## QUERY

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\author{ HA<br><br>H A }

$\qquad$ |  | $D$ | $P$ | $V$ | $Q$ | $L$ | $F$ | $S$ | $F$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $A$ | $D$ | $A$ | $A$ | $Q$ | $L$ | $L$ | $N$ | $F$ |
| $A$ | $D$ | $P$ | $S$ | $Q$ | $L$ | $N$ | $F$ | $L$ |
| $L$ |  |  |  |  |  |  |  |  | NEHPQ

A DASOLLSF DODEHPQTA Q ALILAYLSSSQSAQLLSALPQ
 A D P GQQI L N F I QNE HP Q T A L L V L S Y L E P E Q S A A I L S A L P Q
 QKAAI LLVSLGPDLAA QVLKHLS D
 A D P M Q IVN F LQ S E HPQTVALV L S F L E P QL S A KV L S A L P E

 A DP R A L L A E L V R N N E H P Q W A D P N Q L L F I Q N E H P Q TI A L VLA Y L E P A Q A GMILLS S L P Q WLDA R S I A D M I R N E H P Q IV A I V DPS QLI NFI QNEHP QTIALLIMAYLEPDQAAVVLGSLPA
 WMDPRAVAEII SLE HPQI IAIVVLTHLEPDHAAEVLSNLPE

 A DP N QI Y N F I Q N E H P Q T IAA L V L S Y L E P E Q A S Q I L S A L P E
 DPQQI LNFVQNEHPQTIALILSYLDPDQAATVLSSLPV
 A P A A H L L N F I Q Q E Y P

WM D A R QVAT IIQ NEHP
D P S QLL L N F L Q E H

## EASQLVNF!QNEHPQ

 A LSYLK WMDGASVAFLIKNEHPQLIATILVHLERSQSAEIIRALPP

AAILLVMLGPEKAASVLKHLDE


 WM D S A A V A E L I K N N E H P Q II A TI L V H L E P D Q S A E I M S Q F T E
 WLLD P A T I A N L I K N E H P QU IAA TI L T H L E F D Q A A E V L K L F A E WMD P R Q V $\operatorname{A}$ S S I I D WMESRAVADII RHEHPQIQAIVIAYLESDQAAEVLANFDE A EP A QVLN F $\lfloor$ Q N E HP Q T $\square A L V L S Y L D A S Q A G Q I L S E L P Q$

N

ID PKQLVKFIQNEHP
 D PAHLLNFI WM D A R Q V A G I I

A D A S QLL NII
ADAHQLLNVI WMDARAI SNMI WMESRAVA DVI WME A R A V S D I I

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E LQ TEVLKR ${ }^{50}$
60
70
80 DKQADVAKRIATMDRTSPDVIKEVEDVLERKLASLVGGVD
 ETVEQLVVE ANIGRVTPEVLEEFLSLAKAKEMISEGGI E
 DEVETLTFEIAARLETDDAEVLEEFQELMNAQNFITTGGIID DEVETLTFE:ARLETVDAEVEEFQELMNAQNFITTGG1 D EEEEQMTHEAANLRKVTPEVFDEFHQLFMASEY:NSGG|

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 DLQADVARBIALMNGTSPDVIAEVEQVLESKLSTMTGGVD DDQSDIARRVAVMDSTSPDIVNEVEHLLEKKLSTTVGGVE
 EVQADIAKRI AVMDRTSPEII SEVERVLEKKVSSTTGGI A KVRLDDLMRAANLEEVQPAALQELNEVMEKQFAGKMGGLK ELQADIAKRI AVMDSTSPEILNEVEQILERKLSTNTGGMD A El EQLTYTVSNLGRVPPEVLEEFLELQEARTHD HGGVK AEIEQLTYTISNLGRVPPEVLEEFLELQEARTHIIHGGVK NTRLDLMMRIANLEEVQPAALQELNDIMEKQFAGKMGGLK EVQSEVAKRMAVMDRTSPEII KEVEAVLEKKVSSVAGGVQ DEIESLTFEMAKLDKVTPEILIEFNELMMAQEFITTGGLD DEIESLTFEMAKLDKVTPEILIEFNELMMAQEFITTGGLD EMQADTARRDALMDRASPDVINQMEREFEKRLSTLVGGVD QLQT VVAMRIAEMDRTNPETLSEDEKINESKFSSVVGGVD NDVEQLTVEI ANVGKVSEEVLSEFQDI ARAREMISQGGI E RTRHEVMIRVATLDGLQPSALKDLNEVLSKVLAGSLGGVK EQQADIARRMAVMDSTSPEVINEVEKVLERKLSTTVGGVE EQQSEIARRIAVMDRTSPEVLKEVEGVLKERJSTVVGGI Q RDRNDVLLRI ATLEGVQPAALKELNDVLTQLLSSAMGGVQ NTRLDLMMRIANLEEVQPAALKELNEIMEKQFAGKLGGLK RLRNDVVLRIATLDGVQPVALKELNDAMAKMKKTTLGGGK DIQWEVAYRVASMDNTSPMVIKEIEKVLNRTDMTTIGGVE RDRLDLMMRIANLEEVQPAALHELNEIMEKQFAGKIGGLK KVRLDIMMRVSTLQAVQPQALQELNDIMEKQFSGNMGGVK EVQADI ARRIATMDSTSPEVIYEVEQILENKGSATTGGIIE DEDEQLTYEVSNLQKVDTDVLKEFHDIAVAKDYMLTGGU DEIEQLTYEUSNLQKVDTDVLKEFHDUAVAKDYULTGG| E QLQADVAKRIALLMERASPETVRELESTLEQRLSSSVGGIK EIQPDVAKRIALMDRTSPEVLREVERVLERKLSTSAGGVD PMRLDLDMRI AELEEVQPAALQELNDI MEKQFAAKMGGLK EVQEEVAYR1 ATMNNTSPMVIKEIEKVLNNKLSSVIGGVQ DVQSDVAYRIATMNNTSPMVI QEVEKVLENKLSSVVGGVD
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## QUERY

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## , <br> and

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140
150
 DI L S L D D R AI Q R V L R DV D N N D L A V A L K N A N E EVVQNVI F N N D I I L L L D D R S L Q M V L R E V E N K D L S L A L K G V P N E V A N K I F K N
 $F V R D T D P V Q L V N F L Q S E H P Q T I A V V L S Y L D P P V A A Q I L G A$

 RRIDPAHLLNFI QQEYPQTIALILAYLEPGKAAVILQN


 D I V T L D N R S I Q R F L R E V D N S D L A L A A L K GA S E E V K K V I I
 D I L $\operatorname{L}$ G M D D R S L Q R V L R E V
 VTLD N R S $F L S Q A D P V Q R E$

## F

## D

GLD T SI
 $D L T V D N R S D Q R I L R E V D S H D L V L A L K G A S E E V K N K I F A N$

 $N L M D V E D R G I Q M L L R E V P N D V L Q R A L K G A D E H L R E K V Y R N$ SLRRADPLQLLNFI QGEHPQTIALILSYLKPEQAATILAN
 DI T T L L T D D R D I Q I L L R QV D T D D L S L A L K T V DI I T L D D R GI Q L V L R E V D T K DL GLLALVKGNPEVVQKVMAN
 DI VQLD DRSVQLI L REVDSHDLALALKGAGEEVMSKI ERN




 DIVKLHDTAI QRVLREVDTKDLAKAMRGANEEVNERIFKN

 $N L V D V D D R G I Q Q A L R E I S S D A L V M A L K G A D E P L K Q K I F R N$ $N$ L I D $V$ V D D R Glll Q T L L R E V
 DIVLLDNRSI QRVI RDVDPKDLQLALKVSTDEVREVVVSN


 NL I DVV D D R G I Q T I L R E V Q Q D V L M K A L K G T D E N L K E K I D V V L L D D R S I Q K V L R E V D N A DL A K A L K N V D T E V Q D K I F K N DIVTLDNMAI QRVI R DVENEDMMLALKVASEEVKEIVEKN

 $D V V L L S D R A V Q L V L$ R QVETHDLALALKTASDEVENUI TGN

 DI T T LD P K S I QRVL REVDNHQLAI ALKGAGBSVKEVI MSN

 $F L R Q T D P I Q L V N F L Q N E H P Q T V A L I L S Y L E P Q L S G K I L S S$ DLMMKDD D R GI Q T L L K E V Q T E S L VI A L K GA S P E L R E K I F S N



\section*{ママ} | $N$ | $L$ | $I$ |  |  |  |
| :---: | :--- | :--- | :--- | :--- | :--- |
| $D$ | $V$ | $D$ | $D$ | $R$ | $G$ |
| $D$ | $I$ |  |  |  |  | D $V$ VTLDNRGU Q $\quad \begin{array}{lll}R & R A D P R Q Q L A\end{array}$

DII KLSNSDI


D V V T D T S

| $D$ | $V$ | $T$ | $L$ | $D$ | $D$ | $T$ | $S$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $D$ | $I$ | $I$ | $T$ | $L$ | $D$ | $D$ | $V$ |

N L

| $N$ | $L$ | $L$ | $D$ | $V$ | $D$ | $D$ | $R$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $N$ | $G$ |  |  |  |  |  |  |
| $N$ | $L$ | $E$ | $V$ | $D$ | $D$ | $D$ | $R$ |

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 MS K R A G E M L R R D I Q F M G P V R L L P E E L Q T E V LLK R I A L L E R T S S P E V V L P E E L Q T EVVLK RI A L L E RTS PEVVVK EI ER

 | $L$ | $P$ | $E$ | $E$ | $M$ | $Q$ | $P$ | $E$ | $V$ | $L$ | $A$ | $T$ | $M$ | $D$ | $R$ | $T$ | $S$ | $P$ | $D$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $L$ | $V$ | $L$ | $R$ | $E$ | $V$ | $E$ |  |  |  |  |  |  |  |  |  |  |  |  |



M S K R M A E M I K K E M M F M G P V

 MS K R A A E MLR D D L E A K G P V R L S EVV E GA QKE I L T VARAMA E
 $M S K R A V E M L R E D L E A M G P V R V A D V E A A Q K E V L A D I D R M M A D$ LPESVRRAM RIA LMDRTSPEVVREIVA L P E S V R A M R I A L L M D R T S P E V V V R E I E A MSKRAA QLLKDELEFMGPVRVKDVEEAQQKIINTVRRLEE Q S K R A S E M L K E D I E Y L G P V R I



 $M$ S K R M S E M I K E D M E F M G P V

 $M$ STRRAA D ML R E E I E F M G P V $M$ S QRMAE TFQE EMEFMMGVVRL R DVVE EA QS RIVVGI I R R L E E MSSRASASLKEDLASMGPTKLSDVEAAQKEILTI ARKLSD MSKRAGEMLRRDDLEAKGPVRLSEVEAAQKEIIAIAARRMAE
 M S K R M V M S A R M S E T M K E E I D D F M G P V R L K
 MSERMAASFKE EMEYMGPVRRLHDVEEAQTRIVVTIRKLED
 MS K R MVE TM K D DME YM G P V R L K D V E E S Q S R V V G I I R K L E E LP P E L RVDVARRDATMERTSPEVI SEVQR
$L$ P P E E L R V



L P H N Y Q A DVVARRI A TMERVVS R R E VV V S K R L A A M I E E DL E Y M GP K R V K EVV E D A Q Q K V V N V I R K L E D
 $M$ S ERA S A MLLK D D M E Y M G P V R A K E V Q E C Q T K I V S T I R A L E A LS E
LS E
N
$M S$ QR A A E T L R E D L E S R G P V R L S E V E A E Q K E L L K I V R R L A D VS K R MVVT FK E E ME F M GPVRRLKDVEEAQSRIVGVI RQLEE MS K A A EMLRED ID FMGPVRLREVEEGQQRIVGII RKLDE


 Q S K R A A A S L K E Dl E F L G P V R L M DV MSKRAA EMLQQDI EAMGPI RVVSVVEGAQKEILSVARRLAD M S K R A A E L L M D D L E A K G P V K V S E V E N A Q K E I L A A A R R M A D $M S E R M V E N F R E E M E D M G P V R L R D V E E A Q T R V V G T \square R Q L E E$ LP P A L Q A D VA R R I A L M N S T S P D V V A E V E Q
LPPALQADVARRIALMNSTSPDVVAEVEQ
MSSRAAETLKEEMEFLGPVKVKDVERAQKAIVDIVRRDDE LS K R A GEMLKED DE Y M GPARL R DV E EAQQRIVQi I R R L D E MS K R A A A LLL K E DMD Y M G P V R L K D V MS KRAAEMLQEDLEAMGPVRVSDVEAARREILAVARRLSD
 Q S K R A A A A L K E D M E F L

 $M$ S S R A A E M M R E D L E S K G P V

| QUERY | A GE V V A R |
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| UniRef90-Q9WY63 |  |
| UniRef90-B813Q3 | A GE\\|VIS R |
| UniRef90-U2MTB1 |  |
| UniRef90-U2MTB1 |  |
| UniRef90-B0THA3 |  |
| UniRef90-B0ТНАЗ |  |
| UniRef90-Q8EQY2 | $\square \mathrm{GE}$ V V A R |
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| UniRef90-F4A1L7 | A GEIVISR |
| UniRef90-UPI0003B5ACF2 | S GEIVISR |
| UniRef90-D1B6C6 | A GEIVI AR |
| UniRef90-G7V5J4 | A GEIVI |
| UniRef90-F7Z412 | S GEI I I A R |
| UniRef90_UPI00047E8712 | A GE\\|IIS R |
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| UniRef90-A8MHD7 | A GEIII S R |
| UniRef90-M1E927 | A G TIVISR |
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| UniRef90-U1YAQ6 | A GEI I I AR |
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| UniRef90-I4DA83 | GGA ${ }^{\text {V }}$ I SR |
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| UniRet90 UPIO003661AF6 | $\stackrel{\text { A }}{ }$ |
| UniRef90- M4VE94 | EGKI |
| UniRef90-D5CN01 | EGQVVI |
| UniRef90-UP100016C0A | QGE |
| UniRef90-UPIO0029AE6 | E1 1 |
| UniRef90-G4T3B0 | AGEI ML |
| UniRef90_UP100047897F1 | T ${ }^{\text {L }}$ |
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| UniRef90 DokxW8 |  |
| UniRef90 R4KEN4 4 | A GE |
| UniRef90-E6QR77 | E G Q A |
| UniRef90_19W6G7 | DGE! |
| UniRef90_H8L3E1 | E |
|  | D |
| UniRet90_10IGE4 | A ${ }^{\text {G }}$ |
| iRet90-A0A059K | E |
| UniRef90 D4H35 |  |
| UniRef90-R5SHM5 | $1{ }^{\top}$ |
| UniRef90 A4SKL8 | A GE ${ }^{\text {M }}$ |
| UniRef90- T0PJ55 | A ${ }^{\text {a }}$ E |
| UniRef90 ${ }^{\text {- W7WU90 }}$ |  |
| UniRef90-K0C4W8 | SGE |
| UniRef90-Q3A |  |
| UniRef90-GOAIL2 | S GEl VI |
| UniRef90-UPIO002376243 | EGLI Al |
| UniRef90 A1WUC2 | E |
| UniRef90 JoN5W6 |  |
| UniRet90_C6WJR1 | G |
| UniRef90_B1Y385 | E G |
| UniRef90_082T45 | D |
| UniRef90 UPIO0042212FC | E |
| UniRef90_P52610 | QGEIVI |
| UniRef90- UPIOOO399FFBD |  |
| UniRef99- ${ }^{\text {UPIOOO399FFBD }}$ |  |
| UniRef90-A3ZPG2 |  |
| UniRet90-A3ZPG2 |  |
| UniRet90-A0A023CWP2 | $\stackrel{\text { A }}{ }$ |
| E6P | NGQIVIAR |
| Ref90-FOSNY3 | AGEIVVS |
| niRef90-F9ZN91 | $A \mathrm{G}$ Qli |



UniRef90_A6CES3
UniRef90 U4UVA UniRef90_U4UVA8
UniRef90_S6HC25 UniRef90-E1R5S5 UniRef90-UPI0003B53B67 UniRef90_D5X0F8 UniRef90-DOIYG9 UniRef90-G2DFU0 UniRef90_K1YR00 UniRef90-G5ZZQ4 UniRef90_Q67K15 UniRef90_UPI0003B57AEA UniRef90-F8ABX6
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UniRef90_UPI00036AF4C3

NKQMDVIKRII ${ }^{50}$ ANMEQTSPEVVI RDVEKSLLE ${ }^{70}$ RMMEKAGGVE ${ }^{80}$ DLQPDVVRRIATLETVQPDAIKELERVMQRKFASKDGGVQ KVRPDDILRI ASLDRUQPVALQELNDMLEQQFSGNLGGLK
 RQAGEAMLRLAALDGLQPSALRELNEVLEEQLSSSVGGPK RARSEVMLRVATLEGIQPTALKDLNEVLFKVLATSLGGVK R RTD 1 MRLATLDGUQPKALQELDELLEKQFSSNLGGUD ELLQCEVIMRMATMAETAPELEEKVASVVKRQLSSAVGGSK GMQPEVVRRMATRQVGPDALVELETVMQSKFAAKVGGVD KLRAEVLLRLALLNKVDPEIVKEISDALESELQSKUGGPE
 EKQAEVARRTALLMESTSPEVIHQVEQLLERKLSTSTGGVE
 DTQVEVAKRVALMDRTSPDVTREVENYLEERGSSVVGGDD EVRAEVLIRMSNLGDISPQVIKKVSAILETKLEALTGGVR EVQAQVAFKDADMNSTNPEUISEVEKUVEGKFSSVVGGVGG ELQREVAHRUATMSRVSPADVRLVESVFEKKESTTVGGLQ ELRADVAFRIATLGKVSPQTLKQUEKVVDEMAGSKVGGSK NFAMEVVMRMLRMDSVQKEVLDGLEKTLRKEFMSNRDSHE
 DMQAD ITALRIATMEATSSEYVRLVEDVVQRRTSTVVGGVQ NMRYDTVMRI AGLEAVQPDALKELDALMEEQKSSNUGGVE RLRNDVVLRVATFTGVQPAALQELTEVGQNLKRSKMGGVR ELQVEVARRMASLEE:SPEVVKKVSEVLDKKIASMVQGVK RLRQDVVLRIAATFGGVQPGALQELTAVLTKLLASRMGGVR AVRADVVMRIANMDKTNPDLI GEDERILDHRDSSVVGGVK AE!TAVSRAMAKLDSVSKEVLKEFNQAMTDGKEMLYGGPE AELTAVSRAMAKLDSVSKEVLKEFNQAMTIGKEMLYGGPE ELHGDLLVRIATLDGIPPQALAELNDVMARQFTSADGGAK DLQPEVAIRMANLDE: SPEVVKRISAVLEEKDDAFTGGVR NLQADVVYRDASLDSVPPGVVNELNEVLSDEMKTKVGGVA SLRNDVVLRIATFSGVQPAALQELTVVGNLKRSKMGGAR RLRDDVVLRIATFGGVQPTALNELTEVLNGLLSSKMGGPR
 QMQVEIAERI GMI ASTAPSTIERIERVIENKFSNFVGGVH RFQAEVDYRVASLSTVQPRALFDLNEVLENASRASUGGVK RVRNDVMMRIATFGGVQPSALHELTEVLNEVLSSKMGGVR
 EVQSDVAHRIAVMDRTSPDVIRQVLALQRKLSSTVGGLQ TLRVEVVRRMATLENDSPEALGELDEVMAEEUMQKMEGVP EFAIECVQRMDRMEPVQRETLDKIENTLRSEFMSNRDSHE
 EKRAEVLQRVANDESVQPSAMEELERGMKQQFSSNSGGVK
 SI RSDVAYRISKI KKVAPEVINRAEDALHREIHKKVGGLD LLRADVVFRMATLDDVNPQVLRDLEEVLSTEMQMMASR1 E EAQPEVIRRATLNTVQPEALRDLEEVMRAKFASQDGGVK AQQNDVVYRIANMKTIPDTAMRQLQGILKKKLSRQIDGAA ELQSEDAERDGTDTSTSPAlIVEKVEKVIENKFSNTVGGVR
 DIYADVLERISRLDRLSPGVVDEGGVLDEEYARRVGGVN $R Q R N D I M L R I A T F G G V Q P A A L A E L T E V G Q N L K R S K M G G V R$
$M M R A D V V Y R A K I D K V S P D V L S H I E E A L Q R E G G G V G G V D$
 ELGAGDVMYR AKDEKVMPEVLAQMEEALRRETGGVVGGVD KQRLDLLMRVAALDRI QPQALQELNDLLERQFAGTLGGIK EVQQEVIYRMAKLGNLPPGALEDEESLLAELEAMGGGVK ALGGEVMFRDARMEKVSPEMISVERAI GNQGMSSVGGPA DKKDPVVECIARMESASPEAIKLVESQLRHKFDNVIGGVD ELQVEVAERI GTLGSVSPRIIKRVEQIMENKFSTNIGGVH NMRSDLDMRIASIEGVQPSALRELDDIMEKQKSSSIGGIN EVQADVARRIAVMGRAAPEVIKDIESLTEQKLADLAADLN TLKADVVLRMATLEDVSPQVVRDLEEVLATEIQMMVSRIE SMRSDLMMRMATMKG:QPSALRELDQUMEKQKSTNIVGVD ETSFDVVNRMLRLGSVQKDVLDKIEQTLRLEFMATRDAYE SLQADLLYRMAVLESUPPPGVISEMNEVLTEEMATSVGGVE EEVETLSLEMAKLNQQDHEAVDELVATVQAYDSLAAGGVD



UniRef90_A6CES3
UniRef90 U4UVA UniRef90_U4UVA8
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UniRef90_D3F3Z2
UniRef90-R5PZU8
UniRef90-T4VZ38
UniRef90_UPI00036AF4C3
 NLIMSDDRSLQTLLRSLEQEALVLALKGADEALREKLFGC $N L I D V D D R G I Q V M M R E I$ QTDQLVIALKGADTSMQEKIFKN DIVLLDDRAI QKVLREVDTAELAKALRGVEAEVQDKI FRN TLLLSDDKSLQTLLRAVEDDLI LLALKGADEELRKKLFAC DLINVDDRSLQQMMREI SSETLLLAAKKGTNNALKEKFLSN DLVKLDDRSVQLVLREVVSETLIVAKKGGSMEVRDKILAN NLI DVDDRGI QTLLREVASEQLLLALRAADEGLKEKI FKN
 NLIMMDDRSLQTLLRSVDNELLVLALKGADEPLREKLFSC DIVNDDDRTVQRILREVDNKDLPLALKAAKEEVWRKIMNN
 KLRRLDPRTIANFLRNEHPQTIALILVGHLDADLAGQVLAH DIVNLDTRAI QRVI REVNDADLTYALKVASDEVKDTVYTN


 D L L KL D N N A I R E L L K E A D K N QLM A ALK GAPEELKEK FLA N
 DIVNLDDRAVQRVLRDVEANVLATALKGVREEVKEKIFRN
 NLTALDGRSLQMILREVNNDSLTMALKTASDEMQEKVFAN DLIRVDSQGIQVLLRNVDKDKLADALKGASDTDKDLFFNN
 DI TTLDDRAI QLVLRGVETADLATALKGVTDTVRDKILKN DLAQFDDRSTQTLLREVSTDTLLLALRGTDEALKERIFGN $N L D D L D D R S \square Q V L L K Q I D T N V L V I A L K G A E N E L V D K F L R N$ DI QYLPDKAI QE LKRRVDKNALVVALKGASPELREKFFRN

 $D V V L V D D R G I Q R V L K E V E Q K E L A L A M K A A G S E V A D K L F R N$ ELGNVSPKILAQILRNEHPQTLALILGHLPPDNAGNLLQN ELGNVSPKILAQULRNEHPQTLALILGHLPPDNAGNLLQN $K L V A L D D R S G L L L K E D D S Q V L A V A L K V A P P E L R E K F T V N$ DI RMLGDAADTELLKRVDKKVLTLAMKGTDEDLQGKFFSN DLTLI DSKQMQTVLKDVDKADLAMALKKASSDAVRELIMK S NLADLDNRGIQRILQDIDSNSLVIALKGAPEEVRDRILAN NLADVED DA I QLLLKKEI ETSALTI ALKGAPEELRDKFFRN DIVILDPMSIQRFLQEIDTKEMSVALKGANKAVADIIFEN
 DI I GLEDRGMQTLVADI PQDVLLLALKGAEKDLKEKI LINN
 DLINLDDRAVQLVLRGVEVANLAVALKGVSPSVRSKVMNN HLVLLDDRAI QKVLRQVDTKLLALALKGVDAPVRDKIMHN DIVNLDDRSVQLVLRQVEPADLATALKGVAEDVRDKVTGN DI RKLDNRSIVEELKAVERNTLLLAALKGAPEDIKEKFFGN DLSKLDPGGI QTLLRSVEKDKLALALKGASDDLRDLRDSN DI LTMDDRSVQRFI RECESKDIVFALKTANEEMKQIFFHN

 NLAELDNTADQLLVKEVPGETLLIALKGAQAALRQKFLSN NLIALDGRSLQMILREVNNDSLTLALKTASEQMKEKIFAN DLLMVDNRGIQAILQAIPRESLVKALRGASEQIREKFLSN YLIKSDERALQTVLREI DSEILILALKGSNPTLRDKLLGC


 DLVNLDDRGMQTLLREVATDRLLLALRGVSDVLKNKIFSN DIVKI HDRYISVI LREI DREVLLKALKGASEPVKRKILGA NLIEVDNRSIQRILQDVSNDSLVIALKKGCNEELREHFLRN

 NLRDV E DMGMQAALREVSTDVLVIAALKGADVDLQEKIFRN SLLLSLSDRDIQTLLMRVVSETMLVALRGAEDGVRNKIMGN DLSSLDDKSLQRLLREVDVK QLALALKAASPDLKQKDMGT DULTMDERSI QRF RDCDMKDUVYALKNATEEMSDLEYRN

 NIVQLDDRAVQKILRRVDNKTLAVALKGAPSDVSNKIFKN DLVMVDNRGIQALLQSVSRDVLTKAMRGAGDAVKEKILSN DLTTIDERGMQTLLREVSTGQLLLALRGVGSELKEKIFSN DIRKLDNRAVVEI LKAVDKNVLMIALKGAPEDIKEKFLSN DLVRLDNSSVQTLLQRIDKDKLPIALKGAKPPMRDLFFDN DMALIDAKQMQLVMKDVDQADMVLALKTASDAVKELIFSS F L R RTPPE HVVTFLRAEAPQTVALVIANLHTTLAAQVLA H




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LS QRAADMLREEMEY【GPI 180 MSSRAADNIKDEMEALGPVRLTEVQEAQKEII SVARKMAD MSKRAADLLRDELEAKGPVRMSDVEDAQKEVLAMARKLAD MSKRASALLKEEMEYMGPIRLKDVEETQQKIVAI DRKLED MSQRAAANI QDEMEADGPVRLTEVQEAQKQII AVARRMSD
 MSMRAAESLREDLEGRGPMRLSEVEAQQKELLKVVRRLVE DSKRAAELIGEELEYMGPVRLRDVEEAQQRIVVNIVRRLEE VSKRAGEALREAVEYLGPVRIRDVEEAQARVVALDRRDEE MPEKLADLMVVFRIAMMDKVRPSEIGKEQQNRZAKKLEQ LPEKLRSEVVFRIAELDKVDPEIIQE MSTRAAANVRDEMEVLGPVRLTEVQASQKRVVARSLEE MSERAAKILREDMEALGPVRLRDVDEAQMEIVNIAKDLAD MSKRAAEMLKEEMAYMGPVRMRDVDQAQQRIVAVVKKLEA MSNRAATLLKEDLETLGPTKLSDVEKAQSEIVQKCKELEA MSQRAAAAFEEEMQFLGPVKVKDVEAAQRSIVEVVQKLAE
 MSERAGENLKEETSLLGPVRLKAVEEAQAKII HTIRQLEE MSERAADLLKEELQYMGMVKLKEVEAAQSKI DIIKSLE
 MSTRAAEALRDDDESRGPVRLSEVEAAQKDVLKVARKLAD MSKRQAETVKGDMETTSNVRLKDVEEAQSRIVNLIRKLEE VSERARENLDDETELLGPVRMSAVEESQQKVVAIIRQLEE MSRRASEMLRDDLEAAPAKLSEVEAAQKDILQIARRLAD MSQRAAQLVREEMETRGPDRLSQVETEQKALLAATRRLAD MSSRAVETLKEEMSFRGPVRVSEVTEAQSTVTEAVRQLEE MSSRAAANLRDEMEALGPVRLTDVQEAQKAVVATARRLSD

 MAPGVRAEVL!RLAKLEAV
MAPGVRAEVLIRLAKLEAV
MSQRAAELFI EDMEARGPVRLSEVELQQRLILQVARRLAD MSQRAAELLDDMEARGPVRLAEVESAQKDILDQVRKMAE MSRRATDTLKEEMEFDGPIKVRDVEKAQQEVIETVRADEE MSTRAAEMLNDDLENMGPVKVSDVETAQQKII KIVKKLE MSNRAADLLREDMQMRGPI RLSQVETEQKNILQLVRRLAD MSNRAAEMLREDDDAQGPI RMSKVEQEQKAIVQVARRLAE MSQRMGETVKSEMEYLHNVRVRDVEEAQQKVVSVIRRLEE MSSRAAAMLREDLEVSAPARLSDVETAQKELLATARNLAD LSSRAVENIQEEMQFMGPTRLSAVEEAQQKVVSVIRRLDE MSKRQAD MRDDLEAGGPVKLSEVEESQRKVVQIVRRLAD MSNRAAELLRDDLDAQGPVRMSRVETEQKALLMVARKLAD L LSERGRENLIEEMELMGPVKVKMVEEAQQKVVSVIRSLED MSKKAAE MKEDMEAMGPVKVSEVEKAQKEVVRIIKQLAD MSERAAKLLKDDMQALGPVRLKDVDQAQTEMVFTAKDLAA MSKRMAETVQSDMEVSRNVRLKDVEEAQQRTVNLIRLLEE MSKRMAETVKGDLEVTTNVRLKDVEEAQQRIVNIVRLE MSQRARAMFVDDMESKGPMRISDVEDAQKTIMRLARKLSD LSQKAAELLKEDIDVLGPVRIRDVEQAQREIVNVIRQLED MSKRAAELFAEDLDSRGPVRVSEVEEQQRTVLQVVRKLAE MSSRAADMIRDDLEAMGPVRLSEVELMQQSIVKIAMKLEE MSTRAQTVLKDDMESMGGIPLREVESAQAEILKIVRRLEG VSARAAANI MDEMEAMGPVRLSQVQEAQKQVITVARRLSD MSKRAREMLLDDMDARGPIKISEVEQAQKEILTIARSLAE MSTRMRESVQTDVEYGHNVRMRDVEEAQQRIVSIMRRLED
 MSTRMAETVQSDLEVTVNVRLRDVEEAQQRIVNDI RKLDE MSKRAADMLREDLEAAPPAKLSEVELAQKEI LTVVRNLAD MSERARKVLQDELETMPPVRRIDVEKAQQELLKVIRRLEQ MSTRAAEIVRDDLESRSPVRMSQVENEQKSILLIVRRLME DSERAKEMIQDDLESMGPVRLSEVESAQQSIVQQALRLEE
TI ISNRAAEMLQEDLEAMGPVRLSDVEAMQQTIVKLALKLEE MSKRAAELLRDDLEAMPPVKLSDVETAQKEI MASAKRLAE MSERAAEMLREDLEMMGPVKVSDVEQAQQAILKVARQLEA

 LSS SRAVENLKEETEFMGPTRLSAVEEAQQKIVSVIRKLDE MSRRAAEMLRDDLEAAPPTKLSEVEMAQKDVLAIARKLAD LSSKAAELLRDDI AVLGPVRIRDVENAQRDIVNIIRQLED MSTRAQAALKDDIESMGGIPLKDVETAQAEIMKVVCRLEA MSKRAAEMLRDDLEASPPAKLSEVELAQKDILAIAKKLAD MSKKAAEDMREDMEAMGPVRASEVEKAQKEVIKVDKNLAD MSERAAKQLLEDMEVMGPVRLKEVDAAQADLVTVAKDLAS MSSRAAEMVREDLENLGPAKLSDVEAAQQKIIKVVKKLEE MPEEEQADIALRAARMSETPPDVVEAQKEVEGVMRQ LPEEEQAD ALRGARMSETPPDVV KEI EGVMRQ MSERAGKMMREDMEAMGPVRLRDVDEAQSAIVQLAKELAN


| UniRef90_A6CES3 | A G |
| :---: | :---: |
| UniRef90-U4UVA8 | D G T I VL |
| UniRef90-S6HC25 | S GEI M L |
| UniRef90_E1R5S5 | QGEIVVAR |
| UniRef90-UPI0003B53B67 | EGSIVL |
| UniRef90-D5X0F8 | A G Q I QL G |
| UniRef90-DOIYG9 | E G QV T |
| UniRef90-G2DFU0 | A GEIML |
| UniRef90-K1YR00 | E GEVVI A |
| UniRef90_G5ZZQ4 | E GTIVL |
| UniRef90-Q67K15 | S GEI Q I A R |
| UniRef90-UPI0003B57AEA | EGKIILSK |
| UniRef90-F8ABX6 |  |
| UniRef90-F8ABX6 |  |
| UniRef90-S2XD32 | K GE\\| I V A R |
| UniRef90-B6AZ23 | E G T I VLA |
| UniRef90_UPI00046EBED4 | K G EIM L |
| UniRef90-K2CL41 | RGEIVISR |
| UniRef90-TORGM2 | QGKAFISR |
| UniRef90-B9LA39 | E GKV |
| UniRef90-R6QGS4 | A GEIVITR |
| UniRef90-M5RRD8 | T GE |
| UniRef90_A0LT55 | A GEI VIHR |
| UniRef90-IOAMN8 | S GEI SL |
| UniRef90-M1P803 | E GKLVLG |
| UniRef90-R5RD17 | SGEIVV |
| UniRef90-A6GTY7 |  |
| UniRef90-W3ANL5 | QGELVINK |
| UniRef90-A6W8J8 | S GQ V L T R |
| UniRef90-UPI0003B5D93A | A GEIMLG |
| UniRef90-F7RW45 | A GEIML |
| UniRef90_UPI00046CE654 | E GVVVLA |
| UniRef90-V7EP30 | E G T IVLA |
| UniRef90-H1RY67 | A GEVV |
| UniRef90_UPIO002492967 | R GKı YI G R |
| UniRef90-D5MGD2 | A G E I |
| UniRef90_C7LW69 |  |
| UniRef90-C7LW69 |  |
| UniRef90-W6X3P7 | S GE VL |
| UniRef90-G7UMX2 | A GEI S |
| UniRef90_E6W3P7 | E Gll TLG |
| UniRef90-UPI0002628E84 | E GKLIMA |
| UniRef90_UPI000369742D | S GE |
| UniRef90-JOULQ0 | A G Q |
| UniRef90-H6LDQ3 | EGEIVTSK |
| UniRef90-U4TE14 | QAEISL |
| UniRef90-S1NSY5 | EGEIYI T R |
| UniRef90-W0DT03 | E GKL M L |
| UniRef90_W8WYZ5 | A G Q |
| UniRef90-UPI0003B37231 | EGQIVVRR |
| UniRef90-F812E9 | RGEIVI WR |
| UniRef90-R4LP74 | S GQI EI QR |
| UniRef90-D3SNY5 | QGVI DL |
| UniRef90_UPI0003B38915 | R G EIML |
| UniRef90-G9WNN1 | K GEVIINK |
| UniRef90-G5FBH3 | A GEVI I K K |
| UniRef90-F3L308 | A GELVL |
| UniRef90-UPI00038131A7 | QGELVISR |
| UniRef90-W4NYX4 | E D R I Si GK |
| UniRef90-K1Z7T4 | E GKLVL |
| UniRef90-U4QQY9 | E GKL VI A |
| UniRef90-A6DX37 | E GKITTL |
| UniRef90-UPI0003B78D52 | S GQ D L G R |
| UniRef90-D4JX29 | EGTLVISK |
| UniRef90-F4BNR4 | K GEI YL R R |
| UniRef90_A0A010ZUU2 | S GQI TI R R |
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 $D$ Q Q A DV AYRI A VMD RTSP EMVRMV E E ELLGRRMMATVVGGV E





 $N F S M E V I M R M L R M E A V V Q K E V L D D N V E K T L R T E F M S N D D N H E$







 HEVVEALTTAEI A RLE GVVDVEVLDEEVLE EFRAR QYYVVQGGVG H E V $R E R N D V M L R I A T V F G G V Q P V A L Q Q E L T E V G Q N L K R N K M G G V R$



 N L V Q M I V EFRTEVI YRRLATLERVVSRVI RDLDEALQSEFGSKMGGLD $K L R N D V V L R I A T F N G V Q P A A L Q E L T E V L G G M L S S K M G G A R$

 EVVQS DI MFRIA KID KVVSPEVLGGQIERVVAHKEQHQQGGI G
 E K Q T D $V$ AK R I A L L M D R T S P D V I RF Q S EV DY RIA TLTT T DQPRAL F DL NSVLENASSATI G GEK

 GVVRA
 DFA $\square D V L N R M L R M E T V Q K E A D R H I E E M L R S E F V S T I D A B E$
 ESRPEI I QRDASLLETVQPS AMEELEQIMMKQFATNS GGI K P FAMEVVMRMLRMEAVQKDVLDDVERTLRNEFMSNRDSHE A Q R P E L L S R I A A N L E S L P P A AL K E L D A I I D Q K V S S R DG GVVK
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 E L R A E 1. D I R DDVVERRDA GMERAYPPIVVKVVE EVVVRSE DAMEI G G L N RTRVDVLLRI A T LDDGDP PNALNELNEIMMERQFSSNVGGVQ KVKHEV SLLKIG STSSSVS PNVI KAIVDKAVE QREMESS G GVVD
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RMAE\|IFNNFDRQTEARFDST|L|EEHNRDSAER|I|KALMFTFE ■A A ELMNMLDKESAET LLLRKI GEEDPTLDEEKI REKMFTFE
 TLLANI L N E V D G K T E E Y V I S Y I E K E Y G DLLA E K I R Q K M F I F E K V $V$ V PLVVEI I NRADPTTE KLI L E GLLEARDQS LAAE EVVRSRMFVFA


 A A A E L L N H L E T S R T K V S ME HV R A DD P T L A Q K I E D Y M F T F E





## F

 ASAEIL NLLLKS QQEEAAIAAAVREFDAELAAQKDIDEMF LFE AVA ELL L N NV D K A TEE H I F G R L E E D D P EMA E K I R Q L M F V F E
 AVVSSL H S M K N N L D A D I L E S I E E T D P V M A E E I


 TAAEILNLMNAS QEETAIGTVRAHSEDLA QKI DDEMFDFE Y I A D V M N H M D R S N E K F I F D E M G K D D P E L A D T I R K K M F V F E
 RAVVDI I N HLLG S GA D R T I L



 AVAEI LNAVVRATEEEVLSEIVEEESA QTAE DI RNDMFVGE

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 A A V D M I N QL D R S F G A D L L E A l R A E D P A L A T A L D E A L A A F E QV A E A VA E ML N N R L D S T S G R E I L D D H I D Q Q D T N
 AV A DV FN RLGAKASKATLT QI E QLD QELLAASI KEMMFTFE S V A E I L N A V D R A T E E E V L A E I E E D S A QM A E D I R N L M F VF E







 Y $\mathrm{V} A \mathrm{~A} G \mathrm{G}$
 AVA EMFNRMGQKTAKATLA QI EQRRDEQLA N EI KEMMFTFE YVA DVMNHVD R S T E K D I F D E L N I K N N P R L A E GVVRK LMMVGE CAANI LNFMDS GQDQAI LGEIARDDAPLSNRIQDLMMVGD

 AVADI FNRLGAKASKETLAKIE ERDEEMSNQLMEMMFTFE A A AS I L NFMD GSASN LVLKKKI SESSDAEGLATKM QDKMFVFE


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D LA QLLDAAG ${ }^{130}$
140
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 DLLEI E D R GFREI L QNV DNELLSKALKTASEDLKEKI FSN








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 DI AKL N N R DI VEI L K AV D K N T L MVALKGASDAIKEKFFSN D V V K L D D DS I Q K V L K E V T M K DL VYYA L K G V D D E I S D A I Y R N D MM G L D S R A L Q A I L R E I N N D S L TMLA L K T S S S E PMMREAK FA N D LA G L D D K S L Q R L L R E I E A K QL AL A L K A A S D D LRRD KI M S A
 DI LIKL D D N G L Q M V L K E V Q S E DLL LM S L K T A S D EVVKN KI Y S N NLLELD DRSI QLLLKETNSNSLTIDALKGSQTELREKFLRN DI LTMMDNRSI QRFI R DCDMK DVVYSSLKGA GEEGILAAAFYS N


 DL A K L D P A A I Q T I I R A V D K D K L P L A L K G A T E S L R D L F F S N



 $N L M S L D D R G F Q R L I R E I$ ATEDLVVALKGVDASLQERFRDN DLLKLDAGSVQTLMRAIDRDVLGRALKGASEPVRAFFFSN
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 DIV R L D N M A I Q RI L K E V N VK DI A FA L K G S S K EVA A A I FK N
 DI A K L D K N AI T EI L K A I D K P DL MLL GLK SAPE DLK Q K F F S A DLTSLS GS DMQT L L REVPTELLLLALRGSSDELKEKIYAN D I V LLL D D R S L Q Q R V L R E V D N E DL $\operatorname{P}$ L A A L K A V S E DVVK Q K I F R N
 D FVTVP QPTMRELLSVI DKKVLAMALKGTREDVRAHIPRA D MVVS D D R A MREEL L K K V E G Q QL T Y A L K T S T D E M K T K I F S N D L G R L L P A D L Q R V L R EVVDSSSSLAVAMK S A S E S L R DK FY A A
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 LS ERAGENLLDEME LLGGPVRTRTVVESSQAKIVAVIRTTLE E LSERAADMLREDMEVMGPIRRLEEVEEAQQAII RI AKRLDA MS S R A A D M I K D D L E A M G P V R L S EVV E A M Q Q T I V K I A M K L E E

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 $M$ S S R M R E T I E T D I Q Y L H N I R M R DVVE E A Q Q K I V G V I R Q L E E MS QRAA QLFREDIEARGPIRRMSQIEAEQKSILQVVRRLSD I S E R A A E MI Q D DL E A M GPVVRLSEVEAVQQEIVVKI ALLQLE E
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MS QRAK DAFDE EL QFLGAVKMKEVEAAQRKDVDAVQS LAD MSERRGANMVRE EL EFMGPTK LSDVVEQAQQNVVVIVRRLEG MSKRGAEMLKEELDLMPPDRISSEAEESQRKIVEIAKKMEA MS QRAAQSI QDEMEERGPMRLAEVLEAQKAII AEARRMAD MS QR GAEMLK E DMDAMGPVKVKEVEMAQQQI I A A VRLLES

 I S K R R A ELLEE Q GKYDKPVKK KEAEEAQGRIVRDMRKLEE LS QRAAEMLRE DMEVMGPTRLAEVVAA QQGVIDIAARQLEA M T M ERAAKLLRDDMAAMGPVRARECEAAQGNLVTLAKDLGE
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 MS QRAAEILLEDMEARGPVRLSDVEGAQREILAIVKRMAD

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 $M$ S S R A V E M L R E D M E V L G P V R TAR E V A A A Q S E I L N I A R R L
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 NVSETVLANYLKNEYPQTVAVILSRIKPSHAAKVLALFPE $V D P R Q U Q T L L D G E L P Q T A A L V L A H L R P E H A S A V V S A L D D$
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 | $L$ | $A$ | $L$ | $L$ | $M$ | $I$ | $A$ | $L$ | $G$ | $P$ | $D$ | $A$ | $A$ | $S$ | $T$ | $L$ | $L$ | $K$ | $R$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $L$ | $F$ | $D$ | $A$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| $A$ | $L$ | $L$ | $M$ | $I$ | $A$ | $L$ | $G$ | $P$ | $D$ | $A$ | $A$ | $S$ | $T$ | $L$ | $L$ | $K$ | $R$ | $F$ |
| $D$ | $A$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | WVDTLQLSALIEQEHLQLQAVFLAFLPPDVAAEVLSYGES WV D A E L L A K Y V S Q E HP Q M Q A I F L A Y L P P E T S S K V L A K M P V

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 D L Q D D I V Y R L A T L G QV S S D A I D T I E QL L TA F HAPK GS G G S

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 GI R P EVLMRLARLVAVPEDMLMAVDKVLQSQLIAMGGKEA




 A QR $\square D V A R C I A T M G S A S P E A V S I V A E T S Q R K S N E V V G G I Q Q$
 Q V Q P E I V H R I A T L G P V A P Q A I E M L E E L L S R R IT T E QM G G A R

 $R V R T D V A Q A F A T M G S A T P E A V G I V A G V L R Q R A G A V V G G I A$











 ELLQAGVAYRLANTTKTHPDAIKEIARVLKKKYESEAGBAE ARAADAAHALATMGAATPEAVRVVADNLRARTGAAMGGDQ




 D Y H D E L L Y R V A QL D E\| D H DV A A D|LHDLI ER C $I A B M S Q G T$

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 D I QKL S T Q AI REI L KV AD K R DLMIGLKGASEELKQKFLAN

 DI R K L S D R DI DEI L K V V D K N T L M I A L L G A P E DI K Q K F L S N

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 DI TVLL E D R A M Q L V L R QVVETA QL DI NKI D DPG I QLI L KE I D QA GLPLALKTASEELREKLFFN
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 D I K R L S H E Y L M R I V N E I D R E KL P L A L K GA S E TVVRKM F L Q C

 H L F A L D S K S M G T L L R EVVDSDTLI A A L K GTPEENRDNFFGA DLSRLE LLPDLQQRI MREVDS GDLIVALKSATADAREAVMSA DIVKLLESRDI QQVLRGIDSKIL ATAMKGAAGPVVETIRAN DI L S M D D R S I QRTFI RECDTKDVVFADLKTATE DMKTVVFFNN
 DIV TLTTDNAI QAI NGAVDNKILAPALKGAKDDLRERFINN DI A S F E A R DVVQ I L R GVVEMSVLAADAMKGTTAKVVETITTK N
 HL FVLDDPQSMGTLLRDIGNDTLIDALKGDSEEERD YF FRA


 D $\operatorname{l}$

 $N L Q S L D D Q S L Q R I L R E V E N D S L I I D A K G C K K E L I D K L L N N$ DIVVLD DRDAQRVLRGIDVRVLALALKGSSGPVADVILRN






 D I K EMDS GQ I Y NVLRF


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 MS E R A S A M I K E D L E D DM G P V
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MTERAAKMLREDMSAMGPVRARECDEAQAALVRLAKSLAD VSERAAQMI QEEMEDMGPVRVRD
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 $M S S R A A D G V R D E D A A R G R V K L A D V V T A Q K E V V A V A R K L A A$ LS E R A S S MLK E D F EVLGGVVR
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Q GE DQ A
A GE: T I
EGKLVL
DGKIVL
SGQIVIRR
DGK: EVG
K GVI E
K GVI EFG
E G TIVVS
DGEVELS

| A G T | $\mathrm{N} L$ |
| :--- | :--- |
| $R G E$ | L |
| R G | L |

EGKVIL
EGAVNLG
A GE T T
S GEVVVMG
RGE VL

| $E G K$ |  |  |
| :---: | :---: | :---: |
| $S G A$ | $I$ | $L$ |

ADEITL
DGELMI GK
EGKMVL
TGA T TV QR
QGEE EL
EGKMIL
ADEIVINK
E GR A A GR


| $A$ | A D | $T$ |
| :--- | :--- | :--- |
| $R$ | $V$ | $V R$ |

$\begin{array}{ll:l}R G E \\ Q G T & D & L \\ V\end{array}$
A GAlVVRR
AGUIDL

| $E G T$ | $M M G$ |
| :---: | :---: | :---: |
| $D G T$ | $A F G$ |

EGVIVFG
QEEI SL
Q G IVTV HR
$\begin{array}{llllll}\text { Q G ELL } \\ \text { A G Q } & \text { I } & \text { S K }\end{array}$
A GQ I L

EGS $\square F G$


EGEDQL




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30
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 LINENVIA NYLRLENPQTVAAILSQVKADISAKVLPLLPE

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NMPETALANYLRGEQPQTVAVILSYDAPSHVARVLTLFPE ADAKSLFSALQYERPQTISLVLSYVSPAKSANVVEQLDP




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 V S
 NVPESIVSGYLQKEHPQTAAFILSKVSPVCAAKVMGLFS R

Q EQ S F LLK DET T PVLALVLS RLSPQKAAEYDKLLPG QLSENVIANYLKNEHEQTIAAI LSNVKTDVSARVLPLLGQ VDPKVLAEVMKDERPQVIAVLLGQMTRSNAVECLNAFDP

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 $R Q R E D V V E K L A T L E S T P D E V V E T$
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 S R RLLE LVK R LDAKMSKTSPEVVEKVAEVLRRTETTEDDGKS








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UniRef90 W4HFI8 UniRef90_IOHQL7 UniRef90_C7DEF2

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EA A QLLINLAA GEVRGTVVPA|
Q R N A P L A EK
A P LA E K\|IEEELLT TFE

 A L V D I L D N V D R R T E K N L L E K I E N E D T ELL A E R I K E N M F V F E



 A A A EI MNYLDNSMEG L LMDQI REHDEDTAVQI QD LMFVF D

 RMADLFNKLDRNAFDNMAPELEDKDPDTFNAIRAKMFTFE EAAKILDGGRKATEQRVLPKLFKDDKDVAKAIEEAMFVFD
 A A A A I L L N L A D R S T E K G I L E S L E T D D P D L V E Q I R R L M F V F E

 A LA S IL L N H M D K S LEE T T L K DL E E H S P E L A S QV R E K L Y T F E ,
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  R M A D I I N K M D R
 QAAD I I NRMPGDRTQMV E ILLRAR DPELVAA VEDLIDYD FA QVADIVNRY Q GNRGQLMESIKLHNADKASDIERNMYDFT
 TVVA R I F F D GLLG S E L E E P I L RMA D L F N K L D R DVVF G GL QAAI D S R R P GALLE G I V S KM M T F E





 RVARIFDSLDSRSEKAFLAALDHAEPGAAEKVRALMFTFD


 N L L N L P K K V G G T E R N I I N Y L E H E N N I L A N EIIK A NMFTFE RMA DII N K M E R T Q M E E S L Q S L A E S R P K S A E I L K G M L F T F D



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160
MLF
 DLVKLDKSSI QKVLKEVKMRDDAFALKDAREDIVDTVYKN DLARLDQQSLAQVMRGVQGNTLPLALRGASKELRDLFLAA DLTKI RAEDL QKL LMEVVDQEDLAGGLKGASEELENKVMRN
 DLARLDAAGLQTLLASADRSTLIIALKGAREETAAAFFRN
 NL DEMDDRSI QILLRDVPQEHLQCALKGADDPLRDKIFAN ILSRQSQEVLQTLLEVI PLSEWVVALKGAEPALTKA QGA DIVK LERRDVQLVLRGLDASVLAVAMKGASEPVLETITTN NLRELDKK SI GTVVLRSVDAALLAVAALKGTDADMVDDCLST NLLDMDDKNLAGTLMRNVDGDILSRALKGGVDENARNRFLGC DLASLDAAGLQTLLSAADRAVLVVALKGARPDTASVFFAN DI LLVVDKGIQAVLKE円DNEELALSLKTASEDLKKKDFGN DI KRLTPDDMMTVVAAINRDKMPLALKGANPNIRKLFFDC
 DVLLLNSKEMRLVINNRLADEVVIATAALKGAEPEVIRAADMQT DLVRIDPQGLVRVMRGVEGNTLPVALKGAKEDVAQKFFAA



 DIVKLTPKDRTTLFDQVPPDRVVLALKGTNDDFRKVVLSA HL FVLDTKMTGVLMREI ESDDLILALKGLEEEQRQQFYGA HLYVLDAQSMGAMLREVDSDTLIVAALKGIEEPQREVFFRA DIVLLDDRSIQKMLRELDSVELAKALKGADSEVCDKIYRN DLVKI ESSGIQELIKILDDSQLALALKESSDAIRQLI SAN DIVKLAPRARTTLFDAVPNDRLVLALKGTEADFRTTVLSA D V VKLTPRARTALFDQVPTDKLVLALKGTDPEFREDILQS DLMRLDLGSLAKVMRTVEGQTLPLALRGAKKEVRDYFLQA



 DLASLDPAAMQTILSQTDRAVLATALKGASKPVRGAFLRN DLIRLDAQSLARVMRGLQGNTLPLALRGASKEMRAHFLDA DLI RVDRTTEGTLVQECPGDKLQQALTAASPELRELGLGS DLQTQDVKTMQKIVREVDAGQLALIALKAATTMLKRAMLGAA DLVKLDTQSVVRVMRGVDGNTLPMALKGAKAAVLERFFAA DLANLDAGGLQTLLSAADRTRLTFALKGAREETRAAFFRN
 DLARLDPAGLQTLLSSADRSVLITALKGARPQTAAAFFGN DI 1 NL APRARQAI FDQDPTERVVLALKGTDDDFRDA!LAS DLVKFNEMHLGKIMREVTATALPLALRGAKKE IREAFLSA DLVKFNEMMLGKI MREVSGNTLPMALRGAKKEVREHFLAS HLFVLDARQIGTLDREI ENETLINSLRGLDPDDREDFYGA DITNL NARTRMAI FDQIPTDRIVLALKGTNAQFREVILSS
 NI ARIDGRDVAKVVRGVEQDMLIKALAGATGEAADFILSN DLFKLPMQDLAQVMRGLDGATLPMAMRGAKKEQRDHLMEC ILARQSDETLQHLLQEVPQEVLALALKGDDSDFKRRLMSA VLSTQSETTLTQUI EAVPAELWALAALKGAEPAVRKAVLGA
 DVVKTPKAR G
 NI ARIEPRDLPKILRAVDQAKLILALLAGAKGDAAEFILAN DI 1 SLPPRARTALFDQVPNDRTVMALKGTDAQFREVILQS DLLVMPQRSRVLLLNDISGDDLTMALRGASAEDKECVLAS
 NL DELDDRSMQELL RQVSSDQLLLAFKGTDEALKEKI FKN ILGRQPDDILQALI EAVPNEVLATALKGADKSIDNKI EEA
 DVIDRCEDRALQEKLRTMEDRDI ALLLKGQKPEFDDKI KSN DLANLEAMDLARVMRGAPGNALPGALRGAKKEVRDVFLAA
 DVIKLQPRARMLLEDAI PTERVVLALKGADDGLRDALLS S
 TLFTQSSETIDVI NNEVTTEQWAMAMKGDPDENRQVIFST
 $D L A R L D V Q G L V R V M R G V E G N T L P L A L K G A K P D V L E Y F S A A$ DLAARQTEANVTRIDEAVPGEQWAVALKGCEPAVRDAVLQS

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 MSARAADGI RDEMEARGPMKDAEVLEAQKAMIGDARNLAK

 MSTRMAQNUKDDLE ITTNVRMKD
MPRRQAQSFEDTMRRAGPVPLSRTEQTRRDTMARVKELVD MSKNRANDILENME LRGKVTLKREVGARRDVMARVKELVD LDPQRSREMLQEELSVMGPMRARDVREAQSAMVTCARQLAA
 LSSRVRRMVEQELASGEPSSQREVAEARRSVTDAADMAG

 MPKRQAQAFEDMMRRAGPMPLSRIVETRQEIMATVKALAD LSS R RVRRMDEHELNSKEPSAHRDI AEARRTI TDLALEMAG
 MSKRAATMLEEEI EYLGGHIGQGKINEAKQKIVSVIDRLLEE MSQRVYKLLLEEVDSLGEVKAKDIDEARSYVVTAKDMDR LSARVRRMVEHELNGGEPAAQRDVLEARRTITDLAMEMAG LGARVRRMVEQEMAGSEPAPAKDVMEARRTVTDLALDMAG LPQRSRDMLIEEMNAMGPVRGREVQNAQAQLDDGALELAE MPRRQAQSFEDLMRRSGPI PMSRIEQTRREMMATVKELAD
 $M P R R M A Q Q M E Q D M L R Q G A V A V S R V E N A Q E V M N L V R E L V E$ MSKRAAEADEDEMAERGPMRISEVQDAQKQILNIARKLAE MSQRASDRFQEEFEMLTKVKIKDIESAQRKMLDAAQKLDE MTRRAGELLVSEVEALGPIRRSRVEAARSEITAVARELAQ LTARARDMLLDEMNTMGPVRGRDARAAQTM VDYTRQLAE MSARAATMMRDEDESMPAQRRKTVEDAQADII T IAKRLS D MPRRQVQLLQNTTSRLGPVPDSRIEQVRKEIMARVRELAE
 MPRRQAQNFEATMRRSGPVPKSRVEEARRETMAQVKQLAD MTQRAGELLREEDDMLGAVRRSEI EAARMELVDLARTLDE MSQNRAEDILDLLDMKPRVTLREINEARSKIVQVARVLEE MSKRAASQLQDELAERGPMKRSEVEAAQRELCRTVRRLGD MTRRAGELLRDELTAQGATRRSEVEAARQELVALARSLIDQ LA T R A R RIVVENELATS EPSPQRDVLEARRVI ADLAALDMAG



 MS K R M A D G L R E E I D T L G K V K E S D A E EA M N A V V A V I R D L E S


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 L P K R M A E A L N A E I Q R LGG P M P L S K I I I I S R T E V M A I A R R L F E


 MGK RMA E AMR E E I Q E R G RVVR LAR DA E EAMM A V V NA V R T L A A LAAS R A R R M V E Q E L S N S E P A S H R D V L K A A R R M I AA D A A L S M A E
 $I S$ D R R K LIF V Q S E L E I L G P L R R D E V D K A R N N F L A Y V R GLVE $L \begin{array}{llll}S & R & R & L \\ S & R & L & A \\ L\end{array}$
 $M P R R Q A A Q A F E D T M R R S G P V P L S R V E Q T R Q Q Q M A Q V K A L A D$


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YMKPKQ TAFLLNNEHSQITTMLYLDQNHAAKVLSFLSN YMKAKKIAFLLDNEHPQIVTTILIYLDKNQSAQVLSLLSD ASPDDLLALLARESTEVAAVMLSKLDVERAADLLGRLPG


## EKLLPVLQNESTEVAAVLLSKLDVKRAAELLGKDPG

 WREPTEI AGLLETQPPQLTAVVCARLPRDVAAAVLELLPG

LLTVLNDESPQTDADAS YDKPQLASRLIERDPD
 PRTADY MPDAAVGQYLMKEHPQIIAALVLSRAEPQTSANLLTLLSK PKVLMDYVSKMYFSSFAKAUAYGESEDAGDLLNNMDA KVLREYLQHKHLESLAKV TAYLDSTEADELLQMYDY
 EAENLFEALKEEHPQTVAIITLSNCKKKTARDLLEMFPE MDKDRLTR RLQGEDPATKADVLSQLEPKQAAAYISSDDE PPHVMGF REHPQTALKLACSDAQGAASLLSSLPG LPPHVIGQFLNREHPQVITFVLSKLRDSFSAEIVPIVN LQEAALTQYLMKEHPQVIALVLSRADAATSASLLKMLPR DRLERFVLQESTE EAAMVMLSKLPVPKAAELLGRLPG WLDAKTVVEMVRLEHPQVIAVVLAYLDPDQAAQVLRGLPE LEDAQLQQI LEREATEVSAVVLSKLATSKAADLLGALPG LTPEEMLPUTDAESAEVCAVVLSKLPTSKAASLLGLMPG ERLIEFVTSESDEVAAVLMSKINVTKAAQVLGRLPG DPANMLAELARTEACEIAAVMFQKLPVPRAAEVFGQLEP VDPARIGTFLVGEHPQVAAVMLSKLAPSAAANVLLSLEK

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 A D K K D TVVC R L A A K L L A P V A A P D D 1
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 G L K D E V V R R V S S L G R V E G A I L TT TVV E E R L R T RLLE S L GT G E E
 E EKKEVVMRLAKMEP【SPDVLRRVDQAMHEKKAENVDGRN K M G G L
A R A R R $\square$ T F A $\square$ S QTS G $\square$ N P M L VD Q $\square$ G D S L R P A Q A F A K D P V A D F A E KI K T R V SALLKNDS PKVL S SVVGSTMRK LGFYGED SVVK









 E K R E D L L A R R L A A L E S S L


 K T R DD L L Y R I T Q I E NV A D D L L E L I E R C AT E YTENKN G G DK
 ET R DVI L V N V A R L L $P$ L R N D V VRRRMLSAK P PS E Q MARMI E HRFRESFRVAS GN GAE



 N H R E D V I L L A L L S E I D Y H S D R E R D Q L E R R L L R F K S K I R S S R K A K

 $P$ L A R R I T Y A A V S S L T S G I H S I A TM G S P S P D A V RVV A D TVLK QRA SAVVGGVQQ







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 D E K K
 QAQPE LR L

 PKARRI A YA MS QTA GVTPDTVVRI GLSAEPARAFTNAPPE RARHDVIMRVAALEGIVQAALVELDEVMERQFSSTUGGAQ


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 D
 RVLHIRDTDLQRLLADMADEDIALLMKGKDENLRVRFLKN


 NLVDLDDRYI KLVIKNIEKEKLYIUALQNTNLIVREKFFKN H1PRVAPMDIPRVTREVDQKLLVTALSGALSGVADFELDN
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Hi PRIDPRDMPRVTREVDNAVLIKALAGAPEDARDFLLGG VIANQTEQTLELI HQHITHDLWAVALKGATPEFKQDILKS NA ARDTRDIPRLREVDGGDLLTAMAGAEADARDFVLEN
 DI PGLPKKSRLLLFDALPGDEVNAALKAAHEDVVEFAVLEN N VNLEDKY Q QLLTSNLEKEKLCTALQGTSEVIRNKFFKN NIARI APRDIPRILREI DQPQLVIALAGAETASRDFILEN Di LRIEDRALQLVLVELDTPTLAMALSGVAEELKTKVVKN HIVRVDARDVSSVLKSVDNDTLVTALASATHELADFILAN DVEKSDDRFI QELLRSMSEKEVAYLIAGKPEPFRKKILYN
 VILRITDDDMHNVGREFTDNDVAIILKDKSDEVRDKLGFN PRLGTADVPRVLREVDQTRLVTALAAAGDNVAEFLLSN Di ARLAADDVPVVLRAVDNDRLVTALLAGAEASAAEYLLDN DIVRLEARDVQQVLRGVDVAVLAVAMKGALPAVEEVITAN DLVRLPEPGRKAFLRNVGARTLLHALKGSDGRVFAALAAV TILDDDRRDLQEVLQEFADMEIALLLKGKEQGIREKIMRN DI ARVKPTDIPNTIRNVDNDTLAAALKGDDALVAEFILSS NLIALDGRSLQMILREVNNDSLTMALKTASEQMKEKIFAN DLLRLEDLDAMRVLEEIDNGLIAKALK DAKEETKEKLETC
 DI AGLGQRARMVVFDQAPTDRVI LALRDADAALREAVLPC
 D VLLDQKSRVTLFDGMSTEMITLALLRDAPAELVEAVLSA DIVYLKDRDIQKILRDVDREKI AIILKFESDEIRNKIFRN DVINADDKFVQQELRNLTEVDIAYLIAGKDNDFCEKILSN DLGRANDVGIRELLRAISNEDLKVSLKNAPDAVKDKFFGN DVITMMPKHLQYLISPMTDKELALLI HNQSEEFRKVILAN DIARLSQRSRLVLFDDDQTDVVTALHGCEPQRQELILQS DLNRIQDLEELQAILRKLDLSKFPLALTGAGEELKNKILKN DIAKMSEKSRIELFENIEADRTAPALDGLEEGDKELILSS DLGKLAPAALVTVLDTVSPDVVVKALYGGAKAFREQVQA HIARISPADVPRIVREI DNGALVTALAAASDELRDFLLAN DLAEUDNRGVQLLLREITPD
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| UniRef | K1 I EENUSLNSPLAPREVAFARRSUVQEAlSSLLK |
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| UniRef90-A0 | M ${ }^{\text {E S SLAAGQ }}$ |
| UniRet90-UP |  |
|  | ark |
| UniRef90-UPIOOO3B38B99 | L |
| UniRef90-M2U868 | A ${ }^{\text {a }}$ |
|  | DMLTEELEVLGP RLLSDVEQAQQD |
| $\begin{aligned} & \text { UniR } \\ & \text { Unin } \end{aligned}$ | (MAEAELQSPANVPPRDIVDARTVDSVLRLA |

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 LSARTRRMVEAELAAPAEPPRREVLAAQREI ANLVLRLAG
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| UniRef90-L0LF89 | S GQ\| E |
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| UniRef90-Q1YLL2 | Q GKLDL |
| UniRef90_UPI0004690DF9 | S G D L V VL |

## UniRef90 W4HR71

 UniRef90-A0A011UTB6 UniRef90-LOKH16 UniRef90 ${ }^{-12 \mathrm{JK} 28}$ UniRef90-UPIO003B36BCB UniRef90-C0APR7 UniRef90 F2NS86 UniRef90-UPI000382EE62 UniRef90-UPIO004648DEA UniRet90-C8PNE7 UniRef90-W70Q16 UniRef90-A9CYK2UniRet90-O0G103
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UniRef90 A6D5Z3 UniRef90_A6D523
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UniRef90- UPIOOO3B6E68F UniRef90-A0A017HTM2 UniRef90-G7QP40 UniRef90-D2R526 UniRef90-A0A059G5F5 UniRet90_B2S1 $\times 4$ UniRet90_S9R5N2 UniRef90-Q1N1L3
UniRef90 UniRef90_UPI000375472C UniRef90-A0A017HCZ1 UniRef90-M5DNR5 UniRef90-Q89AZ9 UniRef90-A0A059FP23 UniRef90-P95715 UniRef90-EOTGK6 UniRef90-A3ELZ0 UniRef90-UPI0003B49F5B UniRef90-UPIO0037CE8B3 UniRef90-UP10003B6AB90 UniRef90_UPIO002E05FA7
UniRef90-EOTHL2?

| MPAESLGKVLEEESVEVAAVMLSKLPVPKAADLLGKLPG WLDATTAGIIRREHPQLQTVVVACLEPRLASEVLLAFDE LPDERLLPVLEDESVEVAAVMLSKLAVPKAAELLGKLAG ANAERIKVLIDGESDAVKSLVLSQIEPKKAAKVINLMDV |  |  |  |  |  |
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|  |  |  |  |  |  | DDSTRVAKF LQEEHPQTAAYVVSMLPTAFAGKThMK DPE I EGEVLAKKLSGEHPHDIDALLSKVPSDAAVLIVRAFEP ADPLRLGAFIAAEHPQTSALILSRLAPQASANVLLTLEK $N V P H D M M V D V L S G E S P L V A A V L L S K L P T A D A A K I L G L L P G$ LN DDVLQKHLVQEHPQV SYYI SRLPSEDAAKILMAQTM QMKPDELAAPLSRESWEVAAVALSRLPVNRAAEALSRGPG DDNDTLLPLTNAESTEVGAVILSKDDVARAANLLAMMPG PPAVVAAALQRETLRTTALVLRELPMEFTGRVLEKLPA MSGENLTRILAGELPSSKALVLSQLEAKQAAEYISSGDE LEAAQVSAFLVNEHPQTSAMILANLAPSYAASVVLTMDK LPEERIVDLLTGESTEDAAVMMSKVDTAKAARVLARLPG 1 PPDQLARAMEGEQAGAVISLILSALDPATVGQIIRRLPA IENEQLWALISKENGKTLLIVYYYLTKEQKKYVFSMLEK K V VLQ【 RLAPLLESESAEVCAVLLSKLTVAKAAELLSELPE

W $\square P P D L L V N D L K K E H \square N L Q A L L T A H \square P D E Y S A R V M D E Y D E$ LAPEELSRIVAGEEPNRIALILCFADPDVSARVLEEFPY SEQLALFFRDESPAAMAMVLSRLPSRLSAAALANTAP LSVDQIINIDFKESQQISAVILSRLDSDKAVEVIQKMNN LPPEDLAELAEAESTEVAAVLLSKLDTAKAAQMLVHLPG LPPEELAELAKAESTEVAAVLLSKIDTAKAAEMLOHLPGG LKP DELLAKLCEAESTOEVAAVMLSKLDTAKAAAEMLAKLPG LDAPTMLEMVEKESTEVVAVVLSKLKVSVAAKLLGLLPG MEADRLRPLLERESAEVCALLLSKLGVSKAASLLADLDP ADPTQLATLIQNEHPQTVALILAYLQPEKSAVILQSMTP
WVSVARLADVLSREHHRMQALLLAYLPADLGGQMLKHLPQ QLSNQQLMHLVKGESDEMTALLLAQVAGERSSYVLQKMKD LEPERLVELLSDEPPQVLAVILASIAPSSAAKVLVMLDK LDEERLGALVVGESDEI AAVMMSK DTAKAAKVIARLPG

 DPKQDATYLSRLSPNLDALILQKLDVSVSSELLGHMEG LPKQKVIRYITNELVEUAAGVMTKISPVVATSVIESLDK LVAFLKTENPGVTAFILLQLDSATAAEVLASLDD DELVLALEGEHPQTIAVVLSELAPKKSQEVLALLSE NLTTNQLRWLLENESDRIQAMVISQLSPSRSSELLAAYPT WMDPRAVADLVRNEHPQITAIVMAHLDSDQAAEALKLLPE
 PARSLADVLEPESASVAAVVLLQLAHKQASKVLSLMPD YAEPDMUSNYURTEHPQTMALGLSYLDPEQASAVLAEMPE

LaAALARESVEVAAVALSKLPVAKAAEVLGKLPG


MEPQSAADLIRDEHPQIAATILVHLKRAQAADILALFDE

 PLRAEVMKRMVTMASAPQAAVRIVENQIRARSKDTSSGQA P M R G E EKARRV AYAVSMTGGVVEPTVRRIGLDAEPARAFTATPDE



 AEKK DIVLDRLARLKTIDPE ILRTVSTSMREKFTRDRTGSAA

QSRDEIVRRAVELKAVNPRAAEDDEARVRELVDEMETGSV DLRNDVLKRMLQIK PLA GPDQSLFESHVRQTYQAGEGRHT GLRGEI I KRMMALTSI PETATKIVEGLSESTAKDMSAGQS PLRNGVMRRMLTFKPIVDATMKMI EQTDHEDFMDNADTHS DVARSIAVSVSQTAHVDPDTVDGIGETILEQPAFSDGADT SVRSDLTRRRLHLRTVSPEDETLLDQALRNNDEGDKAHHS TVRADLTRRRLHLRNVAPEMETILDQALRENRAGEQAHHG $E R A R R V A L A F S R A N H V S P L A L H R I G Q A I V R D Y A F D R P P D Q$
$S L G R A V L S R \square A T T G S M P A P A K K L I G K R L G E L L G S M R S G K D$

A QARRDTCAMSRTSAVTPDAVLR DGQS\|VAQRAFSSPPAD
 EEKKEIVLRLAKMQKLNSGULYQVSEALKKKMTASDDGVS PMRSEI I KRMMEMATVPEAAVRMVESQURTNQKDNSAGQT DKARRITYAVSMTAGVSPEAVDRI GLSAEPPRAFQKKPDE EQRADIALRIAKPGTRNDSLLQPLAKAVVEKTRSQEELIQ D $\square K K L F I K E L A K P R Q L N M D M V E \square I S D R L K S R F E M K D D G S K$ DTRDKIFELSRKFHKTDEAVVAEADHVVKTAGVSCDDDFQ

 QECHEL I LQU SKTQVLTSGLMETLKDLI DRCKSASLQGSK ELQENILLQI RDLDLSSESGKDSLERFLRKKEAVKHPGDK QQRGEVLRRMTALGQVSAEARAIVERRISE ILQAEANGKD A R K L
E H R T E V E H R T E
 P VAAR QI

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

 DRARRI SYADSMTA GVSPEAVDRI GLSAEPPKAFEKKPDE



 EKARRVAYAVSMTGSVVE ETVRRI GLEAEPPRAFTATPDVE

 RTRADVVLLRIATMLDGIPPNALSELNDDMERQFSSNVGGDK ETQEE I L L S I K NLD L A S A G L T D SLLERFLRRKRETQDRTGK

 SVVQA DIL L Y R M A V I E S A I R Q NVKSLFSEKTNVEPGVLSAAGTVLKRSGFYA KAC PQARRI TJLSVSRTAKVTPDAVRRDGRALAEEHCGTPAPAE
 AVSTE TLLHRMAFLHDMSAEVVVADLARELLRKQLDAHPAGVR S KLTP A M GFMVQQAQRVDPGIDDQVLARMMEMEFLNNDDHLS EEKKDLIVRLAKLKHVNPQVLQVMSDSLHKKFAALHDGHA ERARRV AHAVSRTAGVSPAMVQEIGGRALAATYAFADKPGB
 D E R T Q V A L E L G R L H E L P L ELLV E K I A R H V P D D G T V G V D G I K

 S KLLEP AMGFLVEGRKPDPGGDLVLARMIEMEFLNVVQTLE R L R H DVM F V S H L WR R A A S A L A E L T E V G Q N L K R S K M G GV R

 $P M L D S T \square G Y L$ VS GEQVDA E DEAVVVAQMVEDEFDNQVQEVE RELARNFSNF IDNFYKKEC

UniRef90 W4HR71 UniRef90-A0A011UTB6 UniRef90_LOKHI6 UniRef90_A4WUV0 UniRef90_I2JK28 UniRef90_UPIO003B36BCB UniRef90_C0APR7 UniRef90_F2NS86 UniRef90_UPI000382EE62 UniRef90_UPIO004648DEA UniRef90-C8PNE7 UniRef90-W7QQ16 UniRef90_A9CYK2
UniRef90_Q0G103 UniRef90-H0HNX6 UniRef90_UPI0003795DEF UniRef90_A0A037ZDM1 UniRef90_E6YGZ6 UniRef90-K8PQD2 UniRef90_F9Y3L7 UniRef90_K2MB11
UniRef90_T0ZX91 UniRef90_UPI00047D6267 UniRef90_UPI00029A1F7F UniRef90_S6A9B1 UniRef90_G8SUF4 UniRef90_UPIO0036EF6B3 UniRef90_S9Q9G0 UniRef90_UPI00016C3502 UniRef90-W5SNH0 UniRef90_UPI0003B76C4C UniRef90-M3JM83 UniRef90_E7NUC4 UniRef90_Q28NY1
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UniRef90_F5YE05 UniRef90_W9A3C6 UniRef90_B7QQP0
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UniRef90-Q1N1L3 UniRef90-Q1N1L3
UniRef90_B6WSP6 UniRef90_UPI000375472C UniRef90-A0A017HCZ1 UniRef90_M5DNR5 UniRef90_Q89AZ9 UniRef90-A0A059FP23 UniRef90_P95715 UniRef90_E0TGK6 UniRef90_A3ELZ0 UniRef90_UPI0003B49F5B UniRef90_UPI00037CE8B3 UniRef90_UPI0003B6AB90
UniRef90 UPI0002E05FA7 UniRef90_UPI0002E05FA7
UniRef90_E0THL2

120
RLA S V L N EMD K A QLD E V I Q DL E S V G T P D L A GVVKARVVFS B

 RAAKLLNEMDVGTESTLLNGLVYARPESAARVEELMFGFAB $R$ V C A L L N Q A P Q T DR D E V L A GGL D Q D D K A F A N L V R K A I F T F V


 MNSNQEETAI ETVRAHSEDLLAQKIIDDEMF LF E

 RVVA S V L N E M E K S Q M D E V M E D L E K S G A T D L E E G V R A R L F F S F

 Q $V$ V $A$


 $V$ V $A$
 R V G A I L N Y A A S A K R D E $N$ L A D ML R S FP R N D R M P V V Q K L E QAD P E I A S R V V E K L Y RME IL V D I L S Y M D S E D E K N L L
 V L A E I L R K I DPA T E H D I L Q N L S D S N P E L E Q N I R E R L F T L E

 RAADLLGKMDPQDSRKLFTRI REKNPAFAENI NEHFFKME A V V R L L N E LDE K T E A D E V I R D L E A V G T P D V D A I R A R L F S F E A L T A $L$ L R H S D DS F G D R L L D E L S Y E D P E L S S K G L K D R L Y T L D


 | $R$ | $L$ | $G$ | $A$ | $I$ | $L$ | $N$ | $Y$ | $S$ | $N$ | $A$ | $A$ | $V$ | $R$ | $E$ | $E$ | $L$ | $L$ | $Q$ | $N$ | $L$ | $E$ | $Q$ | $E$ | $D$ | $A$ | $A$ | $F$ | $A$ | $E$ | $A$ | $V$ | $R$ | $R$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $R$ | $I$ | $F$ | $T$ | $F$ | $A$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| $R$ | $V$ | $G$ | $A$ | $I$ | $L$ | $T$ | $E$ | $A$ | $A$ | $A$ | $A$ | $K$ | $R$ | $D$ | $E$ | $V$ | $L$ | $T$ | $A$ | $L$ | $E$ | $E$ | $E$ | $D$ | $E$ | $E$ | $F$ | $A$ | $T$ | $D$ | $V$ | $R$ | $K$ |
| $S$ | $I$ | $Y$ | $T$ | $Y$ | $A$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |



 SLLIGGV N A A V E R A V V

 RVVAS LL N E LDD K S Q A D E MI H E L E LDA G S S DV D A I R S QLL F S F E RVGAI L N Y A A S AKRDE LLEGLE ETDREFAERVRRAI FTGA


 S V G E L L S L I I S T E K R R D S L L V A F
 RVADIVNRMSAEKGDALLASLRGSTAADFAEVETRVFRFG
 $V$ A A NI L NF L D T GADQGVLGEI GK $\square D A$ RAAELLGKLDPQDSQKLFSRIREKSHSFAENDNKHFERME
 HVNEI L KLL L GVEDADRI TREVVSTADAAGGKTLEKSRYTGE PVAA E I L N S V D KA T E T R I LA S I E E S N P DLA A E QI R KA E DD T Y
 K A A DLL G R LRRPGDSQKI FARRIREKRPGFAENNIMEHFFRME P A A A V I D A L H G S R R R H L V D E L A S R D A R L V K QL K R L S IE F D A I G E L L S L I P A E K R D T L V K F L E T S H E D K L Q G I Q K S L F T D D VLAAAILKKMERATEHSILHALAEKNPTLAARVVRTHLFTLD RLGAVLNTAPQTAREALLEGLEGEDPAFAAEVVRAIIFTAA
 VAA A E V V A A A GK D A G R E L L A D L E R Q D S R L P A L L G R MVVHC P E

 T A V E L L K L I K R D Q E T K I L T K M F S S D K V L A K R I K T K M L E F S

 AAADI MNYLDTHDESVLME
N LAA QL L S YMMD DT E Q D RL LEA A LA VR R P GVVVGNVSEKWFTFE
 $F P R G V M N K L G N E G R D K I$ EKKLAERKGRFNREFHKSFLAFE T A A E:I N L M K T Q Q E E A V I T A V
 D MHLLS QKARVLVFDGLSTDVVTLALRGAPEELTEAVLSA

 QI ANMAPRDLT LLLAQLAPEVLAPALRGTGAELRKQLLGS





 D I I H M T P R A R T T L










 D I L L G

 DFLELNRENLNKFLSDI HPIVVAVAFRGTEPETRAQLLER E IV V H L A Q K A RVA L L D GL P T DL V T L A L R HAP P DVVA A V L S A
 LI ARVVSPVDVPKI ARVVA QQDLVTAMAFAT DEESEFMLAAN



 DVVLI D D R S L QRL M
H A A R E P R D I A R L V R E V D Q A A L V R A L A A PAPE DA A F I L S N VLGR QREETMDMLVQQQI PLELWATALKGSD■TLQQAI KRS ILASSQAPEVIDLAVAEVPTDMWADALKGTDARMRQVVRER

 DI PRLR PLDAPAAARAADPDMLRTVIAGADDAAVEFLLAN







DLM D L G R E S L N R F L G E TH P V VTA T A FK GTEPETK QVLLER
 D L T QLLS A K D F R HLLF S S MP D E KL A R A L K A DD Q G QR KA MLL S K D
$\square L L F L D D R A D Q K W L R E V D Q M D L A D A L K G L D N E T R E K V F Q N$
 DLLFLEREPLNRFFSSFHPIVLSCALKGTETEI QSRILEK

 HLPRLR PADVPRLL R GVEPRVIAATALAGSAEETAAADFSLL


 D I D N L D D V Y I R R L I K K F F P L Y E L S E I M K V E K E E F K K K F Y K N GLEELSSKRAVP DVFREMPEEKLLDSLKSAFPEVFEY LLAN $N L V D V D$
$A L E R A P$
ALE R A P R QVVP LLIF RE $\square E \square P$ VLLT A M K Y S S K P M T D Y L L G N



## UniRef90 W4HR71

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UniRef90_UPIO0036EF6B3
UniRef90-S9Q9G0
UniRef90_UPI00016C3502
UniRef90-W5SNH0
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UniRef90-M3JM83
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UniRef90 Q2CHR9
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UniRef90-X0UF49
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UniRef90-S9R5N2
UniRef90-Q1N1L3
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UniRef90_E0THL2

## 

## 47D6267

180
190
200 LS KRVAATLSEEI AERPTPKPKEAEAAQRAVIDAAIRALVN I GARARRMI ESELSMGSEDADADDMQARKTVASATVRLSR
 LS ADKVAA $\square$ AA $\square$ GSRFSPTE

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## L

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Ren

 IGARTRRMVI ESELLSA
 MS S R S K S VLEEE E S E L L G S I A D SVVVR EA Q G TVV LA A V R K GE E


 Q S K RAA S S LK MP QRVVSTELKKENLVR DGAVPVS QVEQARKEVIDDVKQMQS MEPSLVSIVRLLE EDSMGPI SLAEI ETAQNGILEIVFKDSVE L G A R S R R M I EA E LAA A M E GI S A E A I A GARKRUAA TAVVQLA Q


 MS KRMAENI RE EAK ELLGSVKRK DGEAAFGQVI SAMRDLAN


LS QRMADNLREERDGAPK RRAKEDEDAKSEVVAAVRRLEE MPQRMVKALEDDMEARGAVALSRVQKARQDIMQMVRELDE MSRLQEDALTQAMQRLGAI SAARVEATRNEI MAMLRTRAR R P K R E Q QLI L S E L G N T K D L K R A E V E K A R K E L L S E I R K
 IS T R L A D A L R R E E A A E R E K P D A R E N E A A Q N A
 MS A RLLADSLREEVADRDKVK
I S QRMA T GLLRE EI A E R GKVVK PA DAEAAQGRVVAAVREAAD IS S RMAD QYR D DL GTMKPMAPEAVEQVQREFLNVLMGLKR

 CTSER A VTMMLDDE E A S L M M E P L L E K E V CPERYY ITMVVSSEVEMMS DVDEETVNAAK LEVVQVMR QALE

##   <br> I S S RMA DQYR E D LK E DGAVAPSEAET DQREFLTTTLMDMRR $L P$ VKRA GLIAEAMAD』KTTRLDS DDKARRE LGGRALQLAA



## $\square S$ QR LA D Q Y R E QLA K M P A P A E D Q G E K A Q S DVVCRVMEMVE

MS A S Q A E A VE VE T E Q LT F E Q T Q $\quad$ A D T A R Q S V V S L V R N F A A $\square S S R L A D Q Y R D G L D D P N R K P V E D A E A T Q R S F G L T M L M S M K R$ MS K R A E QW L

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LTNDS QVLYLIKEEETRDKALVLSQVPAKRAASLVQRLEG
 ML E M
MREEERQQ LLDKETPANDAVLCLHSPAEVTAGVVGSLDA LDDHDDFFLIDFKEHEQDI TVLLI YFSKLISAKLLLLFNF QISNDDLWKMCNDVPAKTI EVLANYDPPDRTAWLLNQLDD



NAVE $\square$ SR $\|$ V S GEKPSMDALI LCFGNPDAAAAVLNDFPE
 MA WAMTCFSAEEAAKWMGRLTL

E LLDLLS S E E A A $\square$ A $\square$ Y H M P $\square E \operatorname{DRARYGKQVTP}$

ETTEDAAVVLPK LDDVTKAAALLDEMPG $M P P Q L R \square D L L Q E \square K P H Q Q A \| V F S Q M D P S D M A N I L K G L P V$

$$
\nabla \mathrm{A} \square \mathrm{R} F \mathrm{~A} \text { P S A } \square \mathrm{R} \mathrm{~S} \mathrm{~A} \mathrm{~A} \square \mathrm{Q} \text { S } \square \mathrm{N} \text { S }
$$

MDAKVAAHADGNMTPKDADPDNF LETTANLFK

lupas_14
lupas_28
jnet
conf
sol25
sol5
SOlO
jhmm
ssm


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REQSAVAYELGEFETLPVSTFKDVADRLAQKSLNVANGLS
 DVKKNFI KTLAKPRQLNVDVI EVI SKIQGKLGTEKLDGSK EKRVKVLAEI SRVEKLPHNVVQAVISEMRMRPEPKVEGAS KKRSIFLIGGIENFIALSKKGLLEFNKILRNLIEKYTK SVK DRDKQVSTDLASWPKTTVESVKEEYKHLDNPDEDNTGGVT $T V Q K D A L S R I G R L N D V P E E A V Q E L A S H L R Q Q R A S Q S T G Q R$ DRTVD VMLGI AQL HTLSYKEHKEISSRGFSKAMD LLQGTE NFSFEVIVKRILNLEEVSKNVVVNLENTLRKDSSREVDNNQ $M A K K L G G V L$
$M A K F Q G G L G$

MENQGS $\square$ F $\square$ NGKA
$\square$ NGKA KMKEE $\square$ L $\square R \square H D \square D \square S S E Y E K N R \square E R F \square E K S F P \square N N P M G K$

DMQATVIQRLVDLGHTDAEVLQD DESR LQQAMSHRR QGLS $E V Q T$ K WLLALLDELSPPEMLPEEDRESWQDFSSLDRQPVR SLSRESLIDRGCIESLDS $\square T Y K S \square G S V I K K K Q Q R V K G L D$ EGF GERMMLDDAVGNEA ERVVT LLKNVSS LKNLNSWEYEK $\square G N E \square R F Y K K Y Q K E D V Q$

PRARKПNFATSQTAGVTPQAVDR\GQSRMAQLDNKPEPED EDSLGUVLTMKD $\$ SVSPSQLQQLADESAKKLPMPFDGLG A QRRELA LGLARQPELSTRYA $\square$ A VADELRAQLAESTGGLA

KKRENK L K G L D
K K G G F S
E $\square Q Q T A Y T T T S E \square Q V V D \square Y E \square S D M L E S D P R D I Y K K \square A N E D$ SKRAAMLLKM TAEA A A A CLKYLSLDDASA HDRDKGLTRMDNFTGLNYFGFTELNK】VCNCSFLEKNR\D
lupas 21
lupas_14
lupas_28
jnet
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sol25
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jhmm
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 $D V L R T P T V I L S N G L R S M N P E I L A L A L D N L D D E Q V A V I L S G$
$S L P E L L P R A V A V F R E L G E E T M V Q L A A S L R E E V S D Y L L G N$ SLPEVLPREVSVVFRELGDERLLASGLRTSGGEVTDYLLSN




DLAKLTLKMKVDLLKR SSLDDLALSLKVHPSSLQDKDMEG DLRYISPKMLVEELRAVDLKKL GHALKK YPEDVRNHLYMR


 DL L Y ${ }^{L}$ E R EP L KLKALEDFELQR\|LREFNKDMLG凹AF LGAPMPTVLRFFDN ELQGMRDRDLQEVLRREGLH $\qquad$ PSLLFGTSEELCAKLLRN RLRYLTTDMKRQFLLDVNHDLLAASLRLSSKELILDLLSE


 DI PRI A AVDVATAVKTVAQTDMV DLESI DDAFVGRVMERFERSRLPYLLLDSHSSVTEKTMKE RLKLLGEDDI RVLLHSVDKD VWSLALLRGASSHTARSILDC $T L V N A P V E V L G A A L L R L P A A Q V V T Y L S G A E G S L R E Q L L N A$


 DIVFVDNATLKQAFTRLGYHKLS ILMSVAEDEARKKIISN



UniRef90_K2D541 UniRef90-Q5E14 UniRef90-A8V404 UniRef90-A0A059E6EO UniRef90 A0A059EBP3 UniRef90-V5WLY1 UniRef90-N7M418 UniRef90-R4YK22 UniRef90 T0ZQD7 UniRef90-W6T150 UniRef90-A0A024EY71 UniRef90 F7WYY6 UniRef90-UPI00037DB0EA UniRef90-M5RQW2 UniRef90 UPI00037D7638 UniRef90 B3SF19 UniRef90-TORCD UniRef90-TOR610 UniRef90_T0RU92 UniRef90 TORLP4 UniRef90-Q2W2F6 UniRef90-TOSDPO UniRef90 ${ }^{-}$M3 ${ }^{-1}$ C3 UniRef90-Q2W0P7 UniRef90-A3ZNX3 UniRef90-UPIOOO361FBE UniRef90 тот 3 L6 UniRef90-TOC2H2 UniRef90-H7EMN5 UniRef90 TODNI6 UniRef90- UPIO0047B1388 UniRef90-E1 X2T7 UniRef90 ToSWZ6 UniRef90 U4UXQ7 UniRef90-UPIO0028942EA UniRef90-Q2W6M2 UniRef90 S9P8A6 UniRef90-E1X4R4 UniRef90-TODDP7 UniRef90 UPIOO04679810 UniRef90 W5WX37 UniRef90-LOR9Y5 UniRef90-K8FA16 UniRef90_O058C6
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jnet
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solo
jhmm
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TS RRRKELVLEEESLLKRARKKD $\square K$ AMTMSFVNY TKELT L
 FS E
 $\frac{\square}{R} P K R E Q H L I R M E L Q Q M N Y$ S

LS S S MKQTMD DVFTGPPVLYTKDAEAERRVLDVVLQMHE $V$ VDSMGQEMKEACE QEKIPKSQAQEEHGLI MEVFRRMDD VSKSMADD DRDILDGPKR RQSECEEALAKVLAIFRQMID AQRPYAETAYNVMVSAQNYSAKDVQRAQERIVATLISLSK

$\square S K R A Q K M L L D D M E S F V R \nabla P \square D D \| I S A Q G K V V A Q V S E W M K$ VSRRAASDVAEKREESVAVRQRKVAFAQ V VTDS IDREFLEKLDL PKPASAINKAQDEIVKYI RDKEK

 RPEREQQLI KEMAFRQSTVLSKNSKE ILLSKI LNAIKNKYR LPREYAEKSYHAMKARLNNENDS DAKAREKKVQM A T LSSR

YTEETRKYYQEQLQ
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 LARK LPPANADQ\|
MS S

| UniRef90_K2D541 | GKEMF $\downarrow$ NR |
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[^0]:    lupas 21
    lupas_14
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