

## GYDLTR\FVGSEGTLGVITDVLYPLADSAAVCAFPSMGE 

 A Y NS Y VFEVGEERHLPQVIDTFRDLALQGUVNTKLHMDN AF DAF Y $\square$ QF QDDQQFEQ VQ $\|$ R DLE GVVGSVN $\square M$


P S F MEVK $\square$ H C P E VE D $\square$ AP L I D T $\square$ Q Q $\square E R E G \square T$ QS H HM $\square$ T N
 VMRN
 F G Q LVDA $\square$ T N $\ L S N G \| L P A A M E \square M D$

FAD I GAAVDAVVETMQSGV PMAR EGTLGlVTEAT LRLDARLPTKVAMAQ $P G Y D L L G V L T G S E G L L G V V T E V T V R L L R R P A T Q R A V L M G F$

 PAVQTLMVSFDE
$V R$ KAAEA 1 S RTLTS GULPS K
GYN $\square$ NS S $\square$ F VGSEGT $\square G \square V T E A T \square K \square A V S V A V V N F P S \square R H$ $L R L A P V L P T K V A M A Q$

## 

 AFRRGTVFVPRFADLETLVD\KNYDEDTMATNGMPEDGS VATFPT】RDFETLAGAVDTVVQSTQSGVPLARVETLD GFDTTK $\square$ F $\square G A E G T L G Q V T E A T$ L $\quad$ RLAPLLPTSVAVVH


FEE\｜VDATSKVLTAG【VPAKME【MD
TP EFEMAARAVPTVR Q A IQEAATN $\square L I A S E G T \square A V L T E \square T L K \square R P K G \square F E N V V D A M N$

## QUERY

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50
TLWEAGSAHLTTRAQYTTEPGHTPDSVTKQMQKDTGMGAWN ${ }^{80}$
70 VLWEAGSANVRRSDYTREPGATPDSVVRQIMKDKGLGAWN ALYEAPVKARRSDYVTGPGSDPDVAVRKLAKDHHLGDWN TL WEAPCTKVNRADYHPGPGAISDEAVQKIRKDHNLGAWN TLYEAAGV VNRADYVDGNRSI TEAEI EKI KKDTGMGSWN IL VAAA ALAGPRTKYTSSEKLLDDQELDNIAEQLNMGRWN LLWEASA KTTRRHYYDGKGPLPPSI RAKLASDHDLGMWN VIQELAVTGKPRSAFYDKKSPMPREVDRQHAKKMPFGSWF LNLEAATSLDRTKYHSDSGPVPEAGRRRMMEDLGVGKWN SLVDGACLGTMNDFFPGRDTALSDDEFVEFVKTKSQGVWN GL WDAA VYGSKDQYWPENAPVTDEDEAEDLKKADLGAWV VLYM A MKARRADVFPGEGSVTDEWITGFTRDHHLGDWV LVEWAAMVGRRVDVWKDGDGPIPDWRLKQLQQQLDUGVWN GLQDASLYKTRDDFEDDERGVVKPESAQKVIEELNTGAWV LTLEAAHYGPRSSYTNHKEVIPEEDFEKMAKKLNTGRWR IIEAFLGFVGK RAELWGKDEPIPDWKVRELQKELNMGYWN TYPA MKVKRSDUYQGEGADPDHVLEEVRKKLGVPRFS DLYVAGTEESYPFDAMGGRTPISDEARNALQERHGIGAWM VLLDAAAAGGR ARYHRGAGPVPDSVVRTLMADLGI GRWN AL HEAALLGKRRADF EGQGPMAASAVKAAGEVLGLGYWN DLRLISGNDYPVERANGRVPRPPDTRQALRKEAGUGAWN DFRUALTSEKP GPYMKADSYVPYDLLERIRVEERWGFWR MGVPVARVEFVDS LARSMRHNLTRRAPT
 TVIATIQSGIPRVEFLD ALQMKAINAYSKLSHAEDPT $A V R A V I Q T$ LGVP $\backslash A R V E L \square D$ $\square L T \square Q S G V P V A R \square E F \square D \quad K V M \square G A V N R S K T D H R E A P T$ HNTVRMVNAYAKLGLREEPM DLVSLTVVMQRDEQADPKGAYLQPAEVDALRRBFGISPMT DRRRVAAMMAVNPNGAAAHQVMTEQQVSDIAKAYDIPAWT


LDDVMMDACNRFSSLSYPS AFPTVKAAVDVCVQVLQSNTPIARELMDEVAMEMCEVAPT ELLDAMQ\|

A ACNRYSKLSLPERPT GПPVAAMETMDEVQMKNDGGATAPRVWKEYS MGVVPVARIF FVVN ALAMKAINAYAQDSYPESPT FPSVKDAADVA
 NSC $\square$ RA $\nabla$

ENYQPTGLP LDAEAL LDDVMMDACNRFSKLSYPT SFNTMKDANAVEATNKYSKLDNPVRPS LDDCMIDATNKYSGLDYPT
EFLDAASV AAVNAHAKADFPRTPH FPNVEKAVNAVQEMNSPYGADDDHMMAADNDGGLVDRPL PVRYLMSSRLCPPEFRDRVVGDDDAMRIMSSRLLPVGYWN $N F A D V A \square A T M L S G \square Q V S R V E L L D E V Q V R A \Pi N \square A N G P E V P T$ LDEIQMDVINRAGGTGRPT LDEVMADACSRFSEMGAAT SFTTGG GACQAVILADQTGIPGARDNAYSRGTGPETPL EFMDQACIEAV ENFQPAGLLPVDAAA

AAVPVARTEFLDD VMMDACNRYSKLNCSVAPT
 NAYSK KN पPEQPM MTTKTWLEAPT VPVARTEFLDEH TMAACNKYSKTDYKVTPT AANVAMAV IRSGVQVQCVE!LDDVHMDVINRAGGTPATT PLLGGGDLSDPTSAAMYTRTDANTAEMEAQAAKKG GFWS A AAAASQVIRAAVPVAAEDMDDVQMSVINRAGGTNRPT $A M Q \prod A A$
 FPDVRKATEAVREVVAQGVGLCDDDFMHAMSKRKWPEKDS FLDQATLKVV EDYAK GLPTDAKAV

QLSITQAV EAYEPRGLLPTDVAAM

| LQ AGVP TARVELVDEQ |
| :---: |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  | AVYKSLSSGAVPVAM

EFMDALVVRALREKLGLPE WLL
KPA $\square$ RAA EDFVANYP DVEAL
QUERY

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UniRef90 T0G7T9 UniRef90_T0G7T9
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UniRef90-T0LAP3 UniRef90-T0LAP3 UniRef90-W9S121 UniRef90_UPIO0046B4E4B UniRef90_F6CMD0 UniRef90_A5WHZ7
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UniRef90_UPI000394315E UniRef90_UPI000463289D UniRef90-IOJRU6 UniRef90-UPI000333F4A8 UniRef90_G9MQT4
UniRef90_M9Z568 UniRef90-K4LEH8 UniRef90_UPI000463612B UniRef90-W9CQV3 UniRef90_L7MEY5 UniRef90_D4D4N8
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UniRef90_UPI00046A503C UniRef90-H1 V603 UniRef90_UPI000347F197 UniRef90_UPI000289E9FB
UniRef90-UPI000464F4E3 UniRef90-UPIO0035D18E1 UniRef90_K9H754
 $V Y A A L Y G T E E Q V E V N W K I V R Q A!A A L G K G T L I T E E Q A G G T$ $V$ V A A L Y G G T Q E Q I FY GAVVYGPEPVRQVMDSVIMKQSFLSDDGAKYYEPEDMPDN
 L Y G A L Y G P QVVVR D S LDWSVI K S S F G N DP GA KF F F LIE D R P D D

 FY A ALYGPEPVMDAHWEVI RDSFSSVVKGARFFTEEDRKND F Y GAL Y GPKAI RDCHWEI I K TEFSKVKGAKYYFVDDLQEK FYGA FY GPDELTS A QWKVVQSKFAGIVRDVR QLREDVVPEN $M Q A A L Y G S A A Q V A A D W A L I G Q A Y A K S G A M M L L T D R E L G D E N$ ATFALYGPKEVMEYNFKQI QEAFKPDKGHVLTSSQAHYPKN AKFGLYGHRDVVQAQFDTLRR VVREIPTGRLRGTLFAGQP

 AKFGLVYGPKGVI QAQFDEFK RVAAKAPKGCGQVDEELDDAA A A L T L Y G T S E QL D V N E K I I R D A F A G L G E V N V F D P K G A




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 LLMEFHGSAASVQEQAETVQGI ASEFGGQAFEWASTPEER

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#### Abstract

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## L

LI E V V D G H P L A A
L F L E F T G S E N S VVE E Q A I T A G EVVIDA A N E GS DF R WA K E L E B A






 L I I E V D G P Q V L I E E Q A G RV A A L C R R D N G A R E V VK VA E T E E E R

 LFFK F S GTRNGVADSISRTKSIAREHNSTSSFEFARTDQEG LMVEFHGS PA GVVQE QTERF GEI A A EMGSSGGFTFAKA T E D

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query
UniRef90 M4XOZO
UniRetero-O2Y8Z3
Un UniRef90-C4ZM78 UniRefi90-EAU3F6 UniRefi90 W3 W3J UniRefi90 Q39Tso UniRef90 F6ILX7 UniRei90-S8C7C5 UniRefo- Q2G889 UniRef90 M MWUS4 UniRefo-M7WSHz UniRefi90-UPIoо UniRef90-V5F823 UniRef90-R1EU50 UniRefi90-S704Y0 UniRef90-L2FMT8 UniRef90 UPIOOO3787152 UniRefoo-kiwtre Unirefoo-Tog7t9 UniRe90-UPIOOO35ECDOB UniRe e90 UPIIOOO35F7457
Uniref90-A4XDW3
UniRefi90-D8KKX1
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UniRefi90-a5P348
UniRef90 ${ }^{-} 5$ EAM77 Unirefi90 UPIOOO360DE8F UniRef90-UPI0002E88831
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UniRef90- 221328
UniRefi9- =8TRD7
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UniRef90- 14 Y VK1
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UniRef90_K4LEH8
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## 130

140
150
160
QPFKYRAQLMSGVPNTQEFGLYNWRGGGGSMWFAPVSEAR QPFDYRAKLMKGVPNLQEFGLYNWRGGGGSMWFAPVSQAR PAFKYRASLMRGDMTLQEFSLYNWRGGGGSMWFAPVSQAR RATQYRFDLMKGKPNLGEFDLYNWRGGGGSMWFAPVSQAK PVFKYRADLMRGYMTLQEFGLYNWRGGGGSMWFAPVSPAE PDFEYRRQLMMGGSTLQEFGLYNWRGGGGSMWFAPVAAAR PAWDYRVRLMRGEPNMTEFSIMNWTGGGGHTNFSPISAPS HYDQDRVDVCSGKPVLREDDWLNWVPNAAHLFFSPVVPTK SLLHYRDLTMQGIPNNHELQWLSWRPGYAHLFFAPIIPSR SYLHDRAAVFAGVPTFRELAWHQWDPNAGELFFAPISGVN PTWQHAKRLMAGELDDDEFGLYNWRGGGGSAWFAPVARAT ALDVPGADLQTGNPGLGPLRSIEYRGDGGH门SFSPVLPSD SVPEPHGGFFVGVPSLLWSLPMVKYRGVAAHIDYSPIIPSS HYLHNYARFTTGIPTWRELDRMKWDPNAAHLFFAPLSANN QNLRVRATYLQGISSMGEFWMKQWLPNCSVIMVAAISRLE EALGQPGQVQAGVPSMSFLSVMDWVGAKGHVCLSSIAPLR SVGEPHGGPFVGVPSLWSLPIDGYSGDAGHVDFSPVLPSS PMLEHVFRNQUGLPNLDEFGVYNFRGGGGSAWFALVLPLS GAEHVR

PPADEADGWLP
KLWAWRMGTMTGVVADPPARTAGWS
AKFKALFDMNRGIPNGKF
EDTKTEVVPHSG\|PTVEPLGIVDSRGGGGHLWLAPVLPR
SRLWNAR HNAYFAMLQ LKPGCRAVTTDVGVP S


SRLWNAR HSAY
arlwarhkayya
TRLWTAR
SRLWQAR
TkLWAA
SRLWTAR
PLLRWVHKILRGVPT
HNAYFAAS GLR

A SLD A GI QU $\|$ RGVP
TRLWTAR
HDAYF

SRLWARHA DFYATCA
SQLWAAR
NAYYAGVGLRPGC

KELWKRKEADWACY
DRLWRAR
SQMWKAR
SRMWQAR
VDNTGQGTLAAGDP
VDNDQDGTDAAGDP
SRLLWAR
ERLWKAR
NRLWEARHG $\square \mathrm{Y}$
SAL WAAR


KKLLWAR
KLL
WSARK
SKLWKAR
KELWRARK
QLWAARHSSWYAV
LI
TELWRARKVSPAVVQVKP
ARKKL WHARHNAYP
EWWKARKMVSPADTGQL
NWLWARHNAWYAAKALL
NWLIWARHNAWYAAKAL RPG
TSAEERKKLWSGRHTAWWATLSQM PGSRGLVTDVAVPPS NKDWKAR HAAWYACLADRPGCKGVSTDVCVPTS HRPEERNRDWQMRHHAYWAlLASRPGARAIVTDVCVPLS DDLWQNRKYALMSTLAAFPEHRCW LRFWAGRKA

AFPAVGRISPDYYCMDGTIPR
ESFRHGHALMQGVPSDEAYRNGLWREDLGLLWFAPTVPAT KELWKRKEALWACFAMEPKYEAMIS
HDLWSARK QSLWSMLALRERGSEVWSDDVVPS TALWEAR HKAYYAALSLRPGAKGWPTDVCVPI S

EKWHARKQVSPAIAKIK P
SRLW WSARKTARHNAWYAFLA DAPGYKAYSTDVCVPDS KLLWSARK EDLWQNRKY EQ| WARRAVSAAVVQDK TRLWARHDMFWAl

SARKEAПWSVMA VELW
SKLWARHA $\square$ F
YATCA
SARKOTIWSMDRPNTRCYVTDVCVPIS
HELW
SARKQTLWSMLALRKEGSDDVWSTDVVPLS MAKFRTHPLWRMRHNAYPALLAGLRPGTALVTDVCVPDS HDLWKARK
ERLWAAR
TRLWRAR
ADLWTDGKN
ealttarrt
NKLWQAR
adLwark
DSLWSMLSSLRREGDEVWSTDVVPITS

AEFWKARKLVS
HEAYYATVNLRPGADGWATDVCVPIS
AHYSGCALVEGAKGWPTDVCVPVS

ARHELWEARHNLAYAYTHGYR GRKLMSTDVVVPD
EПWFARRNASQS DT U
GSKKLNEDISVPRS NALWARHNAYWAQKSLLA
ATFWAGRK
${ }^{\circ}$
$E K L W F A R K V$

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UniRef90 UPIO004 UniRef90-UPIOOO46B4E4B Nierab UniRef90-K6DR09 UniRef90-UP10003C13D8C UniRef90-V9FEQ6 UniRef90-A7SQV7 UniRefo- Q2CIXO UniRef90-V2YRI1 UniRef90_UPIO00420B5F9 UniRef90_G7Q7R4
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UniRef9O-UPIOOO464E4E3 UniRef90-UPIOOO35D18E1 UniRef90-K9H754

GSECKKQAAMAKRVLHKYG[180 YVAEFTVAP ${ }^{190}$ PMHHVTDVL 200 GSETDKQMQLAKRILNKHGLDYVGEFIVGWRDMHHVIDVL GSETDKQMQLAKRLLNKHGLDYVGEFVGGMRDMHHVVDVL GDDAVAQYEVTRRRCEEAGFDFIGTFVIGMREMHHIVCIV GSETLKQMQLAKG!LAKYGFDYVGEFIVGWRDMHHVIDLL GKHTLNQSALAKKLMNKYGFDYVAEFYVGWRDMHH|1 D mo GKTARLVHELVTSGLKKWGFDSFPTWCVLGRELHYIVNIV GKDAETQYELCKQLCRKYEFQYMGNFCIGAREMHHILDLI GRDAVAQVDMCKKICTKHGFDYLGTFYVAQREMHHIVTLL $\bigcirc$ G

GA EWARASRAISNAHGWDLVCDFFMHERHAIIFVNFMT GAEFVKSMDDCRPI FEEFGFDYMGGLMVGPRHAEHVMDLL GADALAQYALARDHAHAYGLDYLGAFAVGAWALHHRVTAV GEEAVKLYELSRDICAKNGFDFVGETTAIWRSANHRQVLP GR

RLA ECVAETEADLGASPAPCPAVGHVGDGNFHAD
Q

## Q

VA LLVYKTKKDLKASGLVSTIVGHVGDGNFH RLA D ALTMQSEAKATEMGLVAPTVSHAGDGNL
RLAEIITLSKEDSGKLGLFASVIGHVGDGNFHQAVVV KI P DMFQRLKEDREKYQIDLVVFGHAGDGNLHP NUI
A ALADADEYAAKLDEETGLIGGVLGHVGDGNFHALVMM KLPDALK G $\square E E \square G K K Y N V V \square P C F G H S G D G N \square H V N V M V$ RLADCVEATQEDILANGLIAP IVGHAGDGNFH K A L P EVL R RMREMSDKYGMRANVFHAGDGNDH
QUERY
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UniRef90_Q2Y8Z3
UniRef90_N1QEK3
UniRef90_C4ZM78
UniRef90_E4U3F6
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UniRef90_S8C7C5
UniRef90_Q2G889
UniRef90_M7WVS4
UniRef90_M7WSH2
UniRef90_UPI0003B56D60
UniRef90_-V5F823
UniRef90_R1EU50
UniRef90_S7Q4Y0
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 Y D R S D A E Q MKK A H A CF D E L L Q A F A R E GYGGVYRA N TAFA E K

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FDRSDPEECARVSACYRALVNAHGAVGLVSRTSLDFQQE FDRRHADDRARALELCEALVRAAAEAGYGVQRAHPALMDR HAAGKGEDAVRAKTCAEALIAAQAEAGFGQDMTDPGLGAA YDKENTDETHQALACYHASFKAVMNAGY $\square P Y R V G \| Q S M A E$ YTM GEEQRLLELYKQLLHDAGEQRFMEYRTHVGYMDT DPDKPEELEEAERLNRRIVERALRMDGGEHGVGLHKMGF
$\square{ }^{1}$
V
V

 | F |
| :---: |
| F |
| F |
| F | LDTEDASEMERAEAFMDRLTKRAJAMEGGEHGLGQGKMKY DLDNADEVERVKGFDDRLVRRAAMGGGEHGVGQKKMVY FDKSNKKAREGGRRVVKALLAEAELNGFANYRSHVQHMDA VNADDPAEVEACEAFVDRLVRRAVAMEGGEHGVGQKKMKY VDPDDPEELHRVHLFVERLARRALAMDGGEHGVGLGKRAL



6B4E4B
?迢 $V$
$V$
$V$

$V$ D P N NP P E C E T A E A L N Q Q L V S R A L R L G G GE H G I G L L V D P H N P D E V E R A E A V A H R L A E R A I A M Q G GE H GI G L T K Q H F PK P E E A A E A E R N HR R V R RALAMDGGEHGVGHGKMAR Y | F |
| :---: |
| F |
| L |
| F | $\square P$ PAVP



F G S D A

.

## Y <br> Y



 C D
M D
FDPHNDT
FDPHDPKDTAT DF EVAHKDASRALDDDGGEHGGL

D R N NPAE MA IA QR LS S QMI ER AL H L G G GEHGGUGVGK LGY
$Y$ NRK
F R A D D P E E E A Q R R V $V$ H D F T E E R L G R R R A ND T DARNKGELARVREAVHRMVERAIADDGGEHGVGIGKKER T D A R N K D E M E RVVEKA F E E I M E K A V Y DPKNE GQRAADVKCVID DMMSRALEMKGGEHAI GDGKKDC A D A R D HEEMERVEKAVAEDFTAAIVGGGGEHGIGTMKSPR DPNNPEEFARAKKFNESLVEFGLDHGGGEHGVGLGKRQY
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 GYDLTS LRFGGEGTLGTITEVQRLRLHGDFENDHDAVS ILIAS E GTLGVITEITLKLLSKGVFPSIQSAMN PAFDSFYMRFFDKESFDNAYAVVKE $\square$ N $\square E G V V G S \square N \square M$

VGDAVSAVATLLQAGDSVGRVELVD
GYD $\quad$ T R RLVGSEGT $L G V \square T E \square T \quad \square K L S G \square P E A V V E A A C$

FES $\square H$ DA $\square Q T A M E \square \square Q C G \prod P \square T R V E \square M D$ LADFDSUPRAGEVVGDLVAAGUVPAAVEMMD

FADVEAATRFVTALIQAGV PSMARC GYDLTR R $\quad \mathrm{MVGSEGTLGLMTE} \mathrm{\square T} \mathrm{\quad} \mathrm{\square RLQG} \mathrm{\square PEAURSARC}$ FDD $\square$ VQA GYA $\square$ T NVLTS G $\square \mathrm{L}$ PS K $\square E F M$
 $P G Y D L L A V L T G S E G M L G V I V E \square T V K L L P K P Q V Q V L L A A F N$

 QTLLAGFPSTDEAGAAVSAI GUAAGVTPAA EMMD FDDVDKAGRAIAA\|IRNKVIPATLE\|LD

## 

KT TMATFKDLDDTATAVD $\square 1 G G \quad S G \square L P A A M E L M D$ AVSAATCSFPTLSDAARAV AGLLQGVPVSRS $S E G T L G \| I T E \square T \square K L A$ T V DMAAFDSVEKAGDAVAGVDAKGDIPAALEMMD

G TFENVEQAMN $\checkmark V A A A G L L P A B A M E M M D$ EMFVFW

VVMAAFERVQQAGDAVGAVIAEGIIPAGDEMMD EAAGEAVARVVREGLVPSLLE $\square M$

PAYRRAMDAV FADLPSAARTVSQ I A NRDTPCTLEFM $L F V G S E G T L G V I V E D L R P L L A P G U F P D L E S A G H$

P L P E A C S $\square$ LMATESS $\square E D$ A GRAAVAVLS S GVIPAAMEVM
VT E LR L A P L L P T TVA VA Q GYDMTRLLVGSEGTLGLITELTVGKLQGIPEAVRSARC YEDLEAAAETVSAIIANRIIPATLE
 EAAGDCVAAVIAGG IPPGGMEMMD SEGT $\square G \square V T E A T \quad L K \square Y P V M P T T V S V I S$
 PWLRDFFCAVNDDAQLDWMVDRLQALALDGTLKGSFFFWN

PVPEETVLLLAAFGDVGRAADAVSAITAAGILPAGLEMMD RALLVGFPSVEGAGDCVAGV $\quad$ IIADGI IPAGMEMMD $V V 1 \operatorname{CGSEGQLGVVTEALRILRKPEGGARPVLMG}$
A Y DMVR LIFTGSEGTLGTITETTVR\!PAPAPARVTMSA PGYDLLALMNGSEGMLGUVTE\|VRLLPDPETAQAVLAAFD

FTVSSGKSDDLKPM $\square$ AT $\square$ QAMRNEGLL Y $\square$ T S VS S


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# 50 <br> E AVV <br> HIVAARVIPATL EIMDEVQMKVV 

 ELMDQASLRAV NMGATAPRVWKEL TVMQ MGI PVARMEYMDENAVVDVEALNKYSKDTTPVRPS $\square$ NHFASHDVPKYMHQTEPGPLLPET $\square$ AKMREKYNTGYPWR
AVYKTMASGVT PVAM

ELMDEVQMAAS！SYSGLPLTT
EFLDNLS $\square$ RAVEEKFNKGLP $\frac{1}{T}$ DKRRVAAMVADNPHGCGNHKVMTGEQVDVISKHYDVPEWT EA S $\square$ TQAN $\square$ YNETFYNEK EDFARIGLPTDMGA $\frac{\square}{T}$ VKKRKWAEKPT LDDDQMRFINARKWPEAPT


NEMAEAGLPEKPH
 NLADNAAEQAVHAGYTLDTAA

VK QRHWAEQPT $E L V D \quad P \square S \square A A V N A H S G T R Y P E E M T$ AVAD $\$ MASGVPDAA $\quad$ ELLDDVQMHC $\square$ NERQWKEAPT SFRRAVMMYGIPDARMELLDEMSVAAANSYSKLSDPETPL

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DQAS \RAV ESYKPMG\DP\NAEAV
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LD DVQMRCDNERTWKEAPT HAC【VAVEKFQPVGLPVSAAAV

A CNSYSK LT TDAVK PT NTEDAGTAVAKAGTIPAGLEMMDNPADRAAEDFIHAGYPI ILQ A GVPIARVELVDE TSMKQVNDFSDTSYKESPT AVFKTMASGVTPVAMEFLDKLTDEAVEEKFQKGLPKDAGD ELLDATTLAAFNAYNAGVAGFSPQPL ALADEAAEQAVQCGYPKGAGAV
N VT $\square$ QTVENFVHAGLPMDAEAV
K RKWKEAPT पD DVQ $\quad$ K A CNAYSGLEAPT

T F Y DMS LIAAKTVSDFVDHQA I LTVEDDALKANDPTDAA DAVNKYCHLDNPLRPS QLT $\quad$ DNA $\square E D K A G L G A G T$ ELLDASADAAFNK YSTEVADLQEA IRQAAAAASIVRSGVPAAVELMDDVQMQ\IDNNGGAGMWT RYA $\square Q A A E D F V R A G Y P T N V E A L$
AVYKSLAGGAMPVAM EFMDALVVKALREKLGLPEWL RLAlDEAAEAAVGAGYPRDAGAV
QLRAYA DSYPYPKELVDTSGVMSTEKFDA LARKRFDTPWV
EF LDDQPTLKADEDFAQ】GLPTNDKA V SHA IVAAEAFARAGYPTDAKA DASS $\square K A S E A Y \square K T D \square G A G S D \quad C Q A \square$

D GPMTVAVEDFVHAGYD【AAA】

$T$ VSEFMA SGAAPSMLE LMDGGTVGMUNAYGDFLPDGAGA DGSA $\square$ KAVKE $\square$ DSTLGVPD VEAM
FPDVRKATEAVGDILNSGVGLCDDDFMRTVEKFHRDGDPT SFR SVDDACRAVMMT IQYGIPVARDELLDALSVRAAN
 $K \square A \square Q A A$ EDFVKAGYPVEAEA
$R$ P A $\square H$ A A
EDF VKAGYPLDVDAL
MMDRDAIHAAEAFVHAGYPL FPSVRAAADAAAEMVGRGVGVLDDVMMKAVNKANWAETAS YMDDVCDRAVEAFVKAGYPN
 D $\square K A Y S \square T Q Q F P Y P \quad S V G R A P \square P D W A R E K L R E \quad G F G R W A$
$R \square A \square A A A E D F V H V G Y P R E A A A M D K \square A \square D A A E D F V H A G Y P \square$ RPAIHAA EAFVAAGYPLDAEAL
FDDNAVAGECVSD $\backslash I K S G \square L P V A \square E F M D R \square C \square E A H A G Y P N$ EAVNA YSNLS LKKVEDT
 DVEDAVAAVIAGGIVPAGLEMMDNPAGRAAEEFVNCGYP $P \square R S P M G P G S R R A \square L L A R R D G G S A S E W D E L G R E A N L P V S V$
$\mathrm{N} \square \mathrm{Y} \square \quad \mathrm{K} N \square \mathrm{E}$ E Y A K $V \mathrm{G} \square \mathrm{P} \square \mathrm{DAGA} \mathrm{V}$

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SKLIWKAR
LKLATARRV
KLLWSARK
KKLWEARK
TSTEERKKLWSGRH
Sterkklws grha wratisompasrglctdvavprs ARLWQAR GKPVDALK $\square$ SAGVP TKLWQAR ARLWARHNAFWAAKA DD
ADLWFARKNASPSDTIY
RGRMKLWEGRHNLAYTYTHAY PGRSMMVTDVCVPDS EKDSAGMEVMQGKPSQVALPLAYWRDGCGLLWYAPLVPAK AQLMQARRF K LWEARHSLAYAY【HAF HDLWLARK SARKDALFGTMAQRRPGD ARARKDALFGTMAQRRPGD HVWWGDVVPVS ARAKMWQARHDAYWA MRAGRPGFDAFVTDVCVPVS A LWKRHGAHYATAADRPG PQFRTLATDVCVPIS SELW SARKEALWSVMAMRKNSTDHVWTTDVVPIS
TRLWKAR
ARI WKGRKAAFA
HALWAGRK
ELWHARHGAFYAlVA
HDAYWAAKAVVPDARVISTDCIVPIS RHELWSARKE

S Tf MAMGID

NALWQAR
KLLAARRSAFTALARDMYWACMQURPGAKG1 STDVCVP S KLLAARRSAFTALARLRP PAVARHKPTKI LEDATVPRS DELW

SARKEADWSVMAQRKSDSD GKL WARKQVSPA $\square$ AK $\ddagger$ K P
NLLWKAR HDAYWAGCD
OKI WAARK DAYWAGCDLLAPGMAHLSTDVCVPDS
or wagrk
SAFPAVGRDSPDYYCMDGTIPR
KDIWARRNASQADSMY KDI WARRNASQA【SDY GSKKTNEDVTVPRS NRLWAAR MIWKGRKSAFAAVGR\｜SPDYIVQLK DGVIPRT DLLWLARR SALPALAQK RP TTVLEDATVPRS RELWSARK LRFWSGRKN
EALTARRTALSALARMKP TV L LEDATVPRS
AFPASG
 SABK ERLWTARRSAYGV RRLWAAR
EALWSARK LLWKGRKSAFPAVGRDSPDYYCM NEIWYARRNASPSTAMY LRLWKGRKS
 DRLHSTLELFLGKPAGIELSTNYWRDHTGLFWFSPLVPMK HQLWEAR HDAALAUSATAPGKKMKDTDVCMPLS ADIWFARRNCSQS ${ }^{2}$ A $\|$ Y
EAL ALLWKGRKSAFGRDSPDYYCMDGTDPRG
RMLLHARRVVLTALETYGLW
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KLWAR PGKVRVYEAEDIGVP
 SKLWQAR
DQLTAARRS
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ELLLQARR SALPADETVKSATMTD
ARFWAGRKA AL ALEAFAVGRLSPDYYCMDGVCVPRS LLFWAGRKAAFGRTSPDYGCMDGTIPRGYCMDGTIPR DELWQSRKVWSALSY母DDDKTRVW LAI WKGRKSAFGAMG
$R \square G D Y \square C L D G C V P V_{S}^{T}$
ADLWFARKNASQCDTTY
解
NKLWKAR
PTETNLAMTYWRKRTPAYWSCRAVRPE
SRLWK ARHDAL
NTFWAGRK
LALWKGRKA
ETFWAGRK AAFPAMGADSPDYYCMDG
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NRLWARHNAFYAVVSQ
RLWAARREADPALAQKRP
RPNAKGWS
Tip $\mathrm{R}_{\mathrm{R}}^{\mathrm{R}} \mathrm{H}$ afPavgrospriledatvprs LRFWSGRKN NRLWEAR ETMVPELRPQFGVPS HNTAYAFAHSYPGKKQMVTDVCVPDS
EELW
FAVP
EELWA
$N R$ L WA


## UniRef90 B3RIV9 UniRef90-D7AJ54 UniRef90 C9SC79 UniRef90_UPI00037A5CCF UniRef90 M4B907 UniRef90-UPI00046487E0 UniRef90-K2RVP3 UniRef90- C7JEC5 UniRef90_С $3 \times$ MX9 UniRef90-K2GCM3 UniRef90_KOCUH5 UniRef90_UPI00037F39AA UniRef90-R7ZBK8

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## TD D TP TEGKKVAEDLVHRMLQRAI AMDGGEHGVGLKKREY

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F
T
Y
 YNKKDREQVRMVERVVYRMVDRALE K K K G GEHSVVGLRKKAS TDEEDKSEHRKIQSFSDRLVRRALAADGGEHGIGLGKRKY


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$Y$ Y SEKVRDVAEKLVHDMVERADEMEGGEHGVGLVKRDF


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| UniRef90-A4FN | MGRMFNADDLDTMQR | ${ }^{\text {G }}$ C |
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| UniRetio - Woult | LERQVGSERTV ${ }^{\text {P }}$ |  |
| UniRefotoroxian | L Lletgapat vovmka | W1 |
| UniReito R106E2? | AREFGEGAV | GG LPGK |
|  | M | WL NPGK |
| Unirieroo-UP100047D1BC0 | L |  |
| Unireteoteracis |  |  |
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| UniRei90-E6LB87 | MNLAFSEAELNLMAN |  |
| UniRef90-H2GOS9 | LHLKVGEAGLDMM | N KLAFDPNNLMNPGKMGTP佼 |
| Unipeteo-17esa | LARELGPA | N |
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| Unireero-c974550 | LAPELGPEAVAI | Wi M P |
| UniRefe90-UP1000248DF\% | LEWKVGASGLSLLMKR | St kill |
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| UniRet90-UPI00040823B7 | LkWMEAEHGVEA | MN |
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|  | MAR Lilla |  |
| Unirefolichoras | MPEMFSDID ${ }^{\text {a }}$ AQQR | P |
| UniRerio - 77 E9Y1 |  |  |
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| UniRefi90-ETC $\mathbf{C z z 8}$ | MCVOFS |  |
| Unirieriol-19WFZ7 | V | , |
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 YATF $\square$ AAYKS $\square E A A G E A V A Q \square V A A G L L P G A M E \square M D$

VCT F P DVESVTSVVT\| D Y
$G \square P \nabla A R V$
PGDTPFMVTYERDEDLEAVVDIIRPDRVNMVLQNAASLRH
$G Y D L T R L F V G S E G S L G T V V R A V Q Q L A L A A E F P S T A A A C D$


CFVAYF $\square$ PF KEED DDQM DD TCA LLRKQNT\HSAAHTGN PKPEAYHTLLAAYGSLEGAGEAVSLVDRRGLLPGAMEIMD

GYD $\square$ TRLVGSEGT पG $\square$ ITEVT $\square R \square Y G \square P E T T C A A V C$ GARPVLIGFDSNEVAGACVD\|IRAAGVLPVADEFMD $G Y D L T R L F V G S E G S L G V V V K A V R Q L A L A A E F P S A A A A G D$ QTFLFE FDRVEDLATASDTVSALIRHGLIPAACEMMD F DTVEACTRAVVKVLAS GVVPCALEMDD
 LDEAAGEADRVLRSGLLPGADEDMD

S E GMLGVVTEDTVRDEDARVIDNVENAAN VIMASFDDVEAGGNAVAEVIAAGII PAGLEMMD GYDLMGLICGSEGLLGVITEVVKILKNPQVVPTIEEGGN

$$
\text { E A A G D A } \square R \mathrm{R} \nabla \mathrm{~V} \text { A A G VLP A G ME } \square \mathrm{MD}
$$

FDDVEAAGDAVAGVIGAGLVPAGLEMMD


 SEGTLG\|VTEAT LRLVPKLPQRVGVSG

A G VVPSACE $\square$
$\square K \square H$ G $\square$ P E H T VT A R C


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

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

 C I M A S F D D L R K A G DAVASLIA DGI IPAGLEMMD
$\square F V G S E G T \square G V I T E L T L R L L P A Q P P Q S T V V A S F$ APQSVAVLLADFTAMEAAGEAVILVTAAGVLPAGMEDMD ES $\square C \square V L A D F N S V E A A G R S V A E \square I N A G \square \square P A G M E I M D$

VLLADFETMESAGEAVRAVTAAGLLPAGMEDMD DLLASAARTVSSI DASRIIPATLE I LD

V R $\square \mathrm{MRQPEADKTLLADYN}$
ES $\|$ CVLLADFTSDEDAGASVSDTISAG\|IPGGMEDMD $V I$ MAS F D DVVKGGNAVANVIAAGUIPAGLEMMD


UniRef90-V5SC8 UniRef90-D7CY48 UniRef90 G4HK27 UniRef90 N2JJ92 UniRef90-H1VKA7 UniRef90-B2W4L9 UniRef90 L8EDB8 UniRef90 F8D5K4 UniRef90-J4GCI3 UniRef90-UPI0003680D5C UniRef90 UPI0004050B8 UniRef90-K0EGD7 UniRef90_G8N9R3 UniRef90 A9D099 UniRef90-UPI00047E2EA8 UniRef90_UPI00031148AF UniRef90_R4ITS3 UniRef90 UPI00028A265 UniRef90-A0A037ZET4 UniRef90-D6B4E8 UniRef90 UPI0002EDA149 UniRef90 UPI00047AFF43 UniRef90-UPI0003B7A15D UniRef90-A1K460
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UniRef90-B1ZZC
UniRef90-A3JQ06 UniRef90_K7RKB1 UniRef90 A3K0J3 UniRef90-UPI0002D6F723 UniRef90-B5SHP6 UniRef90 Q4FNZ0 UniRef90-UPI000469BCF5 UniRef90-Q05WU4 UniRef90 M1L083 UniRef90 XORKM8 UniRef90-Q60819 UniRef90_UPI000377D476 UniRef90 W9DX48 UniRef90-A9IQN3 UniRef90_V5ABE9 UniRef90-W1QLG1 UniRef90 U5HAA2 UniRef90-V4J7G2 UniRef90-A0B9P4 UniRef90_V9GGL3 UniRef90- A6CMI5 UniRef90_UPI000455ED9A UniRef90_UPI0002626E64 UniRef90 UPI0002DA1A27 UniRef90 LOJM63 UniRef90-K4RIWg UniRef90 UPI00031F6821 UniRef90 D2PNN5 UniRef90-F4D1M2 UniRef90_G6XH20 UniRet90 UPI00034D21E UniRef90-UPI000262686D UniRef90-E5Y4N5 UniRef90 E8TNA9 UniRef90 R5XJ75 UniRef90-E8R216 UniRef90-D8EZ09 UniRef90 B6WWC5 UniRef90- S8BL04 UniRef90-UPIOOO42165EE UniRef90_A6EJW9 UniRef90 WOTC20 UniRef90-U1LJB4 UniRef90_Q090T7 UniRef90 UPI00047B8561 UniRef90 M1E439 UniRef90-D2R6L8 UniRef90_E6PLP2 UniRef90 M3VJD4 UniRef90-H6R2M9 UniRef90_K9P4B3 UniRef90-W9E3V3 UniRef90-L8LJ84 UniRef90_UPI00037B1A73 UniRef90_W1K0B5 UniRef90_Q3AWP5 UniRef90 ${ }^{-}$W2E395 UniRef90_UPI0003B77D24 UniRef90 A0A044UMQ4 UniRef90 UPI000366D7DD UniRef90-F1A1D2 UniRef90_B8G9E2 UniRef90 UPI000349BF61 UniRef90-UPI00036AB8C1 UniRef90_KOWKS2
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ELLDARTПMA VNRYSKMTLDERPT $\square S L D$ ASHYHPRTEYTDNPDP LTEEQLDAAAKKVNLGRWV AVCEDMA RGHAPALLELMDRTSIRAVNAMANMGLPL TLEDAA $\operatorname{LAEAVRTEVAVARIELLDELSVRMTNDYGLPAPT}$ FPDVRQATQAVIEVMNKGVGLCDSEHMRAMSSRKWPEKDS DQRSLRAANAYR

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

P H
 LDQPTLEAVEAFAK IGLPT $R P C D R A T \quad E A F A G A G Y P D C E A L$ AVCRDMAEGHTPSLLELMDR TTVRAVNAMAR MGDPETT K L T L Y AVDK SHYRVGYPSDLEAV
TRLIA IHTQ DTSEQAWTET LRKEDRQKVGDSKWV RTILMA】EDAFHFGFPREAGAV

EATEAFAKAYPDCEAAL
E LLDA L S VKAA
RLADEAAEAAVRAGYPKAEA

## NAYSK $\square S$ S $\square$ G K K P P L

$P \frac{L}{\mathrm{~L}}$
A VND I SQQGIPA GLEMMDSYA QQAAEDFAHAGYPL KPATAAVEEFVRAGY

GME IMDKALIEATDNFSKAGYPR EATEAFAKAYPMCEAL NFM $\square$ NA $V$ ND $\square$ F GRDEYPRDA A A V

## 

$\square 1 E A \square N T F$ D
AAGQAVTDVIAAG I IPAGLEMMDRQAVQMVEPFVNAGA NEY $\square D T S H P D V P M$ DRQMFAEMGASEGRKWSDKN FPT TEDAANAARDLVQQGVGLLDDVMDKMDNAKGGGDTWS $\square D S T T V K V L R R \quad C D P N \square V L P D G D \square$
TFSTPKCAEAAQS $\square L M S G \square Q V L R M E L V D A \square R Q V N \square T G E H M$ CRLKWPETD S

AVF DAVRTEVDVAKDELVDGDSARMANDYGLPSPM $A V Y K T M A S G V T P V A M E F L D N L S I$ RAVEERFHKGLPDEAGU TFKTDEECASAAQT ILDMSGTPVDANSDKQVNEYGGYSYPS RTTI AAVNAYKRMDLDTEAAAMLIAQSDA
A L A I EAVEAAVSAGYSRDTAA
SMQMDASLGRYSKLIEYQPDT
A L A DEAAEAAVACDYPEGAAAV
E $\square$ A $\square E G V E A S A Y P V G H \quad P S D \square A A F$
MMDRPA $\square$ HAAEDFVHAGYPL
$N \square M \square$ N A $V E R A F K M G F P T N A Q S L$

LDDNMMK ITNKTNWVESPT
EAYANI GLPTDVGA L SFPELAGAGAAVTD\MAGSRPMDRTAVRAVEAARPMGALL EFLDTKCDNAVEDFAGLGLDRTAGALL R TADDUVKEYVFFDLSIDTNAL

VLAVTA Q $\square R$ PAMLLEFMDSVSINAVEDMLRMGLDREAGA L GTLTAA TEAILAITGVLDPAMMDTVADNAVEDEMRMGAALL NFTINAVDDLFGRDEYPRDA A Alv


NVTDNAVNDFFGYDEYPRDA
A AV
 AACNRYSKLTLRASPT TPEEAGNTLTARQ L LPVALEMLDGPMDRMDEEATHAGYPV LDDVMMKAVNDASGTKYPT MD HNADRAVNSAYS $\square G L P A$
$N \square S \square N A V E D V V A T$
GCYPRDA
UniRef90 A713P7 UniRef90-V5SC85 UniRef90-D7CY48 UniRef90_G4HK27 UniRef90_N2JJ92 UniRef90-H1VKA7 UniRef90-L8EDB8 UniRef90_F8D5K4 UniRef90-J4GCl3 UniRef90_UPI0003680D5C UniRef90-UPI0004050B8E UniRef90-K0EGD7 UniRef90_G8N9R3 UniRef90- A9D099 UniRef90_UPIO0047E2EA8 UniRef90-UPIO0031148AF UniRef90 R4ITS3 UniRef90 UPI00028A265F UniRef90-A0A037ZET4 UniRef90-D6B4E8 UniRef90'UPI0002EDA149 UniRef90 UPI00047AFF43 UniRef90_UPIO003B7A15D UniRef90-A1K460
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UniRef90_UPIo0037B1A73 UniRef90-W1KOB5 UniRef90-Q3AWP5 UniRet90_W2E395 UniRef90-UPI0003B77D24 UniRef90-A0A044UMQ4 UniRef90 UP1000366D7DD UniRef90-F1A1D2 UniRef90-B8G9E2 UniRef90_UPI000349BF61 UniRef90_UPIO0036AB8C1 UniRef90_KowkS2

LTEEDGSKDDLISRQLDLIIUAAFKENGCTNFKRAKDKQES 110 LFVELAGGAASVEETLAAFQEMALSNGALRFDWAEERRER LLIEQDGDPETVTRDDEQURQICREQADSDQVAATREEAE LFFEFHGSPAGVAEQVELQSUTEGNGALNFVAAADADAR YIGAAYGPEPIRKAHLEITKREMTKVPGSRWFLLEDRKEE LLAAFDTPDP A A DLAAVGALCTAAGATDVVPADTPAES VFLEFHANHGGUEEEDDLCLT: FEDHDVLEFESADDDEMS HPRSAQEDAEAVREVVKKYDGTGFEHARTEKEA LLIEQDGDAAVVEKDIIARILSICEENQADEVSMAASEAEA LSGGMYGTKNQVKAHZDLKTAMKKLGVKPLFTDKERKDG LVEVEGPKEEVAEEALVLEEVIRESGALEVRVASEAERQ LFVEUAGGEAATEEQLLRDFREIARLRAGMMCDWADEEGRR FLEFHGNEAGLMQDMEFAKEIGADNNCTDFQFEKDSQSR LFFEFAGSPASVAEQVELTQEIVESNGALGFQTAADADAR LIIEQDGPAEIVKRDIERIIKICKEENAVSVKSAESEEEA LIVEVEGSDAEIDAQLALILDIARTHNPVELREAQSADEA LLAAFDTPDP AADLAAVGALCEAAGATGVVPADTEAES LLIGEVGGLEAGVDDVAAEVMNVCTAHHVRTVKLAANDAER LTVEIDGPEHGDDDEAAVVRQACMDEGAREVRLAADASDR LLCESDGTPEEVAEEVVAVRAVLEASGATEVRVAQDEAER ILLEFAGGAAEVREHKRQVLAWAAEHAAG YRAARNREEA LLLEFHGSESSVAEQAETFGETAQDNNSTAFEWTSDAEER LIVELEGEREEVAEGARRLAEVIAESGAEEVRVARDEAER LMVEFHGSPEATAQDAERFAEIVADHDASPFRWSAKTEER LLCELDGNADDVNHQUTVTQSILCDAGATLKVSNSDAERA LIVELDGTESEVDELLKQVRSICEKNNCSSLKLSKNEKER LIVEVEGSEAEVDHQLSLIMEHARRHNPVELRESKSAEES LLI ELLDGQAAEVAVASDRAADLCVEAGARAVRRADEAADR LLIEQDGPIQSVQADMEKMTAICVQSGALKVNVAKSDWEA VLCEMDGMAEQVEAEVARARRVLESHGATEVREARDEAER LLDEVDGHPGQVADEAAVVEKCLTKSGATAVHVAKDAEEK LMFEVDGTENTVREGGEMLKDACSTLATSDRAASDKKERD IVFVEFHADHSVSREVERCRTAFEDHGRSFDVSEAGPEMD LLFKLGGSKNTMNDQIKIVRQTCKKNGGFNMEVASDQAEK LFLKFEGTQAQMVEDVERTKKIVKNNHGSKFTFSRNDKEA IVERDGEKSVVRERVARLRELLAQEDGFAVTHAVNREED LLFEVDGTDLSTSEDAKRVSEVCAGLAQSTRVASDQREMS
 VLFKYAGTPAADAETAELVRDVVAKYGAGRYTFVEKDDDA DVEAVRGPAASRD REVFAEVARSCGATEVLVASDRAEA LLLEVVDGPENLGDELDTIKKALKEIDVENVEVAESKEAE
 LIVEDDGPEAGEVADQATVAKLCRDHGADECVEADDEAEG FFFEFAGASAAVQEQVTATEAVAAANNGLSFAWANTPEER LLI EVDGIQAG DDQLDDILTVCKSNHVRNVKVAKDEAER LLI EVVGHPAQVADEAVSVEKVLKDSGALEVVVAKDAAEK LLLTFDGSEAQVEREYDKVARYCLLEHGALDVFLVDTPERK LIELDGLEAGMDREARAVEAIVAQHGGQLHRTRQEPEYK
 LFFKFAGTKNGVKEQVSMVQSIVKSCKSESFEFATSEEER EAARRELAALERICADAGATLAHTTFDAAEA पM DEFDGDDDVIFKDCERVNAV LEAQGCTEVLFADTAQQK LFFKDGGSEKAIKEVVKEVEKI ASQHNNSNFEFASDEETK LLLEQDGPRDVVRQDIEAMHAVCLDEEALSVEVARDEAHA LARSDAGGEQGVEE CARMAAVCEAAGATFVAQSADEAEG LFGDVDGDPDTVARNLERMAQSCAKEGATGVTLAQDVAAS LLIEVDGDEAGLDEQQERIVSVCKASGAREVRLASDTAQR LVAQSDAPGAAGAAEVELRRAFEDCGAGEVFATDDPAEG LVARSDAPGAFAAHEAELMVAACEKAGATEVFHTEDPEEG LLIEDGQEREVAAAVEIAGELCRQAGARTIRRASSEADR MIVELDGTKSEVEELFKQIKQI AEKNKSNSFKLSKNEKER LLVELDGSEVEVGSNKQRVAAICTQNGARSTTRANDAETR LMI EVDGSAEGVAGRAAGIRTVAADGALHVDMADTHEAME LLI ELDGQEAEVQASAQRAEQLCRGAGARGLRRAEDPTEA LLIEQDGDPELVERDDESMHRLCGQKAAQVTVAANDEEAK LLFRLDGSAAAVRAETQTLGSALDEYAPVFLETASGPDEE LLVMEGLIEEAVEEQAERVTRVCMESGAREVRIAKAPEER LI EVDGVEDGLDDQLDQDDADCRDHGAFDGRPARDPATQQ


|  |  |
| :---: | :---: |
| UniRef90－V5SC85 | WQA RHDAYPAVGTTW PGKTtVVSDV |
| UniRef90－D7CY48 | ALEWKGRKAFSAVGRLSPEYLVQ |
| UniRef90－G4HK27 |  |
|  | NALWARHNVHYAMQAM RPNGRVWSTDVCVPDS |
| UniRef90－H1VKA7 | STLHCRADTMRGLPT WDELRWLNAKAGGGVWT T DVAVPTS |
| UniRef90－L8E | DLLLQARRLT LTALERVKSATMロDDVC |
| UniRef90－F8D |  |
| UniRef90－J4GCl3 | ADLWMDRKN ${ }^{\text {W }}$ |
| Ref90 UP100036 | ARADSHALEAL A SATARTKSRLTDDVCVPLS |
| UniRef90＿UP10004050B8E |  |
|  |  |
| 90－A9D099 | ALIWKGRKSAFGATGRIDADYICM |
| UniRef90 UPIIOOO47E2EA8 | TLWRARHDAFWAVKTMW |
| UniRef90－UPIIOO031148AF | NTLWARHNLAYAVMA |
| iRef90＿R41TS3 |  |
| P1000 |  |
| UniRef90－A0A0372 | ARI WLGRKSAFGAMGQINDYMC |
| UniRef90－UPI0002EL | DLWWKSRKM |
| UniRef90－UPI00047AFF | ALFFYENSVLRGLVSDKPLDMCYWRDKCGVI WYCPI |
| UniRef90－UPIo003B7A | ARLWDARKKGVG |
|  | LRFWAGRKA |
| UniRefo－B1Z7C | KRLWTVRRKCSGAMGQM AMFELGOAKLCLDGV |
| UniRef90－A3JQ06 | WQAR HDQYFASMALAPGAMGI STD |
|  | RK |
| UniRei90－UPI0002D6F723 | LMWKGRKSAFPAVGRLSPDYYCM |
| UniRet90－B5SHP6 | LKFWSGRKN AFPAAGRTSPDYYCMDGT■PR |
|  |  |
| UniRef90 UPIO00469BCF5 | AAl WLGRKSAFGAMGQINDYMC |
| UniRef90－M1L | FALTEARRS ${ }^{\text {a }}$ ALSALIARLKPTTILEDATVP |
| iRef90－X0RKM | EQLSTARRS ALSALARLKPTTILEDA |
| 0377 | WAGRKNA A A AFPAVGRAAPDYYCID |
| iRet90－W9DX48 | E\WAARRLVGAAVSRLDP隹TRVYVGE |
| A910 | VAGRKN AFPAAGRVSPDYYCMDG |
| UniRef90－V5 | ELWEARSKLGKAFEPYDPDLSSLAAG |
| UniRef90－U5HA | SRK MGLYAVID YVPGSKVIVTDV |
| UniRef90＿V4J7G2 | QARRAISPACFKLKPHK |
|  |  |
|  | KVMEARRSALAALSRLRP TTILEDATVPRS |
| APC | K ELWARMEMA |
| UniRef90－UPIC | DML IAARRL AGDAMEQप GDRLVDDVCV |
| UniRef90－UPIO002DA1A27 | DKLWQVRKLVS |
| $\begin{aligned} & \text { UniRef90_LOJN } \\ & \text { UniRef90_K } \end{aligned}$ | AALWEARRALSASAVVY |
| Ref90－UP100031F | A |
| 2 | DLLLLEARR AA VALEQLYED GTTMDDDVC |
| UniRet90－G6 | AVWKGRKAAFAAVGR SPNYFVQ PKARVISTDG |
| UniRee90－UP100034D21E1 | AR】WKGRKSAFA |
| UniRef90－UPIoo0262686D | SMWWANRKMGFGAMGADSPDYLVQDG |
| UniRef90＿E5Y4N5 | ARRV A |
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| 8R216 | A WKARKSAFGA】GRTSPTYCTQ |
| UniRee990 D8EZO | EGLWEARRNVS PSLYKLI GPHKINEDIVVPRS |
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|  | A R |
| UniRef90－U1LJET | ARR |
| UniRef90 UPIO004788561 | DV |
| UniRef90－M1E439 | D |
| UniRef90－D2R6L8 | T |
| UniRef90－M3VJD4 | Vpp ${ }^{\text {P }}$ |
| UniRef90－H6R2 | atrrf al Pavertgrliledvg |
| UniRef90 K9P4 | ALLWKGRKAFAAVGRUTPTYYVQ DGVVPRS |
| UniReer90－W9 | LKWWKRKAAFAAAGKISPNYFVCMDG DGVIPRT |
| UniRei90 UPIO00037B1A73 | RLWKVRKALSPALRTIAPKK TNEDVVVPVS |
| UniRet90－W1K0 |  |
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|  | RLLTARRSAFTAL |
| UniRef90－A0A044UMQ4 |  |
| Ref90－UP10003 | DLLWKGRKNAFG |
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210
220
230
240
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RNRD
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 FDANDPE ESMKAEMAGNDIL KLLCVDAGGGEHGVGIVEKRDL VDVESTAELARVRAFLDRLVMRALDMGGGEHGVGQGKMAY


 F DATDADEARRARESFDA VMALGLVGGGGEHGVGVLKKEW Y DARNPEELARAVMLGQQILELGVDVGGGEHGVGILEKDQQ Y D RLLQA GA DQRAL RCQDEIL QNLI A Q GYAPYRLGVQSMSL
 F N A NQPGELEKAEALGADILKLVVEVGGGEHGVGVEKRDL


 F DANVP GELLEKTEAF GAEDLDRDCVVAGGGEHGVGMEKDDQ

## Y <br> F Y T T <br> <br> T Y C F

 <br> <br> TY
C
F} D S R N K D E M H R R V E Q A L E E I F Q T A V



$T T Q E E K E R G Y G V V A R M V E R A Q A D D G G E H G V G M G K \square K Y$ LD RD DPDEMMQRAAVVAKKKVFFEKADGGGGGEHGIGGLSKAPY
 Y DP HDPK QAAASARDNDLVARKAIVVGGGEHGVGLGK $\quad$ GK Y A S NDEEYQKRKEVVFDTI A WKA I E L D G G GEHGVVGTVKK K Y F D A A D P DSVRRGQAAFDAIMALGLRLGGGEHGVGMLKREW TNMRDENEVRKTEDAVEEI FNYAI ELGGGEHGIGVMKKAF A DPSDPA QLER GEELYRAAVVELA DL G G GEHGI GE GK QA Y
 F D A LD A E QARRAQAAFDQI MEAGLALGGGEHGI GVLKRAW EAR G GHERAEHLSSSIAE LCVVDLGGGEHGIGTADAC S T D D T P E GHARAWELD K KIVVARALDSLDGGEHGVGMGK LD F FDDAEPGAWERAEEVSAQLLDLCVEHGGGEHGVGVDKACK F D A SVVPGESDRASKAGSECLQVVADVGGGEHGVGIDEKSAE
 R D K L D E Q WK E K L E K VF E E MYE K A A EV G G GE H GI GFA K K E Y
 DKRDKEEFARVEAAVDEMFDVAI SLDGGGEHGIGTAKSKW FSQQD
 A GMSDEDWKNKLKDGワKEIVELTSALGGGGEHGIGLVQKEF

NAEQRKTAETIVENMVKRAIDAEGGEHGVGIGGKREF T DARNHEEMERVEAAFADVFAAALDDGGGEHGVGAMKAPY F D R NDPDAVARAQAAFEDI LQVVGALGGGEHGVGVLKRPF D P S D D GA IE R TKAA AGDI FSAALLEGGGEHGVGAAKLP W

F D A N Q T GELERAEAFGAKI LEACVEMGGGEHGVGLEKINS F DPDDADEAERAQRAFGEVMDLAIVEDGGEHGVGRLLKGW H DPTDPDMTERAHRAFGEIMDLAIALGGGEHGVGRLKKAW
 YDHK $\square$ P GA WERVE E L G GEVILK LCVVKVGGGEHGI GADKKC Y
 Y S A A EPNAEQRVV DLGAAILKECLAVGGGEHGVGADKRCY


 Y D P R DP D QRRRAHDI A A GVLERSSLANGGGEHGI GLEKCEY F D N S V V G A L H VVE EL G GE I L K L CVV R VG G GE H G I GA D K K C Y



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ET पC\|VLADFTNVESAGQAVAD $\|$ IISAGVIPAGME $\square$ MD FDD $\square$ GAATAA $\square$ AEV VQSG $\square \quad D V A K \square$

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


YAD $\square$ HA ASAA $V$ SA $\square$ MA QPV $\square$ PCA $\square E \square M D$ VVMASFDDVGKAGKAVGD】1AAG】VPGGLEMMD $\square E S A S H A T S$
$\square \mathrm{F}$ VGSEGT $\square \mathrm{G} \square \mathrm{V}$ TEAT $\square \mathrm{K} \square \mathrm{A}$
PSVVEATR V VP H HPT $\square R$ Q
$P G Y D L L A A V V G S E G T L G D I T E T V R L T R N A E D V R T F D A D F D$
 $P G Y D L V G L I V G G E G T L G V V T E A W V K D T P V P V I R T A T M A F A$ PGYDLMGVFVGSEGTLGTATEILKILKRPEAVGSFPSVRA PGYDLTGIFVGSEGTLGIATEULRULKSAESI CVLLAD
 VI $\square$ GSEGT $\square G \square V$ TEVTVA $\square R \square A P$ VTHS $\square M G A F A$
$S L L I P F P \quad D \square D R A \square E T V P K \square D K S K T \square P T A \square E F M$ GYD $\square T R \square F V G S E G T \square G V I T D V T \quad \square R \square Y G \square P E S A A \square C S Y$
GYD $\square$ CA $\square M \square G S E G T \square G V I V E A T \square K \square R D T G E V P T \square G A Y F A$



DA $V$ A A $\square$ TARG $\|$ VPRC $\square E A M D$
S LLVPFPN $\quad \square D K A \square G T V P K \square I K S K N \square P T A \square E F M Q$
$\square \mathrm{AD} \square \mathrm{V}$ Q S GVD $\square \mathrm{AK}$
D LE S A $\square$ E TVPK $\square$ K S K N $\square$ P T A $\square E F M Q$
$S$ LLVYKNPKDA DDCVPVI MSKGLIPTGDEFMD GYDLVGLMVGAEGTLGVVTEITVRLRRVGYFDSVGQAGD SGIQPNAMEI
 LI DFP $\quad D \square E T A C K A \prod A P D R T C R V E$

 $\square F \| G S E G T \square G \square V T R A \square L R L D P A Q \square P A S T V A L F S$ FDDVEEGSRAVSD D DSAGULPAPAME CMMN

NFC $\square$ NADEDTVKTNCYPRDA
ELIDAFSATVSNEYLNTSHPDVP
$\square D D S A \square K A \square N M N \square P N A \stackrel{F}{E} \underset{A}{\text { P }} \ddagger$
$S \square I E Q R \square F P A T \square D F$
MDRNA $\square$
DATPRNDWLETST

TTSDVVVMNLSRCELMNDEG
ПKVTNTVFKTTLPCAPT LDELALRALNRHLGAERPA TASAAAAVSMRQPQVPAMDEFMDRSADSBLERRDVPDAGAM AVTKDFTSGVFPSALEDRNEFMDKNAIRAVEEFKPVGLPVV
FTT T $\square$ EAAGETVSA $\square$ RAG $\square L P A G M E \prod M D N \square S \square N A D V V A T N$ YMDDVCIRAVKAFANVDYPL FPNVEAASKTVNE LLSSGDPVDYKMUQSINQSNLCGRTS EAVLA AALEEAVSRVMRQAVTPCALEFMDQHADDADADDDPDGRAL

HGAGA V
A AA $\square R T V Q R Y A G \square D \square P E \quad G V G A \quad L$ $N \square A \square R A A \quad E D \square H A G Y P V E A E A \square$

AAANSYNKTN $\square R$ VSAC A $\square$ IA A GMDPAA LEMMDQLTKAVEDAFHAGYPREAGA V A VLD $\square A Q \square R P A M L E F M D A V A \square N A V E D M L R M D \square D R S A G A M$ AV SAAADVIRAGVPVAALELMDEAQMRATRPRVWQEKPT
DMEVAGACVS A $\square \square A D G \square I P A A \square E M \square E A \square E S W A H A G Y P V$ FYQDTTAAAAAVSRLMSQPIPATLEFMDHYRNDSNDPMAG

A LK DGI A A F L $T \boxtimes R D A$

 TVLQUAAVADPAAELMDRTCDRAVNSLTRMSLDESAGA L

TAREAAATGVVPAEWLDRDG $\square N G \square Q Q F Y D T G Y P L$

QRAA $\square$ VAA EFGGKK FPDSQSDAY
PTVDAAVQTT $\square$ T $\square$ QS G $V P \square A V D E \nabla Q M Q A \square N K F S D \square G Q P T$ SCWDAAVT VFEVIKNGFNPLEERMLHEVNEVFNLGYPL TVRDAAAASAAVTAACDRPADMDRNMLIAVSEATGVGANY A GLDAVTD DMAR TRPSLLELMDRATCRAVEAYKPLGAFL SERDAAETVAYRPSMFEMLDGLTQSMLNELKDFGLDENVGG
$V L A \square C G K \square R P E F M D R A T \square N A V E D M \square R M G \square D R Q A E A M$ REVILAA EKFDGKK FPDNSSDAY A S RVAVTSQTRPAEFMDNTS $\square$ NADVDMLDAMDLDRTAGAM MD A R A L E MVS RYA GLDELPL
KTTTAAVEAFSKSGYPTDTEAL
LDDKMMQVINQRRWTEAPT
 YA $T$ GRAGVVPA $\square A E L L D G P V L R A V D P A L G E R G R G L A L$ $\square E L E L S A T M V N R$

## YLDADLPNASMAF $\square E \| H R N H N$

$R D L I S A$
EEFLGKK FPDNSSNAY
KLSVQTSC EYLNE SLPYQQAGAM
AVRATAAAGLRPAADELVDRHCLRAVDA WKNMGLSAEV
 VFR A GMLPAALEFMAGETDDCLALLRRTPPWPGNVRAA
 A VAKKF $\square$ ERPS
S $\square$ Q DAANAFLLHGMQLNA $\square E L L D D K M M E C \square N K T K W T E K P T$
 T $\square R$ A $\square$ EMHSAVP WPEGTGGL

DRTADEAVESANFPVGHPLDVEAL


|  |  |
| :---: | :---: |
| Ref90 F4P8Y5 | EAYWQARKT MLWS DMT LKRNPDDKFLGTDLAV\|P||S |
| 俍90- C88330 | LS SWQ |
| ef90-F8A7 |  |
| ef90-B1WY | LWKRKAAFAAAGNISPDYFVQ |
| UniRef90-A8MAT |  |
| UniRef90-V4X | DELWEARGKDAKAFEPYDPDLSPLTPG |
|  | EELWEARKSMGAVALWSVLDQGKLKSPGARDWTTDVVPDS |
| UniRef90-UPI00047DD765 | arrssmgacakLkPNVTTD DVIV |
| UniRef90-A0A031GW71 | WSGRKN |
| UniRef90-Q012V3 | WDarrgcy |
|  | HEAR HQAYWALVHLFPGHRFMI |
| UniRef90-E6WC | ARR ALSPALRSIAPGKINEDVVVPVS |
| UniRef90-D3SN | QKLWTARKNSPA VOTKPKGPALGNLKTGK\|NEDIVVPRS |
| UniRef90-H5TUV4 |  |
| UniRef90-Q8DIG3 | LRLWQRKAAFAAAGRL |
| UniRef90-UPIO003692 | A WKGR |
| UniRef90-O4PFP4 | GKปWEGRKA ALWAVAATNQAPGVKVWTTDVCVP |
| $\begin{aligned} & \text { UniRef90-H6MXM5 } \\ & \text { UniRef90_Q3SHD } \end{aligned}$ |  |
| UniRef90-14A955 | AKLWQGRAV |
| UniRef90-UPIOOO376 | ALI WKGRKSAFA |
| UniRe990-F9U8F0 | TSLWKARKALSPLLMALSPALRHTAPKKINEDIVVPVS |
| UniRet90-UP |  |
| UniR | VG |
| UniRef90_A4481 | WEARRSCFGA FSAMHAGKTKSAQKVIATDVCVPDS |
| UniRef90-H8GYW4 | WARRSVSPALGRTRPQRMNE |
| UniRef90-H0R399 | EAFTAARR AA |
| Uni | WSARK ES |
| UniRet90-UPIO0034D | LK WKGRKAAFAAMGQC |
| UniRef90-Q9PG | AARDQL |
| UniRet90-H1YDK5 | A |
| F1 | HD |
| UniRef90-B1XNB6 | LKLWKGRKAFAAAGNISPDYFVQ GALLEDGVIPRT |
| Uniefo-K9R | LKLWKRKAAFAAAGHLSPDYYVQ DGVIPRT |
| UniRef90_D9X1V0 | EMFMQARRTVY PALERLGTTLLDDVGVAV |
| UniRef90-10RDK9 | A ALWYGR |
| UniRef90-F8AD10 | R |
| H5UVN5 |  |
| $\begin{aligned} & \text { UniRef90-U2N9E } \\ & \text { UniRef90_O9RVK } \end{aligned}$ | EARHK |
| UniRef90-Q0GCN | WQAR HDAHYANMQLRPGA |
| $\begin{aligned} & \text { UniRef90_12JTX66 } \\ & \text { UniRef90-F7NMX } \end{aligned}$ | WRARRGGTSA |
| UniRef90-UPIOOO382A435 | D |
| UniRef90-L7URW2 | R |
|  |  |
| UniRef90-K9YPI | AKLWKRKAAFAAAGHDSPDYFVQ |
|  |  |
| UniRef90_R7X | AR |
| UniRef90-A5IOK1 |  |
| UniRef90-L7LE09 | EAFAMARRV A APAVERR GSLLLEDVGVPL |
|  | A ALCK |
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| UniRef90-B2KASO UniRef90 A3G183 |  |
| UniRef90-N9XLX1 |  |
| UniRef90_IORIG0 |  |
| UniRee90_UP100036CF1B3 |  |
| UniRef90 L9XEJ6 | ML |
| iRef90-H1C | ESTWSARGAFLEAlKASTSDLDE |
| UniRef90_UPIO | ERLLFARRM ALPSIERFOGE GRALIEDI |
| UniRef90-A6TL |  |
| UniRef90-A5D | QELWARRNGFWSTFEYRFYQTKQMFKDGVLI LLC |
|  | DSVWDARRGC |
| UniRef90-Q313K8 | PLWETRRGINPASYLAAPDK |
| UniRef90 ${ }^{\text {ch }}$ LRK | TPIWKTRGAF DEATKGSTTEM |
| UniRet90-C4XWB1 | EVLWGARRAGL WSTFEYGKKVLDDKDDVQ ${ }^{\text {L }}$ WT TDAV |
| UniRee900 UPIO0034 | RLLTIRRSFHPAMEA |
|  |  |
| UniRef90-UPIo003B42370 | GVA |
| niRet90-T1VW | AQLLEIRRL A APASERLGQC LVEDVG |
|  |  |
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| W2 | ELI G G R R\|LIA Y Q A K E R\|U G Q CLL VE D|V|CIVP R S |



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UniRef90-UPIOOO382A435 UniRef90-L7URW2 UniRef90-C4LIW4 UniRef90_D5BVM9 UniRef90-K9YPL 1 UniRef90-UP10003765CC3 UniRet90 R7XYV4 UniRef90-E5XLL9 UniRef90-L7LE09 UniRef90 WoE6Q0 UniRef90_Q6ASD7 UniRef90-A3G183 UniRef90_N9XLX1 UniRef90-IORIG0 UniRef90-UPI00036CF1B3 UniRet90_L9XEJ6 UniRef90-AOAO45JIE
UniRef90-H1CTZO UniRef90-UPIO002626CDA UniRef90-AGTUJ8 UniRefefo-VGKPY5
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QESERAALLALEDKVIGHAIALGGGEHGVGIGKQKY PEDYPRAEAYAERLVAKALELGGAEHGVGLRKKKY YHPDDPAEDARAHAALEGLFAEVIALGGGEHGIGAAKRDW YDKANREEEERAEQAVDEVFEMTLAFGGGEHGVGLTKRKF EPQEAEKVESAVRDLFRFTI ELGGGEHGI GFMKKEF FDPADADESARAQTAFGQVMDLADSLGGGEHGVGRLKKGW YDQAVPGALAEVEALGGEVLKLCVRVGGGEHGIGSDKACF FNAQDPEQTRDTTQVVGRLCERAQKLQGGEHGVGMGKIEF FDPDDADEHDRAQKAFGQVMDLADSLGGGEHGVGRLKKGW DPLNPDEVERTHKVAEAI HRLALELGGGGEHGVGTEKRKF FDGAVEGAVDRAEAVAGGLLDLCLEHGGGEHGVGADKAKH VNPDNPEEMKRAYACLDEVFSLVLSLQGGEHGVGMAKRPF GSMSDEDWNTKLKSGUQETEELTVKLGGGEHGIGLVQREF FDANREGELERAEALGGRLLEACVAGGGEHGVGREKDNQ TDAADLKRARELEDRMVRRAVEMGGGEHGVGDGKVRH
 HDPNDVDETRRATEAFGQUMDLAIEDGGGEHGVGRLKKGW YNKTIPEEAAKAKLAVKNMVARALEMDGGEHGI GLGKKDA YDNSQPGALEVVEELGGELLKLCVKVGGGEHGGGGLDKKDAB
 ASMSDADWNKKLKDGLKEIFELTVSLGGGEHGI GLVQKEF FDDRDPEQVRKVIEAGEEITRRCVELGGGEHGI GVEKVDM HDPTDADETARANRAFGQUMDLALSLGGGEHGVGRLKKGW YNSADPGDLEAVEKVGGEILKLCVAKGGGEHGI GADKKMY FDNSUPGELEKVEEVGGEILKLCVKVGGGEHGIGADKKCY YDATDRDATDRARAVFDD:VAATLALGGGEHGVGTLKTPY YDKDNPDAASALLEAANDEIIAAALRLGGGEHGVGTEKIDF YDPQEEKDALEELDKVLHEVVEKALSLKGGEHGIGGDAKKKY FDASDQAAVDCAEAAFDEIMQLGLGLGTGEHGVGYLKRHW AAPDDRATWDALHATYDEMMT LTRAAGGGEHGLGLHKQKY LDPDNADEVSRAVELNERLVARALEMEG
FKKQD RAKAAXAVERMVTRAI QADGGEHGVGПGKRDY F D GR $\square$ HEEREAAERALLGEIMQAAVDLGGGEHGIGLEK LSG F D GTTDADPDE DWAAA GEI FEAALELGGGEHGI GLLKRRW

 YDESVAGALETVEETGGKILKRCVEAGGGEHGUGADKNCY FDDNTPGELQKAEAAGDELLKLCVEVGGGEHGVGDEKREL HDPEDEDETRRAERAFGEIMDLAARLDGGEHGVGRLKKGW DNDNKEQWDKKLKDVFECMYKKSVELNGGEHGIGGAKKPY
FDPEDTDEARRAQLAFDQMMGLAVMGGGEHGVGRLKKGW DDPDDPDEVARAATCLDAVFALVIGLDGGEHGVGLEKRDF UDKANANELERGEKAKELLFVHTVSLEGGEHGIGGUTSAY PEQREVAQKVVDQMVQRAVALEGGEHGIGFGKREF DEDDQEAWEDRMRKAMNDMYAMAKEMKGGEHGLGYDKDDF YDPTDAAVAERAEAAYGEDMDLALRLGGGEHGVGRLKRPW EGDAEHHALGKRVDEQVVHRADELGGGEHGVGLGKQQY YDPADAAMLERAHLAYGEI MDLAVGL GGGEHGVGRLKRPW DELSEDEWHKKLNEAMEDLYRKQRELNGGEHGI GLAKRDY PDSTMEEWHALEPKALRELYEVTDRLGGGEHGIGLKRKKY TEHGDAAAQVRARAAFDDIADADELGGGEHGVGLLKRPG YNSPD YHKVQTVVDRMVKRALDLEGGEHGVGVGKRKY SDPADFVKARALEQAMVRRAVKMGGGEHGVGVGKVHH HDKSDPGVREKAVAAKKEMMNVLSMGGGEHGVGLTKAPY QDFTQPAEVERYANFMDELVRLVVEEYDGEHGTGRNMAPF DDMNDAEWKKNLEGAMDRMYKKARELKGGEHGDGFAKMSY YNSKD YDRAKDVVDRMVGRALKYEGGEHGVGVGKRSY

EVP
FFPDDADEMAKVKPFLQRLVKRALAMEG YDANDPESVLRAGAAFNDIMSLAIALGGGEHGVGRLKKAH FDRTDGSVPEAVWTAADEVFRRALELGGGEHGVGVLKRRW YDKSAGEQEKALKAKQKIFQLTLELGGGEHGIGLTKAKY FDGRKPGEKEKALAAGSRCLQVCADAGGGEHGVGIEKIEE NDLEEAEFKARVAKFFDVIYEEATKCGGGEHGIGSGKMRY G YDKLVA
DYPEDK
FERGLA
F ER GLAEPPAEVWAAADEVFRAALDLGGGEHGVGLLKKRW


## UniRef90 H6BN39

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ESVQVLLADFTS\|EAAGGAVSD\|IQAG』IPAGMEMMD



SEGT $\square \mathrm{G} \square \mathrm{V}$ TEATVK D HVKPHFETVV VGQ
LVPFEKMQD A $\square$ NVVPK $\square$ MTAGVVPTCLEFMD
F D D $\square$ H S A A D S $V$ A M $\square$ R M M G $\square$
GYNLNS $L \mathcal{F} V G S E G T L G L V T E \square T L K L A V V P Q E Q S V A V V T B F$ SLLLI P FP T

GYD LVR $\square$ FVGSEGT $\square G L V T E A \square \quad \square K \square A P V P E S A V$
TSF 1 L P F

GYD $\square T S L L V G S E G T \square G V V V S A T V R \square R \square A A D F T D V V Q A A A$
$\square$ F VGS E G T LGGVT RLI LKLLPRPEASASVLVGY

```
PCKMDF पA \squareF P D TE T A पD T V F K LLLK A G पD P
            VLFAPVDDLEYVTEFLYR|LPRRDGQEVVLLNN
```





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GYDLTH|F|GSEGT\G|IT EVTQPEA\SAA\CNFPT\DD
```

UniRef90 V717B1 UniRef90_U2L4D2 UniRef90-B4WNH2 UniRef90 C1CWF7 UniRef90 K9XQ15 UniRef90-14WVQ6 UniRef90-XOPFF3 UniRef90 Q96Y71 UniRef90-UPI000375707A UniRef90-A7EQ66 UniRef90 F4LT71 UniRef90 UPI000368C8AF UniRef90-D4MUV9 UniRef90-X0T8W6 UniRef90 G0VRC2 UniRef90- S3AW82 UniRef90_UPI0003B441D2 UniRef90_Q6BMB0 UniRef90-A5DZZ5 UniRef90-B3DXH0 UniRef90-D5UQJ8 UniRef90_D4ZZH4 UniRef90 UPI000478F68E UniRef90_UPI00035C4AA3 UniRef90_UPI00047A1D90 UniRef90 UPI00035D44D8 UniRef90-M3K114 UniRef90-B8C7B6 UniRef90 A0A016QSU6 UniRef90 H0EVQ0 UniRef90-B2TIV2 UniRef90_UPI0003724812 UniRef90 A0A031LT71 UniRef90-D6V985 UniRef90_G7VFA9 UniRef90-NOBEG6
UniRef90 J7LTB9
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UniRef90_S9Q278 UniRef90 UPI0003B76401 UniRef90 UPI0003B30111 UniRef90-UPI00046AC9C4 UniRef90-V4TNG1
UniRef90 D1KEB4
UniRef90 F8JCZ8
UniRef90-UPI0004674631
UniRef90-D5GZR9
UniRef90 S9VJI6 UniRef90-A8HSW4

NFS $\square$ NA VEDTVATNCYP
MAA ALDQPERLE LDMAEGL
RDADA
RAVNVHKGTSFPERP SYRDAASAAQAVARDMAQPTPCALEFMDALALK LPEAAAL

 EL SFKTSCEY LNEK LPYQSAKAM
$E L L D \square A Q V R A \quad$ VN N Y SKLNLDESPL

PPGAAQ
 FPS $\ddagger$ LDSTNTVAQUYRAGIQPNA $\square E L L D K Y F T R H W L E C P T$
SDS $\square$ KAAEM Y $\quad$ Y KK $\square$ PHSDA GAYV

ELLDEMSTRA FNKSLG SDSELA RKWSEMP T VTVRGLGVLPERDEFVD AATDRAVNRHRDRHCTVKPT $P \square R D A A S A A A G V M R A G V Q V A A M E \square M D E V Q M K K W K E L P T$ $R E A \longdiv { L }$ LAA EFLGGKSFPDKSSDAY
$D M L G L A \quad L P V S R L E L V D G P S I I$ I EFSEYLDADVVKSMNKLNA QLKETDGGMLM $A V L A Y Y D D L E T L V E D V V R V R A G R L W P L F A E F$ DEDVVRMGREMGEGNML GSALL

D V VDSSAASTGNNDFPTEVNG NKSVRCC EEFLEEKLP


AVLAVGRRLRPSMMELMDRASDNAVEDYKPMGLDR


K VWDEKPT

VDLDA AMLAEDWPADYEKLKSTLPP WT $L A D V E D P R$
$A$

GEPAAL



A VQSQMGVPVARVEFMDAAAV KAVNDHSKLS $\square$ RETPM

KAVARLPEGGAW
LLS A A T D A VR R WVA Q GLT R GVPR $\square$ Y D P A A A R S Y GE GEFL
 A A G $\square$ T P T SVE Y F SEE DVD K WE E Y S $V$ K K K D G S G Y

|  |  |
| :---: | :---: |
| UniRef90＿V717E | LLDSFDGSTEEDERSYDKVAQLCLEEGAL |
| Reef90－${ }^{\text {B4WNH2 }}$ | LIIEDGMPAEVAATAEQTDRFCRKNGARQIIQATDPDER |
| UniRef90－C1CWF7 | LWI ELASPAAALEEALSCCRELC |
| UniRef90 K9XQ15 | LLVELDGLEVEVAEGKKRIAEICRQNNSRNLTSA |
| UniRef90－14WVQ6 |  |
| UniRef90－XOPFF3 | LLLSFDGTTEEV |
| UniRef90－Q96Y71 | LLIELDGHNDQVNEEESRVKRAIEENEGEVI |
| UniRef90－UP | ， |
| UniRef90－A7E | LFFKFSGTEQAIKDHIHRVQSIAKQWKG |
|  | GD |
| UniRe90－DMMUV9 |  |
| UniRef90－X0T8W6 | GSPDELKKISVKTGEMCLEYG |
| GOV | SEDDLDDKAVVLDEVCTENGASSVLVAD |
|  | LTVQTDGPSASVDAEA GAVLEAAGGAVRAARDDAEAE |
| UniRef90－UP10003B441D2 | T |
| Q68 |  |
| A5D |  |
| ef90 ${ }^{\text {B3 }}$－ | LLLEVDGSEAAVNADIDFFAKLVRSFSPRNLSKALGEEQC |
| D5U |  |
| D4ZZ |  |
| UniRef90＿UP1000 | NGPEATRRA GLI QDCFTAAGVVDVLAAEDPA EA |
|  | SSTEEQVQADYEAAGKMCMENGALEVFVSDNLSS |
| UniRef90－UP100035D44D8 | （ FTDGGAVWTEQSTDATEA |
| iRef90－M3K114 |  |
| 俍ef90＿B8C7B6 |  |
| A0A | LWVEVAGRDADVTAQLALLREAAELHGGQVVGEARAPEAQ |
| UniRef90－H0E | FKFSGTKASVKDNLQMV |
| UniRefao－B2TV2 | A SAPAAAADEAIRRVCLTNEALQIVVA HTETDR |
| UniRef90－A0A031LT71 | DDQLQDVISIVKEKGE |
| UniRef90－D6V985 | VLMETSSPRDDARMLIENTLEAAMEAGLVV |
| niRet90－G7V | E |
|  | E A |
| UniRef90 J7L |  |
| UniRef90－${ }^{\text {UniRef9 }}$ | E |
| UniRef90－W6R5×4 | A |
| UniRef90－E8LBD6 | EDELDMKMEQLDETCTACGATDVVEADE |
|  |  |
|  | LVITLDEGDEN |
| iRef90 U7 |  |
| UniRef90－－12F8C5 | GSKDSIFDDYVKLGEAA或AGGLEAFVADNRNT |
| UniRef90 S7HG72 |  |
| UniRef90－A1SLU4 |  |
| UniRef90 M M 77 K9 | LLVRTDGHGAEDEA GIVRSALENLGA |
| Unip | LLLKFDGSVEEIENYYDNVAK CLQQGA DILIADTDERS |
| UniRef90－B1R055 UniRef90－UPIO003820E06 |  |
| －－14YY5 | PEDDLRALLEKALGSAFENGTDEDATAASEAQN |
|  |  |
|  |  |
|  |  |
|  | FK】 GSSK】LNELIKDVQK】SKNHNYYKFQFAKNESQQ |
|  |  |

> EQAAELVLEAGA

DDEAAALAAMFRDAGTAWAEQSTDPVEA ПITVETSTEEEDEDKAARUDE：CTAGGAMATVVPD SKK LILVISGLLRRPDVEFAAFSRLAEEAGAEVFVAESVAESLG

 Lf VEFTGDEAEVEEKVAGLTATLDRGPKKETASKVATAPA LLCELDGTEAQVQAELDTALKVLSGA STLKVSESEAERLD DLLTFDGREEEVEASANRAKELVMAQGALDYDVLRDKESD LGLDSLTKEELDAELKLALAATKKFKAAVILDANSEEAK VKEDYRT\AALFKQVGKAK\YLQSGKELD LVFEFHGSPAGVQEQAETVQADTAEHSGMDAEWAERPEDR GAGSTTSANDQETR ■MVSFTGDEDQLDEQCEKDDEGARENNADDVLVANPA
 QEQLARUMASLAGFPVEKQVFTEDPREN UniRef90－I4LOX7 UniRef90－H5T977 UniRef90 ${ }^{-}$K2KNH5 UniRef90＿UPIO0021926FC UniRef90＿10UZS7
UniRef90 O9HKQ4 UniRef90－UPI000249162C UniRef90－UPI00030826F1 UniRef90－A0A016XHQ8

UniRef90_V717B1
UniRef90-U2L4D2 UniRef90-B4WNH2 UniRef90_C1CWF7 UniRef90_K9XQ15 UniRef90_14WVQ6
UniRef90- XOPFF3 UniRef90-Q96Y71 UniRef90_UPI000375707A UniRef90-A7EQ66 UniRef90-F4LT71 UniRef90 UPI000368C8AF UniRef90-D4MUV9 UniRef90-X0T8W6 UniRef90-GOVRC2 UniRef90_S3AW82
UniRef90_UPI0003B441D2 UniRef90 Q6BMB0 UniRef90-A5DZZ5 UniRef90-B3DXH0 UniRef90-D5UQJ8 UniRef90-D4ZZH4 UniRef90 UPI000478F68E UniRef90_UPI00035C4AA3 UniRef90_UPI00047A1D90 UniRef90-UPI00035D44D8 UniRef90-M3K114 UniRef90_B8C7B6 UniRef90-A0A016QSU6 UniRef90-H0EVQ0 UniRef90-B2TIV2 UniRef90_UPIOOO3724812 UniRef90-A0A031LT71 UniRef90_D6V985 UniRef90-G7VFA9 UniRef90_NOBEG6 UniRef90 J7LTB9 UniRef90-W5XQW4 UniRef90_UPI00047E7D1B UniRef90_W6R5X4 UniRef90-E8LBD6 UniRef90-AOJSX6
UniRef90 C7MP87 UniRef90-A1HPH4 UniRef90-U7UHU7 UniRef90-I2F8C5 UniRef90_S7HG72 UniRef90_A1SLU4
UniRef90_M7N7K9 UniRef90-R6N9Y5 UniRef90-B1R055 UniRef90_UPI0003820E06 UniRef90-14YYJ5 UniRef90-NOB951 UniRef90_UPIO003B3F342 UniRef90_A5EEG1
UniRef90-A9DDP9 UniRef90-K0KPX8 UniRef90-W6WWK5 UniRef90-R6G758 UniRef90-W3RHL5 UniRef90_UPI00047B8F07 UniRef90-A1HM32 UniRef90-E3BDK1 UniRef90-D8F3M0 UniRef90-UPI0003B59CD3 UniRef90-S9Q278 UniRef90_UPI0003B76401 UniRef90_UPI0003B30111 UniRef90_UPI00046AC9C4 UniRef90_V4TNG1 UniRef90-D1KEB4 UniRef90-F8JCZ8 UniRef90_UPIO004674631 UniRef90-D5GZR9 UniRef90_S9VJI6 UniRef90-A8HSW4 UniRef90_A0A038K4P9 UniRef90-K9Z4R1 UniRef90-U7UQP1 UniRef90_UPIO00375E8F1 UniRef90-X1KBIO

QSUIWSAR 130 140 $\qquad$ C D V V IC V $V$ PR

160

## K D A WA A R S ARLWKGRKAAFAA MGQLSPDYYVQDG

 $C D V V V P V$ A LWEARHHAFYA LDKALYPDHTT LKLWKGRKAAFARALWAARKALSFAQRAVTQHK
D TVVWTARGAFLEADKNSTTE MEEA


SRFWNARKG AFPAMGT $\square$ SPAY TT LDCNVL

SARKEALWAMLAQ
EAWKLVSPHQSLE

DAWAVRGALLEAIEADTVL
CRPEADYDAT DVVVVVPD

HNK IWQARKAFAEAVRAESLIVCKE
$G T-D V \vee V P V D$
LLWT TRRSMHPAMEAM

## EKLWLARRSVS PS LQNL

EELYSARKNAF YAILLNYGRNEDD

GKVRLLSEDVIVVPRS

LK MWKRKAAFAAAGHVSPDYYVQ
QLIE 1 RRMAYPATERM
ERIWKARK
CYAEADRMLSPV
GHMDT DGVIPRT
GRADTVARQLAYPALERK
E A L F A A R R L A YPALERL

Y CMEDI VVPPV



SA LWA ARHAVYDALRAAW WALRVD
P GHGTMI GDVCVVP
KMLWSARK
ES S WSAR GCF LDEADKADTTEMDE
MRKE
HALWERHTLFFG
PGHRFLVTDVVVPR
Y SLRAQAA
S SLDQRQAFWTLREVISPAQ
KLLERRRRLFYG
$E F K N D M G L R R A F Y P \square A D K Q \| S T A Q R D G G G V L$
EMLVELRRNSRGVEVDDE FR
$S L L E A R R L A N P A$
$A R L D D L R R H S R G D E V D D E F R$
$\checkmark \vee G E D D A \vee P$

SSVAQQKALW
HMRESMSDAQKPEGGS
RVWKVRRSCLEGSKAL
EQLVELRRNSRGVEVDDEYR
AVWDARDSFLTVIESKSELVDEM
NKIWKARKSFAEADRARSLI LS


ELFVAARRAAAFPALEARGALLLEDVGAP
VRLI EMRRASRG EGI WKARGAFLEATKSSTTCMDE VDIVVPRS EAI WSARGCFLEAIKALTTEMDE A AGG VDVVVPR
 RSLQQAQDFWR LETFSEA QKGAGGSIKHDIVSVPIA KLWAYRRRVSAASYVLGPDRD GGDMA VPRG DNLAQRMAFWKLREDUSWAQ KPEGGS MKHDTSVMV
 DA WAARSSF $\square E A \square M E E T K$ ASLDQRRAFWT D ALFEARRL AYPA R A PGFPGLRKLRKPWPADKPYWKNSVKGACQSLEFHT

GRDLVD | $D$ |  |  |  |
| :---: | :---: | :---: | :---: |
| D |  |  |  |
| V | $\mathrm{C} V$ | P | P |
| V |  |  |  |
| L |  |  |  |
| R |  |  |  | ELLLDDRSKMYES DKEYN I ETDDVVVPR E RLWTARRLVS PA LRA $\square$ RPHK ASEAQRDGLWRLRESLLSEAQ SRVWETRKAGLGL

ALWHIRKGLYTTVAEARA
A I A GI WDMRKQAVGLLGAL
LMGMKPEGASIKHDVSVPVS

DLWKGRKSAFPAVGRLSPDYYCM
RSLRQAEDFWR $\quad$ REAFSEAQKSAGGS $\square K H D \square S V P V$

SYWSARR ALLA

VIAASEGQSQADWK LREDLSEAQKFEGGSUKHDVVVPVS

LKLWKRKAAFAAMGK SPNYFVQ
$L Q L W E L R E A G L G A T A R G P G M A D T W P G$
WEDSAVPP
DLKERTKLYAGRKQLFAADSRYKEGSCTS LADDMAVPYS ARLVERGYAGDPD $\quad$ AADVLFRAKMGVPADGFVFFLPLLPFN ARLWADRKDTF

## A A $\prod \mathrm{WS} \Pi$ RAK SVGL

ATI I KI RQDIFAAGAQY
RQLWA RESAAGIATRMADGSEAWPG
$R \| Y L A R K G L Y A S I L R L R K S E K E Y \square V I G$
AVWDARSEFETA』QQTTTKMDEA
K A L W
K ALWWH $\square R E S \Pi P \square A Q A Q E G L N I X H$


D DMNEE QWKK K|LT D DFECMYSRARELLEGGEHG|IGFAKRPY NDMELEEFNKQVKGFFDD IYYQKAAEFGGGEHGIGYGKRDY Y N N S V P G E L E E V E E L G G D L L K L CVVRVVGGGE H GVVGAD K R C Y ARPDDT TVWARI EAVYDRMIA QTLALGGGEHGVGLHKRRF



 Y N P K DP E E TA A V K K CVV Y DMLDDRALDEME G GE H GI GLL GK K
P E WS LD K WY DTLNK LL PEMYK IVGELGGGEHGIGHKRKAY DPKDQNE\DIANGFLERLAHRAISMDGGEHGVGQGKKQY NDMEE GEFKKQVAVFMDKVYAKATEFGGGEHGIGHGKMDY
 G
G D


KPDEKKKCETVI HEMMLLGLENEGGGEHGI GNGKRKY Q HE QRREVEKLVDLMIELGLANEGGEHGIGNAKRNF
 YSRELTEVVPQADWDAADEVFQAALDVGGGEHGVGVLKARW
 TGGAVVEMPENVWAAATDMFRAAMALGGGEHGIGTLLQAF EDRDEHTWHE LVKDAVLPEDYELTYSGLGGGEHGIGGAKRAEA Y D H R D A D A V L R A R A A F D A I V A APPDDEPAKRAAQAAFEDILSAALELGGGEHGVGLLKREG

K P G E R K Q V E E V V N Q M K L G G S NE G GE H GI G N SKR N F EN D TVVDYKQRVFKVNERLI ERVLSVNGGEHGVGYGKKVY APPDDAEAWARIDHVLHDLAAHAVAVGGGEHGVGLRKRAY

 GKNKDE VEKLFKEVAKISIDDGGGEHGI VDADKAAFVARWHEVNDTVHAIVRKHGGSEHGIGLLKRDE



D MTD E E WEKQLA EFHKIVCYA YVYS LGGGGEHGIGAMKDDA
 E N M D DE Q WNK LLP LI Q HE IYQ Y VY S LGGGEHGI GYKR LDL $M D M D D A T W E K A V E E F H Q Q V Y A Y A Y R A G G G E H G I G A K K L R Y$ GDDP QE D WDRNNLP LA E K ELLF DETT E LGGGGEHGI GDKRKK Y MDMSDE E WE K NVE EF H Q QVV A Y A Y S V G G GE H GI GA K K L K Y
 D DLDDEQWHE LLTTLAMDKMYAKAKELNGGEHGI
DELNDNEWDEKIHSIMKMMYDKAQSLRGGEHGIGFAKKSY EGADPNVPSPALAAANDDLVRFALSLGGGEHGLGSTKRGA $\square D M E K P A Q W G R F N R \square V H D I V H A M N G S I S A E H G I G L I D R E D E$ EGADKA QF LSSLWEPMSDAI FELVSE LGGSEHGIGQMKRDA
 VGADT GAFLSRWKEMNEIVHALVLALDGSEHGIGQLLKRDE D E K DVVDKAMS LVNRI T E RS I K F E G GEHGI GMSKRS H
 NDLE E E EFKK RVVDKFFDI I YKEATNCGGGEHGI GS GKVVK A GADKDAF LDDRWHDMNEVVHGIVLAYGGSEHGIGGMKREE


 KAMGPH QRALVEKGDQRMLEDTVAMGGGEHGVGHAKREY SETD DEKMHD $\square$ ARAVR DLLMELGGAM SGEHGDGLVRSEW ERLG DQK GVDRYRAFT D DMVELLILLGLGGSEHGTGRIMAP F
 E H M D K A Q Y L A L LWD T M S D A L F E L V V T E L G G G E E H G V G G M M K R D V


 LDGENETEWQ

## 



FSRE GDAAERAHRALDLLHTSFADAGFAPYRLDVDHAHR $F$ NNPEEVARYQAFMDDVQALADVEGGSEHGTGRNMAPF DMCDPA QEQQVNTDSHEVVA LVAKYYGWGEHGKGY RSEF MDEEDEARDRRVSDAVAALTKRYNGLIWGEHGKGGRRGEY
 FD LLT D DGVATFRRFLADAANLVVAHGGGEHGDGQARAEL A DLSNE EAMAKDNKFMMDMAMI SVVRHGGSEHGDGLEKKE E




MS DMFTETDLETMQYVRSSFNPKGLANPTK MAEYMDPVELK $\square$ MKAVKKADDPKN】MNPGK LPKMFGDALVDAFQQVKAVFDPDDRMNPGKYGDTSD WKKEK ADSLNLLRAI KKALDPNNGLNPHKM RALIAVDPGALALTRRLKAVLDPNNAIAPGRY VELEWGSDAYQLMWQLKRLLDPNGULNP APAFFGESLYDELRKIKRAFDPHNQMNPGKDCTPFDSD SPVYFGPELYDVLRRIKEAFDPEGQLNPGK VPQQLSPAVQTLQQQIKAVFDPTG\|LNPGR LPRMYSPEMIRRFEVFKAVWDPDGVLNPG
 FEDFYGSDYVELMSRIKLAFDPNLILNPDK


UniRef90 V7I7B1
UniRef90-U2L4D2
UniRef90-B4WNH2
UniRef90 C1CWF7
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UniRef90-X0T8W6
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UniRef90-D5UQJ8
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UniRef90 B1R055
UniRef90-UPI0003820E06
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UniRef90-A9DDP9
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UniRef90_K9Z4R1
UniRef90- U7UQP1
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UniRef90- G2ZY61
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UniRef90_A0A014NM34
UniRef90 B0PGS1
UniRef90 W8R7S3
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UniRef90-E3G5Y5
UniRef90 L8PCI5
UniRef90-A0A017HJK4
UniRef90_UPIO003AA0721
UniRef90 UPI000237C439
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UniRef90_Q1QGG8
UniRef90 E9JP28
UniRef90 - D4CQM2
UniRef90_C9Y9Z8
UniRef90 R6STJ0
UniRef90-W5XYV6
UniRef90-E2Z9D7
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UniRef90- UPI000375F54C
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VT A $\square$ A K

VP V L K Q VFP NVETCCN

F H D $\square$ K S A CDA I I P L R E CDV
 S A MVY F H

Y D S $\square$ A D A A R S VSD I $\square$ S A G $\square$ L T T L E M M D
YPDMANAADAVPALLDLL SAVA $\square E G$
LR VDGV T T 】E G M G G

G Y D LT R L L I G S E G T L G L VT E A T L R L A VR P T A T S VA VA A G


GTLVTVLRRLRLVPVVRASALVFV

A H K ACALLF YENLS LASEAVKDLARNDS VSAAEDMD A L A L L K L Q GV E Q A L E IM Q

WY

A $\square \mathrm{I}$ K T $\square \mathrm{P}$ D T A A A

WH

TEYAEYAAP $\square$ PDDTAAA $\square$ M $\square E F D$

QPVSAVELLDRRSLRSVETKAGMPEWVKALSANACA

D R TMDELARDNPAFRPV
SAAELMDRNALRSVENKPGMPPVLKELGADNDVVALL

QLIT QAVENYVHAGYPTDAAAVLLAEVD

TMREANRVAVA LKK $\square$ NVSAAELLDSRDASVRDERGFGKAS

G G W
G $\square$ DE QLVRAF QERTGVGA WV
$D L V A$ A AELMDRAS LRSVEDEPGMPDYLKTLS PDAASL


$D L L D A \square R S K Q G Q A R A G S N \square P G Q P D A$
QLPRGAGW
$G G W^{W L}$

G G A A WV
$T \square R E A A N C A A R V V E G V P V A A \square E V L T S R A W A E V P T$
$\square$ P E G R A W
GPA $\square$ QAA EDF VHAGYPTDAAA $\square$
LP A G A A W

NYPD $\square$ AA A G D QPVT $\square \mathrm{E}$ G $\square \mathrm{DHRLVADERRKHQQLAGLGAWL}$
CLMSASS पDGMPSEDSK VKSGNGAWL
 NYGQAY

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UniRef90 Q2BJY6 UniRef90-UPI00037A7E89 UniRef90_W9TTW8

A Y LI IM MD GANKQHTVQQRQQLLANLGDCNYF\|AETIIEQA ${ }^{100}$


 $L M V E M G G \quad D T R D Q A L E R A R A M V E D S G T T A A L V V P P G P E A$ LL IE LS GDTAQRDALTAFLETADDEYVLGDVLLAQSGEQA FAMQGDTDEAAMLAAFEHCTERGWVSDGVIAQGESQAA QESMMEHDLE GAFEDRE DTDAA DA LLVEFQGSAGEVQEK】LTFMDLSTELA पLEQFTTDPDEQA

TKEE $\square K$ AELLEQALKTTTRFGSAVI LEASSEKA Q VLIELTSSRPKDDLQSLLT DLLGDAMEGGLARDATGAQSD SKETVDANGAF $\quad$ KK D RLKK D $\square$ P TAMPLYSQDPKEY

SELIDDDLPAADDDARDR LVANGAAVES LEADDPADQ SEAHARARFEHLLELAFEEGCVLDVVAESMAQA LLLKFDGSAEELERLYEGVAQUCDEQGALDVLISDTEERD LI ESRAASQSLLHEQINLIMASIAHFPKQVDFSEDPAVYN LIESRAASPSLLARQQLALIMKALACFAVEKQDFTEDPVEN FVETGGESPAQARARAEAIVRAADVVDSAVV

GT DPVVTR LEDTLAALMEQGR ULDATVARSEGQR IEKALIGAPDAIRAGLARLVALMAEGGPGSVVEMTDAGAQ IETSADDDKTLTARTEADEFALAGFNTVYPVVFTTNSDEY PEEDAARFEAMLEHALTEGWLADAAVAQSHTQT E EMSVIR A ELLEA LGGTMTPVGDAEAT G
$G \square E G G \square E F E S E Q \square A A \square G R A H G A T S D R L A A T E E E R$
LT F DGYRSEVEFNTARVRGLALENGALDYIVLTDAQAA LLIKVEDSESAAREQFERLLEAALDQGCVLDVVAENDAQAA FSEDANDR
DEDEDDRKMEKAGDVCEACGAVDVIVAAADE MMVEVGGDNA AEAMERAHTLAKDSGTTHYKVYPAGPEA YVEVGGADQGEAAEQARLVEKAMTGAGTGALVVTEPA RQ $A L V E I A G F A E G E E A R V A S A T L S Q A D D G G D F A R D A A M A$
$L V E V R A G D K A A L N Q L I E D V K A R L A D L P T V L P D T F T D A E Y E ~$

 $\square S$ QSDA AAA
VETRAGDPQRDQDQVAADTAALSEVAAPDDFTATDATLA $L F \square E C E G P$ MRQARLAQLKEKLLRKSPNVPPQEAQTEEEL EFAGSGAELQEVLQQQLEEQAFELGLLRDVASNDSQRAC

VE Y QAQGKA ELVEQDEAAQNVLSRPATGS AFLT TALDSGHAADAVLAVDRADA LIIEVEGPTAGLKEQAMRIREICMQTNCRDIQEAKNNDER L FVEL GGDPAELRSRAAEVVAAGQADD $L V E V G A P G E Y V T A S L E R A R A L C A D S A A D D T V V Y P P G A Q A$ $L Y C E T E G$ ATLEEALARAQSLTTTVSNTGSVVVHDPAEM $F L E F N G D P D D L D A K \square A S C R D R L H G L D G L R A L V V V T D P A G Q$ FVEVVGDTHAEVEORAARVGTSCAACDGTAVVAADADEI LLIFKFAGSSSAA ERLLEASIGAADEDELDADAVVASSVAQS - PQQALCAFTEDAATS DEAEEAAKDAQS LGA\|DVYAATTKK DQ LYVELEGDQASVTARAAELLDALKAAGRMTGRVVESAAER
 $\square \mathrm{F}$ VE $\square \mathrm{A}$ GDD

RAEVLDRAARTAESAGADDSRVVT ENPHRQ
M $\square$ QMGGDTPAQARAAANRLITAVRGGGSGTVHEFTDPAHA TKELLNAK FVEVGGATREEALSRAQEVARAAAEATTGHTVVADPAGQR VQLEEDCLEA LEKNDATITSALSPDES GVKFSFDSAEQE LIVELTDTLAGVDLSEPLAAVLAEAMEAG SLAEDADLA


 DEALSVLHT\|LEES LKNAVIEDAVIA SEAHARERFEAVLGQA DEDGLVGDAAAENLAQS LLIELSDSGDSAELSERLVAWLAEQDMLDGVVAQSETERQ


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U8PCI5
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UniRef90-UPIoоозвз4872

 GKLWWVVRKGILA
VDPRGRGQLWQLRKGLYATIVAGARPQGTTALLEDVVVPV DLYVLEGHSAHALDEARERAFWMGKAAGADDVDDTVVPRA TLWGI RKGMFPAVGAVREA GTTVII EDVAFPV A SMWQIRADGAGLAGRTPDGSQAWPG S LWEDRHSVTEANKKA R RLWA
 SSLQDSHTFW HVRESDPDA RTAGGSDVVVSAM H S DVSLP $\square \mathrm{S}$ F L WKKVRKGMFPAVGAVRASGTTVI LED DAF
ESETQRANLWK LREEHAEAQKRAGASVKNDVSVPV LI WKAREELLLAI QNSTPM

D S WWA IRK
KK
 HDLWH $\|$ RES $\square$ PLLAQAEEGLNDKH ESIWKARGAF LI LI A $\quad$ KKGTTCMDEVDIVVPR QLWK ITRKDTFPAVGAMRQT ARLWADRKDTF PAVGAVRKTGT
ERIYAMRKKAVGL L L
RALWRIDREASGTATRMPDGREAWPG
REMWARRESAAEDTHDR
KALWEVRK
NRLWRVRKGLFT
QAFWELRDAIS
LVDDR R HARGDDVPTLDA ASLQQRAAF WK LLRTIPAAQ VGEDVAPRS ARLWKGRKTAFGVAQIAPAYY $\square$ E I WKVRGALVKAVEAVSEQEPV RALWHIRESIPLAQAQEGLNDKH RLWG DRS G DFPTVGSMRQQGTTC IDED
 R I WGCRRQFAEAARDUD $\square$ MF
TKMWQDRADGA GLA GRTASGDQAWPG
RRLWRIREEGAGLATRLADGAEAWSG HSLDQAESLWRLRENLSEAQ VLWHIRKGIFPAVGGMR

WEDAAVP
NLWKLREYISETISHWTPYKND DFFWQLRENLSPAQKLI
QLWKIRKDTFPAVGAVRQT
QLWRLRESDTESIAPYTPYKND
QSEAQRKNLWA IREGDPEAQGY
RLWA I R S GLFPSVGSL
AKLWKIRK
A L WEVRHSVSEGNKKA
GI ERI YAMRKKAVGLL
RLWA RKGLRPAVGAVRAT
$\qquad$ $R P \frac{E}{T}$
$R$
EGGS $\quad \mathrm{KKHDV}$ VV GNAKGAGVGLTTDSAVPVS GNAKGAAKPIPFAEDTCVP QEIKVRNELWYARKGLYAAVAGNRPSGTTAILEDIAVPMD DRLWA LRENLSEAQKRAGGTVKHDVSVPDS NRLWQRRGAFGAVARLAPNYLVN AALWRIREDGAGLABARADESRPGLSG WEDAAVPPT SALWRI RADGAGLGGRTPPDGAGGGDQQAWPGFDAAVP RELWKI REASAG

 EGLWQLREH $\square$ PRLQAQAGKN $\square K H D \square S D P I S$
A ELLW W L
SARKEAD
EGLWKTRK
R GLIPAVGAVRA
 HDLWHLLRE
$\square R F W Q G R K$
QAFWRVR EGHGLDRL
ARLWRI REDGAGLSARSPAGGL

$R Q M W Q V R E S S Q G A T A Q V R G A D R T W P G$
$N Q L G P E F R M F T D I D P P L Y E W D G L T W I G G O D$
ALWRVREDASGTATRLRPGRADDSEAWPGWEDCAVPPPRLD
SWWKIRKALLP LDSASSRPSGSTVITEDIC FE
SNDAQAKAI WAVRHSVSEGN
ERWK $\square R G A L V T A V E A V S E Q E P$
D R
 QA】WEVRKSGDGATARVPGEPDTWPGHAKPWEDESAVH LDLW ATLRENTSASQRKLGTSIKHDIAVP
QSLKQQDFFWQLRDSMSHAQKLAGR SIKHDIAVPIISI QALWA
HALWHLRE STPGAEAELL
AELWRLREDTSAAQKAL
KLWQLREAMSETQKRDGP
AYWNIRKGIFPAVGATRP
RLWHLRKGLYTAVAGARPA
KGTTAI KHDI GVPSS
$E L L W R M R K D T F$

## UniRef90 X2H5PO

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NR\|ADF\|H ${ }^{170} \mathrm{~K}$ KLLQSQSGVRMLIAFGHAGDGNIH ${ }^{180}$ LIC $\frac{200}{10}$ PALAGTCRDLAVLFDRYAYRDSVVFGHAKDGNI HFMLTDR PALAGTCRDLAVLFDRYAYRDSVVFGHAKDGNMHFMLDDR
 QM EFLNRARELATEANAGVI GCGHAGDGNVHLAVFCP EQLA ARLGAGLRDFEALMAEH AAPLEHSTRAVREVVPGGLVVPVG LIPEFVEETSAMLLSAWLGLSTYGHLGDGNLHFNFV DKLGDAL DDDQKLFRKHGYNAIIFGHAKDGNIHFVVTQA

VPTAGEASAAVTAAGIVPCPFGHA
A
 DDRVEEFLADARRRLHEDGAEDFDVAHGGDGNVHY SAY LDEAAEYSSLTEVFARYGTRGTWYAHASVGTLHVRPGLD AEVLGDALVELKKLLEAYSYDYVIWGHLLDGNLHFVVGIM

 VSRRPAFVTEVDASLEQYGVRLVNYGHLGDGNLHYNVQAP

| $R$ |
| :---: |
| K |
| K |
| V |
| V |













## P

 PRRLGAYLRDFRRLLGSHGLRGTPYGHFGDGC PEKLPGFLKEVDSTAAMPGARLVPFG

## 

 GDSFAKGDQNTQELFAKHGYEGIIFGHALSGNVHFII MGKLMDDVI DK TAEAEKEF SSFG Q AV HDLH DFEKWHYEALIFGHAADGNLHSHVMV
 PEHLADYIADFRTLLDSHGLKYGMFGHVDAGVLHVRPALD
 S R A A E F LiERADVSLK

 ETLADALVDLQQLMQKHGYDGVIYGHALDGNLHF LISQG ERLT GTCEGL $\quad$ GLFDRYGYDAVIFGHARDGNLHFMLTQD


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UniRef90_A0A011P143 UniRef90 UPI00040380C2 UniRef90 R5E010 UniRef90_UPI0003742C70 UniRef90_D5QH42 UniRef90 U6F5D8 UniRef90-UPI0003B3831B UniRef90_UPI00037E1ED3 UniRef90_W3Y3C2 UniRef90_H6SRJ8 UniRef90_M0L7P7 UniRef90_A0A014NM34 UniRef90 B0PGS1 UniRef90_W8R7S3 UniRef90_M4K4J2
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UniRef90_E9JP28 UniRef90_D4CQM2 UniRef90_C9Y9Z8 UniRef90_R6STJ0 UniRef90_E2Z9D7 UniRef90-C7R130 UniRef90_UPI000375F54C UniRef90_UPI000474B97A UniRef90_19M4I1
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UniRef90-B215W8 UniRef9o-K2LND13 UniRef90_Q6AKR2 UniRef90_R4XPZ2
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R D GRD DK QWSEAE Q\|HNALYYQKCHELGGAEHGUGTAKVV|KY FETD EQLGRYRDFTEEMVDLVLGHGGSEHGTGRVMAPY FGA
 D D D T A $H R L L H Q I F A T A M E L G G G E H G L G R V K A G H$ $F D$ NDAEVERYGKFMDAVAQQADVKYGGSEHGTGRNMAPY LE R A S DVP A F R A FDRSMPDAAA T G A A LRRRCVNDVAHQLLGGAEHGGDGQTAGPE
 E GMVVA E F V G Q C E QV T R R V LA E T L Q R H G G S E H G I G L V K K P Y $F$ ESPAEDERYDRGLREVVELVVHQYNGEHGTGRNMAPF VDMPA DAFLAR SHDVMDAVADVVRDVDGSEHGVGQLKPYM KDSKD DFAQKSKKV DSELYKKAKEVDGGEHGI GYARQAY VD MEKADYLAHWESLNRVIHDVVSDLGGSEHGIGGQLRRDE
 K GMDKQAF LDDRWEEMNRLVHDIVADLGGSEHGDGRIKVDE LKTEDGVETMRS SAA DVT DLALEHGGGEHGDGEARTE F
 F
$F D M C D P Q Q E V L M K Q \square S D E V V A L T A K Y G G G L W G E H G K R A Q Y$



 F D P REAGA ID RVVHAAASDIVEVSLAAGGVLSGEH
RGERDEDRWRRLHANMDSAYAKAYS LGGGEHGDGLSKRRY
 FEG E EALLGRYTDFNEEMVSLILAAEGAEHGTGRAMAPY D G L S P E GWM EK M E S F H A D L F K EVVYA LG G GE H GVG Y K K L K E


 TGADNTEFLQLWPQMNQRIHCLAVDYQGAEHGIGQLKRQD F NSAEEVARYQAFMDDVAQLLAVEFGGSEHGTGRNMAPF
 ATMDKQAYLAQWESLNSVI HD VVAEVGGSEHGIGQLKRDE PDFAEPGAVDRYRRFMADLSEMVVVRHDGEHGTGRNMAPF
 D MCD P Q QE LLMK Q I S DEVVALTARYGGLLLWGEHGKRAE Y
 P GARD THLWHRVNEFVHELVARFGGS DSAEHGDGLLKREA F D S R D T D QL H RVVEAGREIMEACVK LGG
LGR $\quad P G G Q Q V F E E F V L T D A A K L V A R H G G G E H G D G R A R G A R L$


 A GMTDRD FLAANQDADNR VVHDQV HGFGEHGDGALKKND P E EREAAAE E FVVHTMVKRAAG LIE G
F TEATEVQRYAAFMEAVVGRRAGTVKAEHGTGRNMAPY E GWEKSYFEFRK SLLS LADVSLGGGEHG GGAVKLSE $F D P A S E A G Q A A M R R F L T E A A A L V V E H G G G E H G D G R A R S E E L$
$V G G E E G F D S K Q E E A F K D V F D S V V D Y D G S E H G D G Q L K K ~ D M$ YDAN $\square P G E L E R T E A L G G K I L E L C V A V G G$
 PGGTA IFREFLTAAAE VAGGYGGGEHGDGRARSALL




DRADPDATAELVAEDNEIVDEETAAQGGEHG\GDTNRGR N GMEES Q WNEKSKLLL QALYRK GKE LNGGE HGI GL NKRSY

F
 $D M C D P Q Q E M D M K Q D S D Q V V A L T A S Y G W G E H G K G Y$ R $\operatorname{L}$ G A Y D VLSNEA YRYE DAVNTIVHILACHGTAEHG\|GT\K K H W LGADTAAF LQLDWS QMNHRIMALVMDYKGAEHGIGQQLREE ETVDNASSFIARTTEDVNRIVVHDLVDALGGSEHGLGQQLKRAE QGQTEAEVQSA $\square Y$ VVVHDSVVQAHAGS DSAEHGVGQLKRDE






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UniRef90-W9TTW8
UniRef90_UPI0003B34872

## MVEKAGDAVACMDAAGDPAGLEMMD $T L \vee T V L R E L E L V P V L P G R T L V V L$

R A A T $\square L R G \square P V A A A$

ADVVDAARD $\square$ MT $\quad \square$ LEFSPAAVE


GHFASVAAAVE


DF D T P VD $\square$ LM H $\square \mathrm{M} \square \mathrm{E}$ G $\square \mathrm{LGAHPKMAA}$
$P G Y D L L A V L C G S E G L L G V V V E V T V R \square R A Q L V L A D V V L A G E$ A N
$D \square A E A C R A D A L L K A A P V$

QAMLMGFTQVEDAARAVD $\square 1$ A
AG $\square \mathrm{DPAGMEMMD}$
$D \square D Q V M R A V P E\|I A S G L T P N\| L E Y \square D$ T L V T VLRELK L VP VLPEHAMVVL

LLF F P S LT A A A A A VP LIF NE
A G A $\square \mathrm{A} \mathrm{V} \mathrm{E}$ VMDGN

VP G L A Q A L Q
DDVASAVALFAR $\square$ RAEDT $\square$ TS CE $\square$ MGR

FFNMEDAARA $\square$ P P
$\square$ Q G E S $V$ A A A

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$R P A \square H A A$
EDFCHAGYPLDAEA $\square$
ATMRARRG PDSVTGLPD
GRAW

ATGDA $\square$ ACDPAAVE $\square M D R T \quad \square L D \square A R R K \square A L L H G T P E A L$ VEAVKAAVTGKRWPYEGGEAHL

GAPAAM

VT WVMMPKMD $\quad$ AA A N Y VDR L VKA GAESVE LLAREAVGSFPG

GAWL
E LP E G G G W
R QLP A G N A W
RPA $\square$ QA $V$
EAYCHPGYPLDAEAV
$A \vee G Q \| L S A G \square I P A$
LPDDTRRAAAAGLPEGRMW GMEMMDNDA $\square$ RAAEDFVHAGYP【

T $\square$ D S ARDVMT $\square$ LAAKPSA $\square E G \square D A S \square V D \square M R H R R G \square P Q G K$ DAAELMDRAS $\square R S \square Q D K P G M P P Q \square R G F G \quad P E A A$ A $\quad$ ALL
$R$ PA $\square \mathrm{HAA}$
EAFDGAGYPLEAEAL

$L L R R A A G F G A A L T A F E V M S V H C L R D V V R A F P R D L P D D A W C$ MP $\square$ E T A $\square$ A Y A P DCHEP $\square$ P A QHP WY

AELPEGAA■
$\underset{A}{\text { G D C P Q A }}$

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 AQAHEADAYFRAGLGGANVSGFLVEERAKQQ $A G V T G F V V E D K A K Q$
ILAEVSETSVRVPLQEEFETVLAEAMERDLVLDVALAASE LFVSFAGDDEALGAQAEQLARTWQEHGHGYATLRLPTPAD
 $\begin{array}{ll}L \\ L & C E S D G M P E V V E D E D A R M K T L L E E N G A T E D R V A R D E A E R ~ \\ L M V Q F G G N T E E A D A Q A H R M D E A L R E N A P D V Q F M D D P A R E A\end{array}$ LYVEFGGTPAEAEAAARRAERAFAAHVRSTLVVDTDPADR

TAAEDQTK EAALDLK LLTEFADDPDENAASUSRLEDVMSDLGYGFGRGGEHEGGG VLLEVSDARNEQHAATLLESLLADAVAAGLI GDABVA LFVSFTGDDEVAAMDALVERWERNGHGYHTLRAVTPAQQG $1 \mathrm{~L} Y \mathrm{~V}$ D LD G DPDQQVRAEADRLLARLKENGRVDGRTIPDLQER
 HEFVGTE E EVREKLAPVEARLAAEGRAFGR ARGHT L $\quad$ CELDDGPAVEVDALIEQVSEDANACGATSLKVASTTEDER LYVELDGDDQTVDARAAELFDVVKAQGGRVVASADERRS L LFVSLT GDDE EELLGRLADLAGRWHGYQ A AFDSDADRN LLVEFADSPPENEENMRRLADTMSDLGYGFGMGAHEGGVV MII VE GRDEDELLKVSEDIEKLAKKNNADDVFVGVSRKEQ

## SEEHVRQLLETVLEEAFEAGLSDAVI ANNLSQA

AHEEWLNLPEDMAALLLEVAADDEES $\square$ QAKMQAARDALQD VVSQSAADE
TGDSVAEVEAKAKGVLGDAGALDSLVVTDVAEA FAETGGADPAEAAHRARLLAGAAGALDARVV TDPAAQ TREELEQNDSVIEECLKQSGRHGFTTTEKPDDG $\square Y$ VEVGGPDDAGDTVRAIVDDLARDGRIVDSHVVTDPTQA $\square Y$ VDLDGADAEVQDKAARLLEA $\square \mathrm{DG}$ GGRVKER\|VTDPADR

RDALASFLASMDEDRTVADAVLAQSGEQA LIVELDGPEPEVETELQAVRREVEAAGATSITVAQGEEER EFSGDEEVVQLRVHEFVRHLQQDTSVVRLGHTLADGA SQAELD STLKTVRK LLTQQPTVGISKEYEHPPKQ LLVETGGEDAQARTRAAEVAEAVRDDPGTTAAVVTDPAAQ LLVELDGENREVSEQDFQI RDLLLNVGEDEVYTARDEAER LY LLFEGTVPVVALLQDTLAEMLEQGLITDAVVAASEAQR AFLLMVGYLEEVEAQLRRISVICSKFDGVDIGHERSEEYW AFLMVEFPGDTI QQASAACERLLAKDAADGRILDTEPDER GAVP V VADLEELLGRYLEEGRDADAVVARNEAQR LIPCGAADKDEAREKADAI HWLKGQDAFTDGKVDEDRGEQ LVETRAATADADDANTARIATVLAGCAGDTGFTTDAKACE ARAEA LVRAAGADDTAVVSDSAAM
AEDLEHADARAQEVVTAVETVDYVVVHEQKEM
D L EA
LIVELDGPGAEVVLASARDES DARAAGAGT RTSENEAER ERLAA RVEAFCTHLGTDTQVEHLDGHTLA VAGPAELTADPRARA VVGLENRDNDRDDGDVERAGELLGELGASDVYVLDDGLEAB YVLE $\square Q G N E P E R E R F A E V L M Q A V E D G V V D D V V V S Q S P R E F$ AF LMVQF GAKTLAEADKQARGLLDSVEGAEVAFLDDPADA $\square M L Q F F G S Q D A V D E Q A H A L L G A V G R S E K D R T V F S D D L E R E$ A $\square$ E ALEA

Y
ERAAAEVVRRLDLVRPVTSVTNEFTRDARTS ESDVPATAKRLLDHLRAQGRMIDATVDDPARR LGAG QEDLDANVNRLTDVLRGFSTLKGADGDAF DFS $L L A Q F G G S H E E A D R N A H R M L D G L S E H D P D V A F L D D P A H E Q$ EDAALA EFTTDPYQQ VLLEMSDSEDEQHAQQRDEAVLAGGLEAGEAGDAAGAQSA FEAELVED
 EAKILAPLLAELEAADGAHGVVGYKVCRDATSI QGSNKEHDEQKELIENLIEKEVIADGVIAQDESQL LLIESRANDD ETLERYTQDVDAK L GARTLAGDPAAKA A ALRAFAGF EADQAER LLVEFAGDDAGARARLDDLAT LMADLGPGVVVKMPDAGPQ LIETHGANPAALQEQ乌QK』GDVLAAFQPSAYFSTDPQVCE Q Q A

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4

A ALLJRTREDGAGLAGRSPAGAPAYAG $\quad 140$ WEDAAVPPD 160 K I WS IRETGASAVAGALSINPATPDPIVGWEDAAVPD
 QQSKAMWD IRSHDPEAQ RK $A \vee P$
 LRFWA GRK AAFPAVGRLAPDY ELWQVRES G $\square$ GATAH $\square E P D T F E G W E D$ VRLWRI REDAAGLATRPPSGDEAWPG TKMWQIRADGAGLA GRTPAGEQAWPG EFWALREADPEANRRD VLWNVRKGLFPAVGAV VVTVSDAKLQSAIAERANDMMS
 RDAGTS S

WEDASVPA WEDSAVPP
 ALPKRRAQMWVMRNGLYKLMRNRPKGTMALLEDIAVPM A ALLWRVREDGAGLS A RLGLTLMANSEGARRPLAFVEDTAVD A ALWRVREDGAGLSARLSTGGESWPG
$P A F Q R$
$I$ DA WDAAGTRI QGMRKRGVGLLGNMKSEGKPVSFVEDCAVP TMWKLRHSVSEGNKKA SAFPAAARDAPGDGG TVDTVPVS QKFWLGRK

SAFPAAARDAPD
$G G E S W P G W E D A A$


#### Abstract

60


 D Q A LWAARENHTEA $\square$ QALWN I R K GT F PAVGAMRDPGTARSTITPVVKLD AALLKVRKSSLG LLMAAGSGTHRPLAFVEDTAVD EVWDMALAAEIGDRKAGLNLMMSMKEAGKPVSFVEDCAVP RDLLDDIRSLIVEGMRDVTVDLLA QAMWRIRADGVGLAGRTPDGVPAWPG LEDAAVPP NS F W HMREH TLAQAEEGANLKHDITIPLS ADLLQPANYWNVRKGLLPSVGGMRPTGTTVI KAFWGVRDACAEFHQLWP
QSQAQRAEDWALREGLAEAQASNPR AA IWR TREDGAGL AARTSDGRPAHAG RAL WRVREDAAGTATRGPDGAEAWPG EA 1 WTMRKRAVGL KYWA $\square$ RSG $\square \mathrm{FPSVGGTRQPGTTCLDGD}$ $R A L W R \square R E A G A G I V T R D P D G S E A W P G$ QLRES ISPAQKRAGRSПKEDSAVP TA $\square W R V R E D G A G \square A T R L A S G V E S W$ GGWEDAAVAP
 EALKRVYAMRKRAVGLLGNVKGSARPQPFVEDTAVPP


 VK RHDSAYRYKDRFIDRSSSEWPSNGDFKKSAY PHVAI P AK WWRVREDGAGLSSRRDDGDQTWPG GRLWKVREAGLGGTAFVPGAARDTWPG GFWK IRKGLFPAVGA $\square R Q T G T T V I \quad E D$ NRLWKVRKGLFT, SAAASRPKGTAC\|IDDLAAFPR RALWRI REDAAGTATRLPGGGEA WPG RELWRDREASAGD HDPEG $\square A E L W W K \square R K S A A P D A L S S R T S D A K H U S F D E D T A V P$ LAFWAGRKAAFGRLSPDYYCMDGTDPRG
EGREADTRVYAMRKRAVGL LDGNAKGEKRPDPFVEDTAVP RLWHTRKGLYTTV YDDDRQAKFWKMRKAGLP LLLSRTGDEKHWPFVEDTAVP
KLIEAREKAFWTAKAA
GAD RALWDVRE DANRVLFSDKG
TPANAPAWPG $R R L W R I R E D G A G L G G R T P A N A P A W P G$
$A E L W Q V R E A G L G A T A H V P G E R D T F E G$
$W$ AELWQVREAGLGATAHVPGERDTFEG $G L I G V$ YDDAERAKLWKLRKSGLP ILLSRTTAE

GYWKARKAFVTAVGGSRPA
K A L WRVREDGAGLSSRLADPDDENAGS

 QSERQRREMWT DRETDPEAE KHAGGSVKDDDAVPTS

 SYWKARKAFVTAVGGSRPA T DFWRGRNRIPEAQ
 LGAV
 $R V L W E R R E G I T E C L A K A G S G V Y K Y D V S L P L N V L Y D L V N A T$ ALWHLRKGLYAKVAGA RPAGTAALLEDIAVPV R DPAVYGKYWAMRSGLFP DRFWKLRK ETFWT RK
K A L W WE V ${ }^{\text {L }}$ RK
TYWVVRKGLFPAVGATGAQ
D WWEVRHSVSEGNKKA
A A LWR R R DGA GLA GRTASGEQAWPG


AS IWRVREDGAGLSSRSPRE


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FNRRPEGVLRWREFLRDSAQLVVDYGGGEHGDGQAKAEF

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| $\mathrm{Y} D$ | $\qquad$ PGQVARMRRVAVRVKDLVREFGGSEHGDGLIARSEF

YDAGVPGEFHKTEELAGRILELCVEVGGTITGEH AD ASGVATYRRFMERAADLVAEFGGGEHGDGQSRGEL ADLTSPEGVARYRRFVEAACDVVRHGGGEHGDGQARSEL RGRSRDEYADIRETVKRTVHDLAHELGGSEHGDGRGKVGD QDFNVQSEDDRYAAFMEDVTHMVADKYKGEHGTGRNMAHF DEKDVKAMRADAEEAFAMVREYKGSHSGEHGDGDVRSEF AGVAPAEF VVNEDAVRRVYDLVNAHGGSEHGDGVLKRDE DLSKPGQVEVMRAVAVEDKDLVREYGGSEHGDGLARSEF YDLRTETGRAVFRAFTKEAAELVVRHGGGEHGDGRARSEL
DMKADAERLVREAGDEVFALLRKGGWAEHGKGVTLSDE FDPDPAKTAAAVRRAGHDVAARLHGTFS
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FDT AEKTQRYDAFMVAVANLVAVQLSGEHGTGRNMAPF DLTDPARVAALRAVAEEVRDLAAEYGGSEHGDGLARSEF DEQDVRKMRDIAEAAF EMVRQYKGSHSGEHGDGIVRSEF DDWEEKYPKFKNYAFG GVKKLGGYDTAEHGVGVVKKED LEQNGDVLHDFMHDAAKLITRFGGSLISGEHGDGRARGELD LGVDPKAHEKPDHELIYAQVERCHGSDSAEHGVGQLKMED GVAVVQPK PGMDAAAF GAAVEGVVYGLREYGGTVSAERGGGMLKRWW
 FDLLSAPGGAVFRRESEELLAHLVVAHGGGEHGDGQARAELC DLSDPAQEVMIRRISDAVVALTLKYGWGEHGKGV RSEY FSTDT EVKRYEDLMNDVKTLVVDKYDGEHGTGRNMAPF FS GSEEGVLRYRRFIEEAATLVARYGGGEHGDGRARSEL FDQRTDAGRRVMYDFLRAAARVVVKHGGGEHGDGRARSEL QDFSDAAEVERYARFMDDVCKLVIDKYDGEHGTGRNMAPF FDSGIPGDSAKAEALGYAILKLCVDVGG
DDMKDPAQAALIDP ISDAVAELTQKHGWGEHGKGDRSQY F NTPNEVNRYQAFMADITQRFAGSLKAEHGTGRNMAPF YDANHPGELARAEELGGKILQLCIEVGGS
VGV DHDQFLSHQDAINLIVHNSVHVHNGEHGLGQLKREE PTSADAPGADKDTETVEDVVAELRGSFSAEHGLGVSKLEET YDLLDSDNGRHTFLEVFTREALVLAQDLGGGSVHGVGSRLSHLL SEDPACKDEDMERVEDIVLDLGGSFSAEHGDGTAKLSS FGDHDAEDAATFRRFMEDAAHMVVRHNGGEHGDGQARGELD FNNRSGVERYMEAVKDVVHKYDGSGKAEHGTGRNMAPF FDLITTAGVRAFRAFSEDLIAALVVAHGGGEHGDGRARAEL FNFGTEEGVKQFESFMNEAAELVSSYGGGEHGDGRARSAL KGMDREQCSAADTRVVNDLDT SMAGS GSAEHGDGDEKDDE DTKSEAGLAEFEAISDAVTDLVVEYGG
YDANAEGELERAEAFGTELDRLCVAVGGGEHGKGVRSEY ERLGGGGDLDRFAAFTEDMVELVLANGGAEHGTGRपMAPF NLKDEDGVETMLETSDAVTDLVIEYGGGEHGDGRARSQW KDAE KRHRLLHDIFAAGMAAGSGEHGTGQAKKDH TADPA AAYG\|VYRGVAAAGGGEHGIGLDKKQW LIADRPKSFREFMFAAAELVASYGGSMSGEHGDGRARSEL FALTTAEGVADFRRFVERAADLVSSYGGGEHGDGQSRGEL VNTKTEDGLEQLHGlADDVTDLVVELGGGEHGDGRARTQW AGAPREWAAEHGAAVTDVVLDEVNRYGGSEHGDGQLKRDH FDAARPADVDRYAAFMADFCRLTVEQFDGEHATGRNDAPF FDDRTPEGRAVMERFCSDAAELVVRHGGGEHGDGRABSSL FDS EAEVRRYEAMDRDVAKMVVGKYDGEHGTGRNMAPF FDLYSAEGVATYRRFMERAADLVVEFGGGEHGDGQSRGELL FGRDRDAFTREDEAVAHAVYAVALDLGGSEYGIGRFKRDL AGAAQAAIQRLVHDRVHEAGSISAEQG\|GQRRV SAMA VGADKAAYLEKWDEMNEIVHGIVADLNGSEHGIGRLKRDL FDAAAPDDVERYAAFMDAFCRMTVERFDGEHATGRNIDAPF AGMEPSAQWERLTQAVHDVVMGFRGSFAAEHGVGQLKPGE DMKDEADEQLLRTISDQVAALTAKYGWGEHGKGY RSEY YDK ERLGDGSGRDRFGRFTEDMVTLVLGRGGAEHGTGRMMSPF FGADDEQFHQFMEAVADMVINKYDGSMKAEHGTGRAVAPF TKTLDGVEQMVGIIADAVTDVVTELGGGEHGDGRARSQW ADRDCEEMVAIADAVTDMVVEFGGSV SGEHGDGRARTQW MRRDGAVKMRADAEEAAALVREYKGAYSGEHGDGLCRGEW PNLEDAAEDQRYDGFMQAVAGLVAGKYGGEHGTGRNVAPF FPAEQDQLLSHRVKQAVNEVACALAGTFSAEHGDGQVLTDE L
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DFATGADALRTLVQTGAVPTVLRLSD
$S G L Y L F D S P Q Q A C Q L V D \quad Q L R D S P V \quad N A V E L L D$
A DLP T T F D TFA LIPS VEAGLA

LP E G R G F
A A A $\square R E L P D G N A W$ FYEAMDA AQH LVK $\square K P \square A D E \square V D R \square G R D \square A M F Q P V$

LS A F E VM WP D Y WT MVT ENVS GRRDPFADKHGL Y

A PVSAVE LIMDRAS $\square R S V E D K P G M P A Q \square R G L A E \quad G \nabla T A$
N LTMAALVHT
QN $L E \square G \square P D Q \square R D$
NCKAY L

PDMDAAAVPTVLEHHPGAVEGDDSRLVDVVRRHNGPGAWM DSTMDK $\square$ S $\square$ N N P AFRP $\stackrel{T}{V}$

 GVPP WL

G D P E A ■

GDPAAL
E $\square \mathrm{E}$
S S VN LT STDR $\square$ GEASHAPEGC $\square$
RVAAVLMDSRSLASVAEKPGMPAFDAQLGAAGNTEAAA DEALDKLPKELDN

P WY V ETETATNDALHEH $\square$ GATAPTGC L

TEEAKHAMQ DHNFATPV

LVDAMEAVPEALNFEVSAVELMDDEVFRLAAESDGYSWH QRALDSVQGKPPDSFCGRNKRCTALLIETAASDANT NTPKA $\square L R E Q A L L G \square R P V R \square Y D V$ DEARHAM KDPA $\square \mathrm{DRP}$ R

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E E QVKATIASVDHTNK
LIE P VE F C $\square R G A V I G Q P D A V V A L L D R L V E L M G D L G G T V V R L E D E A A Q K$ WIIE A LLla
GGVSFTTDAVEGA
VLLEYCATDAGMRAPLEDTLAAAMQQGCATDVLAENARQS
TPEQLQLAI DRFITAVNADNLSYASPILDAEDI CLLEFAGDRDALLRDLERLDTCMADHGGAVVEVPEPVRQK LLI ETRGPSA AVRAAEDSERMAAVLAEL $\qquad$ E $A P A F T$
$P \square G F T$ D PAER
EAYDDAERA
VVAQNDSQR
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GS DAANAAK $\square E E L S D K M A A L G F G F D R S G K H W G A V$ APAMKDYDDPAEEA LLVEARGTAES LSATLAEDGAVLGGVTTGFPFTTDPAEYG VVADHAVSRARRVVADVRPMSSAVLTDSAQA VVALENRTEDRGDEDIQKAGELLAELGAVDAYVLEGGSAR AQDETQAK
SEEHARALFESMMAEAFDAGLVVDVVAENLAQS RLEKQLLEKH VTFHLTESQEDM QGSNKEHDEQKALVEDLLEKEIISDGVLAQDESQL L CEVGGTD LDESLTRARALVASAHTDAAAIYPPGADA LMMAVLEGDDDLVMEQMESTAELAEELECLDTLVGDT T TM M 1 EKALVGTPEAIDDKAALVERLSASLPGSVVVDMDAGEQ GSNAEIAKLESFLEHUMGEGIVADGVLAQDETQV QAlASGFAADAALASSDAERD
LT REHRGVPAPVDADWLLLVELAADHDQTERDASGEPAVG $T R E E L D Q A A Q A L I A E L Q A A G L G Y H Y P T V Y G A D S$ LIETSGSNKDHDDEKLEFLESAMEQELVTDGVVAQDETELD LMIEFDGDAEDVSSALAKLQQSLDKR CEWVAARDEKS R VLVELASSSDAALTAQLQDALEAAYESGACQEVATSDQHRN $L V R G L T G A A R P L E A A V V T D P A H T$ LVVEYDGDEEA पLQKVK LVEDEMRSQGLGYHFPVEFGKDM D AVVA

G G DAQAALEALFEQAAEAGLVSDGVVAHSQAQSA DEEKLLNDLLEELLSADEPLINNGVLAQSPAQFT LLVEFDGDAAANAAKLRQTEEQMGDLGFSW SGTDRAWG C ITVFEGTPAHAASRHRETREVLLDAHGG ESAGEGPA MEAYTKKEQ
LTVEGHAKIVAAEEELILDTCKKYDAEYLGTEYGEK LLEIHAEDEHQAEGLQQIINVFAPDEQVNGFSRDATVC LMIE F DGDDAECTASLEKVRAAIEQPLAFEFDSATTTADK LI ETASGEPGAAEAAMERLARALEDDLDQDAAVAQTEAQA AVTTVEGTAEHVRARAAEVDALLSTLGGT LFLGSRGLPAMVDTEQGVLADLVAKHGGK

| D $L$ GEEP |
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| $L G S D G A$ |

IE F S GDAAAVVDA QVVAFTEHL RADTSVVRLGHTGLADGA SRAEVMEVAARVEAELRNDGLGYYFPLLF

GATSVVVGDPAAQ
AF LEHVLSEEVGATSSVVVGDPAA Q VLI EMVADADGAERLPD LAQRVLEEAFEAGLI ADDATMA $V$ E P DP G GTAAA LE Y DS E L VEADFEAA DGE TN AYFA F DADEA T M A GLL Q DLAE QVLA TAFEA GLIENATAASESQA
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DEN $\square$ NK $\square$ KE $\square$ SK $\quad \square$ A YKSYFS

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 GRLWEGRKRSVGASEAECLRLWGLREGCSQFLFQNAGPIT RKSWRVREDGAGLSARLSDGASGITESEDSAVA HDESTRDRFWKMRKAGMPD LLSRTSDAKHDSFDEDCADP AGLIADAADSQSMGDVAAFWAT RDACSHCAFDPVAKMD RDFWKLREEQSAAQ
 NDWEVRKA KLWKITRKGLFPAVGAVRPGGTTVIIED RAF WQVRE AAPEAQAQEG PSVKHDVSDPLGAMS DKAVELRKAGDGL SVWEVR EACLNTMMSMKGDAKPVSFIEDCAVP TDAAEIDRMWNVRKGTFPAVGAVRKPGTTVIDIAVAVP RDPEEYARYWKVRKGLFPAVGAVRDVGTTVIIEDVAFPD ASLWRVREDGAG
KLWKLRK SGLPIL LSRTTDEKHVSF
REMWERREAAGEVMLIRQPMDNN
ESFWQLRDAVAEFPVM WAPNAAYDVSDICVPVD A RVWKVRESALGASVFVPGERSGWEG KKVWALRKAGLGL LDANLPGDEKAVAVDSAVPPD RTAQQRVDLWR REDSEQDERQYRPTFGFDVSLPGSAM QVWAAREAGATAYPPNDPETHEGWEDAA SQLWALREHVTESEARE PALQTAVADFRA AGLNVMMSMKEAGKPVSFDVECA VVIT ETLRFFRHAVPESVNMLI DERRREEPS自TKLGSDMSVP ASGAEAVKRVYAMRKRAVGLLGNVQGEARPQPFVEDTAVP EQLWALRE GVPVHLASHGLIYK YDVSFPID EAFWS IRDASAELEPVL RKMFWTLRKAGLPILLSRTSDEKHISFIEDCAVP TDLKLQNDUGEVRKSGGLNMMSMKSEGKPVSFVEDCAVE KLWK】RKGDFPAVGAV A All Whre DGagl VGRFARSGGAWPG KLIEARENAFWTLKADGADDL
SLWRWREGTTEAIGHW
ALWAWREGLTEALSH
DNLWELRKKGVGLLGA GLNTKKGDRKPDPFDEDTVAVP
 SDLKRFHEFRHAGPVLP GNEENGRGKRTKGGTDMAVPR RDMWAAHDAFHTSMESGAKNSFEYN
KSLWDVRK AGLNDMMSMKGDGKPVSFIEDCAVP QALWGWREGTT AFWThRERLPLAEARCRSGKHDVSLPAGNMGEFV KLLWLLRKKGAALLG SMPGTRKPDAF VDAVARQRLWQVREALAEVLGVYGPP LKFDVSLPLS

RQLWSKRKAITLELKKRYPYK
LGEDIAVPLP EFWRIRHNVTEAN
SEPKQYAFNWKARNGLLPTTGADRKTGTTCMMEDVAFPVD RADWRITREEGAGLTSRTPDGAEAWSG QSQRERADLWT LRENTSAAQRSLGANGKHDTAMPGE QRDWA SDGAKADRПWALRHNTSESN VRDATVAADPRGRHLLWSYREAHTNSAGVPVKDDVAVP S HENVKKDWAMRKKSVGLLGNAKGEGRPIPFVEDTAVP ALWAARRDLFWKMRKAGLPLLLSRTSDAKHASFIEDCAVP
SLWALREGVTEAVSK
GVKPUTDQRLQGVRKSGLNTMMSMKQ RAWEEGR FGAPVLR KEFWKMRKASTPI

LLSSTSDAKHIAFIEDIAVD WFENRITTFFYPGY IMNNPQMFGTGD TMTVATYDNDEKIM DQLWG｜RK AAVPELFPAVGAVRESGTTVIVEDVAFPIVP HAFWAVRENQSAGQ $K$ KEGAAWKHDVSVPVS ARAWE KAWMERRFDFSTVENLLAT KGGFGETDEDAHNW EAVKRVYAMRKRAVGLLGNVQGEARPQPFVEDTA WAVP KKVWSLRK AGLGLLGNLPGDEKAVPVIEDTAVAVQ
 KALWR DREDGAGILTRSPDGGEAWPG KTFWSWREGITECIGHW ANETQAEAFWNLRESDAPAERADG PAGGHCYDSLPL YTDEAQKDMWSLRKAADPLLMLEGDPKPYPF SDAVEKM EAFWLLRESDSAAERA GLLMG $\square G$ SGWMGRRFDFSTVESLLASRGGFAETIEVAHNWDGDNGVY NTWWK！RK
DLWWKIRKALLP■
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UniRef90－T1C788 UniRef90＿B1YQM
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UniRef90＿T2GZ70
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A A A D A D AFRAQHETACNELLHAAAMAAGGEHGVGLLKTAE GMRDSDAD A D D RCVVAVVREMGGSVSAEHGIGMLLKAY
 $P D A A P T D$ MDAKDREDYYE IIE KVA QLAAHKYGGVLWGEHGKGGFRSEF F D QRTDE GRADMNAFLDRDAAA LVVRHGGGEHGDGRARSEL
 $T D L F E$ GA GLDDRYAAFTEDMVDVVLGEGGSEHGTGRVMAPY LD DEAGVAHSRRF LERAAARVCARHGGGEHGDGRARSEL

 $F G S D A E D Q R Y G A F M D D V A K L V V D K Y D G E H G T G R N M A P Y$ E HVVDGRA F R D E E E R D MKQGGDVVARMRAAEAVSEQVRRFKGSYSGEHGDGIJSRSEY Q DF G DE SEVARYAAFMDE LVTMLVDKYDGEHGTGRNMAPF
 NTKTEA GLEQLHGDADDVTDLVVELDGGEHGDGRARTQW
 GATDADFPEHEISDVMYGVVREFKGSVSAEHGIGFHKKPY
 F D L R T A E G I A K Y R S FAT A S A QLVVD Y G G
 PRNAEEYARGKA LVARWAKDVAAMGGAEHGVVGKLKREDF

 LD DA D P G D LA KLE P L AT QVVEAVLD LGGGAHGCGGVRTQP


 L TTAGDVERFRSFDDEAADVVCAYGGGEHGDGRARSRL
 TRRFDERVEKVLEPFVYEWI AERQGSISAEHGLGVMKKKF
 F DKRVE K D
D E Q
G $A H \stackrel{L}{S}$
FD GERDEFKS LI NEELTPA VVEKCTA LIG
MRRNGAADMRQIAEEASALVREYKGAY
Q Y N K D V E D A M P N A $\quad$ LC D A l
D MKAPK DEKLI
A A D REHA Y Y MMD M A G G

GEHGDGRLLRAEF E S R A Q S Q R V WA L E P FVVYE FVA S K Q GE H GI GL H K K K Y A EVAD K A AFQR
 FELGDPAGQRGFRTFMEEAADLVAAHGGGEHGDGRNMAPF VYGF DAVNAVVYRVDA QGGAEHGDGQARSEL
 ALLYTTPEQCEAAAARVNLIVMHEAVELDGSEHGDGRMHVER NATSEAEAVTDAVLRLIAAHGGSEHGVGRAKRAW


 QEGDVVKKMRADAEEAF ALVVAEYKGSHSGEHGDGDVRSEFB A A Q NTPVVEWRAVK TAVTGAVVDNGGTVHAVGTDMMPF NTKTKGGQESMERTADKATDLAVKYGGGEHGDGRARTQW
 $\rightarrow \mid$「「「｜O Om｜ EGGDPAA HSARRDRLVVHDLVARRSGSSIGAEHGLGAMMKSAE QTADD P LTTQWSAAKRAAT DAIMTA GGTVVTHHHAVGGRDHRP W

「「 KTEQGTRMFRLDAELVKKYKGSLSGE | $M K D$ |
| :---: |
| $L K S$ | RYDKEVEKVLEPYVYEWWEK RNGSIDAEHGLGLAKKN K Q GVVDRA WEA G D GK A I S R QV H D MVTA WG G S E H G I G QL K R D E

 FDTDTGQKRYDNFMQDVAQLAVEFGGSEHGTGRNMAPF D T S T S K G V EKMKEMA DEIAA D L V GKY Y K G GE HG G GRAARAP Y




$\qquad$

PEFEQFYVGFVPDWD QARELARRLAQDR PS LSMAR
A $\square$ Q A $\square$ FRAGF $\square$ PSADEVAD

PCRKYGSVVFPN FEQGVHFVREVARQRCAPAS $\square R \square M D$

ILS QLThRMAVQSQTVVLS
DDMKTGFE LIREVMVQGYKPS
ED DETGUKVLREVMVNGYRPSDA
 SEGSLGVITEAWMRLQERPRYKASASMSF
$D \square E R G L A F \square Y D L Q Q S G A D P S S V H F G Q$ DDMATGVA IVREVVTNGYRPSVARVYS

SVSFTFP DGK DMDEALAEMTRAGDAPGLTKVRM


VFDTYFF D DSFEEGADTFRELKQSGHIPHGARLSD
PETESFHVAFAPNWD

P VP T A R L F T G WRFESFDAGAHALRRLAQDGPLPTVLRLSD

A MRTLA QAGLLPTVLRLSD

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A
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80 $R L L P V G S W$ WL

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E L P A G R A W
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A V LE A K VA Y LR R D DEA Y $\square$ P Q P A S VRSVVC

PE QVKNCAWDE GEPAA V
K D A $\square$ M A A VLE Y LAS D MPEAR
 $\mathrm{E} \backslash \mathrm{V}$ S E S K $\underset{\square}{\text { R A L G Y E K G M }}$ C PDETRVSLRQS GGDGAARMV

PEETALSFASKPS KGP $\square$ A EFMSAAVKKY $\square H Y$ Y R S F

## A WL

T

M
TFTLAAARERTGSK LFDGCKA

R W T

NVQRFGMS LK PPSEWTS LVDS LKKVY VTK KKGFNPETMVV VRRAGSAGRCRPRVRDVEG $\square$ AA $\square$ E L $\square D G R A A A$

RTAA $\square$ S K H T NAFK V N E D VV $\square$ P L E R M GEY T L G $\square E R \square N$
 RAYSEEDANQHFY HFSKDKCV

S DYDKAVEATRQS GLYPASAR VEREEAAYTGSSDGTYDT A D L H A A LP A VR Q S DLLA PANCRLLLDP GEAALSSGAARD GRAG
 $P \quad E D A R Q H F S E L P G F H G E A V V$

 $A D E$ TRT QLA LAAGHPGQ DA WLERY LIKLR GA GE GK PLWSATMAY I $\underset{P}{E}$ P ETAF G $\square$


GRPEWT DTPTPWAV
E T E T A L N L A D P GK L G G D A S G C L
SMQKPSTGLAAKAGP ILFNVLERRGWDLDAACLS ESESA $\square \mathrm{N} \square \mathrm{L}$ A DPAA $\square \mathrm{GGESAGGG}$

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 $L V E S G G A D Q G E A E A A A N R I A E A M G A T R A E S V I M T V P A R M$
$L A G M D P Q V A L E S A L E Q A L E A G S L S E C A V A S S L S D A$ $\square A G M D P Q V A L E S A L E Q$ A LIEAGS $\square$ SECAVASSLS DA FDDTLEAVTRRAEAFVWEDTEKGDGYTYPILEDEET $\square M V E F G G S R Q E A H D A A A R A L R A V G L S S G D D R V R V V T G A D A$


FEGTKEHVESRHAETRELLSAKGGT SLGEGPAQ FY IETTGSNEEHDEEKQFLESCLKKHHILLNGTVTGEDSKA
 $L L V E L E G D G D P L Q Q R G E V L A G A L G A G N G S Y A A P V L P F P E Q$ LA GEYEDTEEGLAELARRIVEDVVAVHPDTSAVIAFSGAQE MFEGTEEHVESRHAETSALLAARGGTSGRWQPAEGP TVEGTHGHVAARSAEVAAVLSAAGGTEPAKAWDHGRF


AQDETEL
PAAELLEDRVAQALALIAEVRTDWAS WLRDV LVIEFRSTREEVVAI TELVKAEMLAEGLGYHFPVLFGKDT LRGTLRARRRGAGCLWEGLPTVVRARRSAASSVLRDGGAA DF $\square$ GFEGPKKVRATVLETMADAVASLPGVQDASAGDARGC
 LWGCEGYADMVALEVEHVEATCRGQGWSDLGD GPA LLIE LDAGTDDTERLAEAAEDA LVIETQGSSKEHDEEKDFFAKALEEGVATDGSLAFDEKQS $G \square R$ VE S L R N R A A E
A VA GYEGTEEDTAYRRERAAAVLRECGGTPL
AMGGEPEEVQTILRG\VEDLZRQGGYAYPDMTDMAGQ

$\bar{L}$ IETS GSNKDHDDAK LD S F DESAME EGQVLDVVAQDETELD


Y E GAA GEAADRRAGARVALRAAGGEPL
TFEGSAAHTAARSAEADAVLRAAGG RDQGEP


GSEVSSAAELLERRAGQALAALVRSVRAQWQDWLQRV
 LLI ELLA G DS D QTERLDA DALDDAGA DLDCGEPAVGVDATAAQ $L T R E H L G V R P P V E A D W L L L V E L A A D H D C G E P A V G V D A A A Q$


 $L$ F MVVE GP K GVVA E A T G T A I E E I V T H F H T Y K K V D S H Y




LVLGFESADHPVDVWMNRALEDCGDHGGTWDVLKGDANAD $L V L G F E S P T A P V D E R L G Q A L D L A R D H G G R P G P D P A D S A A P$

FE GTKA QTNC QRSE LV G VV F Q A F G A T C L


 LIVE I T H T E A DVEDVTDVLDEVVD VVGPDRLIVAQTADAER $L$ HI T AE GCKESVVA A DLLA TARE I ARRLGG

TEDIENS





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

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UniRef9o WOEA77 UniRef90-WOEA77
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LSRMYPPEVI DAFERFKTAFDPDDLLNPBG
LKYMYSPQMLQIIFAAIKHLFDPQNLMNPG I AFMLGPENYQLCKDVKALWDPHNVFNPGK


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

L ETMLGKEVVALLHRIKQAADPHWHFNPGK
 GE GV
NPKMYGEQLWGAFQELKLAADPDRRMNPGK
LEEEHGEAGDYLMKALKEKDDPDKLLNRGVLGL
I KYSKNDNEI QUMKDLKREFDPNGILNPYK
LRDE
$D L E P F A R Y K A R D D P H G H F N R G K$
$N$


MTRYVSKGWUQVYRKKKETFDPKDUCNPRK

LTEE ELADFHAYKNRIDPEGRFNRGK
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L E TCRSAEEVALLMHTLKQALDDPKLLDNRGK
L SASEA I QPFRDYKARVDPSGRFNQGKLGADLGNAY
Y LREAGP LGTEALRAVKHRLDPRGVLNPG
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I GYSK SDQEI KMLKQLK QLVOPNALLNPYKY
L S E E K G T Q GL A A L R A L T A H F DP T G QL NP


AKTFFGEDR\KT\WNYKQFVDPDGLMNPGK
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L THDEIKDFRAYKMRVDPEGRFNKGKMGDDAD
$\frac{L}{M P A E D G D E E L Q P F A D Y K A R V D P Q G R F N K G K}$

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YDKERPE LD CSAMKAAKHTFDPKADLNPG
YDLQRPDPFALA LHAVKQADDPQGVLNPG


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TAQEHGSAYY LLAKLKEAFDPNGIMNKG

YRETRDPAFLEVMDAVKNVMDPKGLLN $\operatorname{L}$
LA VEKGP LGMAALKALAGHFDPSGRLSPG
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A L R Y K DPVQVAAMRAVVAALDPQRIMNP
YHDEIGAVGVEIINAVKRAVDPDGICNPG
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FEREI GPVGVSILRAVVKDLDPTGVLNPG

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conf

|  | 1 | 10 |  | 20 |  |  | 30 |  | 40 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| sol25 |  | B B B B B | B | B B | B B B | B | B B | B B B B | B B B |
| sol5 |  | B B B | B | B B | B B | B |  | B B | B B |
| sol0 |  | B |  |  | B | B |  |  | B |
| jhmm |  | - | - |  |  |  |  |  |  |
| jpssm |  |  | - |  |  |  |  | $\dagger$ |  |




```
sol25
sol5
sol5
sol0 jhmm
jpssm
```



B $\quad \begin{aligned} & 150 \\ & B\end{aligned}$
160
B $\quad \begin{array}{r}B B B B B \\ B\end{array}$

sol25
sol5
sol5
jhmm
jpssm
B B

B
B
B
B

$\begin{array}{lll}\text { B B } & \text { B } & \text { B } \\ \text { B } & \text { B } & \\ \text { B }\end{array}$
solo
jhmm
jpssm


[^0]:    $\qquad$

[^1]:    

[^2]:[^3]:[^4]:    

[^5]:    

[^6]:    

