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DLIEG
FNRLESKTTELSLLIAEQPSTSATVFRLPDV DLVERLNGTFRQI EQHLAALTDNLQQHSLLDARVFSLPQV ELIENFNLLENTLAQFSTLI KQQPAINASVFRLPNV


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

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

KTSAAFNYLNDCLNHLEEETQKSDVILAQYYRDPDP LRSSFDYLFDQLNLLCEELKEKEI SYSSYYQLPEI IR S QF DF I LELTN YL IEE EIQQLSISHASYFQLPPV

$\square$ NE $\square \mathrm{F}$ NE $\square \mathrm{S}$ D S $\square$ SA
SDDIAAELYKDPPD AFNQL $\square$ SATDVLNQFLHECEVVHAECYKLPPS NCQDNEVQRELNML L Y N S KVI K S QVF KI P S I MS Q
 $\square$ D DRFDELKNNTHSLNTQLTHAQPLAADAYPDPQT
 MT DI KS LIFDQLTEHLQKLEKLLATTKPVQALVSRIPAV DLRKTFEQLTDELLALLKKLISESSPLFARVSVIPPV
 MANLDDLMSALEAELVELVRLLREKAPELCSYFHVPLV



## QUERY

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UniRef90_UPIO0034834B0 UniRef90_EOWUR8 UniRef90-D4E6N1 UniRef90-D2AGA9 UniRef90-IODNQ0 UniRef90_V1XJ68 UniRef90-K8WRN5 UniRef90-X8LY83 UniRef90-D1NYQ1 UniRef90_D2TZG3 UniRef90-F8YGJ2 UniRef90_UPI00047030C9 UniRef90_UPI0003C7CA73 UniRef90-F4DFQ0 UniRef90_D1TZ33 UniRef90_UPI00031C315A UniRef90-W7NQI4
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UniRef90_L7Z9E0
UniRef90-S5AIC3

UniRef90_A0L2U6
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 KASSKAAVRLPGAVCYAVTEGQFRETTALITQQVQLKQALL NRSSKAALRLPGAI CYAVSPSQRQSLLEQVEKI NQLKAAF



## T



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


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 $H V \operatorname{S}$ S K A A V R L P G V L C Y Q A T P S Q R S A L R D A I E R V N R Y K R Q L





LT S \begin{tabular}{c}
$N R$ <br>
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$S T S$ \& N K A A \& $V$ \& $R$ \& $L$ \& $P$ \& $G$ \& $A$ \& $I$ \& $C$ \& $C$ \& $C$ <br>
$V$ \& $T$ \& $P$ \& $Y$ \& $S$
\end{tabular}

## $\stackrel{L}{\mathrm{~L}}$



 GCSTKATHRLPGWLRFPAAAAAP LAGALA
 NRS SKA A VRLPGVLCYQVDNATQLDLEN Q

 NHSPKYPFRLPGFIQLAPSH
 Y S Q K S S R R Y V G VI HLLLSSNPNSAEIVVQLI H S I N Q GKA D I

 EHS
 $S$ QK A A R R A S G V L W WF S D D N A F T LLE L V R R L L E I I $G \square S$ S Q K S A AR R Y $\operatorname{V}$ V G $\operatorname{V}$ V I
S R R F VT K H P GLL I $G C S K K S A R R Y P G Y C Q \square Q V D D P G Q$




## QUERY

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UniRef90 C4NV60 UniRef90_UPI000362DFE1 UniRef90_U1KD43 UniRef90_UPI0003187BF2 UniRef90_UPI00031BE7FA UniRef90_V3AXU2 UniRef90_Q8L2D8
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## mm 

 140$T L^{150} N$ A Y R T L T T V L H D
160 EHM T E E S GLP PAARFE WVHR QL P GLI


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| $L$ | $Q$ |  |  |  |  |  |  |  |  |  |
| $S$ | $V$ | $Y$ | $R$ | $T$ | $I$ | $T$ | $L$ | $I$ | $T$ | $N$ |
| $N$ | $A$ | $Y$ | $R$ | $T$ | $I$ | $T$ | $Q$ | $P$ | $E$ | $T$ |
| $L$ | $N$ | $A$ | $R$ | $Q$ | $I$ | $T$ | $L$ | $L$ | $E$ | $N$ |
| $N$ | $A$ | $Y$ | $R$ | $Q$ | $L$ | $T$ | $L$ | $L$ | $D$ | $N$ |


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## QUERY

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| :--- |
| UniRef90 V5CL | UniRef90-G9Y1J7 UniRef90-W11RZ2 UniRef90-E1SCK1 UniRef90-C6C580 UniRef90_V5C5X3

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$\square$

210 220

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240
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 KAQWLEHVEQEMDAVLQLPEDAVLKIKRPVKVQPIARVWY RERWLENVAREYQDVAALPASARLKIKRPVKVQPVARVWY KEQWAGLVEQETETLLRLPPRAALKIKRPVKVQPIARVWY KEQWASLLEQE:RDVKRLPEQALLK:KRPVKVQP:ARVWY

 REQWAELVSQELEDVMRLPEGVKLKIKRPVKVQPIARVWY




 R
 HEQWVAKLQDEIATINSLPEKARLKIKRPVKVQPIARVWN


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$\begin{array}{ll}R E & H W Q L \\ K & Q \\ \text { R WR } & L\end{array}$
KEHWR L Q
REEWQRK E E E



 QQKWQALVAQEQLRVASLGEKEKLRI RRPTRVSPQVNVRY QNNWQSIVEQERVRVSSLSDSAKLRIRRPTRVSPEVNVRF NEEWSKMVDQEVYRISRLLPADAQLRIVRPVKTHPMINLDW QTQWQRLVEQEKAKVASLSHNEKLRIVRPIVRTPEVNVRF KATWQAMVEQEKQRIVGLSENKKLRIRRPIRVSPQVNVRF
 WQT LV QKE K A RVVA S L S P H T K L R I R R P T R V T P EVVNV R F Q Q S WQ QI VELEK VRLLS SLGEKTKLRIKRPTRVTPEVNVRF E D A WRALVNQEQLRVAALPDKQLLRIRRPTPVSPQVNIRF A H T WQ Q CVV D R E V Y D V K R L P A H V ELL R L R R P VK TH P MVVNVRW
K REVGRVEREVDRRLPPGAELRIRRPVKTHPMANLRW RE Q WQS KL EREYQDI A ALP QRARLKI KRPVVVQP IARVWY P K E WE S F L N GEEVT D I Q R L P A G S E L R A E WA P WVV K EI E LVKA KP GEFI K I K R P L P I T P K L N I S F E WE EFII A S E I SLI K E LDD D DTELLRYKRVAKVVTPMVVVVW
 EHT WL QCCI


 QL DHKVSSVPED KLLRI RRRLKVVQPVANITF







## QUERY

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UniRef90-G4C648 UniRef90_X2X5T8 UniRef90-L8D4K2 UniRef90-A4C3W1 UniRef90-H2FW59 UniRef90-R1F3R4 UniRef90-W1B2N2 UniRef90-UPIO002E5E013 UniRef90-Z5XLB8 UniRef90_UPI0004072EFB UniRef90_UPIO002E1CC52 UniRef90-C4NV60 UniRef90_UPI000362DFE1 UniRef90-U1KD43 UniRef90_UPI0003187BF2 UniRef90_UPIO0031BE7FA UniRef90-V3AXU2 UniRef90-Q8L2D8 UniRef90_UPI00030373F0 UniRef90-F4AUX3 UniRef90_UPIO0047C4564 UniRef90-M1FJW4 UniRef90-J2IS55 UniRef90_L7Z9E0 UniRef90_S5AIC3 1BE7FA
20373F0


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K GQQK QVQHACPTP IIALDNTDNGAGVPD\|GGLENYDADN SNSQR YHVSGALPFI AL NPDPMMKVGELTHY
TAKNR YHVSGALPFI LLNPQKE TKIGSLSNFSSKV SATNR YHVSAALPFIVI NPDPEL KLGTLPDYN SEPLTTPRQQQFKAHLPLLLCQDELDPADTHLGDYPPAKARK

 KDDTNTVMFYGHTPTIVE $\square S G / L K T V T A P L P I V V V Q K E$ AGVLKTVTAPMPLIVLQDKD HEQPRQQQFKAHDPLI




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 TQT DA PASTYYYA I EPBV MTEAI VSAYERLVETLGAFNEKWPAL VVGGAVWELP L L MTE A I V S A Y E R L V E T L G A F N E K WP A L V V G GMI WRI P L L

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

MNTDFAHYNEELDDLHSLLRDSD DGSTY LASLPEP E S IV TA Y M H L K Q A V A DLLN S R W S T C


$\square K E L D Q 1 L E R I D S L L K C F L S N T P P M M A N L M T V S T V$ D Q
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NKLKNLYQKLT TEDKQLT DPFNLVYKПSPD VDKIE I E I Q NLSHLI RQGKL IHAEVAALP DA


 LAS ELL LE A F D N L N R S L A Q FC T L L R Q S N RA L W
 V R A L F K E L I ALL I A S F E A E L K H Q Q S I T T F A Y R L G P L




E E CRE L I P T LDDK S L K E L A F LLEEKS K $\square R \square D A L F Q V P \quad L$


## MERQYHLLAR LLEHDFDHVIETCEALIGHV <br> $D \square N S G Y N$ K L T L L E L I E L LA S HL P D A A S N Q S F F Y K $\square$ T P S

A E LEQTFDA LVEESEA L I A LAARHQRPAMWA
$\square K E N L L K T V A E V R Q A L A D F S A V I D N D K Q R Q S V V F S L I D R$

LKSDLLQSVAEVRQALSDFSQLLQDYKQKQSVVFSLIDD LLAELEHCFDHI DEGVERLVDYWSTADLPGWAFN
 LLA ELEATFDDT\EC【EA LVACYRQHPRAAWAD

QLNQALLKFTNCLRTSQQP YWLPGQ

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

LLHELDDRFDQLMQADEQAVSLYET QPLPMWRFDGLSDP $L L L Q L E Q Q F D T L D D T L E T A V S L F E R Q Q P A S W$ V $\operatorname{L}$ T

QTVSNDENAVEELMVLLEQADFGKVQLQTVVPY LA TAMNRLESHLR ILDQSLREYPLWVWH

$\square T \quad L T$ F E A MS T A LVD Y H QLLKR S T $\square P \quad \square W \square$
$P \square$

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DQAPGTVLRLPGFFILSGS

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D QAPG GVVR RMPG W WF LLLS VVNNNH D
H Y S T K I T R K Y P G F VVVV R N N H D Q
GQDPKSTFRTPGAVGLP
$R N S T R E T \square R V P G V I A L P P D W$
QSAKETLRRPGVVALP
$G Q A A G T V M R L P G Y F R L Q A S$

 DLS PK GARRCVGII HVSGNSEYEENVKNKVVFINDCKAE I


GRETEIC PGGI GASP
$\qquad$
 GRCTRSRHGLIGA DETVLASAHTLNQHKAAF HDSTKVTTKYPGLI IVPERADLLESLITSSINEAKNDF



 GANAKLVIDRPGIIADNCEATTFNKVIDRVNRINEHKKLL P Y S TKI T R KYPGYI VVNNNHD LVTELVGEI NRLRDNE SENTLHLGQALNLCRDQF

 N G




 A L S A QL R NQYPGLI SASPVNAAKAAVTQVIEEINAKKEDD
 $P V S T R \square C P A L V G V S C \quad A T L E A D R H A N Q A K A D L$


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 V D A I R V E Q C L T P E M R P R I M R R A L G S F N T K Q L K R S I I H A F D A
 $K$ GVI H R L A K S V D Q R F E I V H D A EP GL I F P MATRTHPV FK D Q E AL E A E Q GLA P M M R S S V L R R A L G H DIT Y Q L L R T L L A A D G
 R A A V V K S S D D A Y E K WQ NV H D R F N Y L I T T S A Y R T I Y A F E D

 E A V $V$ R V A Q N L
 AAAIKAVGNPDQRFEAVHSRFPMMITLQATRYLKVLPN A DVVKK GI T Q Y K D T R S E L L H QV C P WL V T L Q V S R N I R I V T Q
 R QAL GAQFSMKQLARHTQVFDICPRLIV A D A V K A DT H Y Q D D S R S E I L H QV Y P WL V T L Q V S R N I R V V E Q
 A A A MRRDDN K K NVRFDKVHKKLPGLVAMHSTRNDLFIS Q
 E S LI GTI KK S N D R R KVVWTKFEAI SPKQAMRCTPVLLD E AL RVALGYT PEMRPRLL RRALGSVT TKQLQRTIHAFDA LT L K L K K I A D AV K S I T Q Y R R S R S E I L H Q V C P WL V T L Q V S R N I R I V T E K A L L A D E S G E K R Y I A N D L L F E T L P M V N Q L M L T R R K I T Y Y D D D



 GVILKHHYEKM HERMKFLQS P LYYGVDMDTVHRKI S F S N T QQAASRLNELPT QLAHELLNNQLGRI HLKQCYRQVPILES A A A MRRIDN K K NVVRFDKVHKKLPGLVAMHSTRNVLFIS Q
 I KA TS GLD K HI R S A L Q Q A GLPRPALK Q CYRKI P L L C E

G N D L A Q
 H N Y I A D NG G Q S N Y VK N DL LIF NAMPMKN H L MMTRHMI HEEI D S ADVVK G ITTQY K D T R S EI L H QV CP WLVTLQVSRNIIRIT Q K T AI S N F R K L A DE QA S D DL R D GL L G L H F V Q CY R QL K L FA E
 AEVLA QI REQAADLRHPALHDHLRGLHLKQCWRHLPVADA

 MAF LRESDKETRLSKYLLEKAGGLHRFNRKTAGRTFRVLDN A E QL G R I R K H Y P RMR H P ELLH D HL R R L H L K Q CWR HLP L A A A
 K QL L K A C Q DVT K F V R T T LA H A GY P GVVKLK QVFR HIIM FI N H R A EVV T R I K E K D S H Q R Y Q R V R E GILN R L H L K Q L F R H I P L I
 K K I I T S I K D A D P D L R F Y F V $\operatorname{H}$ N I C T Y L V T N E L Y R N L V Q I S E ARI AAEI RQQNPQRRHPHLHTHLKGLHLKQCWRSIPLADA
 A D I L A R I R Q E A A T L R H P A L H THELRGL H L K Q C WR T L P V A D A

 R D Q A P A L I P E A K A V R H P A L H D D H L


RRLHYRQAIIRKITTVLRE

 SELI QKIIKALSPKAFGEI KHRLFARLHLKQCWRHLLPI AEA
 $R$ N GL A R L H LLK Q C WR Q LP TAA E G



 Q Q AI S VLR P LIM DALAS LGHARLHR R QATRKLVILEQ




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INAT
TTSVGLSWCEQKSUKRLSKEQARALVCK PDSIYFG
PTRVRLA WY SSGRSITRLSVAEAEKRLLA
LESUSWT WAKTHSVDDVSREDALVLATKLGVRARAMAEH PSRARLAWSSGRSI KKLSVHDA EKKLLALDDQDAP P QKIISWTWAHTRAI KRLSVADCDILLQKKGKD

 PARRVRLA WS S GRS I K K L T V Q E A E QK LL A LD DEA P


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

P S R R I

VARVRFA W

PS RVVRFAWS S GR S I K R L TVVQEAE Q K L L K K L D T D

PE SVSF VVWSR LIPK KE S ID DT E A R HRLEARLEKAQGNS

PASI RFSFAGGRSIKRMTIGQAKELLVKK
$C L K V Q F S W Y$ S S GRS $\quad$ K K $\quad$ S $\square E E S F Q K L L K$

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210
220
230
240 ASNWEKLIVEQEKKALLENANDSEYFRTVRP|LRTTP\|VN|LKY




AETPQ RRM EMQR LAE DSADE LLARVRSVCPHDRANVVF QS F WQSEIEALIDKI EHAQQGDTLK IVDPKPVEPM NVVF TEAW LLSKLAALDPKERLAQVQPLPPVLKANVCF
 $M G E E K S H Q Q Q Q L Q K L N T L P E H E I L A Q I Q T Q V P V V R A N L V Y$

 LQDVKE

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 T PEWQAQ
$\square D S D A V H V R \square Q \square Q R \square A G \Pi P A S E P \square A Q V Q R Q A P \square M R A N \square F Y$
 MDSSQP S TGSR NE

A D


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K E D N C SVD $\quad$ R T A LP FFY PDKKRR SMNVSDPLMFPGEGRAALPDFNPLPTPPAER ENDEGWDTKKVHSPI IVLGRNTMPVRFNRLEPFEKDD
 RDEEGALMRKAVTIISIVLCQDSSLDECDIWREDPKGEKPV REPD GRLLRRAMNVALPLFDPSHNGQLPDHNTPPPFPNDKR AKGQSKNR DMLKAPLPVFYPHRVGDTFPQDKAAGSKQPK N
 E T A
R P
P $\qquad$ R D P L ERTRRAMNVA L P R
 P D GQP P VR V S C S A V A P I V M I
$M D G R R S \square H Q A V L D Y P G E P G H S L V R A G K L G H W P H D S$ TEPDGHSRRALNTAMPLVVPAPD QRLPHVNSPPVQPPLER T I E K K T T QKRAVLP $\quad \mathrm{AF}$ Y
TTPLERVRRALNVAMPDFDPREDGRDPHTNQPPAAPPEKR RGEAPRTRRALNVSLPLELPHDDLRLPSLNQPPSTPPTER TEPDGHTRRALNVAMPLVVPAPEGRLPDIKTPPQTAP $\quad$ RAR TEDDGHTRRALNAAMPI FVPDNNQRLPHLNLPALQPPTTR REEKRTRRAQKRAVLP I F YP
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GNSD

L L E Q H H Y P $\square$ WA

NEAREAA 1 K SMTQLFVADEGE
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UniRef90 W5YX47
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UniRef90-T2LF08
UniRef90-T5JCH0 K QAVRLIENEDRDKRSETLRRAMNDLDLKRCYTHI RIMPN
 QRLLMRMDK MMPLSKYALERMGYARFSRRQASRKFFYFHA
$K E T V L K D S G K A V G S R E T V L K K A L K S L D L R E C Y R Q M R V M P H ~$ EATVGGEGLSAARQMRNHYASAGYARYBPLQTWRQVRMVDQ




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sol0
jhmm
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TRAKRRDEK LEDDVY LPS LRDF
$P L R L K R D D V E Q D E V F L P S T H R Y D P E$ P I RLQRESK】EPEPVVQSLHRYV QA $A R R D S Q A A P R Y P L$
$T R A R R R D E K L E Q D V F L P S L R T Y ~$


B

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lupas_21
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conf
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jhmm
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