XLK9 |  |
| iRef90-Q5z111 LEWNSLGEEGFSFFCQGLGANN FLQRLDL |  |
| UniRef90-UPI00042C2A28 | RDNRLEDSGLQLLCEALKHPNCKLQKIKLRD |
|  |  |
| UniRef90-D8 | GTQGDDS CKGl A K N |
| UniRef90-G3QFZ7 LAKNPIGNTGVKFLCEGLRYPECl |  |
|  | LSNUNLKDSGVKLLSEGLKSPHCTLETL SLS GCLI TEEG |
|  |  |
|  | K G |
| UniRef90-UPI0003DOCBAA 1 GENALGDS GVQVL |  |
| Ref90-W2TW85 LRNNQLGDGG1SKICEALRNPKKS |  |
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| UniRef90_UP1000468 |  |
| UniRet90 Q9 |  |
| UniRet90-UP100 |  |
| UniRet90 |  |
| UniRef90G1R193 L S A NVLDDEGAQLLYKTMTHPE |  |
|  |  |
| GL |  |
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| W5 |  |
| P100 |  |
| UniRef90-UP100029DDD47 L A G S |  |
| UniRef90-K91VK0 L S A NLLG |  |
|  |  |
| UniRef90-H9GZ11 |  |
|  |  |
| UniRef90_UP1000331496C LRRNRLGDEGVEDLCVALRGPHC RLQRLDLSACSFSVPG |  |
|  |  |
| UniRef90 ${ }^{\text {W }}$ - 1 NM73 | FSYLNLEDEGAVALAESLKD TAPMLEVLEMAGNDITAKA |
| UniRef90-W1NM73 FSYL |  |
| Ref90- 2 2F5 |  |
|  |  |
| - |  |
| UniRef90-13KC78 LSNNDKDSGGILLSAGLK NPHCTLKSLSLSGCLIAERG |  |
|  |  |
|  |  |
|  |  |
| UniRef90-UP10003290E76 RSNELGDAGVRLVLQGLQGARRVQKL |  |
|  |  |
| 100 |  |
| UniRef90-AOAO? |  |
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|  |  |
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| iRef90_K8EBR7 |  |
| UniRef90_UPI00019A5DF6 L G WN SI G |  |
|  |  |
| UniRef90-UPI00006CE9D1 LWGNKI GDKGAQNI GLGLSYCTQTTDLDFRTNSNQTGDDG | LAGSK\TARG\SHLVKALPLCPQLEEV SFQDNQLKDRD |
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| UniRef90-UP100029DD13C |  |
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| Re990 C3V |  |
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|  |  |
| UniRef90_D7G0L6 |  |
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| UniRef90-GOOZK6 ${ }^{\text {a }}$ SNNYFNQEQSVKVAEALEKNQSUYGFHFSGNCGYVDSRG |  |
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|  |  |
|  | N F Y $\mid$ \|A G N S\|ISPE G |

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 CRDLSSVLSTSQTLSELNLKHNKLGDSGLLCEGLKHPHCK VRWLRPGLRKNTVNTKLQLSDNN


EEQUAKLVLQNPRLZSLLSHYFDTPYARTPI





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CRY乌SNALLQNKRपTHपNपRKNNपGDEG
VRWLTPGLRRKYSCQLRTD
VKYLA DAFVTNHKVECLDLSHNMLEAGEALGVAMAENVGL LDALANSVRTSSSLRISLRHNRISTTGAVAVALM
 A QY L A ELLLANTGLKSLDLSYNQLNDQAGLGPALAENAGLL A ITTLAHIIANNKALQRIDLRDNQUNGLTALSLSLKTNT CKNVTAMC $\square N S T L Q S L A L E G N D T E A S E R A A L D L L L N T E \square$ A WLLAKGLA WGSGLQVISLWGNPD
LLLLAQAVKSNSTLTHMY $\square \mathbf{W G N H}$
$C K D L A A V L V V S Q K L T H L C L A K N P \Pi G D T G$ A WLLAE GL AQRPGYQUI RLWNNPI ALLLIDNAGFKNSADEDLDL
CEPLGSVLKKNSTLKELDLSNNDLNDLGKLLSAGLKNSHC CEGLASTLSVNQSLTELDLSLNDLGGALLLCEGLRHPTCK VLNVVKVLSCLPRLQKLDLSRNNVSVSTLLS CEGLCAVLGASPHLQEMDLSFNDLGDPGTWWLCEGLDRHPG ALDRLVETLPSCPRVREASVNNDGSKQTFWIHFSRKEEA
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 APALAACLKVKESLSKLNLSENELKDKGTI
VRDLAEALSKNTNLGELSVACAGLDDEGALAQSVAENRSL
AS Y L LRAL VNSQ RELDFSNNHDGDVASFANFFQTNKSL ARSI AEAI ENNFVI AVVNLKANYIRDEGADCDA
C 1 SLA SALSSNPSLGELDLSYNHPG
LVALSQAMKTNTELSYYYIWGNKLDDATCMA
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A L GLAKGLPQHLRVLHLPSSHLSPEGVLSLGQAL
CLDLASVI LN N PNLRSLDDGNNDLGVKLLCDALRYPNCNI CSVLPGTLRCLPSLRELNLSENPLGDAGLLCEGLQDPQCN VKLLSDGLKSPNCILE
CDSLA S ALS SNPSLIELDLSYNNPG
GRALMFAMCSTQT
VTRLCQMLMQCTQLTE DDLCGN
AKVLCEVLATNYNMKEMDLSHNS
LVALLFEAMKQQQCTVNL
AKEVASE $\square$ AKCTN $\square$ ST $\square S \square W \square N K \square G S D G A K A V A$
ASA $\square G K A \square G N F K F L T N D S D C Q N Q V G D D G A$

VK LLS DGLK T NCKDETLRMAMCNDTVQESLS SVLQSSNCVV TAQLADALQSNTGUTEUCLNGNLIKPEEA

ASAVGEALKANNVLEELNMSNNRDSAMGALSGGLRVNQTL
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VMLLSAGLKSSRCLETLRLADCDLTGCES LSSALQS TEC MVQLQ K S L M KNNNLY GI HVE GN
CKY S K LLQ G D S SLTNLDLGFNPDTGLCFDSEALKKNCNL

1 RALMELTKN


| UniRef90_A9UZG6 | $\mathrm{K} R \mathrm{~L}$ R K |
| :---: | :---: |
| UniRef90-M3YIH8 | WRL |
| UniRef90-W4XLK9 |  |
| UniRef90-Q5ZI11 | KKL |
| UniRef90-UPIO0042C2A28 | LQ K |
| UniRef90-I3KPJ0 |  |
| UniRef90-D8UHD2 |  |
| UniRef90_G3QFZ7 | $\square \mathrm{R}$ |
| UniRef90-13K318 |  |
| UniRef90_U6JKK9 |  |
| UniRef90_A0A015MYY0 | R |
| UniRef90-UPI0003D0CBAA |  |
| UniRef90-D2VQC3 |  |
| UniRef90-W2TW85 | LR R L G L |
| UniRef90-UPIO003EBB9D6 | VKTLRM |
| UniRef90-G1LCY2 |  |
| UniRef90_UPI000333A39F |  |
| UniRef90_F2UJX0 | R K |
| UniRef90-F1PS72 | CKLQKL |
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| UniRef90-UPI000441BDE9 | K E L |
| UniRef90_M2QGX0 |  |
| UniRef90_UPI0003AF5D72 | C R |
| UniRef90-F1RKA1 |  |
| UniRef90_T1HPM7 |  |
| UniRef90-K0R1M1 | Q |
| UniRef90_UPI00046B57AB |  |
| UniRef90-Q9NX02-2 |  |
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| UniRef90 G1R193 |  |
| UniRef90_UPI0003F0B729 |  |
| UniRef90-F6RUS9 |  |
| UniRef90-V5GW90 |  |
| UniRef90-W5LP35 | K |
| UniRef90-UPI00027FC1E7 | LQ T L R L |
| UniRef90_UPI00029D5D47 |  |
| UniRef90-UPI00033467E0 | CRLRRLL |
| UniRef90-K91VK0 | $R K T L R L$ |
| UniRef90_UPIO004571425 | K 1 QK |
| UniRef90-H9GZ11 | LRELDD |
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| UniRef90-Q86W24 | Q R L |
| UniRef90_UPI0003290E76 | LE K L K L |
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| UniRef90-F1RC98 | LRELDD |
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| UniRef90-C3VPR6 |  |
| UniRef90_UPI0001D53A79 | R |
| UniRef90-T1KKF8 |  |
| UniRef90-G7YSW9 |  |
| UniRef90-D7G0L6 | V |
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| UniRef90-Q23MK1 |  |
| UniRef90-G0QZK6 |  |
| UniRef90-UPI00033437D5 |  |
| UniRef90-E7FDK1 | LR E L D L |
| UniRef90-A0DK19 |  |
| UniRef90_UPI000440261A |  |
| UniRef90-H3ALU7 | LQK LR L |
| UniRef90_G7Y4Q3 | R R 】K |
| UniRef90-I3JQZ1 |  |
| UniRef90-F4QBF2 |  |
| UniRef90_G4TPJ4 | Q |


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| UniRef9 | K1QQS |
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| UniRef90_E9QI02 |  |
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| UniRef90-H2T6B0 |  |
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| UniRef90_W5K695 |  |
| UniRef90_T0S8L1 |  |
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| UniRef90_L1J9Y9 |  |
| UniRef90_Q239Q5 |  |
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| UniRef90_C9ZKJ9 |  |
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| UniRef90-I3KFA6 |  |
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| niRef90_D0MV73 |  |
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| UniRef90_S8CCD5 |  |
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| niRef90 U6DHM0 |  | NS ${ }^{30}$

 $N$ V S




S A L K S N P S H LTT E L DLL S E N N LQQ D S G V K L L C S



 $S$ L HGKNI GNDGAKLVAN K Y $\square$ G M S L L E K C Q N K T L T H L IL E G SVVHCD S MLLLLLL C E


TTADEVLQKLLPVMRESRSVQLIRCGVTDEGCAALAS


A LA S A FNSNPS LIELNLSENKLG DS GVTEDSS



 ALL S SLL LR S MP S L R E L D L L
$\qquad$
$\square \mathrm{A}$
 DVLT QGLSHMTLLQSLVLSR NGMGDDGGYHMA E


 K TL L K N I A K N D P H T R EVVVL N G Y


 SELSLRH RGLGAQGVRALAS E ALADALLEN NTDIDSDVGNGNHIATEGAKAIGN LWMVL I T N H NMKY L N L E S TR L K E A D L MMACCQA VL A S A L M S T C $\quad$ L K E L D L L A K DL G TEEI A QCKN I T S L T L N NENSSGGDEGAKD L G T



N K S L L S L K L Y N P SLG S E G T A A L C R $A G C L A E L L V L H T S L Q Q F L D L S Y N K D N D Q A G E E L G P$
 N A L G DA T A L G L A Q G L P R H L R LL H L P S S R L G PE G A L S L S Q
 LQ MS E E VLDD E L E L L N K F I G L L K K S S S D E V L R R K
 A S LLLA S V IP H CACLS KVS LSNT LIGGSEGTGFLA S L T E L H L N T F Y D R D H E GAE IL A D NKNLTHLDLKES DIDDRDVKSLCE QDLASALISNQSLTHLCLS SNSLGSEGMNLLGR VI K I L Q Q $\square P K H L D E L N L S N N P G M H Q E A Y R I L A E$
 $V Y$ Q DLCLALV G K T T L T HL T L G G SVPEA QMLLLLL GE E DLLAS NLL Q S P H C R L L R E L D L L S Y N S L G D S GVVNMLSA
 DS GMKNLSDLLMNPQSKLEKLQLCKCSTTEEQCVILTSAA LVKNTSI TS L DLLSHNKL TNHGARLLSK
 $L$ V K I L E A F S S L



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| UniRef90-M4C052 | A S |
| UniRef90-UPIO002C638F9 LS ANTLK Y EELKLLCEALKQPSCQLQSLCLLLKCC |  |
| UniRef90 ${ }^{\text {K1C }}$ | MSAVNLDETGFKAl AGALLDNRNTTYL DIS KNN |
| UniRef90-S2JKH0 LSETQLSSSTAMALAEALPENASLCRLDDSKN PHIDMAG |  |
| UniR | SNNDLQDSGVKLLSDGLK NPDFKLETLRLVMCNLTVQC |
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| UniRef90-UPlooo3F0C9BD WGN K F E A C C |  |
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| UniRef90-Tos8L1 | GDEGLLNLSLGLKRARSLTKLNLSDNA\RKDPEA |
| UniRef90-F2E0F7 LDYNKIGDAGAQALAFHLPRS |  |
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|  |  |
| UniRef90_UPI00006CE9DC | N GAEGAKH GMSLEKCKNLTSLNL |
| LTASELGDEGVKLLCGSLRH PNCFLQWLSLENCHLTEVC |  |
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| UniRef90-UP100019A5D84 L Y NKIGDEGASGLGSALAKCDNLSNLTLYLYSNQIGD |  |
| iRef90 F1R819 |  |
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| UniRet90_HozL59 L G CDVGPQCLTE AI ALT QNKSLKAIN LINRPLLSSET |  |
| 102 |  |
| UniRef90-F7H834 LEKCSLSAASCQDL ALFLTSIQHITR ${ }^{\text {L }}$ L CLGFNQLQDDG |  |
| - | algalla |
| UniRef90-UP100045D7F9E | A S S |
| UniRet90 UP100027FA67C L GRNDIGVPGVRGLCEALKKPLCNNKKRLWLWGCSIPPAS |  |
|  |  |
| D7FP |  |
| UniRef90-W5L8Q9 LSGSLITEKGCSSLASALRSNPS HLKELDLTYNHHGDSG |  |
|  | LNGNKIGSAGAEAIASSLYVNKTLVTL GLANNDVGNYG |
| LGNNNIGSDGAKAVASE |  |
|  | LTNNELGDGGGQLLGATLAA ATCTIQDLNLSWNQLCHSG |
| UniRet90-UPIo00440BACF LS |  |
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| UniRef90-UP100033455AA LSTNNL LDD GVKLLCEALSRPESYLERLSLRSCGLTAVG |  |
| UniRef90-EOVP |  |
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A A ALASASVHNLTLRELDLSDNELTP LIAELARGDRANKTL CRELALVLTSNQNLTSLQUGCNDIEDAGVKLLCEALTHTN AKDLAWLLRRNDFI EHLDLSGNLIDDVTE GGPA DASNLTL L L A A A S K M N H TL T F L D I N
CKSLS SALQSNCVLRELGLSNNDLQDSGLLSDGLKSQHCK CE LLG SVLNENSTLTHLDLSNNDLQDSGLLSAGLKSSNCK C GSGA A ALRSNPSLTELDLSENNLQDSG
N CHITH
VSALAKVIQ
CKHLGSALQQENSSLKELDLSNNDLKDSG
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A Q A L A DHLP Q S L RKLALGQNQUSDTGAKAFA
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TATI A E AL RSNQVLTTLDLSSN
A QVLARGLP LHL RVLRLSSSRLGPEGAMSGC
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A Q HLA S LLLLHTGLRSLDLSYNQLNDLLAGLGPALAENTGL
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ASTIGKALGNCKFLTNLSI RWSKIDGKGAQNDGLLSNCTQ CAALVRALNSNPSLKELNLTLNDPGELAKLLSDLLRNPHC AKDLGTGUVQKN TTTLNLSRNT VGAQGA



VDAL RDAMMSCSTLTHVDLDYNRDGERGAMLPADEQNR
$A D G L G L G L Q V N Q T L R \square L V V S R N P M R S E G G \square L K A V Q D N$
IKNLLCKVLRSPTC
EEAMARALNKNNQLLK $\quad$ SYPFK VPSARS $\square$ ADRCH $\square R N Q E L$
A A ELARVLPQMGRLKRMDLEKNRDTACGAWLLA
Y A NLVSALKSNSSLVELDLRGNDPGNKG

 EKLLSDV
C
C S L S L Q S S N S R R L DL S HNDLQ D S GLL S DGLK S S QCQ


CKKLSHVIVRNKHLKSLDLAVNALGDDGVTALCEGLKHRK GQY A ALAL QVNNTLQLLDLSFCALGNGRENFENDMKN
C IA YFTVLRTHPSLQEVNLSRTQEETAVHAAEMLLDNTVL CKEVSVTLVVSQRLTHLCLAKNNLGD


CFFLAARMKSTPNLEALYLGFNEDGDEGA
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$\frac{\square}{K} E K \square R \square$
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AlGEMLRHNTTVTSLFLSG GRLGDSGARG|ALL
 ESDSVKATAEMLSGNLWLEDLSL RLHCSEGVVALAN EALAKGLAHNKDLEHLDLQDNTATRSGTRALVR ALGSALANCTNLSNLTLDRNQDGAMGASDLGS

VVAQLLKNHPSTNGLDVR YNLISDAGARYAAE $\square \mathrm{GSALANCDNLSNLTLYNCEIGADGASGFGS}$厄LTTAMKYNHILEELYI GDNDLTSSDGPPLGA DNGVELSEGLKSPNCKLETLSSFC STTERGYGALAS DSGLQLLSSGLQSLNCKLNTLRLSQCNFSERSCEALSLV DTGVKKLSVLLQDKHCKISTLTLNTSNITEEDCAVLTSA AKYLGIGIAQCKNITSLACNLSKNSDGEGAKDLGT SALEQSLGVGLSRDRQLTE MGHMDKENHSLVELHMCKHGDKNFGMQQLCN CKVKHLSLVENPLKNKGVMLLCE ED ASVWQKANSSLRELDLSN NDLQDSGAALLSK LLR RUKANEVIPSLERDPNCPFTDAACHLLCA ASALCSAFVNCINLSDLRLKIVNQIGHEGASGLGS
A A LLS A LKTNPSHLTS LD DS DNVNLLDS GAERLCG NEDEVEEVISOSLDCSQLTNGFANSNQ GDDGATTGGT AKVLGRAIA QYKNIDTLTLNNSNNIGAYGTKDLGT NAVGVASWVDKLANDDPSLTSVTVRGRAFGPDEAAAVAN L L S S E E DLD D FDLKKYA ASEEALLDRLMP V K T TRALLQCCNLTVQSCESLS S

NQ $\square \mathrm{DNEGA} \mathrm{\square G} \mathrm{\square AKAQGTQVHKDDLSHNQDDNEGA} \mathrm{\square G} \mathrm{\square AK}$ A S C S SL L N S S K K N N I P A G G GK WV A DNSVQYLLEGLLSN RSFKKLNLSKNFLTCK GUCPLLR
 SEDCTSLAKTDSQSSSLTELSLRN NELGDEGVRMLFS K ALA S ALRRNPSLDELDLRG NDPGQSGVKELTD
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VLKASDQQK
VLKK R R SALV
$V$ LKSSCVLQTNLAHNKLRDDSGRALGSLIRSSTPI QTLD GLKKDHCKLEKLGLEKCSLTAACCRPLSSVLGSSKSLENLN



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 GLA QKRTVIA QLSSIA N S S I G T A G

 ALK QNCDLRVLKLE GDSFESDSVMSA AEAALVNTVVRALG $V \operatorname{V} L N W P N L R H L N L S D C L L G K A G G D A L G T A L A N N P K L E S L K$ GLGNNLSNLTLYLYNNLISADGASGLGSGLANCTNLSALD LLQKQLYLIYLNLMFNDI GPEGGELIAKALHENTTLKYLR


 F LLNPSNLKELNLSENKLGNSGI SKIMCPLLENQCGLEKLR A QCKNDTSLTLDLSENSI GAQGVKDLGTGI AQCKNI T TLY

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R RAVL QWCNLT



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IFVVFDLCTKNSTDERLNVGSNPDGTAGVEA
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$A L D L G S A L A K C L N L S N L T L G L G Q$
A D L L P ALES
ASY SKMLLDNFT\ERLVISNTDMTEAGAVLAVLREGNNT ATKLSAALKNCPGMKSLELWNNC $\square$
TKYLSTAI EKCKKDTSSLTLNLNDNGDATQGAKY LAAK
C $\square$ AL A SALLNSPSLREVDLSYNHPGDTGVKLLAAELNDPH MCALAESVASN
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 VKA A A MLL SQNTTLQELSL I E ELRKALA
A S DLGS ALAANCDNLSNLELY DQQVSAEKR
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VI AFATVLTQNRAMKGMNLSGEQEESTVHDGHMLKENHHL

 MKLLSAGLKD
$C L D L A S A D N N P N \square Q S \square D L G N N D \square G V R \square L F E A L R H P N C N \square$ VKELTELLQD
AK DLGTGITQCKNDT T $\square \mathrm{D} \square \mathrm{RE}$ ES S DD A
WEELLGLLHVNET
$G L A F A T M L P S N S T L E R \square D L G D C D L D T E C L D A L A T A L N D N$
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VQKПNELLHDNRGSTEL
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CKALAA A LGKEPRLKTLNLGGNQQ GDEGA $\square$ AA A $\square K$
CAVLASALDS DPSLTHLDLSFNKL
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A QY A A E S K ECTSSLQYLNLNLNKI NGAMMVTELLFTHDKL A DGLAKALQG TQVHTLGLSANQUGNATK
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$M R V L C E G L K C C C K L Q T \square W \square A E C H L T D A C C G A \square A S V L N R D$
A RHLMKSIERNTSLSRLNMSNN
AAAGGRLLARNK LI TLNMCDNN $\square R G P G A E A \square A$
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K E L

LR L
$\square E \square R$ L

VREL
$R R \square E N L$
$\square K T \square R L$

T R
CK L Q R $\square$
QRL

DK L

ARER

Q N L K
$\square R E L D$
$\square$
ER

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40
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 D S G V | $N$ | $Y$ | $S$ | $D$ | $A$ | $G$ | $D E$ | $M$ |
| ---: | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $F$ | $M$ | $K$ |  |  |  |  |  |
| $S$ |  |  |  |  |  |  |  |

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 A LLC S A L I N C T N L S
 A LAA T L S E C C K VR K I ILS K NP DD D D A A A E L A T $L C K A L K C C L S A S N A L K N L E L N G L V L R E R D L T I L T K$
D G GVS LSSKALS K H A E LRREVY LS Y L N L LE D D GA $\square$ A VVD A QNI GLGLSNCTQLTNLKFWEGNKIGDKGAQSIGLD
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 K A Li ${ }^{R}$ T $L$

 EVLA S ALS S N S N L R E L D L S G NEL Q D S GVVKLL S A A S CL G S C L A N C $\square N$ N


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LAKALEKCLENSSKALKVFIVGRNRLENEGAQALAG A S GL G S A L A K C $\quad$ N L Q N L T L R L D L NK DGNEGAS GLG S A L




LSSALVNCTNLSNLTLHGENEDGDQSASDLGS VGRVLATALGNLTSLLQQLNLS SNELGCD GMRALAT NACNLTLACCENLANSSQLRELDLSNNNLT DAGLMKLSS | $L G$ | $A$ |
| ---: | :--- |
| $L$ | $L$ | SLGSALANC $\square$ NLSNLTLK GSNQ!GA $\square$ GAS GLGS

 VA QULSRNGDLREINLEWNQFQTMGSCHLLKE LGYALANCTNLSHLALYGYNQUGATGASALGS
 K SI CQMLK VNQ T L S F L DL S H S L L GP N GL N KIV V E E A L L R L L A A K N K A P T H L S M R M $\quad$ DD F K K E E Q F Q E L V E
STAEGISSCAKLTTLTHNAVNNQCDKGALNIGL LATCLSSALGKCTNLSNLTLDLRDNSDDAGVSKLS S


LSKALVNCTNLQQLELNLSRSETDEISSKALGS
 D S L A S A L R S NP S H L L R R V L Q A L A S V L R A C P A LT T L L K R N P L L G S H A S E D V V CKLEVLNLGGNKLG DTAVVDLEQ

LG Y A LiA N C T N
LGTALANCANLSNLTLDGKNQI GSVGVSCLGS


LA S GLGGQC

SE $\square$ QEC $\square$ AK RL
NC I D G D SFSPRAD

A L A VANVLVNDTTLRTLVLSG DGFQELLSVVLSSRTSSLRDLDLSN
 NLIQDHGASAISA NNI QDSGLNLLSA E E A LLQLLAPVVKVCKKAQLESGC
NTVGVEK LIMILRNYQNSDSNLQLNSLGPEACRDLRELL
ALCNALSEHTSLVELDDLS NAFGGRCADALVP $\mathrm{NQ} \square \mathrm{G}$
$E L L T P L L R Y Y P G L Q V L D L S H N D L G D K G L K S F V P$ L G GLANCINLQNLILDLWNQIGVIGASGLGF NLASAUK SUISN L K ELELS D
 VA ALASSTSLTSLNLSGNRIGDAGARALGR ASDLGSGLERCANLSNLTLYGNNQIGNKGALNLGF


 PEALKHL GA GVSESLS CLLSCCPVLAKLSLQACGRFLQQHRLLLAS LA TVLSTKPLLLDLLAVGKNNDGDAGFTLLCK DGGAA $\square$ A AVLPFAC LTS SVLS FNAMGDVGGDALAS L RELNL RGNKLGQDLGVKLLSA KSKKGLESLILWNNRLTR RSASHLNA ALVFIILSDKDLALFDLKKYSASEEAFLRLLPA A P C C S S S A L R R V N P P A L A A E L L N L R R S S N E L
 $L S S A L S T C D H L T Y L T L N G G N Q L G D E D Q S G L C Q$ $\square R G L D A S D \square N E N G D D L A G A \square P S$
TSGCQHLAEVLSSNQNLT ULQVSNNKLQ DTGVKLLCD

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 AKDNH P LLKHLDMS SNHLGDRGVEYLSQLLHTC YLEELN VI QLPDSLETLWLSYGLLTEKCCQFLASALRSSSTLKALD ALTKCDNLSNLKLNDYN:GSMGASDLGYALAKCDNLSTM LI QEDCALQSLSLTDSRLRSRGTILVANALGRNPCLRKVED SMENNGFLQYLKSRNQUGDEGASGLGSGLAKCDNLSTLK ALGNLTSLQQLDLSSNELGCDGMRALATALGNLTSLETLS ALAVNSGLRSLSLAGCSLSTSGADTLAAALAVNSSLTSLN GLR NSKVETLRLKSCNLTEHSSNDLASFVSSASCLLKLD GLASNDSNLTLDLSSNEIGAMGASLGSLANCIKLSNLTLN ALSDPKCIQLLNLSHNDLHSQDMELIRDVLSGNVNLKVLD ALANNLSNLTLELGNNQIGDEGTSSLGSALANCINLSTLN GLGKSKS TVLYLSENDIKAEGAKLI DQGLSECLELKTLR GL LMNNTIKRFNLSSDGLDDNCAQLVGRIIGEN SI NSNTELKELVLSCNDFGLDGMKALRLFVLKHPSLEVLD ALANCTNLSNLILDLDDKCTSG LGSALANCINLSNLTLN
 GLKENKSLVYLNLSFNELGPECGKLLQPLLMLNSKVVELN ALRKNRSLQCLDSKASLGPETCKSLQLMMFENNETLVDLD
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 AFLDAKHLKTLSLSYNULGTTALSQTLQSLPA QTLLHLE ALLEKHANLSAMDLNENQHSQEGLKRLGSVLAKCPLLSTHN GLANCTN SNLTLKCNEDGDEGASGLSALASCTNLSTLD GLANCTNLSTLDLYENE:GNQGTLDLASALARCTNLSALY
 ALANNLSNLTLNLQGNQI GDEGASGLGSALTNCINLSTLY
 ALKEDL WLKALDLQQCGISNDGAKALGHAFHSNSTIMVLD GLCTNLSNLTLYLKDNQLGAQGFSSNLEK CDNLSNMELN SLCQNMTSLYLNLYGSGVGADGAKNDGMSLEKCQNITSLIN NLKKARAKLRGNPLAEGSFY ALVNSPAVTNLWLKRNPLGPQSVDALFRLITQTPNLRTLD TKLHKGNMRRLKIHYTPLTNDCUQYLCNLLTNNKTLQELV GMDRNASUQEVFLDANGIGNEGLRSFLNLLRSSPTYAALC ALASSSSLRTLNLRDNCLGDSAMTLSALLMSGECKLETLD $\frac{\mathrm{L}}{\mathrm{A}}$

## $\frac{\square}{A}$

 ALAQCKNLQYLDLFYNSISDEGTPFLGSGLAKNLSSILTLY SLLTNESVKCLNGQSTPLKEFAHYFFMLMTDNSTLKHLL GLANNLSNLTLDLSSNKIRDECPSGLGSGLANCINGSTLD M NTVLTALNVSANP RDTGVQALADALIASNTVLRSLD Y ALS YNLWFRRLSCVDMKLSDEVSEQULHMMSQSSHLEALV GLK SNCTLETVSLSGCLITEEGCTYMASALSSNPSLRELD GCATNQWTHLNVARNSFSSKKTKEIPPSFKQTLSLKKYLN GLAGNTSLTHLSLLHTGLGDEGLELLATQLSKSRALEELLN ALIVGAKLTVLDLSDNALGPNGMRGLEELLRSCYSLQELL ALTGTGHLKAVCLSHNPLGSTGFELVDKTLPLCHCLTHVD GLVYNYNGQKLCLDNCGMTADSCGDLATVLSTNPSLLDLA ALPRCHHLTTLALRRLALTDEGLVALVSALPMCPSLRSVD GLASHCKLETLRLGHCGITEEGCVALAKALTSNPSLRELN VKA SNKLKYNVGSNVLMDTUMDIRDSLMENKRLVRLD GLQTSCKMQKLSLQNCCLTGAGCGVLSSVFSHTSLRELD
 ALANCTNLKTLNLKNNNI GSIGATDLFSALVNCINLSTLD
 LDELD LERLDLSDQMNDQGLLALDES RVMANLKHLS



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UniRef90 Q0P5G1
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 A S GLLGS G L A K C $\square$ N L L T L S L G G N Q I G D E G A

A ACASKP L A S NTGLRVLRLSGLS $\square R A D R A A A E A L R R N T T L$



CSAAL DRVAA EASS L K H L S MQ Q CR
VHLI TNALK S NTHLKHVDLS DNEDSETGLA
A L DL GS A L A K C DN L L T L D L R Y N L I G

GQAFSHLL LNNSSLVELDLDRYTSLSTELLILQQSLMDNKKD
LCDFMKAIMRNSK IVQKLYFDGNSFQDPVSLTNYF■ANSSL
M K L L S A GL K D
AN TLLASVLEENDCLREVHCENND $\square$ N L Q S VLVNGLQRNKS L
A GCLA QMLRGNHKLSTVD\HGC
A Q NI GLGLLSNCTQLTNLGIS QNQDGDDGA
A S G L G S A L A N C T N L L T L D L G G N Q I G A M G A
A L S V A E AVVA D K T E L EK L D L N G N M L G E E G
$T$ S D L G T NL G K Y T N L L T L WL R G C Q I G C K G A S GL G L


A N A L $A$


1 S S L G S GLA N C
AS DLGFAFANCTSLSNLKLDL
E S GLLSTADLAK FTNLQNLTLNLR Q

V S GL G S AL A N C $\square \mathrm{NL}$ L $N L \operatorname{T} L$ Y LIE Q
$\begin{array}{lllllllllll}V & S & S & L & G & S & G & L & G & K & C \\ L & C & T & L & G & S & S\end{array}$
$L C E L G B S L G G K C T N L S N L T L Y F N Q \square G N K G \square L$
A S RLLCS GLK N C T NLLSNLTL
S R HFA E V L R K N Q R L R E L K L Y H C Q
A K N $\square$ G M SLE K C Q N I T S L N L N Y N K F G A N G A




A Q G L A S A LT K N K T L K V L S IT D N K L G D A GVQ A
MKLL S ALK K D P H V V K L D I
A S G L G S A L A K C $\square$ N L L K L D L R H N E $\square$ G T $\square G A$
A LA $V$ A K A A WE HP S L QLL H L Y F N ELLS S EGR
A KAF QS LIFA Q GESSLIMI DLSNNNKS H $\square Q Q I Q E G \square N Q N K T \square$
TRA AVKHLCSWPNLKHLNLSDCLLGSAGGI ALLA
A S AL GLLCLA QLRNI T DL NLGSNQI GEKGA
CK S L A D L L R A NK T L RVL S L S H T N I D GA H L L VE S LE P N D P L
A $\square A L A E V L G D V P R L R R I D L T G N Y I A E A G L D A$
A S GL G S GL A N C $\square$ NL L Q L R L N C N QI G D K G A



M A A L S R Y L E H C PA L R R L S L A Q T GLLT P R GA L G R A L A A N A T D RWLRHGI DTNTVNTNLQLSDNN

$\square S$ A L S Q QL L C F P K L S K L C L S K T S $\square T$ A K G L A
R Q V L
ATEMATAFQTLKTFEE IVLEQNS DEGVEALAESFKHNPHL
VATMARCLSSCPT LVSLNLSGNPSVTSAGLHNULASVREA


CA A L GK S L K S N P T L K K N L N F S WN K $\square G D L G L$
VQ S V D AL D T N K HLDEFNDD
CAALALVLRSKPHLRELDLSFNCPGDSGLQLLTAALDDPL
A S G LLGS A LLA NC DNLSNLS
A L S L V S A L A N CTNLLELL L L M N Q $\square$ S E K C A
GSEL CSALANC
GV A L A S A L A K N K K L E V L R L Q F N D I N A K G L A G L T S A A S S S L

T S GL G S A L A K C T N L S NL TLLQ DNQUG A
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AQAFGDADGSCKK LTDCK\WTYNQTGDTGASGTAA AFCSSLSNCTNLSSLTLQGCNRVDDQKASQLGA SGL SLSLGSNSLGCDA AEELAA LLRALKMHTGLRELRLAGNRLGDGCAAELLA
 NENKIGDEGASGLGS
 VLTELLQLASNQGCGLDYRGRGTYSVAGMTALAE
EGDERLTAVLHTVTDVRTKNNGRDEDMAHTYST AKALSEAFK LLGSLEEVTMPQCNG\|RPEGLVYLAE S $\square \mathrm{SVITNSSPA} \mathrm{\square RT} \mathrm{\square D} \mathrm{\square SH} \mathrm{\quad N} \mathrm{\square IEDKGA} \mathrm{\square H} \mathrm{\square AG}$

QSPKLKSLSWYRNPTGSVEDMTLFTR LRRTFNCNMLVGDRGASAFAD NPDSCGYपADSGSKPDCRLAALELNNNNUGDDGGAQMDSQ

LGSALAKDTNLSNGSHHCNKDGTTGASCLGS PTVKTASLSKSNLGPAGAEKLAE SADGAALLFESKSHKSIVSDSNNDCYKNKGAQALGE LLATALKMNVTLRELYLTPF

NCNSLQTNGRTDDPD
QY $\square$ QS $\square Q K N T K \square E S \square R \square N N \square C Q U G V N S \square E Q F \square Q$
AKAFKLNNKVREMRMVQNG\|RQEG\|EQLLRD
LGSSGAKCNLSNLTNLGKNYTGKGASGLGS S $\square$ N $\square$ SEVLEMMSCNKYSWNLLNLWKCNDGFTTVFESAH

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UniRef90_UPI00033409D4
UniRef90_V4LSN3
UniRef90_F0VYW3
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UniRef90-R1D710
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AK A|L LHAFHSNST|IMVL|D|V|RKNP|LDDHELLV|KATV|ER





A F I I S T T L | $L Q$ | $R$ | $T$ | $L$ |
| :--- | :--- | :--- | :--- |
| $A K$ | $L$ | $L$ | $G R N$ |


GLLQA AQFLS S ALLAK ITTCLTSLTLDLS Q
L ELLA A QL QHNQR L QE L NVA YN

C $\square$ S A S ALLSSNPS L REL DL S Y NHPGD S G
A S GLL G S GLV V C $\square$ S L L T L N L G C NLIG A K G V L
A S G L G F G L E K C T N L L K L N L A E N F I G A I G A


$\begin{array}{lll}\text { A S R } \\ R & \text { S A } & \text { L } \\ \text { S }\end{array}$
MPVLVKLMAKSES LQELHLGGNYLTEECS
T S Gil G S ALAA N C $\square$ N L LT L D FY Y N Q I G



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

AKYLSEMKRK
CEDLAASVLQQHSSLRELDLSHNHLKDSEVKRLSAARN

YLLK MDE CLL S S L V N L T S L L CVV F D

A S LL A E SLLAHLVVTLTRLDVSANSVRDEGAVALC
QA AL GSAFQDAERLKTLSLSYNPLG
V S GL G F G L A N C
Q S GLL G S ALLA N CT N LT S LY LA GN K $\square G D E G$
A S GLL G S G L A N C $\square$ N L S S
 A TA A A E A L R V N G V L K T L G L G G N N I G
$A Q V I Q D L I F D \| N S V R A L D L S D N G F D T D M V L V L A D G R S K S I$


GL A I A K S MA N K E A L Q ML NL DGN QL G D S $\square K E \square K R D M T$
A R S L L D A L Q T N T T L V V L D I R K N P L VF T L N K LL LTKCTLL L R L IL SNNGI GDLGGASA



$A \square G L G S S G Q C T S D Q N L E D Q L R N$
1 KEVIK NL GQCVNLVDLSLSNN
ALALHS ALA Y S TNLQNLALNLDQNEDGSDGAQALCS


A A D L V S A L G H L K N M S LLK LD F C NSE F D Y R L A Y C L S K Q T N L A GELLAMALKRNAS LQELDLDRWNNDGGGRALLNCLHSNKAL VK AL Y D AVVRGSPA L K R L E L N GNQF S ED DK SIA A L Q E L F E E

GDVLA D F L FAN E CVVTHLGGVGLGLAGVSARLLTALERNTTL

1 A A L A $\square S \mathrm{~F} V \mathrm{~V}$ K NPN LQQVI N L N D N T A T E T G G I I I A

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ELCAYMVGRSQELQSLN AECNQDTK LGAVSLGH ELLFYNLKFTRNLEGLDLSGNSLRY SVVQSLCN QVIGTALGENFRI ETLRLGWNSLRNQGAVAIGQ AKYLSEDKHLILLNI SN NQI GDEGAKYLCE AETLIALLREGPHLEEVDLSGNQLEDEGCRLMAE

A H Y L S K GLE TQGQLK NLLNLD F FNN $\square$ T D T GAQSLSK NAVF LSESISELI RLNDTVVEIHAQKC SFDAHDVESLIL
 NWRQFNLQDFSHLDSRDLALAGA

LS QALSKCVNLLFLKLNLYNNFFDEEVCRDAS


 $\square G S A \square A N C \square N L S N L S L Y N E N Q M G A K G A S G L G S$ $R S L R L S G N G L Q D E G F M T L C D$ $\square S$ QS LK N C L N L E Y LQUGE Y N NiQ DEGVN CLC Q
$\square R R \square T \square N C N T L I G D Q G A S A F A D$ $\square S N C K N \square Q N \square N \square N S S N C \square S G E N \| I D L C Q$ ECTAK S LAS NDCTKEVSFQKS LIGDKGCEAVCS QSLSSALDNCTNLQKLTDDRVNKIKDAGVQKLAS $L K N S V N L K N L Q L Y L R G C I Q S K G V I D L G Q$
 ESLNWSVTRVGAVE\|AALAVVY CPSLRWLDLSGNALFLSGARELAR ESLARLATSSTNLDSLNGGCNFLGDKGVVVISK RVLAQSNSVEELTFRWNSN ENTQALLS ASA $\square$ AF GLVKCENLQTLK LDLSNS $\square G \square Q G A S N L G S$

EALGSALKKNPSLTELDLSRNRNLQDSGVHHLWG


NDKK $\square E S \square L I Q \square Q R E A S S L Q S L D L S G N Q K T S Y \nabla G W L K L F Q$ L NLRDFDHLEPKDLMA! VS RALLQSCNLTDLS NNDLQDSGVKLLSA $\square G S A L A N C \square N L Q N L T L D R Y N Q 1$ GEMGASGLGS PS GLHLRLD GV TLDDKAFDRLVL

$K Y$ Y QVLRFFPALED LNVS ANLLDVE GANDVSV


 LAKRSKISELTLNNLNHIGDEK X X S D DLGY
DSSACDAMAELFRSNRTLQKLTLSGRRRVCVHCLKDMFA AVTAVLKGCQKLTKLDLSGVRRCDDRMLRADAK

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

LLTKGLADTSSLEKLSLAHS P G G G GL E II CQ PSLTVLALNDNDTIGDAGVRSLAQ LLS S EKDLDEFDLKKYSASEEAGLRLLPV LA A CKGMRKLELTGGLHLSTK SCAALSA A LG SALEKLVNLKNLNLRSFDSVS DK GLSNLCS ESLSSALQSSNCVLRELDLSN NDLQDSGVKKLSD AFHRVKANKE $\square R Q L D Q S N \square F F \prod E E \square G V K A L L D$ $L A V C S R V E R L T L T N C R G L T D T G L D A L V E$


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


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 LLA K K
 ALTKLTSLEKLNLEFNYIQNEGGQYVGEALKNLVNLKTLIN


 GL S E I H C EVVVASALK SNPSLRELD


 LSRAGTLRHLG GLVKNPS DQALDLSKNNTPYPDMATLCECFSKFSHLVSLN $G L V R N F T L R E L Y L R N V R G E F D G V F A L S G Y D G E T K S L V H L D$ TLANNLSNLALYLSRNQMGAKGASGLCSALANFDNLPTLD
 SLSEDLWLRALDLQQCGLTSEGAKALLEALETNRTLVVLD ALGGDNTVLCYLDLH GNDI RNDAADAI AHGLABNRHLTYL N GLITKCTKLQTLDFNYNQINEKSAQNI GELLAKCDNLTTLM

 SLFKNLSNLELDLSYNQIQDEGIVTLENDLSRSQQLSRLD
 ALGTNETLVELDI S GNQMGDEGARILAKALQLN TKGLRKL H VSFTNRNLIVLNLSGNQMGPIGGCAMLGKALLTNNTLEVLD ALKAGSNLRRLDLHAVGLEGTGDREIAGALQQCPELMGLG



ALGKCKFLTDFDTQKNQTGDRGAQNDGLGLSNCTQQRY A
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 T TSSC TNFQR TYMRNC ALEYNTFFRGLKASHMRLGEQQ RS AE KLHEKKNLD


 ALCGNSSFSSLDFSNNQLGAPAAAALGNMTRVYGSLRRLN S LE WMKHLKNLNI SAAHLGNCGAVSIVVTGLLRSTSVVEVLD









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 GLKSQLCKLE LLRQMQSKALLILLSKLKKCLGLVNIWTQR

 TLA S S S AL RLLDDIGYNALTSEGS DSPSGFDPPN R HSLCN $S L T S L T$ LI



C S F|L|ASSSLSNTR|L|EH|L|D|L|S YNHPGD V M Y L V Q A L I T E L R T L E E K N P K L
T K Y L S E M
A A R L A Q L LP G L G A L Q S L N LS E N G L S LDAVLGLA
GLTT A RAMELLNVTL TADVDMSRNELLNE EVGSA
1 Q D L K L V Y S S R L T K L K R V R L N F N S L G D P N A $\square$
I I A
 N E Q L F K H L G N L Q N M I K L N L H C G Q C G L S Q S I Q K S L S K LT K L VIALS QNLENEKGLKRLSLSRVSMTARGL CSHL G S ALK K NP S L R E L D L S E N
LP VV A E LL L Q R LT
$V R L L N S A F N R N K N O L D T L$


 SQAI G GWMAK C H S L D C L N L N F QL M G P P L R V V D I A R L D L S L






■E Q G G A LT K Y Q K L S N L Y L S F


| A | $N$ | $F$ | $L$ | $L$ | $C$ | $L$ | $E$ | $L$ | $N$ | $K$ | $A$ | $L$ | $T$ | $E$ | $F$ | $N$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $A$ | $L$ | $R$ | $N$ | $N$ | $N$ |  |  |  |  |  |  |  |  |  |  |  |



S D S L A A S A L T S N P S L R A L D L
VRLIS TSVAFHPSLTSLNDSNNQAG
$V V A L T D V L A S C P M L M Y L G M S T S R A T G A Q A L V E G \square R K G P G L$
MRATLYEAVNDTSTLNADS
AFSLCHGLGKCSNLK LL F LDD
$\square \mathrm{Z}$ V L A E A L E R N D R I K H V Y V
CEAL G S AL K K N S NL TELLDLSKNH




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V V Y I A A G L F K N S Y L E S L S L D G N R F G G VG LE H L L L S T F S P L T E DVVS S D L K $\square$ N H K L T D L N L S H N K L G D R G RLLC E AL R N P E C K

$A D H$ A GP I A K S K GLLC K L A L A H C G L T S K G Q M S H S L S L N P S $\square$ $V K L L S E$
$\square F K V I S K C R K S K R L V V F N D G F$
FANWI E F FERNT TF H T L N V A HN A $\square G D D G$

 AT QL K S MMAERQT


VR S L WD A L Q Y N T T L E E L Y L D DT GII T D S GLLI L D S L M G N T T L


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

A M S KL Q T L NL SF N A I G D A CAVA
A S C L G S GLLT K C T N L Q N L T L N L N S I G







TE A L L A S G $\quad$ N F P S S L L $P R R L Q Q S C K A N E E L Q E L G F Y$



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c c


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