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EYGRRRRQLMKMVGPQGIVVL
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| I | E | E I I T T E F VT R R S F T E Y A E R R Q R V L K H I GGA D S $\begin{array}{lllllllllll}Q & S & R & E & Y & Q & K & R & R & R & H \\ K & Q & L & E & Y & S & Q & R & R & Q & Q \\ L & D & A & M & A & P & N & S \\ M & Q & A & E & N & S & A \\ A\end{array}$

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LN G LDDVVYHAQGEYAYADVIVNSALEKLRKGSRQNDTAPA
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L EGRERVVYYAMGKDREFDRQVMDWVNS:RAKMVRSGATPPG
 I E GKDRI Y A S L G VS P DFDRQLMQWVNHI KTQVRNGATPP H





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 T IK DVRSLVHEMRLFK EFVVLDHLLHDARLYK



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IDDRREFQHRRQQVMEK $\quad$ GGHGT A|I FRSAPMAVMHNDVE $M K L Q E Y L F R R Q T L L A K M K P D S A A L I F A A P A T K R S A D S E$
 A ERRSRVAKADGPNGIALVPTAPERQRNRDSD

 MS DS P
A Q A E Y R R R R E T L Q H RMQP G V A ll FPASPMRRPRNSDVD EEFAQRRAKMFA QMQDNSVADVVSAQEQVRNKDCH R D R RARVL Q QL RA G GVVAILDP TAPEAMMNRDA H




FAARRQRLLTRMAEGGVAI LGSAPAAVMHNDVD P Q NSFVQRRQKVLDAMVDHSLLMI SSGEEQIRNRDDVE IN SEEFKRRRQAL MARMGDG I AVI KLTQADFQERRDRLAFRMGPHSIAII TSPEAIRNRDSH SPS L Y Y A A R R H R L A Q Q L GGP H A V A V I A T T A P ERRPR N R D S D
 $K L P Q E E F H T R R Q R L G E Q M Q D N S T L I V$ $\mathrm{MDD} \square$

$K$ L S Q A EFKTRRHQLIAKAMGD G

QAEY
 QAEYRERRRQQLMSK I GNGTAA FCSAPT TPAP TVLYA QRRA R LAA LMGP DA I A I I TADAVDVYRQRRERVDAADRAGGVAMVPTAPERMRNRDSD
 $\square S$ Q V E F S Q R R A A L L Q Q Q L E D N C A A V I I
 Y S T R R S KL 1 A QMQA G GVVAIVSTAPEAARNADSD
 MTHAHFLARRKRLLKTIGDGGVAIVPTAPEVIRNRDAH Q S VY A E R R A QV A R QL GEGG I A I I P T A P E HPRNRDSD AKMPQEEFTARRERVVFEQMQDNSALLLIFTESEEKRRNNDCD A P IG P DE Y R QRREA L MA QLDP P NAAML I P GA S LV T R S H D S E MT R T E F K R R R R QL M R MM G K D S DAA L PAAAAAKQRNNDDVQ

 D S A DY R A R R E RVVLE QLLG D G V MVI A TAAPEVAARNRRDT H | $1 \mathrm{~S} M \mathrm{G}$ |
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| $L$ | $P$ | $S$ | $E$ | $Y$ | $A$ | $K$ | $R$ | $R$ | $K$ | $A$ | $L$ | $M$ | $K$ | $Q$ | $L$ | $D$ | $S$ | $S$ | $S$ |
| $P$ | $A$ | $D$ | $E$ | $F$ | $V$ | $L$ | $R$ | $R$ | $Q$ | $K$ | $L$ | $V$ | $V$ | $L$ |  |  |  |  |  |
| $A$ | $A$ | $Q$ | $L$ | $T$ | $D$ | $N$ | $S$ | $V$ | $F$ | $I$ | $V$ |  |  |  |  |  |  |  |  |

 $L D P S A F M A R R G R V L D W M R A G G D A I L V A A P Q A M R N R D A D$
 S EF Q QRRDRYLAK IGNGTAI FRSAPMAVMHNDVE YSERRARLAERMVSG VAVIATAPERTRNRDTH S NEFH QHNR HKLLLA S LIPDNSAVL V S S GAEKDRNREVE
 $A A D G D D E F R E R R R R L L M A T L P D D A A A V L L P G A A B L V T R S S G D S E E$
 RQRRLA LID RMGGGGGALVPTSPEQARNRDTH Y A A R R A A L M A QMLLPGSVVAILATAPEVARNSDCD MDECRRQRRDRELMEK GGQGTAAI FS SAPDATMHNDDD
 Y AS RRQAFMDKMQ G GVAI FHSAPEFLRSHNDE
 $\square T$ A K E Y A Q R R E N LMA R V P V G T V $M$ M I V A S S H P E MMM S Y D DP AKMPNDEFVFRRKEVLAQLKDNSIDAI FSSQEKDRNQDCH A A MP QEEFAERRHRVFQQMQEDAVLIVFSE $\quad$ VEKRRSNDCT
 MK A E VF A R R R A D F L T R L G E E A A A I L A A A P P R L R N R D V E
 $M E D Y A E R R A R F L Q Q L G$ GAAAVIPAAPDVTHHADCE PRDVFHGRRMRLLEKI DGALLLFAAPVTLRND DVA
IS A L E Y H HRRAAL AR KL PR D S VAVLAAADVKYRS GAVF





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 DANRSVLWHSLGHDADWDRRIANALNSVRAESRSGTRAPG
L A N H A V V A Y P L A S S T R T D M QVVR W WL E T V R M Q G R A GVVTAPS
 VENADRLYYHFGDDNRLDQHLLTLWQRDLAKYPKRGRGPTV LANQPLMWFSGGHDADWDAR TRGLNAVRANARTGUVPPH

LDGAHLVAYPFATHAGLESRVAGWLDAVRARTRLGAVTPA I SNQSQLFYSLGTDNHWDARVTNWLNUVKNKARMG\|SAPQ $L F N K G A!Y Y R \| G H R A E F D A R V S Q W I K Q A Q D Q D K R G D G A P S$
$W A D L T A C Y A G N V Q A W G Q Q V F A T F D A T T A$ LDGRDAVWYPFATHKGLETRIDGWLGSVRARVRYGTLCPE LANQPKLFYSLGADVAWDVRVTSWLNQVKAQARSGVSAPD LINKQRLYYRI GQNAEFDARVSQWIQKADAQQRRGGAAPA LANHALVAAPLADSGNDDRQIRRWMRAVRAQGRAGDGVPA LEKADRLYYHLGRDRPFNHTVLEHYQNLLQTYPKRGTGPD LANQPVLWCSLGYENDWDARVMRALNAVRANARAGTVPPH LADAGTVHYRFGASTAFDRQLARWLDAVRAQARSGVAAPD LADQEAI YVRLAESAEADRRLRHWMKQVRGQARSGVNPPS LNGQKNLYYSLGRVSYNERVHGWLATMRKRSRQGVIAPS LADAPA FYALGKQAKRDAQLQGWLDKLGGQARVGISAPS LANQPAVFLRLGEDESLEAAVADVLKTLRGKARMGLSAPH LENRSVVWYPFADHQGLEGTVAQWLNGVRARTRYGALVPE LVGRERMDAP LGRDEHDRQLDQWLQAGRARARGQAVAPD

L IL LENQPMLAYLI GRDMAWDTQVMGWLNAVRAKARSGVHAPN LAGRELLYLPL DNAEAVSMAEDALHEALVGLLRRGRPPDK LADKPALHYAFGTSAHLDEQVRGWLDAVRAQSRSGTVAPT LTDRNKIYYPFGLDRQLERTLSYTTKKLHNKKQASVKTPT CQNSTALYHYQGLQPWADQLLA WWLABVRAQARAGFISAPP LADQPAVWWPFAVHAGLETQVERWLAAVRAQARAGVTAPR LLDRPALWLSQTAGAATQARVNTWMQAAREQGRAGARPPQ I AGCDSLHYSLGSDPAFDRRVGASIAALRRSERSGKAPPR
IVKAEKLYYHFGRDRTFNDLVLRLLWQRVALLYERNGVGPT促 L RGAEGIAFRVGKHPEVEPHVLQAWAGQLDRAPRSGTAALD LEDQPAVFTALGLDQNWDQRVVGWLNRVRELARTGVAAPN

$$
1
$$ LADAPVLWFS GHDAGWDQRIAAALNKVRGESRTGKRAPS LLAKADRI YYHMGANQGFNLTVIRHWQSQLRQYHRRGTGPA MGNQPLLFYPLGADADWDARIIKLREAVKAKARTGMRAPG LKGCQTLYYNSGTEHAFDEQMDAFINRFRRAMSGG PR LEGAETLWFRLGEDAGWDARVARLLRGLRGGARLGKHPPR LANAPSLYYPGAHGAALDAQVGGWLKAVAAQGRSGVTAPA SENITALYYHSAQQPWGTDFLQDILN

LADAPAI YYALGSSNELDAQVKLWLRDVRSQARSGVTAPA L LGVKHLF $L V G R K R L Y C S G K D L Q F E K V F L W V G A V K R Q A R A G V G A P E$ FANQPTLFYSLGADAVWDAKVTQWLNSVRMQARSGVSAPN VYDATTY YCNQNEHGRAEKKIDTRNDRFVQTCKTRYPGH $L E G A E G \mid A F R V G R H P A V E P L V L K A W A Q Q L D R A P R R G S A A L$
$F T G V T R G Y R L A V D R G N D R V L D A V Q R V R G R G R T P D V W P T$ DNGARSVYTDVGYTGRKTALSRFLQGQPKVDGMAKLMQNV

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ALLEDTNF\|L|HP|L/R|LLK TLVDWRPWVHDMRLRK


 A L A DPTPILAPLRLIK A A HD I R A ML DEMRLVK
 S I E D P F LTL HPLLRQVK QV FDWAEIVDEMRLFK
 ALVNSHPLVHPLRQVK QLINDEEILHEMRLKK ALEDDPMTVLHPQRLDK
 A I EDGRLLMQQFRRIK
 SLLDADVMLHEMRVIK TMI DVRQCVDAMRLIK
 SISDVRQLI DVQRLI K

 QQRDLCGLLDEMRLVK TQMDWRPLVHEMRLGK | $G$ | $V$ | 1 |  |  |  |  |  |  |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $E$ | $V$ | $V$ | $R$ | $K$ | $L$ | $V$ | $D$ | $E$ | $M$ | $R$ | $L$ | $Y$ | $K$ |

 AIVDPGPILHSMRLIK A I R DVRA EL D EMRLI K A QRDLCALLDEMRLVK AMRDLTPLLDDMRLVK ELHDVEALIHEMRLFK HL LQLDDVAHEMRLDK AI AEASLLIAPMRLRK TI HSLDPLLAEMRLFK AVLDLSHSLDEMRLIK AI HDLRAELDGMRLVK QQRDLCAVLDEMRLFK R I ELLDRNI HEQRLIK TLIDWQPMLSEMRLIK GWLDCRPLIHEMRLFK EFI ALDBYLHDMRLYK RYVDLAP LL H EMRLDK TFMQLDQILNEMRVFK GWLDTNPLVHAMRLIK A A RDLLPLLDDMRLVK QALDVRALLDEMRLFK MFI DI LP MI HD DRVVF DYI NWAPMLDEMRLEK TQ QDLCADLDDMRLFK TVHDLNPLLADMRLVK SVVDPRTLLHEMRLHK SI EDPSFTLHPMRQVK ELLD I R QPLDDMRLIK
 EIRDYRAILDEMRLIK AFADVSARLHEQRLIK $S V A K S N P L H Q L R A V K$ AI R DVRAELDAMRLVK IA A DINGMLDAMRLLK

 QVVDPGSILNEMRVVK


 K IACPRNLLQTMRLIK | QV |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |


 EFIDI GRVLHEMRLI K NIVDVRQHVDAMRLVK

 | $G$ | $L$ | $A$ | $P$ | $C$ | $P$ |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $E$ | $L$ | $L$ | $H$ | $A$ | $L$ | VAKPLRSMLNELRVVK EVSSWRVMLDEMRLFK SVRSLRPVMNELRLVK HYHRVAPIMHELRAIK





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rec

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K DEQAEDWHGRRLGADAAUNSLAVDSAFDNTQLLTAQLIDM

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 KNPRDEQWSGYRNGVQAAEDVFNADEAYS I DGMGSVLAPD
 TNEHDAVWE GHKYTKE EAEAASGI KNDH WL S DFDQDIFNSV S D P L L E T WN GR R L G V D N A P A K L Q I D S A F S I D E F A V E L P K I
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FKNLTALYHYQGLQPWGDALLNE IHGSEKLYFAFGKKAGFDEQVIGWVKK ANSKDRHAQND

##  <br> M M M

 II YGAN TVYY I RDATVIVTDFSTSESKSPL VKSASRVYTDCEKPRQGEQETENKDWQLMKSDKSWF
 TQNLTACYYAQGWQTWGDAIVQSCFD
MNEADNVYDPGEHDRAVVAVETRNARFDKQLQAAYPGH MALSEQVYLNTNEHLRATVEISSRDARFISSCKERFPLH
 MTYADTMYINTNEHYRAVVETETREARFVKKWKEKYPA H LRGVRTVYTNPEVDSLLKAGTGSASSAPNFKSVFEMVGSS LLNQHTLFHFFGKNLIRDSKLIEWIYSDNQRSREGKFGPK MAEAEGIYLNTNEHLRADTTVQTREDRFITEVKKDYPA


L A G A V A
LTK S T R V Y LDLLP S D $\quad$ E F

L K H S Q T L Y A L WWQ H D GVVP DQD ILA DWR K L CNQAGQR DT PA H IFEAEQVYLNTNEHTRAGVQVQTRDARFIEEFKQQYPAB




 KDEGVTVWYDSASHA QLHWQYMKP L LDD DRTKSS Q N
L R GR SR L Y Y S F GQNAA QDHE ILLSKK D FMMRRRGRA GQS GPT V R R A EVVYT DLP GSVVSQSAFTQYLTGAAPQPTAGLPK NT


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130
140
150
160
VSRASTVYUDDPQQSMRQSSTKSF DRYDSGPARSDUVSNF LSSSKHIFMDDDSPGSMPSLITAEST KKLIETGLKLQ TPGYSN|YTDLDSPS DRVGAYHHSARRGRSRSGF
 IK DHDSUYUEDPRYUKDDHETGELLNKELAKNNNKDK LKDASAVFTDLRDPDPRSSETHEFSSKMEKGVLEKMANSQ
 LEGAKNIYYSMSSPNGMNVGLNNWLDQURANTRQGSEVP I K N K K N L Y Y LDY T D E F L H KK I F H WM K P A Q M KVRRNVVLAPD L S GA T E VVYT D I K A F D S S R S I L S G Y Y L A A A E S D T I K K L V D P R

 MGLAHHLY L NTNEHPRANFPI ATRDRRF R R WCQHHY
 L S GVV KVVVLKPDGGRYSPSFVEATQGFHSKFFAGDF L E NTRRCVWYPA AT H
$L$ E GRARLLYCHFGREAAFDAQLLAWLDRRLRAT QGVAQAPQ KAETSTVVWYDWMKPPHAQLHSDYMHHLTEAKARSK

 LA Y A D E I H L S F S H DD Y WA N Y L S G W

$\stackrel{V}{V}$



|  | KRKSLASE\|L|A 170 T ILPLSKTIQELRMI NPLPLSPEVARLRAI |
| :---: | :---: |
| UniRef90_K5VMR3 UniRef90 S2KK29 |  |
| iRef90-D8PL84 |  |
| iRef90-D8TQB7 |  |
| Ref90-D6T |  |
| - |  |
| Ref90-Q9F | DIIDGSSMVGNLRLIK |
| niRef90_UPI00034597FA |  |
| UniRef90 M1LMY7 | H1HDMSNFINEMRSUK |
| Ref90-Cos0 |  |
|  | RWEIPN FLHEMRMFK HYERSAP DRELRAVK |
|  |  |
| K2 |  |
| UniRef90 K2BI | KLIHLESIVLQELRLYK |
| iRef |  |
| niRef90-UP1000 |  |
|  |  |
|  |  |
|  |  |
| UniRef90 Wo |  |
| UniRef90_G8 UniRef90-H3C |  |
|  |  |
|  |  |
|  |  |
| UP10 |  |
| Ref90 UPIO00441502F | KRKALAPEVGRLRAIKK |
|  | HQVNLSTLLDEMRLIK |
|  |  |
| a3A |  |
|  | A HRDISSLGEMRLI K |
|  |  |
| G4TUU | VRDLGKHVAKFRLVK |
|  |  |
| UniRef90-It1HH0 | SLRPLAPEVGRMRAIK |
| 8DTG |  |
| 6EG |  |
|  | DDI DP HVQKMRLI K |
|  | AVKPLRPLMNDLRMFK |
| UniRef90 R1G769 |  |
| UniRef90-D3B6 |  |
|  |  |
|  |  |
| UniRef90-N1J6H8 | RVKPIRPLMNLRUMK |
| UniRef90-H8KXF22 | NYLIRSAPLMCDLRMVK |
| - |  |
|  |  |
|  |  |
|  |  |
| 7M |  |
| UniRef90-LMM |  |
|  |  |
| UniR |  |
| UniRef90-U1GJ50 | KTKPLRPLLNDLRIQK |
|  | A HYDISPFIKEMRLIK |
|  |  |
|  | QLLP V P FLEAMRLLK |
| UniRet90_UPIOOO3 |  |
| UniRef90_UPI0001745C12 |  |
| UniRef90_W6MK06 | SVRSLRSVVSNLRAVK |
| UniRef90 Q2QNJ2 |  |
|  |  |
| AOA | VRIPLYPVINQLRAl |
|  |  |
| M7Y4 | ADIALNGMMDQLRAVK |
|  |  |
| M1 | $\begin{aligned} & \text { KKLKSVADLRKVK } \\ & \text { SFASPVPTOPLRLE } \end{aligned}$ |
| iReet90- UP | QLLSPIGLVGMMRLIK |
| Ret90_UP |  |
|  |  |
|  |  |
| UniRef90-LOB | HI CDLSDIVSEMRLIK |
| UniRet90_R9N775 | R L D D Wh Fiv M M RL M |
| ef90-H605W8 |  |
|  | SFRP T PWI HQLIREIK |
| E4U0 | LSALGAVLHPMRVIK |
|  |  |
|  | K⿴囗GMSKTiGELRKIK |
| C5 |  |
| UniReeg9-A5DEC |  |
| UniRef90-F2QPR1 |  |
| iRef90-M4RX |  |
|  | PFRSANELLHPLRTMK NIKAGYRII GKFRLVK DLEHLYPVICECRVIK |
|  |  |
| UniRef90-AOAO24GHA3 |  |
|  |  |
| UnRef90_F4X8G4 |  |

UniRef90_UP1000368CB4E
PLDPALI 10 10

20 APFAARRRRLMDHMRANGAA FLANDEVPENGDAL MTSEMYSERRKALSKAMDNHSTVLLIFSAPAALRNRDAE

ISALEYATRRAKLASEDLDDGAVAVVPAAYVKYRSRPVFMNS STIYAERRAQFAAQMEEHSVCVLFSGTAPHKSEDMEMNKEFYAGNRKSLYQKLEAGSLVVVFSGHAPDKTNDEN$P V P K K L H A K N R D K L V Q R L K P N S V V L F Q G G H D N H Y N T D T V$| 1 |  |
| :--- | :--- |
| 1 | $P$ |
| 1 | $P$ |
| 1 |  |I PMEEYYRQNRSKLTAAMPDNGLVVLLI KKEEYQCRRQKLVEADAQNHMIVIPMNNQFF $\square K N R R N V S D K L Q E N S M L V M F A N P E R N R S N D V D$IT SEEYMQRRKKLLDFLQENSSMLVMFAGKAPYKSADET $\begin{array}{lll}\text { l } & H & R \\ \text { E N K }\end{array}$



 $L S K$ E F H K G R R E A F R T M MP A N S V A V I F S Y P E R V F S R D I N

 MK GQ F Y K E K R HK L L E K V K D N S V V V LFA G NAP K K TA D EA $\square S A L E Y Y$ Y R R L L L L A S K M P S K S I A I L V G A D V R Y S S G S V F



 LS QVEY A LRR R HKLLMS LI QKEATVVVVSNP T Y Y M S N D IP



 MK K E F F M KN R DN I LE S I K DN SMLI LIFA G EAP QK S A D EA $\square T$ Q Q E Y K D R R D T L V E K L VA S H I I V I PA A R K Q Y M S E K IP M N K K F Y K S N R N K V L N K I K D N S L L I LIFA G N A P K K TA D E K MTK E F Y K G N R A K V Y A QMK E N S L L V L F S G K E V R K T N D E F LD K E F H R Q R R E V L R Q Q L P P R S V A V L F A S P V R N R A N D V D
 L S A E F F H Q E R R E A LAR A K M P D D N S V A V F F F A N A V R N R A A N D V D
 L $M K$ Q S F F DIE N R K R L A E T LIP D E S V T I LFA G Q A P H K S A D Y L
 $M K$ K E A F IIRN R S N L I N S LIENNSS V V L F S G K P C K K T G D E F
 M H K E F F I H N R Q E L Y K N L Q A D S L L I L FA GKA P Q K S A D E D AESFLARRRAL SKLFPGETLVIPTGHEKVRANDTT LSAEWHRQRRDALRELMPANSMALLFNNPVKNRSNDVD MDKTFHSGNRERLYGKMKENSALLLFSGTEVRKTNDEF DYKTRRTRVMEAMPQGSLALFFSGKAPVRSLDEA MKEVYUKRRNSLKKKMKEGUILFLGNGESPMNYTDNT LTGTEFELRRQRLASLIEAHSIVIVLSHPTRYMTNDID YNSNDYERRRDRLDDQLEADSLVVLFSSTDSTHNHGIP

[^0] LTADFHKGRRDAFRAEMPANSVAVLFSNPVRNRANDVD DANVFEGRRER AEQMADRSLAVLFSGRAPHKSRDAV

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UniRef90_C4XZ20 UniRef90_W4KH17 UniRef90_A9NUB9 UniRef90_N6UTE2 UniRef90_IOWG41 UniRef90_C5VNK9 UniRef90-M0ZSN9 UniRef90_B4JK96 UniRef90_W4WFM
UniRef90_B5X1B7 UniRef90-K7IQ45 UniRef90-R6TQB0 UniRef90_R6YGQ6
UniRef90 UPI00037 UniRef90_-UPIO0037C2143 UniRef90_UPIO00376ED24 UniRef90_V4AAL7 UniRef90_G7LXF1
UniRef90 J2K0F5 UniRef90_B4NE82 UniRef90_O62565 UniRef90_E6R253 UniRef90_R6FSB9 UniRef90_A3LPU9 UniRef90_B1R1X6
UniRef90 Q0WUQ7 UniRef90 I8J2L0 UniRef90_R4FLH4 UniRef90-W1SM61 UniRef90_UPI0001D53CC6 UniRef90_N9WC05 UniRef90_F0QZN4
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UniRef90_UPI0003F894F9 UniRef90_S7QKF6 UniRef90_M1M7F0 UniRef90_F5WVA6 UniRef90_TOPDY2 UniRef90_UPIO004070874 UniRef90_S9P492 UniRef90_UPI0003F8CE61 UniRef90_U2CFS1 UniRef90_U2B8H1 UniRef90_UPIO003FBF6D0 UniRef90_Q16RG9 UniRef90_B9YC67 UniRef90_I6ZY37 UniRef90-Q0TMC2 UniRef90-W5L2H5 UniRef90_X0WME4 UniRef90_Q094B3
UniRef90-M0SHF6 UniRef90_C0BMV5 UniRef90_T0CSU9

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 SDPGKEKWVGKKDDRNEAQAVSGDTEVYNKAMATEISR PTEHVQDWEGTKLSREEATKISGLARVEWLGAFPGLFHAL KEPGAEQWDGFRTGVKGVVEVENADEEDVYRAPYMEKL

 KDPASELWDGPRTGVNQAVELFGVDKSLPLLHEFEDFTHYL KDSHAELWDGPRSGVQAALDVFNADEAGDIKHAEHHDRP ANPDLEKWTGRRLRAAEAMEISGVTVVHDLDHSAVFGRL KDQHSELWDGPRTGVEMATEMFGTDHALPVTQFEQFLALL KNEQRELWEGAKTGLDGAVEFFNADSVEDVGKASTYIRSL D A F A E R WT GR RI K E E EA K E L S GI T N YK Y VAA F R N DL S R Q LPEEYATWMGPDPTPDDVTEKYGVTETYYVDQDDEDLAK ADRDTEDWDGPRAGDQGSTTHFGADDAKKVDTFESYLDAL YDAHKAQWDGTRTDFSSIVDLFGADDARHTQNDAADLKSH LSEDYAVWMGKDHTLSDLKEMYEVDEVYYTNEMEDULRSD $K D D H A E L W D G P R T H P E D A V G F F G V D N S L P M S D L P K F L E S C$
$K N K Q A E Q W N G Y R L G V E G K G K G G F K V Y N G I D E H D F P D D Y ~$ EDPDMAKWVGEKMKIHEADN SGVNNIDYTKNFKEFIGEL PSLQDVLWQGEVAGVDAALDIFKADLIAYPDSRLPEMLSRM
 KDAHAELWDGPRTGTEAALSLFEVDHVLPVNEFERFLTSY VDMDDAKWMGRQPSIDKEAADAQVGVNCIVYNASFNQFLTNH RDPRREQWTGRRLGAEGAKKQLQLQFAADNTEFAKAGIKW
 LDDDKEMWSGKTLRDTEGQEISGUKDTVYMKEFNDYFNRI KNAAREDWTGRRLGDEGSKSKLGUSTVFNGKDFKDFADDF LPEDYATWMGQTYSCEHFRKKYDIIHSVRYTDETTEVIKS KDPHDTLWEGERAGLEGATSMFGADEAYSNTSLSSFLPGTV KNPQTELWEGERSGLEGAYDYFNADFVEDDDSARKHISQL DDLAKEMWNGKTLRDFEAKEDSGMEDTVYMNEFYGYLNRL LPDDYAVWLGEVKPGSHFKETYMVDMVFYVDEDGQVFNEQ KNNHSEKWEGARTGVEDAPDVGGVDDAKPFQELENNVLRDG
 VTLEMERWLGKTDRQEEVEPLNGLKEVGYLGELKGFLNRL VTMDDUTWMGPQPSVRELAAQVGVTKSFPFAKLKGMLGKA RDEHSELWDGPRTSMETAMKMFGVDHALPVTEFEQFLASL LPESYAVWCGKDWSLDDEKTKYGTDQVLYVDELADDLKK LSLDHIVWMGNQPSMDEKTALIGADQHAPYKAGLDVISKA ■PESYAVWMGEDYPKEHYKEKYAVDEVHYTCDIVDV LS ADPVLEKWVGKRMTVEEAKEASGUENUQYDEDFEGAVARL KDSHAELWEGPRTGCALLAPARTVEESRPVENFNNF:HR PDALAERWTGARLKPQEASDLSGVENVGYVAEFEGDLHRLL HDEMHELWNGKRLGVEGAAKELGI ATRANTDFAGFKLDTA ADPWMARWVGETITPNAAQDASGVENDELLDQFEDYVRSQ RNAQAEQWTGYRLGTEGAKSKLGFEDANGKEFSKSGMDY RDAAREQWTGRRLGVEGAKTQLGFKRVYNSEDFAKFAI DF RDPSRELUDGPRSGTDGADKLTGVDASFTTGELGKYUQYY KNPRAEMWTGYRLGVEGAKNDLGFTNVFNGKEFLNNNDDF

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KDPHYEMWNGKRLGVQEAKEILGFSNVKP
KDSHAELWDGPRTGVEMAPHVFGVDQALNVSELKGYLTKY
FDPEQARWVGGRMKPEEAQQQADVDAVYPNAEMLDFI HRQ


KNKEQERWQGYRAGPEEA DNTYGASQSYP
$N P G R S E L W W G P R L G V K E S Q A R F G V H E A R G L P E L K G F L S S L$
PDPHDA $\backslash W Q G Q V A G V E A A D E F F K A D K A F P L S A M H K G L$


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UniRef90_M7X4T0
UniRef90_H6LEG7
UniRefol_UPI00174695E
 $L$ DDQPA
LI WTP
$K$ LSHNSRI Y I DLDSQS
MASAKTLYFDFKTPPHQSFKT ADEGDQK DIKQC MCEAEGVY LNANEHPRAQVVVETREARFVKETRESY PGCH
 LGGKKMLWYDLVREVPRCRRVLGQLSEEHKGN K GS QL WY DS SPPAHPR DHQSHVLPT LEGGP
$\square K R N D N I Y Y N Q S Q N E H A K N S S S I F S T F F S G P E E S K H T T N K$ AENAQHVYLDLERREWKGTETKTLDAFAKHVREQY PHD $\square K Q N R D C M L W Y D Y \square S E \square H P K V H K M M Q K F D T Q S W N K V-$ LKRASTDYADLTEKPSGFASLDTPPPAAAPGS LVQULRDR

 VQSSKMIYYDYAEKPKYKSAFSSFFNFGGGGSDKWLGSGK
 RKPENVLLLKGLNTDSGLEI NPAEFP LGNRHGFSVNS
 $L L S A S T A Y V D L P$ SSASKRPARGSYKLLMKYLSGSEAPR ATDNETVYL LHGLNTDSNKFSQPAQFKGIENFNTNLDD
 IS GYDTLY LDDLERQEWGKADTN S S Q
 KGSTVVWYDGSKPCHPGLHQNHVRPLLEGGP


 SK FNPV WY

 LASSG TM Y

RNQ KSVDS DSQAFAKE\|ISKY PQV LKGAEEVNWD DKSVSAKSTVGSRFSSFFTGSNAPSATAS

 K


 TKKSNVVWYDFPTHPAFHSKLM KKGLI LP DRNQG C C


R GAA

SFAHPQVWFDEKGCDLGDVR KMVGDVSKSG MKGNRRMSVGLDLAKESWEEPDDPAYRFASHVRQHYPSV


HGEVSRPTRVLRGFSDKVDGVLPAQAE
K S F DK VMFYNFNND $\square R$ D T REGA D L F D L VK SFKNK $\square G F P S$


Q Y K R A A P $|\mathrm{L}| \mathrm{MKE} \square \mathrm{L} R \mathrm{~A} \| \mathrm{K}$ AMRAARPGMRE $Q \square R N \square H R E L A N \square R L I K$


SVRNTYASTAALRRIKK SIA PLAGKIAEQRAVK LI KNVSSNITP LRRMIK DLTMTLHPDLAAECRVI K



N【KNAFPLFAPLRLVK SSLELIKAVVSLR SVKK NYLRAAVIFKQLRAAK MFASPKMLFHQURLIK

 NYERAAP I FRKLRPI R
 TLDEPQKVLHQMRVIK


S I H NLYPVICRFRVVK ELQENDPLNNEL


AVENAAPWFARMRRVK R I E NANVLIRSLRTIK
VVRSPVGLIHKLRVVK DLINVHASLAQLRMIK


R D K A $\square$ A Q A L S E $\square R \square L K$
NYNASR
$D \square R N \square H A D \square C R \square R A V K$

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UniRef90-U6ICF7
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1
 TGI QQEEFRQRRGQLMSAVKEHHVVIVVSSPVKYMAVDVP I SKKDEYKARQLRATKAALDKNEFIVTTSAPVNYMCGPAF $V P R E L H A V N R Q R L C E Q L G Q G A F V V L Q G G E S P T R Y C S D F$ $V P M S L F C H N R A R L V S R L Q A G T F V V L Q G G D V P F N D T D T N$ SVQTYTERRNALKKAVGSGLILIMGNEEAPMNYHDNT MLREMHVHNRKKLQNAMAEKGVVLLQGGEERYRDCDHLD VAMDDFATNRRRLCERLPKGAIVLLQGGETKQRYCDTD IS RKEYA WRRRQLMHVLAEDHVFILSAAD DKDMTNDDP MEKHFFSKNREKLYERMEMFSAAVLIFAGKAPIKRGDEN MEKHYKERRKKLAAALD DNAIALLIFSKTAPYKVGDEK LT KEFHQGRREAFRALMPANSVAVVFSYPERVFSKD MDRLPDNSVVVAMSGRVKSMSGNIF YTKRRQKLSANVGDGLI LLMGNEDSSMNYADNT


 RSLHQNQQSDHIIIIPSASKSYMTHDIP FNQKRQQLLCDKPGPCAAVVFSGRAPMRSADGA FESNRKNLVNNMKENSLLIMFAGDAPYRSADQK
 KEDYDERRKVLKEKVGEGLILLFGNDESSMNYADNT VPKTLFRDNRTRLAHRLGEGGFVLLQGGDVPFNDTDDN RYNTDETG $P \vee P \square E L H V R N R E K L L S S \prod P D H G F V L L Q G G D E Q N R Y D D H V$ $K V P M S L F Q N N R K R L V A R I N S G T F I I L E G G D E V P F N D D I C$
 I PMSLFRENREKLCERLDNKAVVLLQGGESMNLYDDVE QVPVALFALNRKRLCDRLQKNSVVLLQGGEDAQRYCDTG
 V PIE

AEHTARRRAALSEAFPGERLVIPSGQLLTRS LS SDFHKERREDLRSKMPENSVAVFFSNPDRNRANDVN KI PMTLYAENRRRLVENMKKNGVILDKGGEQTTRHDDHE EVVKKEFHKSRREALVRKMPSNSVAVEFANPVRNRANDVD VSAALFAFNRQRLCKALLPKSVLOR KVNMEVHVHNRHKLLKSLPLHGFVLLQQGGDEQQRYDDHD PLPAAEWAARREALGEQFPDGARLVIPAGGLKVRSNDTD LKRQEFAERRQKLIARTTQNHAVVVLSATKTYMSDKDP
 LDSKLFPGELLVIMPGHEQVRANDTN VPAA $\square F A D N R A R L C D R L P R K A V A L L Q G G E Q T N R Y C D T G$ FDLNRKNLI KKMKEESLLI L FAGDAPFRSADQQ LDAAHYVLRRKKFLEQLPDGALVIVVGNDLLPSNADGT NKETYUQRRNRLKKEIGKGILLFLGNNESGMNYTDNT
 SKQTY INRRVSLKKAVGSGILLFLGNEESGMNYEDNT VPMTLFKNNRDRATKALVENLIVVLGEGGKDKFYNTDVD $V$ SAKLFAENRSRLVAALKK GSVVLLQQGGSEKNRYNAED MEPGSIVAVAGQRTKFATESVF


 SKETYY L SRRRAELKKLVKDGIIIIFGNNESPVNSPANY KEVYI NRRRELAS SVKSGILLFLGNSEVGINYFDNT RSLHALNRQRLNGRLKKGAIVLLQGGKSIMRNTDHE VPMSLFRNNRDRLKELLPDGNLLVLLEGDQSLYNTDVD KETY円ARRAKLKQTIGSGLLLFLGNDESGMNYADNT K S $\square Y$ YQRRNQLKNQFSEGLLLFLGNDEQPMNYADNA YAKRRAALSAAFP GETLVI PTGGEKTRANDTA $\square K V D L F V K N R K R L V D A L P A K S A I L L Q G G K E H F R Y N T D D$ LTSSFFADNRRRFADRLPDNTVVYLFAGEAKRMSGDTD
 KETYVARRRQLKESIGSGLLLFLGNDECGMNYEDNT
SKETYVARRESLKKKVGSGGLLIFPGNKETMNYKDNW T D


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OFBE

LP PEYA\|IWMGE\HPPDYFKQKYCVDRVSFV|DE\|IPSVL|NEM $R N P E R E L W D G P R S G T D G A L Q L T G V D Q T L R I D D L G R F L V Q F$ KDAFAEKWEGTRTGLAAAENMFGADEVLNDHDFQKVLQNK TDLNTEVWE GPKLDLNF CVN ILGGDEQANYDS QIAP FVVCS Y LPESYAVWMGKLHTTEHLAAKYAVDEVLYVDELADALR
 LDP D D Y A V WL G E ITHPP S F F K E K Y G V D A A Y Y VVD E MVVSVLLRK F
 D N GVVMA K WVGGANMTAEAEATVVSGIVNNGWI DAFEEATATY

 RDEHNETWNGPRTGLDGAVD IFGADESQELDPADNHLKQD A G $\square D D D \quad D W T G P L P S L Q D L A T K V G D A K T K P Y A Q L G D V L K K A$
 R D ANN E M WN GR QL GVEGA R KM G L D R VA SKK D F S T E QN D F PDAHAERWNGKRLLSPQEAQDVSGGISDFRY LTRDFSAF LDK Q





 LP A E Y EI WC GKLS TLDEFKERYGVDESYYVDEDAQVFT Q

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 $\begin{array}{lll}R \\ L & \text { P A A Y S } \\ \text { R }\end{array}$

 $V$ T M D DVI WMGP QP K MS DKA A LA G V T K VMA A D S L E E Y L K R A APRTD EMWVGQRDS LDEMAALTGLH CAPISELTTHLE RDAHAELLWDGPCAGPQGAVDLLGVDAAYELEE RD GH GEELWS GRR S S LDA E S S A L L G L A V H DVVRE LP A L L E K A LDP E E Y E V W WM G K LLH A CSS D F K A N I Y Y A V D E V V Y Y V
  $L T$ DD D IVWM GT Q P T DREK S A SVGGUTAATAP TA QL S D YL N KA L P A S Y A T WMG K DHS KEHEKEKYAMD D DQYA DE I A S VLT S



R LP ES Y AVWM GK $\square$ H P P E H F K E K Y A I D E DY F T C D I S S V L K







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KP TMLMLLNGVNTDSGNTCKEAYFDG■GKFKSVLNNK LD RTQDWTVWFDH
AKKYRCAYADTGSTTFGD $\square C R \square R P P T \square A E A \square V N \square S Q S C$ $\square K Q N \quad H M N G V Q \square W R D \quad H G R F R \square I D D V I V Q K G G S I$ TRGAQTLLTLRGRNSDSGRMSKEAHFPGIVGFK KRARLLLTLNGRNSDSGLLSREADFDGISEFKVDNS LKKASKVHFTPPYRFDNMURMSEWLGDPTAQDKEKAS
DAS KLYLLHGLNTDSNRYCKPATFQGTEGFEQ
 FNNSGYCVWYKNRRTSHAGNQQIILSLLNDTAFKK
LS G IKK WWLDMENREWHGERT PALRFAEKVHCHAPQ LDARVY


 QTSI FNTVGCTVSYDTT T



INGDNK Y L DLERQS
MD $\square$ PSTQPQD


KNAK LIVTLYGQNSDSGLYSKEANFDGDEKFKVNNSD S


FSGKPVLELLYGKSTDSGNYSKPASFEGYEKFKEKASADT
KSPSII LTMSGPNTDSGGVTKPAYFKGU EKYVVDS

K A G GRKVHFLPPYRYQNMIRLNRMLGVPFDRMRSDAS
AFEADGFY LGHNEH $\square K R \square T H N K Q T Q Q D R M D N W C K E K Y P \square H$
KGARTLLTLRGRNSDSGKMSAEAKFAGMEGFKVDAGP
NPAVLLTLRGLNTDSGS TVGREASFEGDSRFQ
RADGVTTRVVRGHDAEVDADVDELRADADADAEARAKSAR
$A A G D R T M M Y R V W S E P E T E Q A V S S L A W T A A T L G M E H A P P ~$
A A GDRTMMYRVWSEPETEQA KSLLA WTAATLGMEHAPP
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## EPDTLLTLVMDN

$K$ K $\quad$ VLLTLRGQNTDSGSULICREASFEGTSSFQ


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VPMS LIFRNNRD RLIS R L R A K S FV L L
STATYSERRSRLRQLVGSGVIVLLGNNDSPNND MEKNFYVGNRRGLLFDIMEDGGVAVLMS GYRVNKSADEN

 APYTAKRRALLGSRFPADALVVPSGGLRVRANDTD



SAEEFKDRRSRLAREMEPGSIIAVLQGAPTETGY
HAQRRDALSQAFP GETLI I PTGAEKVRANDTF SAQTYVERRNTLKKTLGKGVVLLLGNDESSINFKDNW E $\square$ D Y S M H R E H R D K L L D R MA P S SFIV L H G GS E V S E Y D D T T


$P \square P Q A A T A E R R A K \square S A R F P G E R L V D P S G N L R T R S N D T E$ K LRREN Y I N K I E E G S I SL FYS GEQK HK SND QF QVPMAVFSLNRRRLCQRLPKNGIVLLQGGEQSQRYCDTD
 TY V E R R D R L K K QVVGS G I L L L F L G N E D S P M N Y T D N P VP M A L F R K N R A K V CA A L R E N A A V L M E G G DVVS F N D T D V S PKNTY VNRRNTLKQTLKKSGDILVPGNGESSMNYADNW SKETY $\square R$ RRAELKRRLVKSGII I LIFGNNDSPANFPNNY

YARRRDQLSAAFP GENLVIPTGGEKTRANDT T
AD YRARRQKLAAELKGGVLVLF APTEPSAGNAT
 YAKRRAALSEAFP GETLI I PS GNEKVRANDTD PIDYTMHVAHRHHLIKKFNNASAIVLHGGEEVDRYDDTQ PISMKMYREQRERL GAS LQQGHAAVLGRASEVPNSTDCN SASTY DNRRQQLAASSVASGLIFFLPGNREAPMNYTDNT

HS K H R E K L F S L F D D N G A VVI Q G K D $\quad$ I M Y R Y D D Y E LT K QKY S AR R N A V M A T VK Q E HVVVIV LG G E I A YM S E D DP
 S K Q TY YQRRKEL KR LVGE GVI LLEGNNESPCNYPNNY
 QVPRAMYREQRQRLGKSLGSSHAALLQGGSEVPNSTDCN

DSATYVRRRNELKQLVKSGVIILEGNNESPANFPNNY
SRETY Y E RRAR LVA DMGET GLLLLFGGNDESMNYT DNT $K$ VP M S L F Q N N R K R L I E R DIK A G T F I I L E G G E D P F N D T D DC $\square S$ L D E L A K R R K A L V L E L L G R H A V V L FP G S E DQ Y M A Y H V P
 DKNIYIISRRKKLLKELVGDGLILII GNSESPMSYADNA ATYI R R R N ELKK KLVKEGI ILLEGNNESPANFPNNY MT A EVVI I P R R E KLLFS AL E E KEAI I I F A A E E E K L
$P D E Q A P Y A A K R R A A L S A R F P G E R L V V P A G N L R T R A N D T D$ S A K T Y A A R R N M L R T K $\square$ G S G $\square V L$ FP G NP L S P N N P N NA
 A V 1 H

IQRRSNYFKKVSAPSDSI FYSGSAPHLDNDSY
SKETYVGERRRKLRELVGSGLIVLFGNNDSPNNYPSNV AEVHAGNRERLVAALRNGGIVLLQGGEEQTRYCTDH $P$ VE QAEYTARRRAALGARFPGERLVIPAGNLKTRSNDTE


 S GLTKSFFKNRRQRVISKMRNEFVVMIVASASDKDMSSGTY LP D N SVVVSVS A P VK YM S GRN
 E T F K Q R R K IL | S E K M G K G I G L V F A G S E V

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YPFRASVEYAY TGDQTEDGVLVLEPLAEGGHRAVLHLLP FPFSVNRNFFYLTNDDQANVVLVVIKGKNK SESFLFIEK NVFRQESFFHWTFGVTEANUYGAIEV ASGKTHLFIPK

 FLERQESYFQYLFGVKEPDCYGVLNDD TGVATLFVPR
 YPFRQNSDFLYGTGFQEPDSALVIHTGTDQHPKSVMFVPQ YPFRPGTDFFWLTGEHDPESVLILRATASG HES $\frac{V L Y F}{C F} \frac{V}{N R}$
SGFRQDDNFYY LTGWSEPGAATMПAAEVVAKDEHVLYLPA YPFHQDPNFFYFTGLNEPNGILLFCTDKTEERDDHLFVET YPFRPGSDFFY YLFVQESYFHYLFGAEDPDAYGAVDAG GKSVFFIPR YPFRQDSNFRYFAGHNLPDLAGLI DASGASRLWGND FPFRQESNFWYLTGVNEPECALTLNDDDNTEEYHLFVPE YPFHQNNNFRYLSGFDEPNSCLIMETLPGPEHKSTLLVPK ELFRQESNFHYVFGVAEPDCFGALMDD SGESVLFVPR


 YRFRPDSHFLYLIGAWIJERAALLVMDSDQDGDKDVLFMP
 YVFRQESYFDWCFGTTEAGCYGA1 DVSTGDSYGFVPR YPFRQDSSFLYYFGLQRDGLVGVIDDDNDGRRDLLGGD EKFKQDNDFLYVTGLQDPEAVYFGYKGQNGPVEMLEFMER
 YNFHQESFFQYLFGVREPGCAGLVMEDLSTGSAVLFVPR
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 YPFRQDSSFLYFFGHDHEGLTGVI DLDAGESWYFDQG YPFVQDSNFHY TGFVEPDSILVVSTVKGPQHKATLYVSE YKYRQASDFWYLTGFEEPDSAVILEKTSSSRGRMTMFSHG
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 $\square P$ E S Y A T WM G E $\square Y$ P K E H F K E K Y A V D E V PEVA DVVWTGPQPS LA ERAA LAGVNRSRPYAELAAVLRAA







 E D P LIETMWSPPPPTLEAARSTHEVD ILAYSDEFDKHVAGA R N FV VEKYTGAK LDAS DAATKAGVDAVMPMRDDPGVLAQB $L T M D A D V W M G T Q P T L H E K S E A A G I T N V Q P S$ GQVATYLKSA LPPSHATVMGK DHSKEHFKEKYAVNDVQYT DEIASVLTS
 NNARRERGEGPLLNTEAVQALNGVDHVYSTENMGEHLSRM
 L S AE WSL WC G D R K P L E WF RE HYNV DE AFYVDELAAVL E ED P LE T M WS P PPPTLLETARSTHESDADAHSDEFEMHVAGA LP E E Y A VWWM GP LP K TN D Y A K K Y D I K K V F Y V DE LEVEL GRL Y P E A Y A V WM G K I F N C D H Y K Q K Y G V V D H M A V I L E FPK S Y A VWM GPPRS LDE E DPTREAWDGQRAGPDGATRDYGADDAF
 RDSQGELWVVGRRHSQAEAEQLYGLDRAFPIGDVDDILPGL


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ATP E E KV VW IG S A E K L E S F A E K S GF S T V K P L D QV A S Y L K A







 R D A Q Y A V WHG Y V K T RE Q Y L E E Y K P D H L H F H N E I L T V L L N E L
 - $\quad$ 「

 L T I D D I V WM G S QP T L R E K C D K A G V D R T E P A A K L K D QVVQRA
 R S H Q A E L W WN G P T V G I E G G A Q E A T G I C C K V Y S








 S D P VVME K WVGGKTV S K E DA E Q $\square$ S Gll Q K V C FSMMDD I WWS GALATPEELAARCGAERYGAEKTLTHMVTEA R D E A N E MVVT G F R A G T E LLAA K Q L T T GIV D E T K D E R D M A K E K WD GP S T S Q D A L R S HF A A D D A R P I S V F F A S H L K G L


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RDNGRTVHYLAPYRGEALIELGRLLALHPDELGAGVSA RKPSVLLTLRGVNTDS GSICREASFEGISKFK VAKGRKV HFLPPYRGETTLQU KQQAKVHYLPPYR SETTDQLSELLDVPVQEVAGAF RAAGRAVHYLQPYRGETVLALAGLLDVTPQAAQQGYS
 KRARLLLTLSGRNSDSGLLAREAVFDGDGEFK
 AKATGPVRAVRGHDAGDEAALTDKVTAERD WA HVNRHAG VYVLHPSSRVPGCDNLVPRT KSPSVLLTLYGLNTDSGKYSREAVFEGIANFTVNNEW NHPSVLLVLSGQNTDSGSDAKPASFKGUERF D
 AEADRRRLRTLWWQTDFEA GNAVMRFLAASVGNDTAPE LKKGQTIHYLPSYRAEHKDKRWSLL

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




LNPNTVLWYSSGTHKDTYSSPVPNRFVLSKVLRDRESHQD IS QYKNVYLDLGQ VISFDSP\|TQGQDHIRNRYKE
NRGS
K LIK K Q I I HF TNQYR DENS LKTISKLLDFNDDDVNKKFS





FTQTRTVYFDDERQKDTDEP L $\quad \square$ GERKARKFAKMYPH $\square$ VTDGRKV HYLPPYRHDTMDQUMDLLGTHPSQQREGAS
FSEHGHL FLLYGRNTDSGNYSRPASFDGIDKF



KKS QRPDH LLPVYRAETRMR LVQLLNCGDMEADKFVSTP AKSNFK WGDVKPGRDGNMSGHSRAHVHDGADTAVQNEAA LP LIF DEVVYDDLPSNRKFSGANNTKSLLKFLTPRSEVVDPDAS Q L S A GR SVVHFDPP YRPEHTDKINHWWDWALSDDPQKVV

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PVADFAAERRRRISERRFGERLVLPAGPLKVRSNDTDD
S K E VY A R R R Q T L V A K M GKR G I A L F $\square$ G N T EAP QYK D N C

A AETASRRAALSARFPGERLVVPAGNLLTRSNDTE
$K$ VD P E M Y R E QR Q RLLA A T LDD A S HAA A L Q G G SEVVPN S T DV
HAARRRKAISSKFKGERLVIPAGPDKVRSNDCD
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YEKRRA QLL SAFP

K S L M A D NRKRLCNKVPE HSIVLDQGGQQQQQSTDRD
K K MY K N R R N N Y I K L V
QHREK LSKHFP GER IVLPA GGLKVVNNDCD

$K$ YPAKE HARRVVEVI RSSSQPDVSGVLYMEGQKTKDNDSE
$A R R D A L V Q R D P G T R L V L P A G V L V V R S N D T D$

MELLHSLNRRRLVQRLPPKSVVI LQGGESTTRYSDTE

K Y P A K A HVVK K VVE Y $\square K A H G E A S G V I V Y L E G Q K T K M N N D Q E$
MMTDVVP
KYPAKEHALRVADYVKSKVPDATGDLYVEGRMTKDNDEP

K VP M S L F S L N R Q R L L VK S S L S D G A V L L L E G G K Q E T R Y C D H E
CTPM
K YPAK QHARRVQQ EK L G DDQ GLI Y L P GQPAVNNQDSD
$K Y P A K S H A R R V A Q L L A H H G Q Q A P G V I Y L E A Q K T R D N D E P$
KVK R E M Y R E Q R Q R L A A A L L S S H A A F L Q G G S E VP N S S D DN
V T A K LIF VE NRSRLVEMLKP GS IVLLLKGGMEQNRYNAMD


$K$ Y P A K D H L L L K V K D L L
VNP TLFAEN RLRRLITAALKTGSVVVLTGGGEQNRYNAMD
A A R REAVVSHRFP GERRLVIPA G SLLKVRSNDTDD



YP A K E H N L R V K D L L S K L S K G S TA A F

E $\square Y$ K A R R A K L R A TVGG GK $\quad$ LL L L G N DEAAS I N F A H N W
$P G E R L V I P A G P Y K V R S N D C D$


K EVY I K R R S ELK R AL GRGVAVFFGNHEVADNYPSNT


PAAD H T A A R R A A V S A Q F P G D R L V I P A G T F K V R S S N D T D
T P MSKSTY L K R R Q V L Q S KL $G$ G G L V L L L G N E E S GMNY R D NV


AKRRAALASRFP GERLVIPAGTLKVRSNDA D
PVEQAPYAAERAAALSARFPGERLIVPAGNLVEANDTH

K Y P A K THAQK VVEELDDAPKS GLI YLRGFNEPLYPYSD QG
A A D Y L P E RAEAA GEPFKGERLVIPAGTYKVRSNDCD

TASEFTERR Q E K L L L K K V V N S G I I L L L P G N E E S P M N Y T D N P
MDKNMYKDNRENVLEKIKNNSIVVLDFAGKARKK T GDES


$\begin{array}{ll}R D T & A \\ K & E \\ K & \text { Y A G R R A A R L }\end{array}$


NKS SYI IKRRQVLKSKFNKGULLLFMGNNESPMNYRDNT

LE SASY I PA RLQVL SEAFP GERLVDPA GQPKVRNNDCD
$K Y P A K S H N K K V K D I L D D L K S D D V A V F I A G E E V W K Y C D T D$



P F P P EVY R ERRARLMSVLKD G VAVI HGAPRDQTGGPVS

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 SNQQYAVWMGPLPLPENVKVSTGVEEVHYVDEVDSVLGAB VPRTDEMWVGQRESLEEMSA GAANTMDI SDLEMNLRQA LPAEYATWMGEDRSKEYYKS FLVDQVLYVDEMMDYLKS LTDDDVVWMGNQPTLHEKSERVGVSHNEPTAALAAYLQKA NTVEDEI WTGPQPSLCEQGAEAGVSNAFPLADMKTHLTKA MPVEYRVWMGEDFPPSHFQAKYRVDDVMFVNDMVAVLRSM
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## $\frac{1}{\square}$

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DSRYGEFWVGARPTDD ПDDEDIVWYGSVNSVADMAKSTGVGHVAAMOQLSDVLAKD LSPGHAVWMG VNTLPYFKDRYKVDFVFYVDELAQVLQSQ DSRYGEYWVGPRADLEAMSDMTGVATANSATVDDALTKDLD YGTESELWDGRRFSLDETRTRLG
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 AKDAGTVQLRVVR EADDAVTRLVDDLRASAESSESATQ CSAKE
IT EKRELLFLP QYRAETVIQLSKAFKLNPFNFEENDS LRTHRKIVHFLPP YRHDIGKIQDFDLLGGHPTQQKEDASM
 LAEGRPVHFVKM SRYYNTMKI A SLLLGCGTREVAGRFS KRLGRKLHFLPP YRFD $\quad$ KQ I Q $\square$ F D L L G $\square H P H Q Q K E A A S M$ AEATGPVRVVRGYDAGDEAALTDKVTAERD
$A K G V K T V E L L R G V N S D S G$
 VGAPE

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

 GA $\quad R V I L T L E R G L I S D R E G L G I A G G S I C S S F K$ $F T Q T R R V Y F D I E R Q S I K D A P L K G E E A K L F N Q R Y P H I$ $\square \mathrm{D}$ T K $\square \mathrm{PT}$ TVVRDP DPDLATKIDVW RGGSTEQ R K
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VGAS
S S TVY A $\square \mathrm{PNQV}$ D D S $\square$ T F L C F G A K


ANQGAKIVALHPSQDPSSPVRVSCMDT
A A E T
$\square E$ Q S K GVYHNVKTSSSS YKNLDAFRRASLNN
GK GKK TVV LDDS IT F LEF DEKNFS ILK DA $\square E R C R$
AREGETMFHDLAARDVVDDSSKATNNREASHQTHNSLLLASL $N G V N T$ DS GNTCKEAYFDGD $\quad$ G K F K S V L
 A N GHAALVVLHP S SQVPGC
$K G V Q T V E V D D G A Y G G N A V A F A \square A D Q V S G A E F$
G GVNSDS GLHV
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 K $\quad$ K $\quad$ R $\quad$ RADV R L $K$ VHILP P Y R GEH T L K L R E IL L S K S VAE EV S S MA S AK DAGTVQLRIVRGVDTNVEAMVNEVRSQAGLPAGEEARE

 IK S K R E V M F
$\backslash$ A A D R R L F A R $\square W$ WA Q D N N S Q A K A L V E FTAA T L G S SVVTPA S PERPDTLLLNRGLNTDSGSTAKPASVEGVNGAQAGKPLPC LRT G E Y EWL Y L DVVE QDRFH QTETEA HRFARDIRRENTRPS S



 LR $A A P T R \square V, \quad R G Y D A G L E A A V A T D E E R \quad R A P R G A D G$

 K K S D R T I H Y L P P Y Q S S N K L L L G ELL LQ


LATGRNDHFLPPSRYYNTMK LAALVDVARVAP DDEDGGKH A HPAEAVW A




 LS DVS K $\square Y$ T T DLLDNVH NE T L K K HLL I P
A GRT $\square H W V D G L P N \square E F P E G A L V$
 A A R S R T L H F MGP V V S A S APVPPAMD LYGR $\square M A R V P G$ C K D F TIIFTTDNDNVHDDS $\square$
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R D REELAWVLSELKLVK K SVELMMAVAEMREKK D T E S L Q P VI S E CRV DK Q $\square K N A H G L L A N L R S S K$ A D A E LA QVVSELRLIK
NFDVLKPA $\square E R A R V V K$ EF DVLAEAASEQRLVK S $\quad$ LFPEMDEAR L I K K LF P E DT E C RVVIK T A L M P A MD MCRMI K $\left.\begin{array}{lllllllllllll}Q & D & E & F & A & V & A & L & E & L & R & L & V\end{array}\right) K$

$R$ VTADDRVLARARHVK N NKLLHPMI MECRVI K D R KLL H P DITTECRVI K D S Q SL Q P A M N $\square$ C R M V K $K \square S V L K E A D E K A R V V K$ S NKWLF GVLT QQRCHK D T S IL Y QI MA E L R VF K $E \square K N I D P$ LDAMRSIK DME LAA ALL S E L R R L I K SDS DFFYA L DEARVI K

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 $M N L I Q A$ VKMRSSK
$R D V A A L T T D R E V K$ D Y D S L Y D EL VECRVHK SATP
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FK P L A P M $\square \mathrm{D} Q \square R \square \mathrm{~V} K$
A S K E LVQA V I S M R LVK DFKKKLKEA I E E CRRVVK C L K N E L L
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HiLEMYRQQRQRLSKSLIREGHAALLASSEVPIUNSTDCN KYPAKSHAVRVADYVKSKVPGASGILYAEGRMTKDNDEP KYPAKEHAKRTVEALRAKQPGATGVLYDEGQKTKDNDGE $P$ LIEAA QYAARRAALAEKFP GETVVVPAGGLKVRSNDTVD ARREKLGKQFAGDRLVIPAGALVTRNNDCD P $\square N Y E M Y R E Q R Q R L G K S L S E G H A A L L K A A S E V P D S T D D N$ पDKEEYK पHREKIMANVPNKSAMILFARRPS

AHRAALSARFPGERLVVPAGGLQRRNNDCD KYPAKQHAR KVAMK GGVSSGLIVLVGQPTVNWGDQP
 FPV PLAKETYREQRERLASTMREHAALLMAGAEVPINSTDCN REIYQERRAKLRAEMGSGQLLFLGNDEASINFKHNW KYPAKAHARRVVEYIKKTKPEAAGVLYLEGQKTRDNDEP KYPAKQHARNDAR KLGVSQGLIFTAGQPTWRDSDQA KYPAKNHAR KVAQELGVDKGI I YLVGEQERRFPDSD
 K ARRAALSARFPGARLVVPAGPLKTRSNDTD KYPAKEHAKRVKHFREKNDAKRVSFFMSGEELYQYCDQT QSAFAR $K$ VPAADFALNRKRLCDRLRKGSTVILQGGEETQRYCDTG APTPVSAWTGHRRAAVSARFPGERLIVPAGVEKGRSNDTY KEVYVRRRKALLDKMGERG\|ALFIGNDAPAQYKDNC PETLRHRRQKLAQREPGERLILWAGSYKQRNNDCD KYPAKAHAKRVAARIRELGYGSGVIYLEGQKTQMDNDGS KYPAKAHARRVAEGLKALGHSGGAIYLEA QKTRDNDEP ADYLPARHAALSKLFPGERLVIPAGETKTRSNDDD

> K F P A K T H A R KYPAKEHAR
$K$ VA TE L GVPS GMIVY
AKRRD
AKRRAALLSAAFP GERRLVI P

 K Y P A K K H A Q NVLS HLEK RKSKGSVF F GS GEVLYKY CD QT K Y P A K R H A QR VA D Y $\square$ NKMPGAS GVLY LEGRATK LD N D E A PGERLVIPA GRLKTRSNDTE
 $K Y P A K R H A K R V V D Y \emptyset R T K V P D A T G V L Y G E S R M T K D N D E P$ $K Y P A K A H A L R D A Q Y D A K M P T N G F L V L A G A E E F Y D D T D L A$ A D L T A V R R S A L S GQFP GARLVVPA GAF KVRSND TAD A P Y A ATRRETLSNQFAGQRLVVPAGGHKVRSNDSD
T L K D F E E R L N N L L S $\quad$ M D D N S L F L L G S K K E S Y M S P NVVK QLPVSFHKKTRRQNLVEAMKGRS ALERGDTTKPDDQDID RRRERLSAHFP GERLI IPA GQLQVRSNDAD HAATRRKA DSALFKGERLVLPA GPPKVRSNDCD
 $R K N L G E S \square E E G G D V I A A G K A P Y K S A D E T$ $K Y P A K A H A R R V A G Y D Q E R G H G G S G V I Y Q E A Q K T R D N D E A$ E VP M E L H R $\square$ N R S R L C Q R L Q E G VY VL L Q G G S LAA F H G G DV E $\square P M Q L H V T N R Q R L C N R \square R$ R
 P A A S Y A A A R REAVSA A Y P GERLIVVPA G GLLKVRSND T D
 $K$ Y P AKAHCRRVAKYLDAGLARDGVI YLAEAQKTRMEDDD QA R N NVA H L M R SLS G GVIVLQQGGGPNHVYETDNE
 K Y P A K S H A R R VAAQ $\quad$ VG LT H GLIVY LA GEVARNNEDSD QAPYAAGRRAALLARFPGERLVVPSGKLKTRSNDDT ARRRDCLV ETVPA T R MV L P A G GLL K V R S N D C D
 K E LIF LIE RKN L G G S GK RTGGLLLFGNKAESNKYCDTV VTAKLLFTENRLRLVKMLLKPGSVIVVKGGGEQNRYNAMD GERLVVPAGPLLKVRNNDC


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KV V K Ell KYPAKSHARRVAGKLKAAGHGERLVFPAGDLQVRSNDTD GHGSGIFVEGQKEHDSDEP $T P L P A D E F P A R R T K L A A A F P G E R L L V P A G Q L K V R S N D C D$
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1 MAGRDEFWIGKRPTLPEFKATLGLETDGYVADAAELEVA DDPDEVIWSGLPDSPAQAQKQYDVDRVLSTTEVNTTLAS ASDDEVVFMGEIPSLNDUITRYGVDEAHYTQDLEKYF SMEEAALYDGESASCE CQSKKYGVACETHYTDEDVVSCLSESW
 PAPEDEDWHGPSADRDQMATWMGADAAFPLAE LI AEYAVWMGPIASPEAVAAAHGVDRVAYVDELAAVLSELD


 V N Q D D I L W S G MP L S L K E A K E K Y E C D E V Y H L S S L D E V L K E Q LHP D FA I WH G N IVN E E WY QK K Y EVVDEV H F N D Q
RAPRDEFWVGARMSLEEMSVFTGLECAHDDTLRERLATB

 I ELA DL M W SVVPPPTLEAAAETHDVTTHVDYSSSVVSEAIMTTT

 VEPR QVLWFGSKPSAAECKRRYDVDEVRYT TQLSSGMRRF $V$ D P E S V I W


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UniRef90 K9Z987 UniRef90-CONIFO UniRef90-O96W×8
UniRef90
K9EGF1 UniRef90-A81TM4 UniRef90 G0S5L9 UniRef90-A0A024RWQ4 UniRef90_UP1000365D85C UniRef90-UPI0004062162 UniRef90-C3BD96 UniRef90-C5MCC6 UniRef90-X6P7U22 UniRef90_UPIOOO2DFB614 UniRef90-H2ZPY3 UniRef90_Q2H854 UniRef90-D9W8T3
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UniRef90 $\mathrm{S} 8 \mathrm{CFA6}$ UniRef90-V2XCS8 UniRef90-A5DCQ3 UniRef90-H2ZPY4 UniRef90-C5GKT2 UniRef90-E9E2J4 UniRef90-B2AFW1
UniRef90 D7BJW2 UniRef90-F2SCT6 UniRef90-E4N2S4 UniRef90_G9NL17

KDVHTVEVVLKGVNSDSGLAVLTA GQVLDTVTFLEFEDK GK



SQSKKTVFATAGQVPDDVTFDD LAKRRK】HFLPPYRYDDKLQLEDLLGपHPNQQKQETS PA ASTVYADHPDKRASGNLLYMI HGSEAPEGLPADLDL FARASTVYALHPD DQRPPQLEVQHSFRARSSDGPRI GGGKT Q 1 PPELDHLGKF R IDDA
GGGKK GAGGVTLLVVAGADEAVEALVDQQLSEAEWLARAEAAYRR SSDGFT:FTGHGSQGPAENPPNDDFKWNEKFKRFMTEQS AKNQDTLYLLHGSQGPAENPPNVTHDS

SGAAVPTRVLRGSDPRVDSLVTAR PE GRVVHFVPASRYATRLKLAELLSPYEVTSDGKKGCAK KKPAALDTLDGVNTDSGT TVACAFDGUSEFN


AASHAN NSTAFATAEQVSEGTKFEGFSET

LDPGATLYVLHPEQAP QFDRTKGTVVI
LASTNTLYVLHEDQAP PRVRQTRAKVNHWM
LKSDVPTRVRRGEESSDASLLSGAK IDDEDRDG
$\frac{L}{A K D A G A Q G V Q \square R V I T E A D A A V T A Q V D R V R R A A G Q V H G Q D A}$
GKA YTTDTNSFNDKFKTYVE
IDNCD\VYYEPRTNSSMELALQHVLEKV
KEATGPVRVVRGHDATDETADTDKVTAERD NAGVLLTLNGLNTDSGHTT QKSQSTVFAIPGQVSDH
GAATGPVRVVRGHDAGDEAADTDKVTAERDTFPTETVVNS GEGGVQVLVVPG ADAAVEEVVARLRGEDETGE
VGQVTLRVVRDADPDVTAQVDEARTTVGADPGKTL AVE


GKNDETVATR\VRDA DPALTDWLDRQRSEQAGSTAEQL ARDGADVR VRGHDAGLEGALGERSNAERD
$\square T K D A G V T V G G \square R T R L V R E D D N V D A L V D T R T D T S V D \square$ ASNGKAVAFAIADQUSDDIKFQNFAETNLSALKKAADELTR QKNPSLLLTLCGLNTDSGNNTLEALFDGIENFKTDNSI
LK EATPVRVVRGHDAPDEQALHDKVTAERD
NAT LLLTLCGMNTDSHRPTVEAKFNGDEKFQVNRD
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AAAKDAGSMVIRVVRDADRDLARALDASRVQNGADADGLE GKDVGSVQVRVVRDADDQVAAQUDTVRATALTEGVAQE


EAPSVHVLCGENTDSGLLHSHPADFEGSAAF SGEPRLL
AGQVT। RVVRDADAEVATRVDKARAAAAETQESGERQRE TKYSDYLIFTTDLD VKDGETAVH DPQTDQFPTDPVPLLAAL STPGVAAPP ILAHPKVHLLHDYHPPLPPSFCA S SGSHNYSHSF PDVPTRI VRGVDPALEAAVTTDAER

LDLAVDEGVDERIDALVAETREQNGLEGGQKA
AKA NKARAAGSKSVVFALDGQVSDQTTFLGFDTT
FSEHS
NAPGRVI READPAMTALVDEDRAESNAT RPTA AREGRTVYTPFGSASSYDTLLLTRLNHGREEAFRTASPKS
 DKAFDALFHTLPRGSPLFPVISAEFTGLILSPEHEGLAVS KAFSYKIYT T DVNQWNKNFESHLLEKDYAF LK R
AQNQSTLYLLHESQKPAEKVPNVF TDS AAQPEVVYILHPDQA

NFS $\|$ LKEA $\square$ E Q CRVVK
RAQDLAHACSLLRLVK
K LDEKLEALSELRLRK
 $\begin{array}{rl}L F \\ R & V \\ \text { V }\end{array}$
V ADDE LVTAADELLRMVK E RLLLPAAMNAAARVI K E ELRVFLSEARLVK G L L DLA KA A S L Y P 1 MA A L R FK


DFDLLKPADEECRVVK MELIDRAVVKMRSTK DVDSLRPAMDAARGVK DTTALKPAMNRAREVK VRLKPAMDAARVIK DFRLLGEAVDECRVVK

 GDDELSRDLSELRLVK
ADAEFTAFLSELRRVK A S RALVEAVVSLRLIK NNKLLHPEI MECRVI K RDAELATALSELRLVK $\mathrm{G} \| \mathrm{L} D \mathrm{~L}$ AKAlVSLRL

NFNVLKGVIERTRVVK LDLELAQGLAEDRLRK EQQHLFPALTECRVFK D SVKLQAAMDRARVIK LQPAMDRARCIK
 RGVDLAA
GDKDFFFALDESRLIK

E E L R VF L S EQRLVK T L LKEAIDDERVIK A DARLAEALAELRLLK RDDELSHALSTLRMVK KVIVPDSLVSMLRSRK VNDKMYH LNELRVFK

TEADLGRELSELRLVK
E EL R V F LiA D E RLVK
EDADLDAEALSELRLIK II K D GYE I

LHHEMAECRLIK
EELRVFLSEARLVK LHEEIVSCRLI K TNHLLKPALDVSRVIK ESDDLAHKLSHLRMVK S DLELARVLSTMRLVK $M D L V A B E V Q L R L$ DFDHLKTAI DECRVDK ERRSLHRVLTHARVFK
 KDKDFFFAMDETRVI K DNKLL QPAI DVCRVIK
DAELEEALS GLDRLVK RTVNLEQSASESRVVK DFALLREA】DECRVVK


$\square$ N A Q $\square$ A E A A S EMR L $\square K$
T LLD FAAAVSELRLIK NDWK LQPAMNNARCi K

## UniRef90 G8ZR74

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UniRef90 U4LD21 UniRef90- UPI0003B43891 UniRef90_UPI00036CFD14 UniRef90_M1VX74

PMPKEMFAAHRAKTDAEDRKEGVVLIYGFPEPTRHCDFE AAFAADRRNRLSQRFPGKRLIVPAGVAKVRSNDTD ADTLGDRRRRLAEDFA APVVLWSGRRSPRNAANT TKYPAREHARKVSELREI IPENDAIFLQGAPVTCRDTDRE MLKQTLHHRRQQLATLI NEPAILWSGNTNPRNPANT KYPAK LDVKRVVDYISKVPDASGVLYLEGRMTKMDNDEA KYPAKAHNEKVKQLLQD LIKDKECAVIPDAGTEKMIKYCDTN AAPYALRRRVTLGEKFKGVRLVIPAGALVVRNNDCD AEYAAQRRAVVSEADFPGKRLIIPAGRLAQRSNDTD ARRDALVRAQFPGERLVVPAGGLK VRSNDCD K Y P AKQHAR

 D KYPAKQHARNVARQ $\square G \square T D G L I Y L M S Q G A P V R N D$ AARREALGGRLFPGERLVLPAGTLKVRNNDCD KYPAKEHNLRVKDLLPKLSK RRARLAARFPGDRLLIPAGRLKQRSNDTD KRRADLSAAF AGLRVVLPGGELKQRSNDTD ARHAKLSERFPGVRLVLPAGGYKVRNNDCD
A EHRRKLSAADPGRR\AV AAGRAPVRSNDTD LINKEVYANRRKKLKENFKDGLI LIMGNNFSPLDCEDNT KYPAKAHGKRVVDI DRRNTPGATGVLY LEGRMTKDNDSP LSKDFHASRRKLYAGLLEDESVGFVEGGREKERRNDDRE
ETLRSRRHRLAQLI
KVAKELNVQSGLLYLPGLPTPHYEDSD KYPAKMHAR $\square P A T E Y E Q R R K M L M D R L P E K S A V V L M G G R T K Y M S R N D F$ MEGQHFAAHRAKLDQVLNEHSDVFLRSGKEEMEFSNGE FQARRGELSERFPGEYLVFTAGTELVRANDTN KYPAKAHAQRRAKVPAARAKHGVI YLESATRLLEDNDEP DRAVYTERRKRLRDKMKDGVRLVVPAGSLKVRSNDTD SPFAPDIYRARRARLMAELK GGLAVIHGAT A FDAPDNT PGERLVIPAGNDRTRSNDTE
PSTLHNRRQK AARHRTQLEEVSRGTTMLIGSGRAPVRSNDTN ADHAAQRRLRISKEHTGQRLVIPAGAPKVRSNDTD

PGRTIVVPAGAPKTRNNDVA NRYPAKQHAR RKVASKLGDSRGLIVLVGKPTVFDSDQT KYPAKKHALK DKKFLSKKGEESTLFVAGGEEPIKYCDQT FTEHRANLFKALGKDCAFMSSGTSQCRYDDTD LE S S E Y $\square P$ ARLEALGKRFPGERLVIPAGQPKVRNNDCD TAEAAAAHRGRLSAELPGQR AADLAAGRAVVRSNDTF KYPAKSHARR VADKLNDADGLIILAGTHTANNSDMP KYPAKAHLLKTKK LDKDISAEERVALGAGEEVTPYRNDTE

KATYVERRRKLCQLVGKGLILLFGNNDSPNNYPANA PAAPWAAQRRQALGALFPSERLVLPAGPDKVRNNDCD

## SHRDALVARFP GERLVDPAGTLVRRNNDCD

 AETLLKRRQRLAELT DVFVILGNGCATPRNPANL ADHRRRLSERIGARDAVVGAGRAPDRNGDAM PGDRLVIPAGGLLKTRSNDTE RRDVVSQAFPGERLVVPAGGLKVRSNDCD LSSKLHAR KVAAELNASDGLVFLPGEPSRSYEDSD ATTLKQRRQKLAQLV DFPVILWSGHPSPRNRANS KYTAREHALKVAKHLGGVQKGLIYLLGTQSASAEDSDREYPARQHALNVKHHLQTLSKTSIFLSGSLQESDKYSDSS KEVY VKRRNYLKDRLKE GVVLLLGNSEEPDNFPANC PLESSKY IPARLEALGKAFPGERLVIPAGQPKVRNNDCD APRAQASYAATRRAAVSAAFPGKHLVIPAGSLKQRSNDTD AKYPAKEHAR
$K \square A K Y \square G V K E G L I Y L P G L$
KTTLKQRRQK LIAQTFPD PVLLWS GCAPSRNPANT PGERLVIPSGNLKKTRSNDDD PAKTHAR KVAKA DGDHGUIYLPGQSELYEDSDME ARRKRLAAAFPGERIIVPSGRMIPRSNDQD AEAAAEHRRRLVTALPGRRIALGAGHAPVRSNDTD KYPAKQHAENVERLLHVHPDDGVIYLESQRSKYENSDQE
 VSEVFPGLLLFPGNDHCA 1 NAHNP KYPAKAHARKVAEYLRHNGQNTGVIYLEAQKTRMDNDEP

UniRef90_G8ZR74 UniRef90_E9CBJ6
UniRef90_A2FCF55 UniRef90_- $77 \times 9 \mathrm{M} 0$ UniRef90_K9XGB9 UniRef90_UPI0003F498B0 UniRef90-A0ZDM1 UniRef90-C5DXF3 UniRef90-R8BG06 UniRef90-A1SGE3
UniRef90 GOVAN2 UniRef90-D6ZID0 UniRef90_UPI000382A55C UniRef90-W9GNP6 UniRef90-C7MBL9 UniRef90_Q5BF48
UniRef90 Q6AFP1 UniRef90_UPI000375E1D2 UniRef90-C5PAH2 UniRef90-F3P923 UniRef90-P43590 UniRef90-U2RNM8 UniRef90_G2NZR1 UniRef90_UPIO0036577A9 UniRef90-U1Q3P9 UniRef90-UPI0003B6ED69 UniRef90-UPI0003719723 UniRef90-R9R9D8 UniRef90-T5AA19 UniRef90-R9NLS6 UniRef90-S7Q0V3 UniRef90-B4WKM9
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 PVFRQESCFYWDTGVNEADCAYFD DDETGKEDLFYPD YPFRTHSTFAHLTGWAVAGSVLVMEPTDAGHTATLYFRPA FPFRASSHFDYFAGDPLENAAICLEA


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 YAFRAHSAFTHLTGWSEPGSVLVLEPTASGHEATLYFGRD HRFRPHSAYAWLTGEDQPGHVLVLEPD GEPVLYLRP YQFRPHSAFAYYTGVQQPGSVLVMEPTKQGHTPGLEVNPR YPYRAHSAFAHLTGWSEPGAVLVLEPNGDTGEAATVYFRE




 YKFRQESNFW KDHSPRGYKMTMF
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 FPYRASSHFLYFAGLPLDNAAI RLEA GELQLFMND Y DFRPDSNFYWLTGCALEDAVLVLRPGGASHDAVLVAPTP YRFRPHSAFAHLTGDHEPNAVLVLEPDDAGDHTAVLYFHP YPFRASSDFWWLVGAN LDPDAVLVLDDTSDSRHDSDEFFRDR
 KEFRQN RYFFYYLTGVNDPGSAAFF$\quad$ D FKSEK L YAFRPD TSSSYYYTGDYEAGAVLVLDPVDPDSEEAHAFVAP


 YKFRQDSSF LYFVGGQKRDGLI AALL DAESGREILEGNE YRFRPHSAFAH LAGTGEPDAVLVLEPGQGPTHEAVLYFRP
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 YGFRADSDFVWLTGVQAEDGVLVLRAADGGHDATLYMPPP Y S F R P S T E Y A Y L T G D H T E D GV L V L E P T P G G D G H R T I Y L T P


 YAFRPDTTFAYYTGDYEAGAVLVLNPVDGKTHTPELFVAP Y DFRPDSDFSWLT GCHAEGAVLVMQPTAGGHDSVLLLRPP Y VF RAHSAFAHLT GWAEPDSVLVFAPTETGHDITL FFRER
 L L I K S D E D N GK L L T L F F $\mathrm{L} N \mathrm{~N} \stackrel{L}{N}$
 APFRQRRYFYYLSGADFAGCAVTYDDEADN
 Y R F R P H S A Y VWLT G D Q T S D GVVV L E P S $G E \stackrel{L}{G} V L$ YGF RADS DFVWLT GCQAEGAVLVLSADGDGP DEADYA ASA VP F R QRRYF YY L S G C DLA D S YLTY S I R D R K K L T L F I P P


 YPFRPHSAFAHLTGWGTDGSVLVMTPNGSGHDATLYFFYA


## UniRef90_G8ZR74

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UniRef90_M1VX74


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UniRef90 G8ZR74 UniRef90 E9CBJ6 UniRef90_A2FCF5 UniRef90_S7X9M0 UniRef90-UPIO003F498B0 UniRef90-A0ZDM1 UniRef90 C5DXF3 UniRef90 R8BG06 UniRef90-A1SGE3 UniRef90-GOVAN2 UniRef90- UPIO00382A55C UniRef90-WPIO0038؛ UniRef90 C7MBL9 UniRef90 Q5BF48 UniRef90_Q6AFP1 UniRef90_UPI000375E1D2 UniRef90 C5PAH2 UniRef90-F3P923 UniRef90-P43590 UniRef90-U2RNM8 UniRef90 G2NZR1 UniRef90_UPI00036577A9 UniRef90-U1Q3P9 UniRef90 UPI0003B6ED69 UniRef90-UPI0003719723 UniRef90-R9R9D8 UniRef90-T5AA19 UniRef90-R9NLS6 UniRef90-S7Q0V3 UniRef90-B4WKM9 UniRef90 M4G266 UniRef90-M5E9E1 UniRef90-A2DYZ1 UniRef90_E6PCV5 UniRef90 FOXQC4 UniRef90-U1LQA4 UniRef90_UPI000399D2DF UniRef90 UPI000475DE13 UniRef90 ${ }^{-}$V6L817 UniRef90-F2U4F7 UniRef90-UPI0004415524 UniRef90 UPI00034B57BE UniRef90-J7LV74 UniRef90-M2X8T7 UniRef90 A0LSN2 UniRef90 A2FK66 UniRef90-B8M2W9 UniRef90-C5DBE8 UniRef90- UPIO00404C8D1 UniRef90-R4SRY5 UniRef90 ${ }^{-}$N1PUM3 UniRef90 W4JSI2 UniRef90-I2H1S0 UniRef90-M1WYF6 UniRef90-UPI0003752783 UniRef90- J9GFD4 UniRef90_UPI0004123FF3 UniRef90-UPI0002B42BB1 UniRef90 K7RRN3 UniRef90_C9LFN7 UniRef90-K9W4Q6 UniRef90-UPI0003747D99 UniRef90-V6K1E6 UniRef90-H5URP5 UniRef90-A0A010RBW0 UniRef90_F4XM81 UniRef90-L8GAF7 UniRef90-KOKSD0 UniRef90-UPI0003B46FD0 UniRef90-F6C8M9 UniRef90-W5VYT5 UniRef90-S3C8R8 UniRef90-K8BM36 UniRef90-K9YBZ0 UniRef90-UPI00037F270A UniRef90 ${ }^{-}$W3WQG7 UniRef90_UPIO00370455A UniRef90-D2PYH5
UniRet90_D5GHP2
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UniRef90_M1VX74


LVDSSTLVRDADRDMTDQVDGRRLLV ADSEALEHD LAGVATI $\quad P$ VQDAAT WTEQTQLLDRWVLPERPDE


LS G G GKTRVLRGVSASVDTAVS
PDEA
LKDFTI FTTDLDNVHDHQVKNHLIAGDVDFFNADDEAR
AGQVQ $\quad$ A M S S S DSQATALVVQVREQAGDDPDDAK


VDQYNK
DADTLVLREADPALTD RVDGARLLLAAGDGAEFDPED LRGQPEVHAAKGVDPYLDSLVGAHSSELRRT ASKRPVI YIL HEGQKPNINAHFLAAFNH
AKDAGPGAVHLRVVAEADESVTALVTTTRRQVGLETGQAA
VD GRTVVL
READPDLT DRVDTARLVLAEDADPED
LKGKTA $\square A \square H G Y D E \square V D K V K K H A A$
$L G Q G H V G L A V V P Q T D A G V E A K A E E L R R R A$
DTATLVVRVDHARIRFAAERVLSENAQDAAFS $\square E V G G D H E$ VPAMMTTY GVEPLLDALV-G GGSPS LENRKNDRF
AAQCP
PDR\RRVY DD G P Y ARNEAQ HFAAR DHEYDPTLPLHN
 LSNKGAVLYVL HDTQD PHLDHHRGTITLNTQA
LARCEHLYVDLP
I A NDQP I R RLLGYQE
HASGKRVRVL
VFAMA GQVADGTTFVGFDEA
SEADALVVTGADAAVEAMVAGANPDG LK NRKNDRFTNQYKTD
 YGAAGP SKTVHVLYGKNTDSGAYSKPA TAERD SFEGMDKFT
 VKDAATI AVVDAATWTQQSQLLNRWDLPQNPPQ
 AGGVE LIE Q A $\underset{P}{H} \underset{\sim}{H}$ EESRTVV L RGHDPRVDAVV
P P H P
$\square R \square R G D D S Q \square I L L H P D H R P P \square E Y E Q D \square F$

KDRTFHVALD DPTDP NYAVPN VA GSVRVR VVSTADPADTARVES $\square$ REA NGFPDKDANSH RGRNPSF LVGAGVDPALDAYRFGHS


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

LKKRRRIHFLPP YRFDTQUQ MMDLLNDHPSKQKEAAS LKSVDA ATDAVQDACTYLKQCDILDRAVSEASTPE LEKLDGALASPSVDEDLVR RFGLKPS REATGPVRAVRGHDAAI EAALADKVTAERD
AGGDRVI ADADADVAALVERVRS EAGLTTTEEQQVAAAE LTPGSTLYVLHADQVP P LLLHGDLLQTAAEVRVDATS SQGAATI $\quad$ ANSHQK FLHPTHAVQNPTTYSQQQELLGRAVGAADAPK DVNGTTD $\square D K N N Q \square$ $K N Q L P \frac{N G}{G}$
V GAEAGAVRVRVVSETDPQVTSMVESTREANGFADPDKN GQHPPVHVTAGVEPMLDALGLGNSTGLRST

EGELVLD
$\square N G \square D V V Y H A G E Y A Y A D T \square V F T A L D K L R R A$
HSEAATIALSNPMIVQQQKEV AGGPVPTRIVRGIDPALERAVATDEER LA LVETGY GLRES QLP L R GVDA
$V R G A P Y M L T A P G V D P M L D A L V$

RTSRSDGD
$\square A Q S D R M R \square R N A W V E K N S P K A S A L L N F T A A T L G G P E \square E P A$ AAECATI HYLPSY PVQDARTYQQQTQVLNRTMAPASEDH RSQGRTVHYLPSY RHQTT LDDARRLELDAASVAAK
$\square$ S P D T T VY
T $\square$ A H Q $\square$ S Q K F P GTV
D DAAAR $\square R V V R S A D P Q \square A E L V G T T R A Q A G T A L S G E E Q E E$

| UniRef90 G8zR74 |  |
| :---: | :---: |
| UniRef90-E9CBJ6 |  |
| UniRef90-A2FCF5 |  |
| UniRef90-S7х9м0 | GDDDLS RDLSELRLVK |
| UniRef90-K9XGB9 | G Liblakal |
| UniRef90-UPIO003F498B0 | TSEYLDTALQRSRITK |
| UniRef90 AOZDDM1 |  |
| UniRef90_C5DXF3 | KDFFYALDESRMDK |
| UniRet90-A1SGE3 | RDSELARVVSEMRLVK |
| UniRef90-GOVAN2 | VTKDWYEI |
| UniRef90-D6ZID0 | QLDDLEEATSEL |
| UniRef90-UPI000382A55C | DEDDLAREL |
| UniRef90-W9GNP6 | Tatelatals tha |
| UniRet90_C7MBL9 |  |
| UniRet90 06 |  |
| UniRei90-UPI000375E1D2 | Ragduark Licelir il k |
| UniRef90-C5PAH2 | A |
| UniRef90-F3Ps | AEVDLTEAASELRLIK |
| UniRef90-U2RNM8 | HTEDLARELSELRLVK |
| UniRet90-G2NZ |  |
| UniRef90-UP100036577A9 | RDEELINFVSVARLIK |
| UniRet90-U1Q3P9 |  |
| UniRef90 UPIO003B6ED69 |  |
| UniRef90_UPIOOO3 | NTQELRQSLSELR |
|  |  |
| UniRet90-R9NLS6 |  |
| $\begin{aligned} & \text { UniRef90_R9LS6 } \\ & \text { UniRef90 S7QOV3 } \end{aligned}$ |  |
| UniRef90-B4WKM9 | GDHRLERAIVRL |
| UniRef90-M4G |  |
| UniRef90_M5 |  |
| UniRef90 A2DYZ1 |  |
| UniRet90-E6PCV5 | EDQDLAETLGEMRLIK |
| UniRer9o--OXQC4 | D |
| UniRet90-U1LQA4 | D |
| UniRet90_UP10003998 | S |
| UniRet90-UPIO00475DE13 | S $\square$ RDQS |
| 6 | R |
| Un | VDKDLHPVIADLRVFK |
| UniRef90-UPIOOO4415524 | TDEYLYRALGEA |
| UniRet90 UPI00034B57BE | G |
| UniRet90_J7LV74 | R |
| UniRet90_M2X817 | Q |
| UniRe990_A0LS | DDRSLATLLAELRLLK |
| UniRef90 ${ }^{\text {B }}$ BN | ETKNLVPAMNARGVK |
| UniRef90-C5DBE8 | SDPDLFYAL |
| UniRef | AVNDLR |
| UniRet90-UPIO00404C8D1 | ADD |
| Uni |  |
| iRef90_N1PU |  |
| UniRef90-W4Js | T DAYLLPALHRARLLK |
| UniRef90-2HSO | GDE |
| UniRei90-UPIOOO3752783 | MDAEFARQLSTSRMVK |
| UniRet90-J9GF |  |
| UniRef90-UPI00041 |  |
| UniRet90_UP100028 | A\QELGFNLQMIRLDK |
| UniRee90 K7 |  |
| UniRef90-C9L |  |
| UniRef90-UPIo003747D99 | EDLVRALSDL |
| UniRef90-V6K1E6 | R |
| UniRef90_H5URP5 |  |
| UniRef90_A0A010RBW | AADQARVVK |
| UniRef90_F4XM | GIILDLAKA |
| UniRef90-L8GAF7 | DAAALQPAMDEARVTK |
| UniRef90-K0KSD0 |  |
| UniRef90-F6C8M9 |  |
| UniRef90 W5VYT5 | Samblherasearmik |
| UniRef90-T5K9Q7 | EDENLTRFVSELRIK |
| UniRe |  |
|  |  |
| UniRef90-K9YBz0 | EDQKL |
| UniRet90 UPIO0037F270A | DAELAEALSDLRLVKK |
| UniRef90 W3WQG7 | R S S L SAI GEARVIK |
| UniRef90 UPIO00370455A <br> UniRef90-D2PYH5 | DLe Lis |
| UniF |  |
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| UniRet90_K8GM: | CDRLAEAll |
| UniRet90 Q46PW7 | SSVALIRAVVALRE】K |
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UniRef90-D7C6Q5
UniRef90-W6JU31 UniRef90_UPIOOO37D0194 UniRef90-K9SHY UniRef90-K9W8U8 UniRef90- ${ }^{-1 C 2 K} 1$
UniRef90-UPIO004062DF2 UniRef90-H0ELQ9 UniRef90-R7ZY51 UniRef90-S6EKB4 UniRef90-B2GKRO UniRef90-K1x5W4 UniRef90-K4JOB9 Uniinefock KaxTL UniRef90-12NB05 UniRef90-K9SD25 UniRef90-D8G7C4 UniRef90 K9FTR0 UniRef90_UPIO004205270 UniRef90-C5CB99 UniRef90_K9YZ16 UniRef90 ${ }^{-A 0 A 034 V 6 W 7}$ UniRef90-UPIOOO36799A7 UniRef90-BOEEA4 UniRef90-F8Q242 UniRef90- A2F8Y2 UniRef90-UP10003B6A6C2 UniRet90_E8SDE1 UniRef90 K9TVR7 UniRef90-UP10003B69E7F UniRef90-C7ZG47 UniRef90- U6HQ51 UniRef90-D4ALU6 UniRef90-S7ZX51 UniRet90-D1NSX9 UniRef90 U2XIH8 UniRef90-UPIO00369AA75 UniRef90-F0XFA1 UniRef90-A81857 UniRef90-B4CZA5 UniRef90_UPIooo36813A1 UniRef90-J2JVC8 UniRet90-A4HQ72 UniRef90_S3DEE3 UniRef90-A7T220 UniRef90-UPI0003B4EB80 UniRef90-A0E3P5 UniRef90-K9QFF9
UniRef90 W1TNG8 UniRef90-U5QKC9 UniRef90_F6EY54 UniRef90-UPI0003B46BF1 UniRef90_UPIo0037E34B5 UniRef90-R4PW02 UniRef90_UPIO002F2FD17 UniRef90_UPIIOOO42B7DE1 UniRef90-UPI000381A8EF UniRef90-A4AIT2 UniRef90-W9G5FO UniRef90_JoX093 UniRef90 K9TBR1 UniRef90-UPIO00468877D UniRef90-UPIOO03ABB068 UniRef90-Q83G14 UniRef90_U2YNS8 UniRef90-M5B744 UniRef90_UPI000475C005 UniRef90-S0AZV4 UniRef90-D7G1L6 UniRef90-D4HCH4 UniRef90-D5G592 UniRef90 BOEOF5
UniRef90 O2TZ97 UniRef90_UPIOOO347800E UniRet90-AOCRF9 UniRet90-D5A239 UniRef90-U7QGC8 UniRef90-W6KQY4 UniRef90-UPIOOO35CAE91 UniRet90-E6JZA7 UniRef90-S8GJX5 UniRef90-U5DLP7 UniRef90_C1ACM7 UniRef90_UPloo047C098B

SKK YYAKRRKS LMEK L KYPAKLHARNVRKYLD
$K$ L RREK LS KQYP
KAT QQRRQKLADRF
ATTLRERRQRLAKMD
DESSTY品AREAGQSQFP KYPA A
 KYPAKSHNVKVKELLPKLSAETTALVDAGEEDNKYCDTD YPAKKHAR SVAKHDNVQSGLVFDAGATPSYEDSDEA


RDRRQRLARLVP $\begin{array}{rl}P G E R L V I & P S G G L K V V R S N D D T \\ F P V L L & \text { WAGDRPSRNPAN P }\end{array}$ RQRRQKLATLI
AARRAKVSAA HPGERTVIAAGEPKPRSNDD QATLKQRRQKLAETFSEK ALLWSGCAPSRNPANT $P G E R V V V P S G G L K V R S N D F D$ ANQKPQDATVFLEGGELPFYDTDGE YAAQREKLVQLLPATEIVLLAGEHTPFRHDDRE MS GDEFRLHRKNLIEVFKQNSIIVGKGAEDRLEFAGSD HRERLSAAWPNQTVIVLAGRAPVRANDSF VEADRQRRRQLHCRF SGERLVVPAGSFKRRSNDQH



NKYPAKSHARR VAKQ $\quad$ LNDTEGLIY LDNEQFRNNEDSD YESAAYTPARDAALGAAFPGERLVIPAGQPKVRNNDCD A ARRERLSHEFR GRRLVIPAGSDKQRSNDTD

 | $K F P A K G H A R$ |  |
| ---: | :--- |
| $P E Q F R E T R Q K V A K E L G D A E G L I V L P G S L V Y E D S D M G$ |  |
| $V$ | $C$ |

P $\square E S S R Y T P S R L E A \square G K R F P G E R D V I P A G Q A K V R N D D C D$ PGERLLVPAGELDVRSHDCD EVSVQEYADRRKRFDECLPDNSVVLLPAADESLYSHDUL
 VSVSLI STNRKRLCERGLRKGAMVLLQGGEQERRYCDTD DPEDFHQNDRTRFLNFFKARNSLIMLMGAVKMNKHDED
 RRQRLAALV DGPAIFWSGRSIGRNPDND SPFAPD DFRERRRRVMEVLKDGVTVVYGAGPVESAAAVA ARLEALGKRFP GERIVIPAGQPKVRNNDCD MDSEKDKKRHEQLTAQL SGGLVVVSSYDQVQLSNDMV A QVLQARRDRLAE GPV AKATAAHRARDSPAF PGAAVVVAGGRAPARVNDCY AKATAAHRARLSPAF VGRTIVLAGGKAPVRVNDNY P LDSSRYTPAR DRADGRKFAGERLI I PAGQPKVRNDDCD HQRRSKLANEVAG TP PVILWSGSPCSRNSANV K $\square$ QQSEYTEKRRQAVCALFPGKTVVVEAGDMRCRANDTF DHRDRLSAALP GRVIVAAAGHAPVRNDDAH $D R Q D \square R H R R Q R \square G Q H \square A$ APVLLWSGGADARNPANV KNADI FLEGGGELPFYDTDGE PVDYTMHAENRGKVINRDRPRGVLLLARGGLAANRDTDHE KYPAKQHARNVAR RLDPRSGLI YLEGEVLFEDSDEP

AASLKQRRVELGKLIE HPVILWSGNATSRNFANT PVPHDFHSNLRKKFLDFFKKNS IVFLKGAESIDKHDD D

$\square G V S E F A A R R R R L A S C L D P D T L L L V L A S G E V I Y S Q D I L$ PLESSRFVPDRLKALGGAKVGKQRLI IPAGQAKVRNDDCD QMSRQTVKDTERNVAAFFQGGS AADWAFYSADCD RATLRARRQRLCERVA APVLLWSGCAPARNSANR $\square T Q A E V S A R R A A L A E K V E N G V V L S Y G G R A L V H D$

UniRef90 UPIO0047A63C0 UniRef90 F1ZCTO UniRef90-UPIo0031CA8AD UniRef90-V6LHC9 UniRef90_UPI00037EE532 UniRef90-C9RNC7 Uniinef90-A6SLL6 UniRef90-D7C6Q5 UniRef90_WGJU31
UniRef90_UPIOOO37D0194 UniRef90-K9SHY5 UniRef90-K9W8U8 UniRef90-X1C2K1
UniRef90
UPIOOOM UniRef90-H0ELQ9 UniRef90-R7ZY51 UniRef90_S6EKB4 UniRef90-B2GKRO UniRef90-K1×5W4 UniRef90_K4JOB9 UniRef90-K9xTLO UniRef90 12NB05 UniRef90-K9SD25 UniRef90-D8G7C4 UniRef90-K9FTR0 UniRef90_UPIO004205270 UniRef90-C5CB99 UniRef90-K9YZ16 UniRef90-A0A034V6W7 UniRef90_UPIO0036799A7 UniRef90-BOEEA4 UniRef90-F8Q242 UniRef90-A2F8Y2 UniRef90-UPIOOO3B6A6C2 UniRef90-E8SDE1 UniRef90 KgTVR7 UniRef90-UPIO003B69E7F UniRet90 CC7ZG47 UniRef90-U6HQ51 UniRef90-D4ALU6
UniRef90-S7Z551 UniRef90-D1NSX9 UniRef90 U2XIH8 UniRef90-UPIIO00369AA75 UniRef90-FOXFA1 UniRef90-A81857 UniRe990_B4CZA
UniRef90_UPIOOO36813A1 UniRef90-J2JVC8 UniRef90-A4HQ72 UniRef90_S3DEE
UniRef90 A7T220 UniRee90-UPIO003B4EB80 UniRef90-A0ЕЗР5 UniRef90-K9QFF9
UniRef90
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UniRef90-Q2TZ97 UniRef90-UPIOOO347800E UniRef90 AOCRF9 UniRef90-UFA23988 UniRef90-W6KQY4 UniRef90 UPIOOO35CAE91 UniRef90-E6JZA7 UniRet90-S8GJX5 UniRef90-U5DLP7 UniRef90_C1ACM7

YAFRAHSAFA ${ }^{50}$ HLTGWSEPGAOVLVLEPTPNGHDATVYFGR ${ }^{80}$ HPFVQDGCFRYFFGDDEPDLVGLV DGASGEAWLFGED

 TRFVQDPAFLYYMGVNQAGCYLVLDPRAM ELWSTLFVPR YDFRPDSDFYWLTGCGVEHGVLVLRPVPGGHDATLHDPTP YVFRPHTAFAYLTGDREPDAVLVLEPTADGHEATLFFRPG

YAFRPDSVFSYYTGDYEAGAVLVLNPKSGATHHAELFVPP APFRQRRFFYY LTGCSLPDSYLTY D DQSDKSTLYIPP LPFTQYNNMMYFAGVEIPDAVLIV DGEKRESTLFFT

 YAFRPDTTFAYYTGDYEPGALLVLDPVDPDTHTPELFVHP
 YPFRPYTGYVHMTGDRARDGALVLEPRADGGHDAYCYQDP
 FNEPNALAII GNDGSGDNHIFHYVRE YPYRAHTSFTYLTGWTVPGAKLVLDPVVGGHEATLYFGRD YRFRAHSAFAHLTGDHEPDAVLVLEPDDGTDHTATLYFRP FLFRASSHFLYFAGLNLENAVIELEDGSGKLTLFMDN YAFRPHSAFDHITAELVPDSVLVEEPT GAGHEVTLFVRP Y LFRQESNFHYLFGVKEAGFYGIVKMD GAGTRILFLPQ MPFRQESNFYYLSGCTVPASFLLLVYQASTSLLSKTLFIPK
 YGFRPDSNFFWLTGCDAEDAVVVLHPTTGGHDTTVYLPAP
YRFRPHSAYVWLGDQSSDGVLVIEPD YRFRPHSAYVWLTGDQSSDGVLVIEPD GEEMLFLRP俍 MPFRQRRAFMYDSGVDDPDCHMIYEVDNATERITLFVPT MVANTGEPGEHTFYLYVRE MPFRQKRYFYYLTGYDYPDAHVTY YKFRPDSAFVYYTGDYEAGSVLVLDPTDGQTHTAQLFVAP
 $\begin{array}{ll}\text { PAFRQRRYFYYLGGVDYEDCAVTY } & \text { DDASDNLVLWVPY } \\ \text { HRHRSHSFVYVGCMAPGYGALI } & \text { DAETGHFTLLAPR }\end{array}$ YAFRPDSAFAYYTGDYEAGAVLVLNPVAGKTHEPVLFMRE HRFRPHSAYAWLTGEDQPGHVLVLEPD GEAVLYLRP WPHRQDSLWYHLFGMRDPPCSAITEDVRGПPTRTLLCVPP VYFRQRRYFYYLTGMNYPDCVVTYNDKRDGLYVWL PPP ILFRQESFFHWAFGVLEPECFGADEVD DAEGKSGLFFPK
 YPFRASSHFLYFAGLPLHNAALHLDA
 PPFVQDGDFAWLTGDDEPGAVLVMAP AERTVREWLLLPS YPFRPDSAFSYYTGDFEAGSVLVLNPGDPQSDEAQLFVAP

 YGFRPDSNFFWLSGCSAEEAVLVMSPAGAVHDATLFIPAP
YVFRPHSAFAHLGOREDDVLVLEPVEPEGHEPVLYFRP YVFRPHSAFAHLTGDREPDAVLVLEPVEPEGHEPVLYFRP YPFRPSSHFLYFAGVSLENAA! RLE GGRLELFMDD
 YRYRPDSSFTWLTGWTTPGAVLVIYPD TKPVLFFKP YGFRADSGFVWLTACQVEGAVVVLWPTAGGHDAVLYLPPP YAFRADSDFVWLTGVQLEGAVLVMHAVPGGHDAVLHVPAP YLFRQESNFHYGFGVKEAGFLGLIKMD PVFRQESTFHYLFGVREPNCLATI DDETGKATLFAPR
 REFRQESNFYYLSGCSVPSSLLLAVYQPGASTPSVLFYPK

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UniRef90-D8G7C4 UniRef90-D8G7C4
UniRef90_K9FIOOO
UniRef90_UPIOOO4205270
UniRef90-C5CB99
UniRef90_K9YZ16
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UniRef90-D5G592
UniRef90-B0E0F5
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UniRef90_Q2TZ97
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UniRef90-U7QGC8
UniRef90-W6KQY4
UniRef90_UPIO0035CAE91
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UniRef90-S8GJX5
UniRef90-U5DLP7
UniRef90_C1ACM7
UniRef90_UPIO0047C098B
$=$
 $G G D D A A V W T G V T P S V A E R A A Q V G A G A G G D L A A C A A A L A R A$
都 QS IDDDVVWTGPLPSLASLAEQVGVHKVLPTEEKIADV KDPFKEFWNGKRLGFVDVARLTGVEEVRPDDELWDFVESL

N
SNATAELWHGKTPSRA

## ? <br> 

1
I A D SVIWS G LPMSAE
$\checkmark$

## 

## P

$\stackrel{p}{p}$

$$
1
$$



RSMYGELWAGRRPTLGESRRRLAVTTRH
PKPESALWHGEMPSRTDTATQIGADAALPMSELESH
RDAHYEYWVGPRAGLKELAAMTGIAETHDDAQLADSVGKD
 K
P

## 

 P H Y E Y WVGP R A G LK E MA A M T G$P K P A S S A D W H G E S P$ TARD Q I A E A I GADAA Y P L S E I T S E I D N L


 VTTDSAVWRSEAAPLSEYKRLLGADE
 LPEDYA! WLGNDWDV
PGDDATUWLGETERLAAAAERVAVRHTAPRAHLADRLARA YDSNYKMWNV VLNNDETKQKFKLDEVLYNDDIESWLSN
PEPGSALWHGETPKREEIAAKDGADVARTLSEMPDQLAK
QAPRSEFWVGPRMTLSQMEAVTGLPAARPLDTLPDQLAK RDQEAERWEVERLPLTELERRTGFARVARSAGLGSLVTTL RANHYEYWVGPRAGLKEMQAMTGAREADLALLADVLKDA SRSEAEVIFDGKTDEEALDETTGANEIIDDETDFETRGRQL TSPEAALWHGPTPSRETDAADDGATAYP
$\square P A D Y A V W M G E \square K P D P Y F Q E K F E T D$
FGPYGELWVGAAPRLADWQRALDVGBVRLSDLEAAL

SDAYGEYWVGARPGLKGLETMTGUHTADDADFDDAVGRNV
PHPGSTLWHGEMPTRSQVAEADAADEAFPLSALKSRCQNA ARPHGELWVGPQPGVAELQEALGLTVR

FRPHGELDVGPSAGLPEWSDALDM
AHPHGELWVGPAPAPADWQGVLGD, $A P E A A T L W H G E S P R R Q D W A E Y L G A D A H F P L A D L G P Q V Q D Q$
$L P A A L Q I V L G P N L T P E A V K E M Y G V E E V Y F D T Q V E E V L A K D$ LPAEYATWMGDDLPPKHFQ
 A Q DA DIMWSVPPPSLEEASEKHDVSRVAHPEQLPEADASL
 PDPGSALWHGDSPSRDRLAEDIGANSAFPKSE

RSPHGEFWDGRRMTLEETETKYQLKVR QDESDEEF RSDYGEYWVGARPGLKGLAVMTGLMTADDDADDDAVAK TSPEYQRFMGPPRAAEWYMQRYGLDGAVVYKEGDQEIREE ETPAGADWHGARPTRDEFAAADGADAAYPLDALPARSPDA $L D P R T A G Y Y G Q R V D T A S S L A R Y G M P$ GRSFAALAGVLDS
LDEGSALWHIEIPPRNQIAEMIGADFSYPLSELSVHLEDA

UniRef90 UPI00047A63C0 UniRef90 F1ZCTO UniRef90-UPI00031CA8AD UniRef90_V6LHC9 UniRef90 UPI00037EE532 UniRef90-C9RNC7 UniRef90-A6SL16 UniRef90-D7C6Q5 UniRef90 W6JU31 UniRef90_UPI00037D0194 UniRef90_K9SHY5 UniRef90 K9W8U8 UniRef90-X1C2K1 UniRef90_UPI0004062DF2 UniRef90 H0ELQ9 UniRef90-R7ZY51 UniRef90-S6EKB4 UniRef90-B2GKRO UniRef90-K1X5W4 UniRef90-K4J0B9 UniRef90_K9XTL0 UniRef90-B1WPK9 UniRef90- I2NB05 UniRef90-K9SD25 UniRef90-D8G7C4 UniRef90 K9FTR0 UniRef90_UPI0004205270 UniRef90_C5CB99 UniRef90_K9YZ16 UniRef90 A0A034V6W7 UniRef90_UPIO0036799A7 UniRef90-B0EEA4 UniRef90 F8Q242 UniRef90-A2F8Y2 UniRef90_UPIO003B6A6C2 UniRef90_E8SDE1 UniRef90_K9TVR7 UniRef90_UPI0003B69E7F UniRef90-C7ZG47 UniRef90 U6HQ51 UniRef90-D4ALU6 UniRef90-S7ZX51 UniRef90-D1NSX9 UniRef90 U2XIH8 UniRef90_UPI000369AA75 UniRef90-FOXFA1 UniRef90-A81857 UniRef90-B4CZA5 UniRef90_UPIOOO36813A1 UniRef90-J2JVC8 UniRef90-A4HQ72 UniRef90_S3DEE3 UniRef90-A7T220 UniRef90_UPI0003B4EB80 UniRef90 A0E3P5 UniRef90-K9QFF9 UniRef90-W1TNG8 UniRef90_U5QKC9 UniRef90-F6EY54 UniRef90_UPI0003B46BF1 UniRef90-UPI00037E34B5 UniRef90-R4PW02 UniRef90_UPI0002F2FD17 UniRef90_UPIO0042B7DE1 UniRef90_UPI000381A8EF UniRef90-A4AIT2 UniRef90_W9G5F0 UniRef90-J0X093 UniRef90 K9TBR1 UniRef90-UPIO00468877D UniRef90_UPI0003ABB068 UniRef90 Q83G14 UniRef90_U2YNS8 UniRef90-M5B744 UniRef90_UPIO00475C005 UniRef90 S0AZV4 UniRef90-D7G1L6 UniRef90-D4HCH4 UniRef90-D5G592 UniRef90_B0EOF5 UniRef90_Q2TZ97 UniRef90_UPIO00347800E UniRef90 A0CRF9 UniRef90-D5A239 UniRef90_U7QGC8 UniRef90-W6KQY4 UniRef90-UPI00035CAE91 UniRef90-E6JZA7 UniRef90-S8GJX5 UniRef90_U5DLP7 UniRef90_C1ACM7
UniRef90_UPI00047C098B
 QGQGRTVAYTPPYTAELLLLIAGLVGDTPEAVRAGASP A GADGVQLRVDAQADEALTALVDSTRQAAGLASGQAASE QNKTFHI QQDIPT $\quad \mathrm{P}$ L A GEKKL HY L PP Y RPEH $Q \square K \square Q A L T G K T V L E$
AK K
ATEPGK $\square H V L H D Y Q A P K N \square E \square Q \square T R K N G C H S \square I S$ ESPF TKPLLTGALDPDT TKDAAEMIVRVVRDADS ALTAQLDERRVSEGREQEAASA TKDA A EMMVVRVRDADS ALLTA QLDDERRVSEGREQEALQE $S L Q Q A T L P V Q D K A T L A Q Q Q Q L D Q R T D S S Q A L I K P G E N E A T$ STGAATI AVQDVTTYQQQTQILNRSVAPADGAE LVNRQQUFAPDGKMDDFDKQLMFWYKDVQNKDRQGVNPPG V GAEAGAVRVRADRQADPEVTGMVEAARQANGFADPGDN

 IEETPTVFLLHKYHEITASHVVRPMPABESEKKVRFNS GPDQGAVRMRVIRTADDQEVLNQVEAARKANGDGGPDRN TANAATI RMRIRTA


GAP TARIV
SAEAA TII $R G \square A P L D E E A A V T T D E E R$ $\square L G R S \square P G A R D \square A$
VQGATE VYSD $\square P$ TFDGSRSS $\square N R Y \square A T V A S E K \square K K V V D H H$ AADGTAVRLL AETDQDVDALLAAVRTEAGVDLAAAE TSEKPHVWYDM AASDQQSDSNDVQNVAGATSAPNSPA $T A R V P T R V V R G Q D P L V D S L V P \quad P S A A$ NPSMTYYAKGVNSDSGSQ$\quad$ PAP ${ }^{2} R T K A V Y K Y S T N A$ VKAFEALFHTLPRNSPLFPEDPEEYTSAV LSPSNPSGAV


V GAEAGSVRVRVIPGTDESVSSMVESLREANGFPDRRDN GSNKH EDESTFFTVSGHVGHGIN FPGGMTVDS
 LS GASEI YTDISARSAFSRFISSFSDSTSSASDAREEAME

GVRMRVI AKTDPQUTGVVNEVRTGDPDRVEHEG

LGDRKGLVVANADSARPSPTVLLVLDQVPAWLRQDVSGFS
MCEAENVY LNNNEHPRAVVTVETREARFVHETHRAFPDH GTEEGAIRVR IIRNDDAEITKDVDADRSAAGFDNPDAS ES AP APSDRNAAHDAELATVLAELDR

$\square A A G R A \backslash L H P P S Y R A E T R Q M L D G L L A G Q A A G D P D G$
RKPSLIVYFYGDDDYSHHSLPDPDQPFLQNYNSDYD

$$
D A G L V Q \square R V \square R E D D T S L Q A A \square E K \square R A G \square P T G Q D A R R
$$

AERSKTDHF LGP IVSASAPVPQAD E DYGKVMQRDPG V GEGAVQLRVLRDTDQALTQLVDDVRES HGFDDADANHA VVGHGAVEAD
SRQHT $\square A Y T P Y R P H P H H \quad F V M N P A P A E \square H S L L C R \square F P$


LKSFPSLFHTLPKASPLFPALSEGLTQPILATEGGAV GSAYGGNAVAFA IADQVSSGAEFQGFAET
RAPSK $\square F \square Y K G Q D S \quad D S K \square I S S Y P Q F P Y \square S K Y K V$
A T
LTDSKETLLVRGQDSVIDRLI


| Ref90 UP100047A63C0 | $Q L A R D C S_{S}^{170}$ |
| :---: | :---: |
|  | ALVRAlV |
| UniRet90－UPIO0031CA8AD | VDDRLLEAA |
|  | PVNDLKSUSE |
| UniRef90－UPI00037EE532 | $P$ S $\square P L 1 Q A V V A Q R$ |
| UniRef90－A6SL16 |  |
|  | DSSKLEEAMNTARATK |
| UniRefefo－D7C605UniRef90 W6．JU31 | D ${ }^{\text {G }}$ |
|  | ADDELAHTLSTSRMVK |
| UniRef90－UP100037D0194 | NFTSLL |
| UniRef90－K9SHY5 | I D R TLALA VELL |
|  |  |
| UniRef90－UP10004 | A AEDLDEYASEA |
| UniRef90－H0ELQ99 |  |
|  | NV |
| UniRef90－S6EK | K |
| UniRet90－K1 5 W 4 | LMPAMNAA |
| UniRei90 K4J0B9 | LEFTSEA |
| UniRee90－B1 WPK9 |  |
|  | E\DNLMKAI S S RL－ |
| UniRef90－12NB05 | AELEEAL |
| UniRef90－K9SD25 | RDRALAEAVVQLRL |
| UniRef90－K9FTR0 | RVRPLKHLLNEMRVFK |
|  |  |
| UniRef90－C5CB99 | ADAQTAEFLSELRLVK |
|  |  |
| UniRef90－A0AO34V6W7 | TF TQSMRLFK |
| UniRef90－UP100036799A7 | ADEELLT FLSELRL |
| UniRef90－F80242 | T DA Y L LS ${ }^{\text {a }}$ L |
|  | AELTSEAITHVMK |
| UniRef90－UP10003B | RELVRTLA |
| UniRef90 E8SDE1 | GDLEFAAV |
| UniRef90－UPI0003B69 |  |
| UniRef90－C7ZG47 | K Etide |
| UniRet90－U6HQ51 | ENSTLHHEMAECRLTK |
| UniRee90－D4ALU6 |  |
|  |  |
| UniRet90－D1NSX9 |  |
|  |  |
| UniRefo－UP1000369AA75 |  |
|  | S VRKLQPAMDSARVVK |
| UniRef90－A81857 |  |
|  | LA |
| UniRef90－J2JVC8 |  |
|  |  |
| UniRef90－A4HQ72 | DFTLLKPSMDAARVIK |
| UniRef90 S3DEE3 UniRef9O A7T220 |  |
| UniRef90－UPIO003B4EB | RLA GA |
|  | ELYYYLTESRVRK |
| UniRef90－AOE3P5 UniRef9o K9aF9 |  |
| UniRef90－W1TNG8 | LDEKLEEAASVLRLQK |
| UniRef90－U5QKC9 | STK DESGLLP |
|  | S |
| UniRet90－UPIooo37E34B5 | DDENLAR |
|  |  |
|  |  |
| UniRef90 UPI00042B7DE1 |  |
| UniRef90 UPIO00381A8EF | QSTELTRVLAELRMV｜K |
| UniRef90－A4AIT2 VS QDLGRVLGELRM】K |  |
| UniRef90－J0X093 |  |
| UniRef90－K9tBR1 |  |
| UniRef90－UPIOOO468877 | RSAELIRVLS |
| UniRef90－OPIO003ABB06 |  |
|  |  |
| UniRef90－U2YNS8 |  |
| 年Ref90－UPI004 |  |
| UniRef90 UP1000475 | ETQTLHEALLEARTVK |
| UniRef90－D7G1L6 ETOTLLEALLEARTV |  |
| niRef90－D4H |  |
| UniRef90＇D5G5 | QHLQPATDD |
| UniRef90－B600F5 | AYL LSALHHARL |
|  | K岛SLKEALEKARVVK |
| UniRef90＿Q2TZ97 |  |
| niRef9－AOCRF9 |  |
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| UniRef90－UP100035CAE91 |  |
|  |  |
| UniRef90 S8GJX5 |  |
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| UniRef90－C1ACM7 | LRAK |
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UniRef90 B8LDI3 UniRef90-W4P6B9 UniRef90-J9MHV7 UniRef90_K9RX22 UniRef90-A0A022MJ20
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UniRef90-UPIO003188B7E
UniRef90-TOZG82
UniRef90-H9JEI7
UniRef90_S2JS89
UniRef90-IOR2R2
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UniRef90-J5SRZ6
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UniRef90 J1JW12
UniRef90_A0A058Z9W9
UniRef90-U6LE41
UniRef90-G8PGI2

QVPMADHADNRAKAVQSMTDRG厄TLMEGGKQTTRYDDHE KETYVQRRALLKKKLGSGVLLFLGNDECGLNYEDNT KYPGKDHAKR $V V$ V S SARMS $D M P M V F$ KYPGKDHAKRRRGLAKTC SHPVLVWASARMSLMPMVF PGRTVVVAAGEAPVRSNDTA



PSKER $\square$ NTREHY L K LLAK DG 1 YYHRGGTTHTRDDDVE KRREALSAKFPGKVLVIEATEPRVRANDTD QMSRQTVKDTERNVAAFFQGGS AADWAFYSADCD VAK LTPARTHADKLAAGETTKQLPEAE KYPAKQHARRVQ EKLGIEEGLIGYSGQQQARNNEDSD

DSEEYANRLQRDTARMREEK L


 SPEEFAERRAASAKGl|AREGVAVFLEGGTTYSSDCNK .




6677776317751678875168888637888458887537

lupas_21
lupas_14
lupas_28
jnet
conf
sol5
sol0
jhmm
jpssm


## 90

100
110
120
WG LETATVCGSSPEFER|V/RNELLGLERVLDVVGSLIKSFVEEE LSIDASYWEHNPPCTRNA

 R YGELWVGAAPGPGDWARALGDGVVPDAEDREEVRPD KNADEELWDGPRTGDEGVKELFGADEAFESKRFASYLKQD
 RDHHGELWVGSRRGVAEAEAFYALPTAAPLEYLEKDLAS L KDSHAELWEGPRTGCTAATQDFAVDEARPVDSFSVY NKG DRPKAELWKG $\square P E P D A A L M E K Y N V D H I L L D S Q L K D F L K R L$ NPA $\square G E F W V G P R P T L T Q V S L Q L G L$
KDAFAEKWEGFRSGVYGVQE TSPEYQRFMGPPRAAEWYMQRYGLDGAVVYKEGLQEIREE ADPLETMWSVAPPTLDDARNRFDAGEYKATTDVASALSQL
 VEPRQVLWFGSKPSAAECKRRYDVDEVRYTTQLSGFLRSF AD DDRQARHTSNDEK
 $\square P E D A L R F M G P P K D P S F Y R S R Y A T D V I E A V K E L K E V E E E L R A$ LTRQNLIFEGGYGDLEDRARAAEVDA I QARSDLLQDILPEG I PEDALRFMGPPKDPSFYRNRYAVSEVVE
ADLLRQARNT SNLKD $\square R$ R WMDVAGKSPVGQVKELLFDL


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UniRef90-I1BYJ3
UniRef90-A9WN21
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UniRef90-TOZG82
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UniRef90-E7KMP5
UniRef90-UPIO00185E41D
UniRef90-J5SRZ6
UniRef90_Q0V147
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UniRef90-U5H087
UniRef90-A0A021X178
UniRef90-U6MEK0
UniRef90-U6KI90
UniRef90 J1JW12
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UniRef90-U6LE41
UniRef90-G8PGI2

MDNAPR LYYVLMGLNADSGNYA ${ }^{130}$ PAAHYEG $\square^{150}$
150
EKFDYAR
 PEAARALALRMYKDAWETGQLRQAVDRTVEGF MGSYKHVFMDKPDHMPT LLSDACAKNLIEPGDRDK

LELNAGTNTLVAGTMGPERQWNRGLAIS
ARGRA $\quad$ APGGGD
RGTPTACVRGIDPRVDALV AASSKPSVLWYHNEAPANPEI HSTDRSVIHQVMNGRQEKV KPKA IFALDFTDMDYDNYVPVEYENRVDRSR
$\square$ NRNDF $\square Y$ F DM L S TSNPSSSNFKH $\square K S L L D G S G N N S \square A N K$ L K


LS D LDDLGCR DGVEYDTHGLTGRNARLLDNQ QVRTSAV GCRUGVEPDDACVRTVHVLKGVNSDSGRPVQSFG







[^0]:    $\qquad$ TDEYISRRKRLLELLPEKSLAII ASASVKMMTDVVP

[^1]:    T L T A A

