

## QUERY <br> UniRef90_UPIIO003649BAE UniRef90-G4HMS4 UniRef90-9DUQ9 UniRef90-W7D8H3 UniRef90-K0F9J3 UniRef90-K6CY09 UniRef90-Kow194 UniRef90-UPIIOOO36E1A87 UniRef90_UPIO004048754 UniRef90-I0KJ51 UniRef90-H7F8K8 UniRef90-D6XSQ0 UniRef90-K21003 UniRef90-UP10003B32550 UniRef90-UPIO0040273E6 UniRef90-K8E3F9 UniRef90- F7UEF4 UniRef90-UPI00047BDF1B UniRef90-ММЕЕТТ UniRef90-A0A038GWQ6 UniRef90_JoGWF1 UniRef9-LOLI36 UniRef90-UPIOOO2F7CBC3 UniRef90_J1FKL2

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F WVGFY LVD
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80 ALLNQLLD IN WVGFYL EEGNELVLGPFQGLPACVRIPF
 AVLKSAFDWLWVGFYLVD NDNLVLGPFQGPPACTRIA ALLNQALDINWVGFYLHEETSNQLVLGPFQGLPACIRIPL
 ALMF QMMDLNWAGFYFL KGGELVLGPFQGKPACVRI P V A ALKTGFNFFWVGFY LL KNEQ A ALKQGFNFFWVGAYLV

ALV K K ALLNQALDTNWVGFYLYEEETDQLVVGPFQGLPACVR SLLNQFLKVNWVGFYLM KQDELILGPFQGLPACVRIPN ALLNEQLDLNWVGFYLL QGDTLVLGPFQGKAACVR ALLEHQLDLNWAGFYLMRE ALLNQFLDTNWVGFYLWKE ALLFENLDDNWSGFYLEEEAS A LI Y Q T M D L N WT GVVY LL A LL L H H F SLVYHSLDLNWAGFYRFDGT ALVFELVDLNWAGFYFLRSE AL Y YML DL NWAGFYFLQREE G | $A L$ | $G Q Y L D L N W A G F Y R$ | $N V A$ |
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E GE AALREAFGFFWVGFYLVKDE AALKEAFNFFWVGFYF DRGQG
$S L V Y H S L G L N W A G F Y F F D G R$
ALLNQFLDVNWVGFYFASG
ALLENHLDVNWAGFYFYKEA

 ALINDNMDVNWVGFYL $\quad$ EE E ALLYERLGLNWAGFYLMDGH ALVYHALDLNWAGFYFHDGR

 ALLEMELDI NWVGFYLY END ALLNERLDVNWVGFY LMEGH A AL HEAFPFFWVGFYL Q E N N ALLWELLDLNWAGFYRMVD
 $A L L W E F L D L N W A G F Y R V A P A$ A A HAFPF WVGFYMVED ALLNYFLDINWVGFYVA A L L N D NL D I NWVGG
 ALMFMR LDAN W WA GFYKLDS K A Al H HTFDFFWTGFYLLNKE ALI YDNLDLDWAGFYLMDK E E
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$\qquad$ SLL WHAYAANWAGFYIRQDQ
 AFVMQTVDLNWSGFYFARGE A LLEERLDVNWVGFYRLID ALLFNSLNVNFAGVYRYD ALLNQSLDINWVGFYRYDPENDELILGGPFQGKVACMH SLLCVQA FDWF WT GF Y CVDE GVE


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YSTEKKHS IYQAL LDQNVPLILDQEKDLDS DMSTVC
TSKKQLFEELTNQIEEIIF QNNIHESMEEIC MSNNTKAERYTRIYTQIEQLI GATNNPYSRMATIS MSNKNKTGRYQRIYNQVEKLIQATESPWSRMSTHA ADYPDLHQRLTALATDETDEDALMATVA
EKKELFKELDSMI EKSSSEDDNLNDFYNEVV
YELLYKELEALLSDEEFQISKMANMS

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DEAEKKAAYQELKPHIK
GDTVPAYELACRAGLEAEDWLANLANSS
MHER $\square$ KYKTLLASAKNLADNEKYTMSLLSNAVS DERDFIANAAQFC
YPSLAKTDAALTEGETDPVAMMATVT AGASKEQVYDQVLEQATGLVTGQRNWDSNLANVS

ASKEELYKQVIQQTKGLIEGQRHWVSNTANVA YALLNRQLEALL LLEAQLNUDDKLTTVC MNKSEKDEGYELLNDQUKGLLSAQNYTLSNLSNAS

SKEEAYAQVLEEARGLFDGQRNWMADEDETS YPTLSKTLHALTDGETDSVALMATVA ATSPEALSFETKFRLLL DITRTISRSLDLDETLSII NTGRRDDQAAQLQTLNE:GRLISSAFDLTLETAIH
 Les LKPRTKDTLQDNLVTDQRLGQVC DTKKALFGKLLSQLEKIIYDTKDLNKAMEKIV E $\square T \square D T D \square E K P G A L L N V A R T \square A E T S \square E$ RDTTAQKRПEQSRQWMFRTSRALHSYRDपRANFN|A NARLYKETCKKLDEFSLLNEVTTSGTSTMEFDELIAR N YDTLAKTIDALVEGEDDAVALMATVA EKLKARLLASLTEGETDADALMAALAA
ESKTEQL
SFYVAARNQRGATALLRATQTLGQSLDLEATLQVVM LHDL YTVTKRQAQELRLLGQVRSVLARAUDLSVIFYSVV KNNQFEDVLIYFSKSLMGKENEDDI LWDVA $D$ LIA R QQALCE GEDDS:AMMATVS
KKRAQEMEFLDTV ATTTAEVDLNKLLQNVV FAQKESEALKERLFELLLYSLSKNLNGLQLNELEHNTVIUS

MDNTESTTLKDTLLPRVEATVSRDTQSEKLFADC DDTSNREKTLINDLINNLTKSGLGKTDVVEMAWE: V ARAFHQAKQRADQLQADHEVSEQUTADLLDELLPSVV

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ARPMTESQRAAALR FQQFLRAI E LINNETLLEQLLDAFT

EKSRKQELEFLDIVSQVSSELELGPLLERII
TKAEFYSDLINDLHTLIAGETSFLAAISNCS
LHADATAGAEATDENNLI
DENTNNEERDDYMVDFGKATTKTESDMTSMMANTS H DRLFEEAQKKARQLEALSQVSQSITSSRYLEEILHLIV
保 ADADDKYRELLYT S SKLSTCLD RA GDLVA


E!LYR\VQEVNAARDLDQALNTIV
NNAQKLENSLLQUANTYKAKNLDVFFESLH NAK THENपKKRILEDSLLYEFEKLI VSEKSLIHELGNWVL HEDEMAQQS ESDSRALLGRLRDTLADHAEGQQRLDQIT

DEMVNYFATSLYGKNTVDEILWDVA NRIVQDVSREPDLAEALSRLV

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 SLL WHAYAANWA GFY RQQDKFNGLLLLGPFFQGRPACQRE DRF





 S LL WHAYAANWAGFYVRQDRFPSLVFGPFHGKPACQLI QF




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 H $\square D R L S T S Q A K K G P M L I P D T R Q S S R W L S G V E Y D A C W M G I P$
 DQSGAGRVMLSGQPLVVPDTVSDPQWSPMPSVVRSWDGVP STQDTSFVLAHGDALLTKDAQDDERFDSSGLSIRASMCVP EPGFRKHVMETGQPLLTNEVTATEKYGNPHVLQGEALVVP Y Q GVLMGKAALMKQCI RVG DVRKDVREDATNFTTYSVLCCSP







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 H E G L V G L V R R T A E P L N L A E V S T H P N F K F F F P Q I Y H S F L G A P
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 GE GV A GWV A Q H GE A L I V P E SVVNDPR L P P KLRKVVKVI AL P K D WL T G WI DR S K E PLLI R D F E K E K D S L L I G E V T R S WL GV P GE GFS GSVVFAEQK SSLI Y DLS QNSKYLDPGENTMCVI CAP





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MQARQRTAGEDETERRQF DHSVAAQMVGCEDVESTYHLAD DITAVKRAEQYEQFRSHILQLLAEGEPLRGILEALA LLRRVVEAVNGSKDLKLSLLRLT


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rddryrathdtvad Tiseedpdrliggi a QTKKLNRNGRMLSDCNQAIVRIGNDPEKLLEREVC DRTDAYAALVRIGNRLHGASGDVDAALDLIV NNRLFAREHTRANQLQLLVELGRNFAELMTPDQLLRLVA NADHKAGDELADLTPEELSELGGVEERTDLDK

LMSATQSLKSSDDLETMNT RVLDRRLREVMAEQVSAQERLDKIV $T Q K \square Q \square S E A L S E A T R S V S Y S S L D T E E T Q R V M$ YEETRLKHQCQKLLAVSRKLFLHLGDFSDLLREMM SDVQEQFRATSDILKVLTSGASAQAQVEEAVV

RRLLARMRDVMAGEGADPAKLLRIV
RETTAAQRDEDWKSNLARTSGKTQGHRDLNELARLTM QALYQUSQLIGSALDIKKTLDETL TDIRDVEADARRAL QVLHEACRIGGHAFDLDEALRKVL MLF Q IGLAI TSGRTMTEVLHTIL
TIEFQDTSLSERTQNALLHISSSSDTEGTILDLIEGVI
STGDRRGGQRNVLTELGQLADESTDLESLCSETVV LHQQAFKRYSENLEVLNSVGRALSEKLDVQALLQKVI $\square Q A R \square E T A R S T R N E L K S Q V S R I N E L T Q G A S D L M A M A D E I!$ TAHRNRKSRLELQQEVLMELVKDISNDLDVQSLCHKAL MNENHPQNYD HYQKALMDISQAITSDLFLEDVEKLIV VLLKAKQLI SQQLDLTVVLRRIV REAEDTALFDTASDLAALRDPDEVLQSIV MVANपRETTRAKDWLESNLARDAALMQGHRDLMEVDLDLD


 RRLFAKLRERLSAGN SSLAELV TGATRQERQQSLGGEFGRTALQTRDDGQQLQRAT KADLLEIMLEUSEKMNTVF
GEKRQSE $\square R \square L K E D A E L N E G T E D D A L G E V L$ AALMAATRSVSQSSLDPDE
 STETTERKKREQQLELNRAIPRLLSAETVEEVAERSVV RDITERKQAEIIQQTLYNISNALNTTKDLSDLYSK川R DRLTDTVTTRASLQSLLEAVLVVVGSGLELDSMLQRIV RLDHLNKRLQQIIGRQLEEHKVIMEAT DR■RT■ASEDNKA VVRADSRRAVERRVC
KEHNEREFF DELVKDTSNDLDLSLSYKDL KALLHIISSSDTEDTVLNLVVEM AEपNDTMRGEQNVAALAQNII dTtelkrtan QLevrermagVIargedodVLLaqVV NAQIFEKVQLENRRNEVLLDLARLFEEQSSLSTVMDTLL ARDTTERKQAESRQAALYAISSAAHAAEDLDALFKRVH

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UniRef90- V8R9M4 UniRef90_W5N1A4 UniRef90_S4Y8V6 ,

 EKARRLVKATS GSIMLLMNEESGLLAAGYDQTPEYRAYEEA


 ALL NENLN $\square$ NWLGFYL $\quad$ E D
 KI I ITTRLNAEA ANDI FLDNNKTNKFECDAS QDHLDE Y QLDNL R H MK L L L G L F DE I R L L D R A T G M I M TP S A A N RE L FA R K E DEAKQLMNADRSTLWLIDRDKNDLWTKGPRGELKE』R\PM

 AEARNDLTNAERCSSLFLLDDPDQQDLVAKAMKESVVKMMRID I





 D A V R D V L P V E Y C G L F V V










## $M V T A R V T G V E \square C S L W L V D E N E N P$

 E L DA A E L A V E V C S V V
 GI AKEYLGVKRVSLMLKEEET LKI CHTGFD DDPDNTTVKG










 THTVS LL S CERASVLLAANPS QPENVFE HTGEHVDESTI P L
 LLI G E WLDPA L N F S V A L Y Y D E N C A Q L N F P Y H V D D D H E S Q P E Q P



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| UniRef90-UPI00036E0C93 | VIFENQVLGVI |
| UniRef90-06L0D7 | I EYDNKII GEI DIDSDKK |
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|  | GElVGV |
| UniRef90-W0JY 18 | RSSGEGVGVFQAASERRDAFSERDAELAELLMA ${ }^{\text {a }}$, |
| UniReef90-A0A011PY84 | RSSGKVLGTFAIYHRHCQSPSAAHIELLEQSARLASIIAI |
| UniRef90 A4BAG5 | 1 1 HNRKLGGVLSVQRYRVERFSDEE |
| UniRef90_C9RS71 | LIHDGQVIGTLS |
| UniRef90-A6C | MLLAEEPIGVINIDTQNPQQFQEED |
| UniRefe90-X5KFD9 | MQDPGGLVGVLNVHTVNRREFTARDV |
| UniRef90 K9QS54 | VFNADQEUGVTQLVNKKKASFDRNDE |
| UniRef90 L9ZN21 | MLVEDRVYGVMMTASSKRVRKFNQKEQEFLSTMVANTIGAML |
| UniRef90-Q01P53 | VIARNRVVGVINVQHRLPHQHTGSEMEVLTTVGEQVGCVL |
| UniRef90-B115C9 | LIAKGHVQGVLEVFRRKPAVPDGEWLEFLETLAGQAA |
| UniRef90-X5UU06 | LMREGSVIGVFAMTRPEPGPFTDSQIE |
|  | LKTRDRVLGVINFSNSDPEEYTAEDLQ |
| UniRef90-K1YSM9 |  |
| UniRet90 UPIOOO34B764C | L NEGELVAVVQLLNKLKGGFTQEDEAL |
| UniRet90 V4QE17 | LVRGGR |
| UniRef90-T2GKS | LTVKGETIGALTVYSGERDAFDEEEVKLLMELAGDVSFYi |
| UniRef90-H0EC | MDrDGQ VGT |
| UniRef90 A9 | GHSDASALDGL |
| UniRet90-UPIOOO3C80062 | N F |
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| UniRet90_Q1QQY6 |  |
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| UniRef90-A3WC |  |
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| UniRef90-B3RXL9 | A |
| UniRet90_W6K8R0 |  |
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| UniRef90 F9WTZ5 | 1 ALNGDTLAVVQLVNKEVTTFTEADRETFRVFSL |
| UniRef90-UPIIO003B4A2F2 | G |
|  |  |
| UniRe990 A0A024G | DKEEILGVLEILNKDGGEFTLDD |
|  | VFDDHDPWGV |
| OS8 |  |
| UniRet90-B1KGK | VLFEEALIGVIELASFEG FTDEQVEVIIELISSNLGIVI |
| UniRef90-UPIO003709506 | DEVFGNLYLTEKAGGEFDADDEVVVGALATAAGVA |
| UniRet90-A7S9Q1 | DHDGEVIGVAQVITKTGSAFTDDDEQ FLKYLVFCGI Gl |
| UniRef90 UPIOOO47 | LVWEGRPI GS AVARRAVGYFPERQVALLRTFADQAVIA |
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| UniRef90-UPIO003B60A35 | 1 RVGDQVFGNLYLTNAASGEFSADDEELVTALASTVGFAI |
| UniRef90-M2YRV3 | LATGDTVIGVLFVGARTERLDTPHDTALLSSLAHHAAMAL |
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| UniRef90 X6GEL6 | KRDGEVVGVISLSRTEARLFSDRQIAVVQTFADQAVIAM |
| UniRef90-TOT276 | SKGELI |
|  | VSRGSVI GVVQMVNKLSGAFSKTDENNFKMFAVFCALAL |
| UniRef90-U1ME00 | 1 VHQGKULGVIVVQQQLARVFSQDEESFLVTLS |
| UniRee90-A0LH02 | V A G M M GV NV |
| UniRef90-U2SUK7 | LWREGRPVGVLNVTSRRPNAFDDRDVRTLELMAGLLGAAM |
| UniRet90-K1YRA0 | LQREDKVMGVLNCFTAKPHVFSKTDINMLTAVASQAAVAM |
| UniRef90-A5 | I RRAGRTLGVI AVQNSEPRVYTPLEV |
|  | IARGGEPFGVLEVDSADSGQFDLADADFLAGFAGLLGUAL |
| UniRee900-A8UU60 | FQUKGRTVGVLNYYSATPNMFGEEEDELLKELQQDUSFAL |
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| UniRef90-UPI000478BECE | LRAGDEKFGI LNI GSPDKTHFTPEELALLESVAFQIGTAII |
| UniRet90-K8GDJ2 | VFSPGELTGVTOLVKKVGTFDETDOKYMOLFNNO |
| UniRet90_D6SLD0 | QGTTVGVLTVDRLIFDQDISE |
|  | TDKIIGCLSVFQNEVNAFDGESL |
|  | GEYGILMAGSPTPSNFDTQDVTVG |
| UniRef90-UP1000377D64E | LKVENKVIGVIAVQSDDPNDYTEKDIEI |
| UniRef90-M2Z3F5 | LMVRGKVFGSLYLTEKVGSAFTEEDEVILKVLATSAGVA |
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| UniRef90-M0E204 | LEYRDTLYGALAVYADRPNAFDATERELLAEVGDDV |
| UniRef90- ${ }^{-19 T S 22}$ | A D |
| UniRef90-F1Q4Q7 | NDGEVIGVAQAINKSPNGFTQDDEKVLQCFMPFCGTAII |
| UniRet90 K3WQH5 | VGVQNRP AVLE LNKEGGEFTFDDECAFEAFASQVAVIL |
| UniRef90 U5EQH7 | E |
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| UniRef90 H2YVD4 | FRQV |
| UniRef90- U2SIL1 |  |
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| UniRef90_S4 | ALVVQragdraftardVELLMALTAP\\|AAGA |
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| UniRef90_I3ILY0 | E N R |
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| UniRef90-X5KFD9 | HQAR |
| UniRef90-K9QS54 | Q NA Q |
| UniRef90-L9ZN21 | D R A R R Q L |
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| UniRef90-UPI000478BECE | K R $\square \mathrm{K}$ L T T L |
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KLLLHADEG TNRTAELKGLLLKCM LDDTERKRTEEELQLLQRITNAVSDASDFDSALEVAL EAVTSPDTLRDLLEAVLVVVGADLDDDTMLQRUV NARGYEESRLRERWLQASAETHNLMSGSDRGQVLGLI A QMLRTADDRTGREQALI QSATRSLVTATDAATVAEQLV LFNETQSSQARQTASADVLRVISQ

QALLDAVAA
ALCARALERARRYDALLANASSLSASLDVQETLQR V
M F
M $\square G A M M D \square S N R K R V M D E L L S A V L A$
VLLGTSRGLSHRTSTQKTLEEI C
A A AVKT NEAMNRVM
EQRLRALL RANAQVVGELDLSAVLRRVV ARDDTERKRAESLQTALYA SEAAHGAEDLLALFQHIDR ELYYDVTDRHRRLRRLNEAVREWLATGTARAVVAEQAC NA $\square$ S $\square D Q \square R E T R K A A M V N M A T R A R D T L E E S V L V Q S I I$ DRVHSLLEAVLSRELDLQQVLRRIV
EVAQRRRAERDQ
EERDRLEATADIARDISTL
HD THLTQHRRREAELAALFDTAGDLAADRDLDAVLRAIV NAKLHDETFKKLNESSLLNEVIIAGTSTTEFNELIDRLI

LLEAMRSVGSGLEHSTLERIC


EVMAEPITAQERLDKIV
KVNRDYSFTSQTNQLIVRATNEETLFKEAC LLRELSSFLTDSVDLPSLLHETC KRRSRQQQVVADLGQFALETDDLDEIMHEAS NARMYEESRRREQRLEALGEUTAALSGTDADEVLHLVA

RQQATVAQLGQSALLGKDLSSLMDEAV
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D DT QRKK品ERLRSDYEINSAIQTTLDLNELFARVH
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$M \square A N T T E D Q K R S R A D Q A D N C N Q A D L H A Q S E E E L L Q Q \prod C$ ARLRETTQKNTEQDWLLAKFTRMLQGQRDLETVSKLIL
 ALLHEVAKALAATLEDDKLLHGA NARLYEDSRLRERWLQANAEITHNLMSGGVHTEVLRLIAA SSDKVNHYLQNAAEI GHELAERGHVEEVLDLVA RNRQQEALAMM GQQALAADTELSALMDETVV RARQQEALAHLSQQALAGTRLDALMGEAT
 QAQLESLYAISVEIASGRELSAVMDRAL SFE LLERDKFRDERLHEAACNFERCSEMESVYDLVI QQRVQELLTRVGKSVT TLMDQRQLLRQ A NA QLFA ASRKEERSRALLEVVNDLFEEQTDLEKMVKKIM LNRAGAALAAELDLERIVQMVS S S S S DAEYRRKVQEVNKRIFSAANLDE:LIDDI: K TEERRAERADATLNRDNTALAAEHDLERLVQMVT
 MSSRSSRRGDEAVSEAVLA MSRHLEVREVLQTIV


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$\stackrel{Q}{\mathrm{E}}$ ESVCTVIKSEASSLMLLDKATGRLHAGAVGAEGALESVPA RLVCETTGWEFGEAWVPNTDQTYLEYTAFRQQSHSMRFAP
 AYTADTIDRVYVCVWRYEPGEQVLRPVAQTDGSEELTFEP FIMSEHMDMLRGMITHLNRDGELVFGLSEEEKERGRYR EAASRLTGAEYGALGVVGSGSLLVEFVTTGDDDTRRDLPH SLADEHVADWCAVYQPDDTGRVCPVVVAHKDAQKEELPE
 HTAMDLVDARYGALGVLGGNGELSQFVYEGDDEPTRLPT TEVQKLLGADRVVVFKLRPDGSGTVVKEAVVPSTPMD L RQI AGNMVAEVCSVYVLRADGVLELYATREAVHDAQLKM DHVESYFSPRHLAFLLVDPDTGDLVVGEKTDLVSGKKLRK EKIGNIIAPVNWSLLLIDKKTEKLYFGKNAGKLKNKRIPK EVAIELVGARYGALGVIGPDRRLERFGYVGDAAAMGHLPE $R H L A D L L A L E V N G V F L H E P A D E T L E P V A W T D A A E S L T F E A$
$S S T G H H N V T R C T Y G E I D P D Q E Y L V D R Y C N E V R S V G R L D$ NTAKTLTESDRCSTFLVKADGSLVKKAHFEDGNVVVVPA EAAALLVDAEYAALGVIGPDGRRLSAFLTVGVTEEQVYPQ ARAVPLAGASGGVVYEYDEVSKAFYLRATHGAEMEXPDRGL SELAPLVRAQQGAFFLADRDGTVLECDAAYQSRAGLRFAM



 A C L E S Q F DVVH H A ML L L L D G S G T R L Y T I A Y A Q S GV G S E I P L


 $R$ QVA DVLDNK Y CKI LD L D E E R Q ELL LWK D GF VGEA T I S AV E





 QFAL QALSCTHA G I A L Y T R GS Q P EVVA A PVVS DV Y S L Q I T S




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UniRef90-U7QJX5
UniRef90-XoWC01
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UniRef90-UPIOO04766C26 UniRef90-E8XQ40
UniRef90_UPIOOO37625E0 UniRef90-Q1DFA3 UniRef90-UPIO003827EFD UniRef90-UP1000315ADBA UniRef90-D8FX09 UniRef90-K4LC94 UniRef90 UPLIOOO3688726 UniRef90-B1ZF40 UniRef90-UPIo002E49E78 UniRef90-B9L456 UniRef90-UP100046BEC05 UniRef90-I2F7R9 UniRef90-A0AO1ONCZO UniRef90-B8GBT4 UniRef90-G3HAB8 UniRef90-C5KUV9 UniRef90-UPIO0026CB166 UniRef90_A8KY43
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UniRef90-UPIOOO37637DC UniRef90_UPIOOO37637DC
UniRef90-UPIOOO37B8879 UniRef90_W7TDE4 UniReego-UIDE4
UniRef90-UPIOOO47

90
100
110
120
GK G I I G YVA E H G Q TVVNLPDA Y Q DRRFK LTTGYK TK S LLCMP SSSVVNRVLERGEPILSIDAQTDQRFSGADQQUKSVICTP EESII TNKVVVKTQEALLIEDAAKDPRFAAKTKGCSTVMAVP


 GHGLLGELIRRPEPLRLARLCEHYGFPAHHPPMDSFLGVP GEGALGHAAATQAPVQLSDIPAREQSVFARSGYRALLAVP GDGLTERVMAAQRPVRLRDGSLGQNVDRCLIDLQDWMGAP










 H G S LAA G LAA AR T GT PVVCA DVVRTDPRA HL F G D GAE K GL G V P
 DSSSA GY TL Q VQQP II I E H L P T E T R F LLRREHGVIDSGL S V P


 D T G PL 1








 SA GLLA GY T L L S S E P VV I E DFRRSERRF TARRRRGADS GMSV I Q G S L A G A CLLT G G E P L L V P D V V H T D P R V V R D L V V V R S C I
 R R T F GVVI LE GRPNVSNDVRNDPLHRRGHPPVETFLGVP
 GHGGVLGGAVIDDTK C P I
 DK GIMMGYVAATGQMVNIEDVSKHDNYHGHGFEAGAVICMP ATAVFGPTFRNDGVI RSDDILADPRYQSAPHYGMPPGHLP

 E S S L Y W SVVA D S GT YVY L V NA D D R N K H I E $\square P$ A F K N QVL V F P




|  |  |
| :---: | :---: |
| $\begin{aligned} & \text { UniRef90_H9GIJ7 } \\ & \text { UniRef90HH } \end{aligned}$ | LIDKGKII AAIYMDSREVN |
|  | i LVGQQPVGVLNVDRLFEDHF EEDVSFLCV |
| UniRef90-UPIO00460 | LFGQDEPLGVLNFGGDDPGRFGPHDERLVVTLGRQ |
| UniRef90-UPIO0037E0 | VQSQGGVAVVLFLNK■KKD |
| UniRef90-UP100037D9EF6 | MFSNNEAVGUQALNKKGGDFNEKDIETLNTLAGHASLS |
| UniRef90 ${ }^{\text {Ad }}$ | LSNNQVLAILVFLMSITPAEDRRLVEFISSVATQLGTVF |
| UniRef90 M2WZD6 UniRef90 | LVRGQAFGSLYLTEKRGGPFTDEDQTVLTVGAESAAL |
| UniRef90_UPIO002FE6E70 | I GSGDRVRGVLLVRAAGRTPFSEKETEPLRGFAAQAAVAM |
| UniRef90-G1U4Q4 | 1 KNENEVIGVAELVNKDNGPFSKFDEDLATAFSDYCGIS |
| 90 U1PUZ7 | GEYGVLTAGSQLVDDFSRTEFEFLQTLAASAESA |
| UniRef90 UPIO00237963F | LMRGGKCLGGL |
| UniRef90-A1SF84 | VRTRGTVFGNLYLTEKSGGAFTAE |
| UniRef90-C1D1Y1 | MTVRGRRTGVLGVATTHPSRFVHDD |
| UniRet90-MOHUA6 | GVFQAASFEADAFGDADVELTELLMAHVTVAA |
| UniRet90-K2D |  |
| UniRef90-UPIOOO237AD72 | - |
| UniRef90-G6FTT | 11 MQ |
|  | RTGRSLGVLVVQNKASR |
| C7LUN | SGDMVYGVLEDTRGEP |
| UniRef90_UPI000361F3 |  |
| UniRef90-G2J2J2 | LNSFKGITGALVLKSYADGRYTEKDKELLQFVSAQTATA |
| UniRef90-LOJPX2 |  |
| UniRef90_UP100036EFFDO | FVAGRFLALLMLHAL |
| UniRef90-D5ZYF6 | I RVREQVFGNLYLTEKRGGRFDEEDESVLSTLAV |
| UniRet90-W4MA39 | LLLEKQI MGGLIIWRQEPGRFPSAVVNLLQAFASQSTLA |
|  | LLIEGEIRGVLAVFSQHPHYYDDKDLELLGFVSQHTSTAI |
| UniRet90-D811x3 |  |
| UniRef90-E2Q1H4 | VGTRVIGVLFAADRTLRDFTPDADALLSSLADHAAVAL |
| UniRet90 X1N5Y2 |  |
| UniRet90-UPIO0047746E2 | VRVSGEVFGNLYLGEKRGDPFNDYDVNMVRVLATEAGIAI |
| UniRet90-UP1000476DCB |  |
| Ref90-UP100041F56C8 | LQHQGRTLGVYSLFSQCPEALSDDMRGLLNSIGO |
| Ref90-UP100035E763C | VVLDGEVIGVINI DSPRQRR |
| UniRet90-AOF | 1 KDDSGV G A |
| UniRef90- A0A024UJC8 | I FNHDRPVAALACNSVHGRGFSAHDL |
|  |  |
|  | 1 KKLGKVI GVFAFYANEKNFFDAEEI ALLVEATDDVSFAL |
| UniRef90-D6W8L5 | OEPWGL GTHDMAPKSFTDEDV |
| UniRef90 G2NFW2 | L RVGAGAMGALRMGRPVGRPFDDSEVALVSGFADQAA |
| UniRef90-_B5YISO | 1 F |
| UniRef90_UP10004 | 1 PKRNGSYGVLGAYTSKKQTFTQRDIHFVQSIIANVLSAAL |
| UniRef90-UP10003 | VLFEGKVLGVIELASFQP FTHDQRDFL |
| UniRef90-S9QQX2 | ARGQLIG |
| UniRef90-UPI0003A6FCCF | GEEATGAI VVQSYSPNLYQEDD |
|  | L ${ }^{\text {de }}$ GGHGLLIFASPNVDDFDDEALALAKILGSNVEAAL |
| UniRet90-R4 |  |
| Unif | LVTKTRKFGLVLIEHKYFNAFDED |
| UniRef90 D2 | R R G Q QVLGIVFLSNKRPGGFTEADQRLLTMFAAHAALAL |
| UniRef90- XoWC01 | val GDDV |
| UniRef90-K2BR71 | VHGNTMGVINLDRSNSRAFSNDLDLL LAAM |
| UniRef90-Q0YQY7 | LKTDDHVFGVLNIYSDKTDAFNDEETALLSSMADNMATTM |
| UniRef90-UPIO0047 | VLFEGQVTAVIELAS FRRFSEDHLTLDQL |
|  |  |
| UniRef90_UPIO0037625E0 | LQUDGEAGGALNVYATEPEAFDDEEQSLLAGLAKDLARGLL |
| UniRet90-UPIOOO33 | GSGDGVRGVV |
| UniRe990 UPIod |  |
| UniRef90 D8FX09 | I SGRNRPWGVLGAHTKEQRKFTKDD |
| UniRef90-UPI0003688726 | SGGNRPWGVLGAHATQHRTFSRDDI |
|  | VLRNGEAAGVLKLQSSRPSAFAEADLGSAQVFA |
| 990-UP10002E49E78 |  |
|  | RVRQQT |
| UniRef90-12F7R9 |  |
| UniRef90-A0A010NCZO |  |
|  | QLGDRVIGVLAVNNRRTGRFSESDQSLLSALADYAADAT |
| UniRef90 G3 HAB8 | NNHQ GVAQV |
| UniRef90-UPIOYO26CB166 | VRSYGDV |
| UniRef90-A8ZY43 | MLIGAIULVNRKDGPFTEEDERNLTELAETMGIGL |
| UniRef90-B8K1K1 |  |
| UniRef90_UPI00035E |  |
|  | ! |
| UniRet90 | RPLGLLYVDSRTPGAASDDDARLVLILAEQASLAI |
| UniRef90-UP10003763700 |  |
| Uniref90- W7TDE4 |  |
| Ref90 UPI00047B67D4 |  |


| UniRef90_H9GlJ7 | S N |
| :---: | :---: |
| UniRef90-H1XPP4 | SNAK |
| UniRef90-S7UGA9 | Q L N R |
| UniRef90-UPI00046CF6A2 | E K A |
| UniRef90_UPI00037E0D20 | ERC |
| UniRef90_UPI00037D9EF6 | E K |
| UniRef90-A0YPN8 | ERKQAE |
| UniRef90-M2WZD6 | D N A R |
| UniRef90-A0A017SSX5 |  |
| UniRef90-UPI0002FE6E70 | E L A |
| UniRef90-G1U4Q4 | A H S |
| UniRef90-U1PUZ7 |  |
| UniRef90-A4SFU5 | $R \square R Q$ |
| UniRef90_UPI000237963F | ENVR |
| UniRef90-A1SF84 | D N A A |
| UniRef90-C1D1Y1 | D N ARR |
| UniRef90-M0HUA6 | E H D D E T |
| UniRef90-K2D6L2 | ELKRAE |
| UniRef90-X0V0W9 | N ${ }^{\text {N }}$ |
| UniRef90-UPI000237AD72 | D N A R |
| UniRef90-G6FTH6 | A Q |
| UniRef90-K0WCN5 |  |
| UniRef90-C7LUM6 | ERA |
| UniRef90-UPI000361F3B2 | E |
| UniRef90-UPI0003B5BCDF | E NAR |
| UniRef90-G2J2J2 | ERKQ |
| UniRef90-LOJPX2 | D R |
| UniRef90_UPI00036EFFD0 | ERSRAE |
| UniRef90_A4H893 | R NCRNETLL |
| UniRef90_D5ZYF6 | D N A R |
| UniRef90-W4MA39 | Q NAR |
| UniRef90-E1SPI8 | ER RQAL |
| UniRef90-D811X3 | SNSRTEAL |
| UniRef90-A9B319 | Y N A Q |
| UniRef90-E2Q1H4 | D GAR |
| UniRef90-X1N5Y2 |  |
| UniRef90-UPI00047746E2 | G N A R |
| UniRef90-UPI000476D1CB | D N A |
| UniRef90_UPI000367D3C2 | D N A R |
| UniRef90_UPI00041F56C8 | E K S R L E |
| UniRef90_UPI00035E763C |  |
| UniRef90_A0A023FXU3 |  |
| UniRef90-H0Q0D9 | $\square \mathrm{A}$ L Q Q A |
| UniRef90-A0A024UJC8 | EQFK L E VL |
| UniRef90-E2CDK0 | A A |
| UniRef90_UPI00030C846F |  |
| UniRef90-D6W8L5 | H Q N Q R V |
| UniRef90_L9VPQ9 |  |
| UniRef90_G2NFW2 | E L A R |
| UniRef90-B5YIS0 |  |
| UniRef90_UPI00047BAA81 | ERKHTE |
| UniRef90-UPI00036C70E0 |  |
| UniRef90-S9QQX2 | ENARN |
| UniRef90-UPI0003B71C79 | A R L E A L |
| UniRef90_UPI0003A6FCCF | ERK【SEI |
| UniRef90-LOIDJ9 | D R A ER |
| UniRef90-R4SLV1 | SNSRTEAL |
| UniRef90-UPI0003613E9E | A S AREE |
| UniRef90-UPI0001E2F629 | ENA |
| UniRef90-D2B2Q4 | T N A |
| UniRef90-U7QJX5 | E Q V ${ }^{\text {a }}$ |
| UniRef90-X0WC01 | K K L R G E |
| UniRef90-K2BR71 | D N AK |
| UniRef90-Q0YQY7 | QRNRKE |
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| UniRef90-E8XQ40 | ERQQMQ |
| UniRef90_UPI00037625E0 | E A L R |
| UniRef90-Q1DFA3 | E GAR |
| UniRef90-UPI0003827EFD | E L A |
| UniRef90-UPI000315ADBA | E NAK |
| UniRef90-D8FX09 | ER |
| UniRef90-K4LC94 | H S Lie T E |
| UniRef90-UPI0003688726 | HRQHSE |
| UniRef90-B1ZF40 | A Q A EA |
| UniRef90-UPI0002E49E78 | N A |
| UniRef90-B9L456 | E N A R |
| UniRef90_UPI00046BEC05 |  |
| UniRef90-I2F7R9 | VR\ETE |
| UniRef90-A0A010NCZ0 |  |
| UniRef90-B8GBT4 | E N A R |
| UniRef90-G3HAB8 | N N T |
| UniRef90-C5KUV9 |  |
| UniRef90-UPI00026CB166 | D N A R |
| UniRef90-A8ZY43 | Y NQK |
| UniRef90-B8K1K1 | R N CR |
| UniRef90-UPI00035E6F82 | E NAR |
| UniRef90-UPI00037F0D53 | ENVRNEVL |
| UniRef90-UPI0004713A9F | D NAR |
| UniRef90-UPI00037637DC | T NAR |
| UniRef90-UPI00037B8879 |  |
| UniRef90-W7TDE4 | E N |
| UniRef90_UPI00047B67D4 | D N $\square$ Q T S |

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UniRef90 G2FDS5 UniRef90-Q3A239 UniRef90-D1B7T5 UniRef90-Q39RF1 UniRef90 A4FFD9 UniRef90-R7U113 UniRef90-J7LOY3 UniRef90-B4V012 UniRef90- ${ }^{\text {K9PBI3 }}$ UniRef90-V6HIB0 UniRef90_Q1NQ83 UniRef90 UPIO00475CE9D UniRef90-E6VTS3 UniRef90-M9SP50 UniRef90 A0A024TS09 UniRef90-A6RC53 UniReforo-C1B0L5 UniRef90 UPIO0035C9A90 UniRef90-UPIO00376BB5C UniRef90-UPIO003186067 UniRef90- D4F1M4 UniRef90- 66 KJ43 UniRef90-1015Q7 UniRef90_14VU11 UniRef90 H5UQ41 UniRef90-UPIO00376FF0F UniRef90-UPIO0047EF725 UniRef90 UPIO0016C4C54 UniRef90 M1XS32
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UniRef90-A1WZO1
UniRef90_W5XD85
UniRef90-Q47Z22
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UniRef90-UPIO002E90FD4 UniRef90-UPIo0047BBDDA UniRef90_Q9VJ79
 LLLKQLTEQ RQSLEFEQUIETAA DLRASTRQKRQLLALCRSHLLVESVRDPSSVSLIC D DTPQKRDERSDRELQRTAQRLTVAESTEEVGEIVVV

DARERQVDIDTVIK ASQTLSGEDQLDKLLSKLM LTTERNTEQDWLKTNLARFTNMLOGQRDTVEKM MERNQLIEAELDTLYLISQILNSTHDLHAKLQAVL KASAPMQALIRAGLELSENRPLNELFPVIL
 RALQARDRLARLQAVTAALSRASTSSD RKALFEHLVS LARACGTA QP TGLLAVLKRSA LI TREVNHLLLEVREESELFKRIC
LLTLLMHSLFADRLG\|QSCVVALTM

A YLT TLKQI QDVL
DEARRQQIATSGVLKVISGSDDLQVVLDTLI EKKNHSLEIIHQLVRDI
TYRAL
 RRKAEKELQADLAALLLETAGLQQLLQEAM NAQLYERSLLENRRNQLLDDLARVDE QSNVAGLDHKI M NARLYEGSQRQQRWLKANAEISERLQGSGASRPAVLELIA M पANLRETTQKNTEQDWLLAKFTRMLQGQRDLETVEKLIL MTAHHNDETDR $\square R D H A K$ AD DG AALSAEDLPRLEKIV
 MTFTEVERTRKSETVLLTLSRQIFT
 YERLVERMLRVVNGGLEGLDSTLQRIVV LINGAALSNERNIEALLEKI MTPQVLEDKRLQALTEAWRLLAPLERREAVYRRVV REAQLTALFDTASDLAALRDLDAVLRAIV RERDHFR\|LVDVTNAVTSKLELDALAAEVS ARDDTERKLAESRQAALYAISEAAQGAEDLDGLEQRVH QRQRGERLQAALFRI AELANASESLENFYAAVH AQETLSK YKELLYELGEKMAACMDIDELLARLAL QRQRGERLQAALFRGAELANASESLDNFYAAVH A NLR
TERTAREQELNTRIRQTVTAELDLDTLFQEAV LYRLGVQVSSTLDINMVLDFCI LSAI NEAI LYAKSPDELYQKVC
 RSTTEQNKEQDWLKTLANFSRMMQGOK D TVRKDAELREKSRSHVLELLTSGDLLPVILEAIV
RDITERKQNEQLNTVLYNIVKAANSRDSUCKFYSLIH LLKEIAEFLNEETEMYSMMHGAL RLINELTQRLNSSGRLSDTMQFAN NAQLYEKSQLETKRNQVLLDLARMIFEEQSTIEHMVR\L NAKLYDRSNQLIRELRMSNELTQRLNQSLRLGDIFKFAF MNADLLSAMKRTVEQLAAFNEMAKALTSTLELREVGSVM NARDYEETRDRERWLAASTEUTTRMLSGADTNVLLAGYA
 EYRDSHLTQLYQALSEVNQALVRMGDDNDDFSVVC SRNDSDRKKAERLLLGQARLLEMIAKSTPLADFFKELI MNNLCEACLTKRELLAVLFDIANFIADSRDIVKSLEKSL RQQEAVAELGQQALETDDLDHLMEEAV

DRKQAEAS回KQDEHLSKVASQALSSETSGAGLVARVV DDVTQTKAAESFALAQENVLVLIAGGAALGESLEA
 E SVLN
 A


## UniRef90 U0E4T4

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UniRef90-J7LOY3
UniRef90-B4VOI2 UniRef90-K9PBI3 UniRef90-V6HIBO UniRef90-Q1NQ83 UniRef90-UPIOOO475CE9D UniRef90-E6VTS3 UniRef90-M9SP50 UniRef90-A0A024TS09 UniRef90-A6RC53 UniRef90-C1B0L5 UniRef90-M5T7G6 UniRef90-UPIO0035C9A90 UniRef90_UPIOOO376BB5C
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UniRef90 - 1 ML H 0 UniRef90-O89D63 UniRef90-UPIOOO4794295 UniRef90-B5GMRO UniRef90-A1WZ01 UniRef90_W5XD85 UniRef90-Q47Z22 UniReffo- $\mathbf{x 1 K 4 G 6}$ UniRef90-NOASU5 UniRef90-UP10002E90FD4 UniRef90-UPIO0047BBDDA UniRef90-Q9VJ79 UniRef90 UPIOOO365AOB6 UniRet90-E3FYP4 UniRef90-14FGU4 UniRef90 UPIOOO345F5FE UniRef90-UPIO00366290F
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## ,

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 E M G S A V F H T S HVV T L Y V S D T I K K E L W S L S E LAAP LVDAQ H GVFFYIA D G GDQML K LL A S YA Y RQRNT FK Y




 A SARELLDDAEYAALGVPDDHGGQFVVDGVSDAQWKA DGPL D A A A E I L G LE $\square T G I W K Y D E R G B A D V P V A T A D F G E S P R F T A$











 DEARH ATAR QMTGGDGAAFIL RDGEFSHYVDEEAVAPLWKMRFPD
 E Q AR H LADA RA GFV L LPTE G G GMEVVVAASSREDEPRGAM


 HRAK LLLLGT DVTYYLSLNDDAA GDTYMRVTDEAFQRVVRMGM

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 A EVGELLDGNDVVTGIDRLDPDGMASAVGGWSRSLHGPLDPD
 SELTPLVSAHAGVFFVADSTTGETMFGYKERKSVSNRFHL









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



 EASVFLSNADEGFVQLIDD NQLVVRASHNIDNPLULRELL




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UniRef90-X1TF33 UniRef90_X1TF33
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QEI CQQ DQA DRVGI FKFYPESNFFNDGGEFVAESSVVKEFP F QIVIENAGARWGVLILEDERPLVAVAKQLHESLEQTPVAF

EEARHFTNADGGTLYLMNDDERSLRFE\|VQTDSLNDRIPN A DLFATFDADRVAVLLAEPD GTLDTRISSRDRKGA\|PRPV D HIDGELDPA D GAY IDTLWDE EMRTVVPGAAYGP LQQ EVVEP N











 RIG T RLL DADACAFI EADEE GGRA ILRACHGWQAWPMILD

 D A I A D Y L N A P Q A T I Y L L D S D F S F KL A G S Y A A Q R P P L S I R A

 ERAHDLVGGDVT Y L SEFFDVGSREDRVRTTAPSFPGLRVPP



 E KL LAALT QLE T G WL FGLA GDKP E Y SMMADRHLDPPALTPPMRC K K A E E Y N P D M M C S V L A L D E E H S T L H P DA Y C A A L E GV T $\square G L$




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$G V G S C G H A A Y G G R T V V N D I Q N H P Y W A W A P L A L Q A G L N T$ GEGFLWDVYDSGTPEYVGDASDDHPALPSDVSVRSAGLYP GDGLGGLVAQGTPYVTSNYQEDERFRHTGEIDDVALGVP CRSGLGWVLADENHLNLKTFYANHRVYYSDYQTRATLNVP GRAVLDRLRNGETVLVDDAAAVAAPGVWQQGAVGSFVAVP GKTVAAYVAYSQEFVIVDDLCWGTRFRPGARKNVKALCVP AQTPLNFCYQSGHVCTLDDLDPQYRQLLHALQVQASLIVP HVGLTRKILDQRQLFIVDDVSFFNNPLALAEGDRSLIAVP GNGLTEYAIASNRPLFLSDLAKTNSLYLYGVTPRQLLCVP PRAVFEPTFLGKGVVRSDDVLKDRRYKNAPHKGMPEGHVP

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 DEGGVGQVAQQARLYRLDHVPSDYKVTGEGLPHSVLVCP


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## P K A R

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 EN S V G G R Y GS A R M P A V H E D L E A G P A A V P I D T R MR S A V T V P

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 $G E S Q V V D A V R S G E V Q V V A D T A T D W R E A A D E S G G R S C F C D P$ A A S A CSTAVQQRRQLVI SND DDQDYRALALGHGUQACWSIP

 $G V G S C G T A A W R G E A V I V S D \| D H H P Y W Q P Y L E F T H A C W S V P$ N K S L L S G Lic ITS Q K T T L L Y CRR D S E T D A R V N H E A C R R R S M A V V P
 D E H P H L W Y L P E R S S Q L P A E T L Q R L P P L L R R Q N F Q G H L A V P
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 SDALTA DVLLRTGAPVAVADVDRDP RA TRADH HVRSSVLGVMP

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


 D R G S C G $\square$ A AL T E G R V V A E D L S E H P L WD R C Y E L A S M H GL R A


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UniRef90＿E7QR42 UniRef90 Q20Y55 UniRet90＿D5BX26 UniRef90－D2B992 UniRef90－U1ND15 UniRef90－UPI0002EC6BEC UniRef90＿K9XA89 UniRef90－K9Z3K6 UniRef90＿UPI00047B2863 UniRef90 UPIOOO380DBOF UniRef90－B2J314 UniRef90－C8x121 UniRef90＿UPI000372052D UniRef90－K9WLM4 UniRef90－W7IVA4 UniRef90 L9WH44 UniRef90－C7Q6M5 UniRef90－LoQQ744 UniRef90－A0A016QUW2 UniRef90＿UPI0003A2277F UniRef90－F5UJQ6 UniRef90－LODN03 UniRef90＿UPI00047A3AF0 UniRef90＿UPIooo36A69CF UniRef90＿U9VMN3
 NA QLYEKS QLE TKRNQVLLDLARMIFEEQSTIEHMVRILL

LLSETSDFTQACLTDKEASATTA FDTTKQKKYERLYHLLREVNQAT TLSLTEEEDFEKVS SRDITERKLQEDLHRGQAKLLEMI ARNEPLPMVLEALV KASQALSGEIVLSKLLAKLM KASQTLSSEI ELDKLLDKLM
AKGERSFKFESLIRNDTEK RDTLDETQLLQTVT RAQLLPLLHEMSRTVTEAGDLSSI RULL SSSSNSEFLDLTLDDASQA：SGEDELDKLLTTVL HLLN NQNQQE TFLLALVGDIS LARCRDFDE ILSYFATSLFDKNKRDDVLLDIV
MYAQNALADETARLAADRRDDTLDPPEEPFENVV QSHTKTПREDEKR【GTLNOTSSTV QLDVTNRKQTEALFVVQQEI YEGIVKGYALSSVLLNKVIC

YAEDQTSRTRRLDKE：AETLNTSNDTYHVLQAVL MRERLTEDGSTRDKMQRLLDAVLAVGAG LELDSTLQRIV ELEKSHRLNRFESMLK FSRVISGSLSLKDILKKAK FYRQLQQVTTRIHETENLEQIMLEVS ARQQATVAKLGQRALEGDDLAVLFDEAA KNYYRALSKI NRIVANVTPPHELESRTS MHDLDELAADRDQLLLQLADEISSDLELDETLHRIISAAL NARLFNETKETLERQTATADILKVMAASPDVQPVEEA A पQQALMQSNKQTEQLRRDGNAA乌ATAELQDHQELVKYLV
MEAMRNQTEPKTSQYDQTMERLLHVLSAARDLETVMDQVR EVNGLHRQLQ AEALGRAGLKAAGSERPEQLLERFL KTDSQALRLVRVVQELSMAKDVDRVAEIVR NEDHDGMAEKQDDQTRSLLKVAQTLNTTFDFQSNLKAAL LVMGEGDRCARLDELVKDVS SHLDVTALCHKIF


EESYQNLLSDGRETTASLHVEDTSQTY MKTALQSQTQRLQETQLKLSSLVELLSSERDRETLLRHIL AKDITERKQAENESRLLLLTTQA1ARAVDVNSALAVVL RATTETSREQDWLKTLAKFSGMMQGQRDLITLGQMLL
 ASRSKEGLDLATVMKASLAISGEIVLDKLLSSLM SNTSQVAFDLTAVMKAAQAI SSEIEELDHLLHSLM ATSSKTNNLDLIVDKASQALSEELLLDELIESLM

TTKVAQ GGTFTEKDEKVLLDLASLIEEQQSUEQULELKV MQQASMSKADDEERERQ【IARLSSLNYRTGEGGYLHNTA

ALSAEVDLNRLMQKIM DEVT DQVKARRQVALLAEAGQRLFASLDEKETLEQVA NARLQEQNQKKПKOLLTПOEDSOKTSSAFPOEERFDRLT RQAQYDRLLVQLTQHTHQTLELLPT LETAV DRERADTALHRTSRDLLYAETTPEIASLVI EDTERKRAEKELRILSHLSHQVLSGDGIDALMKEAV EALVASLRRLTSPTGGVHQLERAVV
TDQANEEQRWDKSNLARLSAQQMQGQRS LEASAAVVV
 NKEELAANEQLLVRES DNLLSRGDDPLTAAQHML AKD■TERKQAENESRLLLLTTQAVTRANDVNSSLALVL
$\qquad$ QERSALLYAKLGDVIQEIH
VDVTARRFDEDRERFLAELELALQPLDTDAEQMAEAA
STTRSADRQQDLVAELGRRAFETDDLDELMHDAI
MNERTSPQNALDTMRRLSAAVSRHRATDEVLQTLV
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KQKQUELLNTIASTANQSDSTA
$R L E L A Q R F L S E A S A V L A S S L D Y Q T$ TLERVA $1 L Q A S Q A L S S E T G L D R L K A R V G$


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UniRef90 E1 X2E0 UniRef90-F5Y282 UniRef90-K9S9T8 UniRef90-K2JJ50 UniRef90-C6HUM6 UniRef90-Z5XAU0 UniRef90-W1JT62 UniRef90-Q31NI2 UniRef90-DOMQY4 UniRet90_JoWZD4 UniRef90_L9W754 UniRef90_A4XS45 UniRef90_K2C4P3
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UniRef90_A8L9P1 UniRef90-M3BBZ7 UniRef90_UPIO00319375D UniRef90-UPIO00371154C UniRef90-K9ZBD6 UniRef90-B4VZC7 UniRef90_A0JZS9 UniRef90-LOK250
UniRef90 G3J290 UniRef90_L5KAT4 UniRef90-F0EAI4 UniRef90-B2J6A5 UniRef90-G3ITY8 UniRef90_UPI000466D511 UniRef90-Q08XM7 UniRef90-V2IN55 UniRef90-E8RCT9 UniRef90-V5V5H3
UniRef90-E7QR42 UniRef90_Q20Y55 UniRef90_D5BX26 UniRef90-D2B992
UniRef90_U1ND15 UniRef90-UPI0002EC6BEC UniRef90-K9XA89 UniRef90_K9Z3K6 UniRef90_UPI00047B2863 UniRef90-UPI000380DB0F UniRef90-B2J314 UniRef90-C8XI21 UniRef90_UPIO00372052D UniRef90-K9WLM4 UniRef90-W7IVA4 UniRef90-L9WH44 UniRef90-T0QQ74 UniRef90-L9X043 UniRef90-A0A016QUW2 UniRef90_UPI0003A2277F UniRef90-F5UJQ6 UniRef90-LODN03 UniRef90_UPI00047A3AF0 UniRef90_UPI00036A69CF
UniRef90_U9VMN3 UniRef90_U9VMN3
,

 ELLST T MKMDRGA $I T I M N P V Q H E \| R H G M S A G A \square Q K G R Y K P$ TLVQSLFPECSGGDF DTANSRNRLE VVTSWGNPLYSETIF KALVEKIGGKFVWVYKYGEDKGYLEEV K V W WRED PT LMI EA QLT GDDGSVLLLDSEGTRLYHGAYSRLDDGVTIGP KI ADIENAGAQSGIFIL EKAGSLLIEAYGTVDSDVEIPV

 K AA AANAGATKCVLLLKQEQYLQVLVAEGQEPKLLAAI PLL


 $N L V R A V L G V P \square S V V T L L D E E R Q W F K A R V G L D A T E T P R$ RAAAQLLDARYAALGVPDDEGSFAEFVEGVSDDDWERDPR DSVVDVVQADSAVIFLLDEKAGELILAAHRYARGVDKLKV


 P H C CKLL NADRLTLYAVNEDRSAGVVKTGLNTSRELKLPV
 E LIHESEQTS IVGIAELDRETGLLLWKHFAGPVGSDRLPV TLTRARYGA GVVGPDGMLTSFVHDGDDERTVDRHLPV

 K L AQEELLQCERSLVWWLPEAGTGDFYPAPDKGPFAGRKYHF ETFVDAEPYVFAWI GEYRETDER VPRASAEPEYDTGDDD SAARELTGADGATFVLRDGQCFYRDEDADSPGWKGQRFPL



EKVNQLMPAEAFGVGПYEAAEKR DKFKGFDEKGSVLPDHF MEGKRUCNAEAATMYLKTEQNTRFEDRSMEDVLPSFEDPD $R L I C H T I G W D F G E A W I P S D D G E V L Q H A E F C H H S E R D T F T P D$
$S E L A P L V N A Q Q G V L Y T V E R D E E H G R H R L R Q L A G Y A D H V A F$
 SAAMELVDARYGALGVLDDDHTGLDEFLPLGLEDRERLPH

 | $Q$ | $L$ | $E N A G A Q T G G C L L$ |
| :--- | :--- | :--- | :--- |





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ASALKKLTRAGRAVLLLLDDEGREWSVVS
ECAE GLQARFAKVLEF LPD QNRLLCRAGWAPEQIDSASLH L T Q T L K T I K CVVKI L L LPDRKTLLLRAATGGWQTTS LTH

T

## 






 TAVVSDVLVAEFTAVLESTTGDDRFVDRHGDGDDTMTTSHC ATARELI GAEYAALGDPDGAGQFLVDGVSDEQWAADPDPR
 $G S V G R M V P F D E A D I L L L D P D G E T L R N A P A P P G G K P V S Y P D$ A AI GQQ Y L D WPV G H A Y L A R H D D N A GHF T A F R E I T E N L A F A S




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UniRef90 UniRef90 F2J313 UniRef90-A0A023BYM9 UniRef90_C6LID7 UniRef90-J2H7A6 UniRef90-UPIO004108780 UniRef90- ${ }^{-}$1SNN9 UniRef90_UPIO00423609B UniRef90-R8E9H4 UniRef90-AOLKA7 UniRef90-KOK5L4
UniRef90 E1X2E0 UniRef90-F5Y282 UniRef90_K9S9T8 UniRef90-K2JJ50 UniRet90_C6HUM6 UniRet90-Z5XAUO UniRef90-W1JT62 UniReffo-O31N12 UniRef90-DOMQY4 UniRef90_OWZD4 UniRef90_L9W754 UniRef90-A4XS45 UniRef90-K2C4P3
UniRef90 KOJQB7 UniRef90-I3JDC3 UniRef90-B2J457 UniRef90-Q1GZ944 UniRef90-A0A017T5J5 UniRef90_4AKK75 UniRef90-UPIOOO468F817 UniRef90 UPIOOOO346EE04 UniRet90-Q3AR86 UniRef90-A8L9P1 UniRef90-M3BBZ7 UniRef90_UPIO00319375D UniRet90-UPIOOOO371154C UniRef90-K9ZBD6 UniRef90-B4VZC7 UniRef90_AOJZS9 UniRef90-LOK250
UniRef90-G3J290 UniRef90-L5KAT4 UniRef90-FOEA14 UniRef90-B2J6A5 UniRef90-UPI000466D511 UniRef90-Q08XM7 UniRef90-V2IN55 UniRef90_E8RCT9 UniRef90-E7QR42 UniRef90_Q20Y55 UniRef90-D5BX26 UniRef90-D2B992 UniRef90-UPI0002EC6BEC UniRef90 K9XA89 UniRef90-K9z3k6 UniRef90-UPIO0047B2863 UniRef90-UPIOO0380DBOF UniRef90_B2J314 UniRef90-C8×121 UnRe90 UP1000372052D UniRef90 W7IVA4 UniRef90-L9WH44 UniRef90-C7Q6M5 UniRef90-L9x043 UniRef90-A0A016QUW2 UniRef90 UPIOOO3A2277F UniRef90-F5UJQ6 UniRef90-LODNO3 UniRef90-UPIOOO47A3AFO UniRef90_UPIOOO36A69CF
UniRefgo-uyM UniRef90_U9VMN3

GAGGCGTAVA ${ }^{90}$
100
110
120
ATRVITEDARGHPYFQPFADITTKRANIVIA NIGMTGHVATTGETVMVPNAYEDDRFDNSSFKHRSALCMA GEGTTGRVIQSGKPTVVPKTSQEPGHRKADDVEYSFICVP GRGPTGTAFRTDNIFIISNTQTDPRFI PWREYTKERNFLS KVGSCGTAAWRGHPVIVEDVWEDFRALVAPFGFRSCWSTP
ENSLINYARTQENVVLSDASCEGTFTADTYVVQVLCTP

$\stackrel{\rightharpoonup}{F}$

ESSLVNSVKRSLKP LVIVDARAGDRYIERQHOPGDVVLCMP GRGVLGLLDTDPHPVRMPDTTEHPRFPAHHPPMHSFLGVP SQGIVGLVSQDGEVVKDDDATKDSRCRKEEMYDDNLLCMP G DVSFCTHTVRQRMPLVIPDAKADSRFANGAPHIRAYAGVP
 NAGSCGTAASTKKPVIVTDDETDPLWLALSYNLRACWSIP CEGECWRGFVDGKLERAVNI DECKRINNADEYNLHHATVP MKGVSSYVALTGEIANIPDVYVAGHFARTGYRSKSMVVIP GKGLLGLLIKDPRALRLHDLSSHVGFPPNHPPMHSFLGVP ENSFVGSSAYLGATLKVDRGVSDURFAREVAPPKTMLVLP
PSSQAGHTLLSATPVVFEDLRVDARFSSSQLLHNHRVISSG
ERGITGYVLRTGEPLLCQDLIARGEVESYGASHVYWLGVP


## 

$\stackrel{-}{G}$
$G Q G P T G L A V Q T R S L Q V V Q D L E A D P A Y E P W E R G Y R A S A A V P$
SACDS GWAMLN RSATVIPPDIYYADPRDAYRPTFVKSVVMVP



G D GlV F GA A L T Q R S P V V V D G L K P G Y K Y Y E G P C P A R A V C A L P




GQGLL GH LIE HPVPLVRVDGLLHHPGFPAGHPPMQTLLGVA





GASPA GYALATYRPVLSNHL GMENRFRTPEYGI ERAI NVP

SRA

WEPFRPWELSSVPLERRQEA LGADQPL
E Q SFCGHAI L R D
$P$ S GLA D RVA A T G


PNPLITTHVLIDSGKRVFAEDLHTDERFRSTEQYGHS GVALPD








CD T A H GT A L G S A E P VVV D D L E A D D R F F L P P D R G L G S A I CV S





D E GMR GYAERTKKEPDLVVEDATRRDDRFARDPY DCCSSLL LVM
KVGGSCGTAAFRRERVVVKDVWESYREDVTTYGYRS CWSTP
GRGPTGTATREDRVIVVCADFLSNSST$L D W Q Q G W A A S V V S L D$


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| UniRef90-B5DHZ2 | HNTHM |
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| UniRef90_UPI0003B61179 | E N |
| UniRef90-D8G6R0 | A N |
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| UniRef90-F5UKW3 | ENAR |
| UniRef90-UPI000477F746 | ENAR |
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| UniRef90-U5W0G1 | D N A R |
| UniRef90-B3RPK8 | T NAK |
| UniRef90-F2J313 |  |
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| UniRef90-J2H7A6 | E $\square$ R R $\square \mathrm{A}$ |
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| UniRef90_A0LKA7 | T N A Q |
| UniRef90-K0K5L4 | ENAR |
| UniRef90-E1X2E0 | Q N A |
| UniRef90_F5Y282 | R Q R M Q |
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| UniRef90-K2JJ50 | E R L K Q R E M |
| UniRef90-C6HUM6 | D N |
| UniRef90-Z5XAU0 | D N A Q |
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| UniRef90-DOMQY4 | HKA |
| UniRef90-JOWZD4 | D N |
| UniRef90-S0F008 | E N |
| UniRef90_L9W754 | H R V ${ }^{\text {a }}$ |
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| UniRef90-K2C4P3 | ERHR |
| UniRef90-K0JQB7 | A N V R T A |
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| UniRef90-B2J457 | E R |
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| UniRef90-A0A017T5J5 | Q NER |
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| UniRef90_UPI000468F817 | E N |
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| UniRef90_UPI00047E3523 | NTIESTM |
| UniRef90-Q3AR86 | R L K Q L A |
| UniRef90_A8L9P1 | D NA |
| UniRef90-M3BBZ7 | E N A R |
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| UniRef90-L5KAT4 | Q N Q M |
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UniRef90-E7QYJ5
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UniRef90 Q5UWI7
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LS R 30
30

[^0]LRQKNKAAVLQRHRNTLSTATGRTQLRATLKHTL
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NGHKDET ILDFHARLAEKAAETTDLHKLVESLI


YEADQRQRYVDKLVDALHSLGERHLSFEETLTQVM SRD DSDRKEAERLLEGQARLLEMDAEGEPLGEFFDELI H T N S K T $\square$ S A K L L G Q K L D D L A T V V K

QYRETDNASRALSSETNLDHLDRHVV
ATNLAR LRSAER $\square Q R A L Y T L A E Q A G S E R S L P E V M H T M H$


MRETVRR\DRALVEARTREEDESAVC KE AETLNEGNDLKGTLDAVL EHLQDLVLE CADVAEMLLGELA
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 TREQR $\square R A L H G T T R E L L E$ A A DD K DEAV A KAL

ETLLK QIT DRVRDSLDEHDILQTTV

 Q S R Y R Q L A N L T R M M N T K L D L K E M L S A V T


 Q S R E A L Y V R L


MESAN TELSRKVVQGLSSIMKEELLNSVVDQCDSMMESLMMNDLL


T T K E SK ER LI NT $\square$ T A T $\quad$ R R S L N P Q DV L A A T V $D \square T$ D S QRDK A LLAA GQN R DLDEMI T Q WE K L P DV L D R L A
 $S T L D D$
QRSAA A EALE QLGRLS LREHSMKSVLQQVVA $V$ G S E L D L P A L R R I V
 S S QK DN YHLLQKTSEI GHKL TA QMEV NEVI DLEN T TEERKRANALEA L QETTAAELMARASTVEDASUVI LA A LLH R L A A L LDDTETAE G P F E H V V VNEI ANAI NRSSNLLNELLRMV A R D $\square$ T K S K N A E D R R Q R S A A L

DEAMRRERMMARVLR IISNKDDDDEVIDEVI $K A S Q V L A S E \square K L D Q L L A K L \sqrt{M}$ R S H F S T L E A DV A A A L G Q G S P L VE S L K R C T


R A E K S QK LYY S $\square$ A N WT $\square$ N S P N $L G E L Y R K \square H$
ETDASTDPKVGKAATLLCKLAFDLANQTDTTAVANDAL E ELRREANKKNLL Y QL M S K I Q A S DDV N DVVLHEDV VA E L S N LI GGETTLD KV SR HAL MMSRVAARHLQE EHDTAEATALRAA T


UniRef90 U9VWQ8 UniRef90_W9VH60 UniRef90-B8F9N8 UniRef90-F7PG33 UniRef90_UPIO002DEC963 UniRef90-UPI0002E32F11 UniRef90_C5T7F6 UniRef90 B4VIH4 UniRef90-K9QBQ5 UniRef90_K2BTD2 UniRef90_Q5U3S3 UniRef90-D5EC52 UniRef90_UPI000347E72A UniRef90-UPI00047BD43B UniRef90_K9V646 UniRef90-A5UVT9 UniRef90-UPI0003641ED8 UniRef90- I7BTR1 UniRef90-TOYPW5 UniRef90-UPI0003B61B20 UniRef90_W0AGR3 UniRef90 UPI00047B3C05
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50
DTAVEDT QANS GS|L|FLLDE LGVEAYNPKTFCSILLFHSDTEVGBGAYNQA
 ESTQSSLLEMPDS GI WWYDEEENVLLDPAAAAE HVPEQPDVFEP E IIT D GPPYEFA WI GEPDPDA GTVLPRASAGAGDSYEEGPR


EEAK QLL N ADRATVVWLL DRNSK T L WTKKRADGSUKEMQLE I L L I E A L L P G DR G SI L L L S D D G GHLLLHGAYCAAIHRAEI GP













 EAL GQSLGGDCCDTVLYDA QRDYEYTRPG\|PSRQGQALPD

 SRLVETTPDTFAWDGRDDDODIEPSAWAGAEHGYDS R L R V V



 E EVVRLFFSPE NWSLMRYDENS GELGFGLELECDKNDRLKS H L M S ELLLGLNRGRVVLVDDRYDRGTYGMTKTEIARGRYRM EKSMRLSGAEDGSV FSYDPHTKNLVQGPGAPPPPDFPVDE $R L A A R M F D V P I A L V S L V D E Q R Q W F K S A T G L D A T E T H R$

 RLIEE QLPK DRCAFLLVDKNGVNLRHTAY IQADDGMVIAP




 $G L L W R R F S P A T L S L S L V H P D D N E L E L L A B L R G T A S R V A V$
 SAL LMMSPTAD GC GVVTLERENRPDTVASASALDLDDEAAYGQQ

 $L P C$
S Q A L E DCEAE F GVLF EYH GD LKK F SE M R S WL VE Q N S F EV E P
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E E LGN I IDDARNFF $\square$ ALLY DSTK TY L V D EYFGSNMRFTKRKL E G L F E CTS DDD A GA V L L L P P R S H K D L E L I AA S RA D K G P N Y H R V
 S Y L C N Y T D S E A GVL Y L H NN NGK LT S H GLQQQNKAQLLPV F E I A T V


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100

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KEGLAGKVFESGLPMVVEDVKKKLRKKGDSSCGGSFLSTP GPAGEYPESDHYCAIENVAEDTFHYQGQMQRKKYLLFR GEGFAGEVAQNRQUTNVSDLYDYDGSHANGYRTCSLLCMP VAGSCGTAAWRGEQVIVSDVWQDYAHLLRPSGLRSCWST






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GKGLTEYVMRKAEPAFITD VRNELGFAFRHANALSTADATADTRFSPADATGRAGICDP


 GDRDYE QLWA GQTFAF CQDAS SS S I R NHSA ILLACP




 GE GLVV G QV G L E R S P I L L
 GE GDA GSVVQTKSS DFVENVRNDPRF
G E GIVTG AV L M T G Q P S I V Q N I D D D P R F L L R A V E R T H F I A V P

D NAFCCDVSKQG

 A GGALGQALRESNPLTFDDI QHDPELMLFTQRCHTACLI P
 A E S $\backslash A V Y V E R T R E S V L L G D A A H E G D F Y I T R N Q T R S V L C M P$


 GHGGLLGELLIR HPE P L R L L A E DA R H P G FP P R HP P M R T F L G V P
 N E A V S GRRV WA S K Q G V H Y H R R S Q WA D MVVA K H L E M M G EM S V


 K R S GL D S EVLLS GKA IMLLKDATS DGRFQYPESAKVSVV SAP A ES LLL LLCP IMMLS GEDSAAQCEF D HCNMS WL GVP R P AL A Y DRAARDIT QLVPNVHELP GHDACDSASNAEVGI P


 EHTL T GRVLTERQALVVDNAQLDALPDERTEHTGPLMVVP GNGI IE Y TIL LANKPLFL YEKD IR Y LAD QHQPQVML TAP
 SREGANTVVLREGEAVLARNVMDDSRFSKGDDHATSVVLCAP GTGGVGGQAVAERKVVKVLEGVQEEYLRIVRTDDEPATVIMDP GQ GPCVDAVWDHEMVVVD DI RTAARWRAADAGVGSML CFQ



$\square E V N R V T V G V L A A B R R \square R N R Q L D D D V A D L R L L D A T L C G Q L L$ $V$ F A GKYFTGVLLNLAGKSDNPFDEE DEQLLLSLVVGEMGFAGL L K A N G A K M G T L C L D D Q R P R T L S E E D L Q A L K D L A H M A E Q E L $V \mathrm{~V}$ I H Y Q G T L L G ML E L H H S E P Y R WL E D D I D L V E A I A T Q A G V A L





 L L
 I A A H SHTAGALN LIYSPKENGFADADL SGLRALAAQATAAV

 HD THGQVVAVLDLDSPDEGCFDEEDARGLGLAGHA』GRAA MMAGDRLLGTF CVVRTRVGHFNERAREVAQAFADQAA DA L




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T D R R R R VNTVLIHERTQTFDTAPDRQA|V|ADHA|V RQQNERELLATDTQHDRQSDLGELSTTV KASQTLEGE SLLDKLLATL LF S S CNELI LDRA DSEDALLNSTL
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$\square$ S QRER $\square$ D R LQ K L Y R A L G E VV L Q S R S A E E ML Q R T C
QS ALQELKQLLTNAPSLLLSAYDKLE
ENEL
LQRLAT $A$
K K H Q I R Q SLELD QULRATV
EKS F LIT KVLK QVTE QMRSTLD F K TTTLQTTV








ASSREGMLRALTLHARALVESH
I E ELS S I LLSSTLDEQVFFNEI S



$R D Q L R G Q L A L L G E T L S S T L D L D R \| L E V I V$
ESLRQQTEREALLATITNNIRQSLDLKQILNTTVV


$\square C M S D T S A A D A D W L H R L Q S A L T E L R D T E S T L Q V V V$ K A S Q A
MFE AEGNAT QQY LQAMERLL LVVQDLSLARSLQRDM ARDVT QRKRADSMQAALYAIVSEAAHWAEDLVTLFQQIH R S K R QL A L L V G V L E E L L G Q L P T R E A V L A A L P $L L E T$ T R S L FACESRAD V SEVVV DASAELASAEDEDAVLHIJA AVE Q S S VLDELLREREGLLGGTLDRVVALQGTA S K E K N L D T IL $\square \mathrm{A} \square \mathrm{T}$ R T E R A G S L E A $\square \mathrm{Q}$ ENRLALJKDDREDE LLLQA L C ${ }^{\text {a }}$
 VFA $L$ G R I K L S D T D LDD GV L D R VA VDVT DLEKEAAFRHALLRLMQHVVEAEDPYKLVLDFA
 QQERRRALI LDLGRRLREEIDPDAVVAKA


 MDSSS DLLF R RLLE QLLNA DGAALS KE R D DN RLL L T I L L T P P E ERFDRI T $A R \square G A L L Q A A P S F T A L A Q V L M$
Q DEFMAVLSR FARRLP TSYDVGAALDELV I A S QQEAT DVAB DTV I
A R D $\square$ T D L K R R E A R $\square \mathrm{E}$ T L LSEATNELLYYTRTERAVAD TVVT $K A Q Q A \operatorname{SSEVVLERLAA} T L L$
 QQHRAER ERALQLI TLLI HQSLNLDETLTTTLL


K EKKERLLNS IT EAI RRSLDPDDQ LQVAV
Q E



K E R Q Q Q F L E L N D A $\quad$ R A $\square$ Q D S Q E $\square$ I Q V V


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REVWEASGATVVAVLALIE RHVQGLLPANTFAIVACDPGMETVSRAFGMPTNTIAVDN VTLLAEAGAQKGSLVLMDGQWRKVQVMQNRVISEQLRDED DTLATDTQFHAAWLARPDDSGAFRVAGEGALDQDDFRVHD
 RLTRRLFSLP DCLVTLVDANRQWFKSRQGIEVEQTPR EEVRAFLGTDRVKVYRFDPEGHEARGGERLPSLLGLTFPA RQVRSLLNSDRVVIYMUDEFDGEVVVEEVNGNWVSVKMPG HYLVNYMKDNQGGVFLLNHYFEMTACVAYERKKFADKIGW QLVVPRLATWCAVYT DTDAGPPALVWHADETRADALRAQL DTLKKSLGLNCSGIFLLDPETKEYQNALIKNNFLIKTLAE NLLQSFLQMRHVVALLADDGDPDVTVGAGWSEGSDERYRLV
 CEIEKLKEVDCAQVVQYLPEQKLWVSVACTSACQSLEMSD RLSMQILKAKHCSIFLVDDQRQYLISKFSTDKRKGTMVRI KILIENAGAEDG YYLI LSSQGKLLIEASEQMTVLQSIPV EKTARILGAKNCSTMLLNENPRMRVCASYGSAAYKESVRK SLTEEQNWTQADTELFLSEKYASWREYAAK RSLNLLLHADNFFVALLNTDTNILETPFFLDEHPYESYPK SAARELTSAPYGALAIRDRDGDLVSFVHGGMDDETVRLPV RTVEAAGARRGILQVDGDSAVVVEADTTSEGAQVREGV SQUREFLLQADRVLILQAMENQGEVVTYEAQRDEAWSSLLGV DTSMAVTGARSGLMLLVDPDPQMLRGRAGDGFPTEVAVRL AQVRQFLQTDRVFIFRFRPSWNGIVLVESDEPGWESILGF DSIGQALKLSRCLMIAYTPKTQQLEIKAEYCHPSCNSLG A AVDDLLYARNFYIALLAEDQQT EFVYSVDQGGDHRPPR TFVVKYLEANQGALELLENENDELKSAYAFQRKKRDDTKM GIVCSVFDAYSAVLFLPGDDAEVYPDAASDMVAEGTSIAP RHTRGLMDADMAYVSFTDFDSNETVIRKTDGEYASMRQPL AESRKTTDCEDYAVFFYDDDRKHMVLFNNETMLGTRRYDL
ETVRELTKSDGASFVLRDNGCCYYADEATAPGWKGQRFPM QIIGGLLPAANFSVSLLYDEDKDALADEALAPLLWKGQRFPM ALCAEGLETPFSKVLVHSEARDRLVLLAGVGWRGDVEGKA ELLQRQGEGHASIWV PSGEGFRRLAFSGTSHLPDADAA RRARQIVGTDLAYVMLLDPERGDTYMGATSPRFDTIRLGM RLIDRETGGHSGFVAELDGPDRAVIRWLAGNRTNALQVPI
 DLARRTVGADEVSTTLVGPGGAHTFTGKRALADDEWQYEQ DRLPTATNFPTAGI WAHDPAAEQLEPRATELAGEHPTFGP EPLKEVIPYDLLSFCLLPEGDQLVIKSGDPKEQVTVLPR QRVEQVPGADAGSLMIREESGDLLFVADRGHPPDELGQRL QRVADQFGAAGGSIRVMDPDGERLHLVATVGRPADLEMRA EALGLHCNASQVGYGELDHVVGEWRGAPSPPLDGSRHVLD YLLQ ADCCSMFGFRSRNGELATRLFNVPESETVFPL DRVIESGPYDAAWHGRYDPTDSRVRPVAWYFESLVVTVPT QAAVELIUVDHAGVTLVRRRHRTAETGPIPRQUDDLOHHF RLAARFFGVETCLLSLVDSDRQWFKSRVGLEENQLGR AEVSPPLQVAAGVFY YEPDERHFRLLAHYRKTLNQSFAL

 RAA DENAGAQRGALLLPRGDTLCVVADAGTSPEDAVPQPD RLIKEDFSTDTG\|VSLTDAHRQWYKACSGLAGDEVSR KII YKLFKVDYCGIFQEVDNTQELRVGWNQQETTNQTDHD $H Q V R T N M R A D R V A V Y R F E P D W S G Q F V A E S K G E A W D P L V G P$
$T E L I Q K L L H S D R V L I F Q L G H D G S G T V V Q A V V P D C N S I L P C$ SEKQKLLUKSDRVLIFQLGHDGSGTVVQEAVVPDCNSVLPC DKLGEGLDVCRCLI YRCQETD LLNAEDQHEFLNGKIKS



RDTGQHFQVTRCTYGETDATQEYYCNGVISVVGRHQMDSF TYLKREDKSDVCSTYLQSRSSESILTLAAQEAVGQVSMAA LLI ESQQAPPVLCTVMMVAADGVTLLSAAGPNMPAEYMAA

UniRef90_U1MVK2 UniRef90_K9VPF1
UniRef90_K9QFJ7 UniRef90 K9V5X0 UniRef90_N6VYL6 UniRef90-E1JUQ7
UniRef90-H8MES0 UniRef90-L9PPB4 UniRef90 F2K121 UniRef90-D2RU41 UniRef90_D5WYX0 UniRef90 O96195 UniRef90-K6WZR8 UniRef90_AOKTF2 UniRef90_Q2JIZ5 UniRef90-K9R181 UniRef90_E1WXJ1 UniRef90_UPIO0029A8F0E UniRef90_UPI00047E9C49 UniRef90-X0ZGP0 UniRef90-UPIO0046A9641 UniRef90-UPI000479273C UniRef90_K9XKA3 UniRef90-K9XG41 UniRef90-K9WCT7 UniRef90_UPI0003B3E13A UniRef90-K9VPC2 UniRef90-M5DHU9 UniRef90-U5W4B2 UniRef90_S9QCL2 UniRef90_A8G0X7
UniRef90- J5ECU8 UniRef90-A0A017TAB9 UniRef90-K9RYM9 UniRef90_A9GK18 UniRef90_D3Q455 UniRef90_K8GI32
UniRef90-B7KJX2 UniRef90_UPI000474C941 UniRef90_E4TME6 UniRef90_E3IPW8 UniRef90-G0HD68 UniRef90-D8G937 UniRef90_G0NB39 UniRef90_UPI0003B39E84 UniRef90_UPI000477FC03 UniRef90-D9QF33 UniRef90_D9QF33
UniRef90_UPIO00380A9E3 UniRef90-M0C8K3 UniRef90-E6JDJ5 UniRef90-UPI000362BE19 UniRef90-X7E6G2 UniRef90-M1E519 UniRef90_U5VZV4 UniRef90_U1QL98 UniRef90-A4J4M7 UniRef90_U5VXC0 UniRef90-E4U5L7 UniRef90-B2UJK8 UniRef90-BOSYP0 UniRef90-D2R3W1 UniRef90-F6UH35 UniRef90_L9USL3 UniRef90_B3E5K3 UniRef90_DOL5V7 UniRef90-W0SLB7 UniRef90_A3JAM7 UniRef90-H8Z2M3
UniRef90-M2ZOY9 UniRef90-X6PDU9 UniRef90-Q5V4V7 UniRef90-S9PMA1 UniRef90_C6AZR4 UniRef90_G5J643 UniRef90-B8HYR2 UniRef90_UPIO002E70EFB UniRef90_UPI000374D31C UniRef90_UPIO003499C72 UniRef90-B5HY53 UniRef90_K9TJL2 UniRef90_A9WIG7 UniRef90-U6HPK0 UniRef90-K9RL37 UniRef90-B7KQZ0 UniRef90_S4Y3T6 UniRef90_K9WNA9
UniRef90 E6W2L6 UniRef90_UPIO0047695B4 UniRef90-EOU7NO UniRef90_UPI000376C01B

GESLSWQAFETGEVVR|VDNN|LQTTPGRYNPDTP|V|ESEILL|P GETLENFCFDQFYDVSAADLPQYQDDLLAQFDVKASLVVP
 GNGPAGRAVRTGQPQVCDDMMSACSFQPWEYNFASCLVLP


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



 DRAAQGPR $K$ R







 GDPVNWQQFRDGEILALPDDHQQNGVWVEFWQSYQLLLVP
 S DS FVKLYEQGRVHVLTAQLPDCYLKLLQGMQARA LLVVP ES YF DWQAEPYWQQALIDPPEPVIVDQLPDEFQAKSVLVVS

 SVSI I NYVARTRETVVQNNAAERGKFTNDPFDKEHLLCTP GI GLVGRVGDTMRTMNIRDVSRCPFFNPFGVKARNMLAFP GVRKVGHIGATGQPVVVESIPEDSKWDAHPEWAREEAGQP NICIGGWAMFNRQPAII EDVSVDERVAYKPTFIKSMVMVP




 GNGPCLAAAAANLTVTVPDLAGDSRWPAWADHVHSSMSIG
 $G T G P C D D A A A G Q A T V S V P D T T D D D R W H A S A A G L G S S L C$ $D T C L C G Q A T Q Q D V V V V H D F R R M R R E G P T P C Q R E G Y T T V A$ NTYPANAAFQQACSVGSNDDEQDWRHKALACLYRSVLALP SFGPAADEMRAGRETVVSDVAVDPRTAAAAATGAYYVTFP SNSGTVMVDRQGKAVWI DSQLHSEGMQTDQHYADAICVP

 D I SFCGHA【LDRGILTVTDALQDARFSENPPHDRFYAGAP GEGLIGGQCALEKSPI I I TEPPRDYFVVSGSTAPSVLMVLP GVGPCRYAFDRGEPIAVADVRTRPDLWPEFAGKAREYGUP ASDLSPMGPESDENRLFHDVVEDYQALSNPSAPQAPLRTV
 $K Q C H D S Q T I K V G H T L I V E D F S S D N N S F L V A H G V I S A D S V I$


 GFYAVSESWSHQCPI RI DAVASYPNRI FRAWGFKSVLCLP GVGIVGWVAQTGEAVNI SNNVEDPRFLKTGFHTRCLICMP
 PMSLVRFVQRTKEHVILSDAAADAGKFSGDDYFARCLCMP GRELIAE LKKGKTVVVDDVADTDPRATADADQTKSLLCMVP DEGLTGDAFRSNTYTFIRDASHHPQFKYFPEPFRTFIGUP


UniRef90 U1MVK2 UniRef90_K9VPF1
UniRef90_K9QFJ7 UniRef90-K9V5X0 UniRef90_N6VYL6 UniRef90-E1JUQ7
UniRef90-H8MES0 UniRef90_L9PPB4 UniRef90-F2K121 UniRef90-D2RU41 UniRef90-D5WYX0 UniRef90_O96195 UniRef90-K6WZR8 UniRef90-AOKTF2 UniRef90_Q2JIZ5 UniRef90-K9R181 UniRef90-E1WXJ1 UniRef90_UPIO0029A8F0E UniRef90-UPI00047E9C49 UniRef90-X0ZGP0 UniRef90-UPIO0046A9641 UniRef90-UPI000479273C UniRef90_K9XKA3 UniRef90-K9XG41
UniRef90 K9WCT7 UniRef90_UPI0003B3E13A UniRef90-K9VPC2 UniRef90-M5DHU9 UniRef90-U5W4B2 UniRef90-S9QCL2 UniRef90_A8G0X7
UniRef90- J5ECU8 UniRef90-A0A017TAB9 UniRef90-K9RYM9 UniRef90_A9GK18 UniRef90_D3Q455 UniRef90_K8GI32
UniRef90_B7KJX2 UniRef90_UPIO00474C941 UniRef90_E4TME6 UniRef90_E3IPW8 UniRef90-G0HD68 UniRef90_D8G937 UniRef90_G0NB39 UniRef90_UPI0003B39E84 UniRef90_UPIO00477FC03 UniRef90_D9QF33 UniRef90_UPIO00380A9E3 UniRef90-M0C8K3 UniRef90-E6JDJ5 UniRef90-UPI000362BE19 UniRef90-X7E6G2 UniRef90-M1E519 UniRef90-U5VZV4 UniRef90-U1QL98 UniRef90-A4J4M7
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UniRef90-M2ZOY9 UniRef90-X6PDU9 UniRef90-Q5V4V7 UniRef90-S9PMA1 UniRef90_C6AZR4 UniRef90_G5J643
UniRef90_B8HYR2 UniRef90_UPIO002E70EFB UniRef90_UPI000374D31C
UniRef90_UPI0003499C72 UniRef90-B5HY53 UniRef90-K9TJL2 UniRef90-A9WIG7 UniRef90-U6HPK0 UniRef90-K9RL37 UniRef90-B7KQZ0 UniRef90_S4Y3T6 UniRef90-K9WNA9 UniRef90_E6W2L6
UniRef90_UPIO0047695B4 UniRef90-EOU7NO UniRef9O-EOU7NO


| UniRef90_U1MVK2 | VRADRE |
| :---: | :---: |
| UniRef90-K9VPF1 | K Q A |
| UniRef90-K9QFJ7 | ENAR |
| UniRef90-K9V5X0 | ENAR |
| UniRef90-N6VYL6 | K A L R |
| UniRef90-E1JUQ7 | AKSRE |
| UniRef90-H8MES0 | ERS |
| UniRef90-L9PPB4 | D N A |
| UniRef90-F2K121 | E N A |
| UniRef90-D2RU41 |  |
| UniRef90-D5WYX0 | D |
| UniRef90-O96195 | E |
| UniRef90-K6WZR8 |  |
| UniRef90-A0KTF2 |  |
| UniRef90-Q2JIZ5 | A Q A |
| UniRef90-K9R181 | Y Q A Q |
| UniRef90-E1WXJ1 |  |
| UniRef90_UPI00029A8F0E |  |
| UniRef90-UPI00047E9C49 | D N A R |
| UniRef90_XOZGP0 | ENAR |
| UniRef90-UPI00046A9641 | K L H R |
| UniRef90-UPI000479273C | ENAR |
| UniRef90-K9XKA3 | K R |
| UniRef90-K9XG41 | E H T R A |
| UniRef90-K9WCT7 | Q Q A |
| UniRef90-UPI0003B3E13A | K N A Q |
| UniRef90-K9VPC2 | Q N S K |
| UniRef90-M5DHU9 | Q TMQQS $\square$ |
| UniRef90-U5W4B2 | S NAKR |
| UniRef90-S9QCL2 | ENERLLAL |
| UniRef90_A8G0X7 | ER L Q |
| UniRef90-J5ECU8 | D NA Q |
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| UniRef90-K9RYM9 |  |
| UniRef90-A9GK18 | E N A R |
| UniRef90_D3Q455 | G N S H Q E V |
| UniRef90-K8GI32 | EQS |
| UniRef90-B7KJX2 | A H A |
| UniRef90-UPI000474C941 | A R Q A |
| UniRef90-E4TME6 | NS LTK |
| UniRef90-E3IPW8 | EGSRE |
| UniRef90-G0HD68 | D N A Q R |
| UniRef90-D8G937 | A N K |
| UniRef90-G0NB39 | A H |
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| UniRef90-UPI000477FC03 | EN |
| UniRef90_UPI00037A4FC5 | ERKQME |
| UniRef90-D9QF33 |  |
| UniRef90_UPI000380A9E3 | S R |
| UniRef90-M0C8K3 |  |
| UniRef90-E6JDJ5 |  |
| UniRef90-UPI000362BE19 | R L A |
| UniRef90-X7E6G2 | M A V Q $\quad$ D T |
| UniRef90-M1E519 |  |
| UniRef90-U5VZV4 | A NA |
| UniRef90-U1QL98 | ELLNRQEL |
| UniRef90-A4J4M7 | Q ${ }^{\text {S }}$ |
| UniRef90-U5VXC0 | A N A |
| UniRef90-E4U5L7 | G WKK Q |
| UniRef90-B2UJK8 | E N |
| UniRef90_F9ZY04 | E T S Q T GVV |
| UniRef90-B0SYP0 | ERAR |
| UniRef90-D2R3W1 | $\underline{\mathrm{V}} \mathrm{R}$ A R R |
| UniRef90_F6UH35 |  |
| UniRef90 L9USL3 |  |
| UniRef90-B3E5K3 | T R |
| UniRef90-D0L5V7 | S G A R R |
| UniRef90-W0SLB7 | T N |
| UniRef90-A3JAM7 | A R $\square \mathrm{DQA}$ |
| UniRef90_H8Z2M3 |  |
| UniRef90-M2Z0Y9 | $\underline{\mathrm{V}}$ N A |
| UniRef90-X6PDU9 | EEARRA! |
| UniRef90_Q5V4V7 | NRVERET |
| UniRef90-S9PMA1 |  |
| UniRef90-C6AZR4 | E L M Q A |
| UniRef90_G5J643 | S QKQ |
| UniRef90-B8HYR2 | H Q A |
| UniRef90-UPI0002E70EFB | S Q A Q |
| UniRef90-UPI000374D31C | S NQRM |
| UniRef90_UPI0003499C72 | 1 Q A |
| UniRef90-B5HY53 | LQQRT A |
| UniRef90_K9TJL2 | DQA Q |
| UniRef90-A9WIG7 | Y A A DLE T |
| UniRef90-U6HPK0 | H HA Q |
| UniRef90_K9RL37 | Q H A |
| UniRef90-B7KQZ0 | T N ERVE |
| UniRef90-S4Y3T6 | ENAR |
| UniRef90-K9WNA9 | ERSRTE |
| UniRef90-E6W2L6 |  |
| UniRef90-UPI00047695B4 | A S TRRE |
| UniRef90-E0U7N0 | QQAQLLV |
| UniRef90_UPI000376C01B | D R / L \\| R E |

10

20 U 30
 $\xrightarrow{4} \mathrm{H}$ LI QLS E QA S TVA E LTT LLLYPAI H EAEQRSEVLSNLLDDVSTVGVSVLDPTELFAGLV


ES $\square E R L N D V G R K L I D A \quad D P E A \square I D R M A$ VSQMLNRSEATESVFSSlV
 RA L K A L R S R DESSRD DVLQNFV LKL S ELASSS IS DMA E FYP A I H


 AS QLD TVVA GUKRELVDATRPGDVESAVVC
A LQ K R RVK LDEALYTATDSLLRASSRKEVGQVLT TRTLRRQSLLNTVTNSTRSALDDYRMLQAAMA

 TQEVGA I L E Q HFDLLQKMMKVL MDNVNEAVSSDKLLVQLGSUTQSSNDHSADFRLLT


ATDYS G LQQKQK LFRESLYKDSTAMGSTS DVSQILDMVL QERLHESAEEQVRQLLALGQVARMLT TEFDTEAVLVMI
 K Q Q Q IIELLNT】ASAANQSDS\|AEVLRTAL


## 50

 RRVVEVVPAVQAGLLWI YDRQQMLDLGPATEADCRLRLRP EVAAGLVDAQYGALGVRGPDGGLSEFVHDGQRATMGHLPV $\begin{array}{llll}D L T V P H L & A D W C T V S V V E E N G R L Q P P K V A W A K E L H Y K Y P V \\ Q V L R A R F T D G S G G Y Y V L E D D T N D L N D Q P E L L R V L Q A G L P Y \\ V & D\end{array}$


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

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




 KGIVSEHS I A MA WIGGIDPDTKLVKPVASYGDTHHLI I SA $R L G V E V G G Y Q G A W I G L A R Q D Q A R R I Q V A A H H G L S W A D V P A$
$D E L G T L L K L D R A D F A W Y D P R Q D T L E F A W Y C R E G L P G R L G D$
 D A AVSVFRLDDCCLLLMYDGRGHLRVRAASAQEAAHLVFPA
 NADGEFLDWPVGHAYLARWHLRTLDPVAFRESTEDTVFRS

[^1]


[^2]


| UniRef90_F7NQU5 | D R $\mathrm{V}^{\text {\| }}$ R |
| :---: | :---: |
| UniRef90-Z9K366 | ERVK |
| UniRef90-A5UTQ4 | K N A Q |
| UniRef90-W9DHJ1 | D N A |
| UniRef90-K9TRV6 | D N A R |
| UniRef90-L0A875 | ERTEQA |
| UniRef90-A0A011QNB6 |  |
| UniRef90-13Y0T9 | T N T |
| UniRef90_UPI00047EA4C7 | Q N A Q |
| UniRef90-W4Z615 | H N K M |
| UniRef90_L9X1H4 | DRAESE |
| UniRef90-UPI00036C41E8 | ENTQR |
| UniRef90-D5H4R7 | D R |
| UniRef90-K7SKZ0 | E A R K E |
| UniRef90-U3TR57 | E A |
| UniRef90_J2IJZ1 | D R V K |
| UniRef90-D0LT25 | S N ARM |
| UniRef90-A0A017TIO2 | ENA |
| UniRef90-A0A024RG06 | HQ R $\square_{\text {d }}$ |
| UniRef90_W0V794 | GRTRHE |
| UniRef90-R4W9P1 |  |
| UniRef90_UPI00037D571C | QAAQLS FL |
| UniRef90-D5H8J6 | D R L Q Q E |
| UniRef90-K9R187 | S Q A |
| UniRef90-M3D4F6 | ERAR |
| UniRef90-L9ZFH2 | NARNRV |
| UniRef90-R5E992 |  |
| UniRef90_UPIO0046A1354 | L G A Q N |
| UniRef90-A1ZZ34 |  |
| UniRef90-A1ZJ42 | E |
| UniRef90-R7KRV3 | E |
| UniRef90-E4U1Y4 | E N |
| UniRef90-K5ZKM4 | E A R Q E |
| UniRef90-F5ULQ1 | S Q Q |
| UniRef90-K9PUG7 | ENAR |
| UniRef90-TOMQY9 | ENTK |
| UniRef90-Q67LV8 | ENSR |
| UniRef90-K8D9X2 | D NA |
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| UniRef90-UPI0002E38489 | Y R I R M |
| UniRef90_D3SEJ1 | ERNRHA |
| lupas_21 |  |
| lupas_14 |  |
| lupas_28 |  |
| jnet |  |
| conf | 99988518 |
| sol25 |  |
| sol5 |  |
| sol0 |  |
| jhmm |  |
| jpssm |  |


[^0]:    40

[^1]:    lupas_21
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    conf
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    sol0
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    jpssm

[^2]:    lupas_21
    lupas_14
    lupas_28
    jnet
    conf
    sol25
    sol5
    sol0
    jhmm
    jpssm

