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 ENR HAASKFLLQSPPGEINDVLNDVRNI SDDESL ■SKEEKVQVICRLLSQAPPGEFYSVFEDLCULVQDDDLM
QLSNEEKVYRAAKFIIHAPPGKFNEVFNDVWLPFNNDNLL IVSSFVEGAPPGEVSSGY I KALTDSTPNL TSDATKMEMAADFLKFAPPGEFNEVYNDVATILHNENQM MNADERIEAASSFLLQSPPGETNDVLNDIRTIISDDDSL QVSDEERVQAVSQFLLQSPPGEDNDVLNDVRNIDSDDDSL
ELSEKQRLVILSEYLEGAPPGELADVVADVKSIVSQDPAIV MDSAQRMSAAASFILQSPPGE：NDVISDLRNVVNDDDALL


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F LD P R N KI I F K F D H LR KEAS DPQPEDTESALK QWRDACD S FF D P K N K V S F K F D H L R K E A C DVVR P Q E V E N A L E S WR N A V D S Y L D P R T K Q S F K Y D H L R K EA S DI S S WD GAMVVMES WR S NVV N F L D P R N CLLS F CF D Y L K K E V S DV QP Y D GE DP L K S WR NA I D S F F D P R S K Q S F K Y D H L R K E A S DL Q A WES D SA V E S WR D A L E S

 F LDPRTKQTFKY DHLRRKEAKDFQSGDVDQKAEPWRAALET
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 YYDPRRQRDSFRFDHYKREAMDPQPMESQTDDTAAALRASSLDE $F$ LID P R S K T T F IRF D H L R LIE A S D P Q P FA A D E S S E E F R S A L E T
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 $Y$ LDPKSHQAFRFDHMNRRATEVEPRPPVEETEPR RTAMVA

 Y Y DVVE S S S S F DF D HATTQK A S GVVQS Y VLDEGQ Q A D L V K S T L K


 $F$ F D P R S K T S F LIF D H L G L D A A S D P Q P H E P N A E S E E F R S A L E T
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 K F N K E T K DS F K F D H L Q K E A S N T Q P E K V D G D L K S W I E S C D N
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 $F$ L D P R T K T S F V V F D H L T L L T A S E P E P V E V V D A E S E P F R S A L E E FCDVESSSSSFAFDHLNQKASNVQSWTLESSQNADLIMKSLVK

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NF WN GRWRSEWKFTDT P P TA QVAAVLKDQVHYYEDGNVQL

 $N$ Y WN GRWRS QWCATLTGGTGELQGTLRVQVHYYEDGNVQL
 NFWNGRWRSQWN I QFD G GSAEELKGIL K L Q V H Y Y E D G N V Q L N Y WN GRWR S V WS L TVGG P A T E L L R G T L
 NFWN GR WR S Q WY I TLLN GS S A E L R G V L K V Q V
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 QRKE IAK WFLLNAPAGE IVQYVAKDLKSVLNDDDVY


VTPEEKATपCSRLVLLAPPCEFNEVLDDVRRDTGDDPQU QLTDDQK DE TAKWFLLNAPAGETQYVAKDVRATLKDENTY

KEATVASFI ESAPPGELADVVNDIKALASSQPNL MSDEEKREDVWFLSNAPAGETHYVAKDVRALLGDEAVY


$E L S G E Q K K E \prod A K W F L L H S P G G E \prod Q Y V A K D V R S V L D D D G A Y$ MS DAD $\| V$ S S VVEAPPGELASVIDADI ESLTDSKPRD
 ELGDDQKVSI GKWFLLNAPPGQVLQVAKDVRELLTDSQLY
 EVT DK QK V D


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TSDQEKVR VSDF LLAPPGEFNEVFNDVRLLLNNDTLL QLSTDETLRVVRHFLESSPPGQFEDVLFDVRDLVSNDQLL DDEKLRUAQHFLLSSPPGQDHDVLRDVAKLVPARVLT
 SESEKTK VTTFTKDSPPGEFNNVLKDCREVVGDDSIF VSDDEKLNANHLLLSAPPGEIRDVAKDVTKLLPAGLLS
$L E\|A S S F\| R G A P P G E L S D V V A D \| K A L T P D G P A \frac{L}{M}$
TSAEQVRSVLRTFLLSSPPGQTHEVIKELKELVPQHFLS LSRKEKERVIHRLLI QAPPGEFVNAFDDLCLLI RDEKLM SDAEKLAVAKGFLLASPPGEVREVAKDVTKLVPRGLLS ISVEDKVKIASSFLLSSPPGEVNDVFNDVRTLVNNDEAL EAKQVRIAAKFI HAPPGEFNEVFN

MSSQET
$\square V A S F L K D S P P G E F N N V L K D C K Q L V E N D D I F$
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HEAASEAFPQ ${ }^{50}$ YNKSHMIICII ${ }^{60}$ EMPGRVGDVI ${ }^{70}$ TTPFNELLEENE ${ }^{80}$ DPSLLPAFKRYNETQLATVKLPGSSQEVVVSGFNELEDNR CEEAPSLCAMYNKDHFTPVQT GKKCEVLLTGHNELEENY QQGDDQALREYNDAQFVTVQSPKGDHHVIISDAGRVGEDR EMAAAEAFPLHNKAHLLALEMPDRSGDVLITTYGELDKDN NEAASEAFPLYNKSHLICLELPNRSGDVLVTSYNELEENE NEAVSEAFPVYNKSHMUCLEMPGRFGDVLVTSYGELQDNE QEKLAASVAQYNKDQMDHVKLPNCEYPTLITAYADGGNG DNSLEPAFRSYNETQLTTTKLAGSSQEVIVSSYNRLEDGR RQEAARIVAWHNKSNFTP自VNG HTVLLTHYNDLGGNR EMAVSEAFPLYNKTHMDCLEMPNRSGEVLITAFGELDGSH RQEVAQVCAHHNKNNFTTVRIEGR NILVTRYNDLGGNR DNELGPAFQKYNEEQFTTVKLPGSSQHVIISSHNSLGGSR
 QKK LAAS $\square$ AQYNKDQM $\square H \nabla K L P D C E Y P T L I T A Y S D L G N G Y$ KKAAEESFPSYNKSHTGGEFPNRFKVLITEHGDLGNGK KKAALESAFKKYNEGQYTTAKDPGSSDSVIVSEHNVUAGD
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 GEAASEAFPAYNKAQMDCLDMPRGMGEVLITSFGEDEENQ TDDLAPAFAKYNEDQFTTVQLPGSSQPAMVSVDSRVDPSR FEELVPCLARYNKEQFTNIVIPRGSENETIUSQYNGEDGR DRAASEAFPEYNVRSMISLEMPDGSGKVLLTKFGELDRSH REGAPHDFAQFNLDPFTLVKDEGYDDQVLITESDDLVHSR ADKLKPAFQRYNEEQLVAVKLPGSNDYVLISKYNKIPSSS DDAAAYEKYNEDQFVTVQLPGGGAKEIVSEWSRLGGGR DDKDKPAFQKYNEEHLIAVKLPSGSQHVLISPHNRLSPTS RQQGEWAGNKYCKKYFVPLNIDGGHVLLAHHNELGDQR LNSLEPAFKRYNEEQYTTVKLPGSSEATIISQYNSLGDGR LASLEPAFAQYNEEQYMTVTLPGSSSNDPLTPYNALCDGR
 KHEAAQVCANHSKKNFTAGNUKGDS VLVTKHNDMGGNR KEGASSAFAQYNKDQLTPVDLEGSDSKALITHYNDLGNT NTGAFD DFRTYNVEQLTPVEVPEKSYKVILSKYNEISPDT DSALRGALRAYNVANTLPIDVPDADYRMLICEEGEVDATH NEAASEAFPLYNKSHLIVLSMPGRSGDVLVTSFGELEDNA QECLPGCLLHDYNTEQLTVVMMDGTNPVIVSKYTEQSAQE
$R N S T A Q A M S T Y N D Q M T V T L P S G A K S V T R F N V E G D N V$ DAKLRSAMHAYNTKNCVGVMAPEGTHRVITCKEGEVDPTH DSSLAPAFEKYNEEQLATVKLPGGSEEVIVSSYNKLDGNR CQEAASLCALHNKDYFTPVM RKECEVLLTRHNELEEKH HHQGECAGHQHCQKYCVPLCIDG NQVLLSHHNVMGDYR DTAGRGMMHTYNVENCLPMQLPNEEKRLVICQEGEVDASH PPKVSKHVETYNTNQFTPVELDNGKGVLITEHGDLGNGK
 RQEAAC MGXHNK N $\square$ AP $\square Q \square$ RHS $V L L T H C N S G G D N R$

SDY LKT LFEHYHHTNYFAVATPNQDHKLLTCQESQDDEKH KNAILEAVEQYNTNNTDPVDVEGK QVILSQFNKEG SK REGAAHAFAQYNMDQFTPIV|KILENSEESVLITEHGDLGQGR
Unequpozabs

## UniRef90 UPI0002B4B0F5 UniRef90_K9FQJ7 UniRef90_V8NV64 UniRef90-G4T922 UniRef90_M0RRF3 UniRef90-B91713 UniRef90_UPI00042B9502 UniRef90 UPI00038BEFBF UniRef90_G4LVU9 UniRef90-C5PGK7 UniRef90_UPIO003831CF6 UniRef90 W1P5I9 UniRef90_UPI0003C26690 UniRef90-G0SA92 UniRef90_UPI0001DEA912

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UniRef90 J4G068 UniRef90_V4M3S1 UniRef90-G1KU75
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UniRef90-FOWHF7 UniRef90_H0W7H2 UniRef90-A0A024U682 UniRef90-I1BRB0 UniRef90_UPI00033389FE UniRef90-A0A024J877 UniRef90-K1X315 UniRef90-S0B4E9 UniRef90-K2RRH2 UniRef90_UPIO003871B11 UniRef90-V91D06 UniRef90_A0A024GT45 UniRef90-S6EHW7 UniRef90_W5JXI0

 ALKFYVDNHYPDGLCSVVFIKDTAMRT IVFVAC|ESHRYKPT ELSKYVGETYPKGVCAVYCVSPGADFEFVVVI SAVKHSPQ EMLKYVAEAYPKGICSVYCVDPGSNFELVVVISAAKNSPQ EMSKYVGEAYPKGFCSVYCTNPGSDFELVVVISAARLSPQ A $\square$ RAYVKD YSKGFCTVYAKTDDGQQTIMACIKRHQFQPK SATVYVNEHFPDGAVEVYADRSDGARSLVMCIVSHFYSK
 ALKAYVSSYFPSGDCSVFRKTLKNRQUFVVCIVGHEYKAQ
 AVGNHVKEHFPSLPA GGVYPTDDG EAVKYTNEFYPSGVATVYGQKVSEGYQVTVCDVSSSKFNPN SVSTHAKEHYPSSTYGVYP D DENDSAVAMVVVANRYSPN SFTTSATEHFPSSTDGVFPTSSG I GLNAYVNYHFPVGNCCVFKKSLGKRQMLVACI EAHQYQPS SLSTHSNEHYPSSSLGVYP SGENDGAMVALLVANKYSPN EIIVKYVSEAYPKGVCSVYCTEPGMDFELVVVI CAARHSPQ


 AL RAYVKEHYPNGVCTVYGKKIDGQQTIAACIESHQFQAK QLSTHTSEHYP TSSYA DFPTADASALALLTVANKYSPT QAEKYVKEHYQGGVWKVSNEVEDEEKKFQLYVVGNKYNPG EVQRYVSEAYPKGVSCVKGKDADGPGTDVVII SATKLSPQ

 HLSAHFAEHYPSSPSAYTVCAAPDDSQVAVLI SSDKASPK SLAKHAAEHYPN CSYGVYPTEDDTAVAILLVANRYSPN EALTYSANHYRNGSCSVFGRTSNGQDTLNVCI EDHQFQPK SLATYVKDAHFERPAFGVYPEGPGNDGARAAMLYVANKYSPQ
 ALDKYVDEAFQGGECSVYCTKSGGEFEVTVVISNSSYSPK ALRTYVKNHYSNGFCTVYSE VVGQQKTVIACTESYXFQPK SLSGSFADHYPTAAAYTVCEVPNNTNQIAILLSTTKASPK
 ALGUYAKEHYERPAYGVYALDDERVG
 S FSTASAEHFP SSSI GVYPISSDSAI ALALVANKYSPK A LD A A A AEHFPSSAlGVVYA DDDAAVALVLVANKYSPQ ALTGYMSQNFPNGAVSVFAPADSKNPSIVIVVESSFQQ




 E I K Y V E EAYPK GVCSVYCVNPGSDFELAIVVISAARHSPQ


 A
E LDS YMSAQFGNGAAAVFAT NSTDT LILLSTERVSDR EALKYVDDHYPNGVCTVHAT ENNEIAIAIVDNKYNPN ALRAYVKEHYPNGVCTVSHQHTPSHASDTGCLRSPEDHDR

 ALTAHAAEHYPAAALGVYP TESDSKLAIVLVSNKYSPN CLKAYVACHVPLAGCCVVNKDLXKRQQLVACSAAHQYPPS



## UniRef90 UPI0002B4B0F5 UniRef90_K9FQJ7 UniRef90-V8NV64 UniRef90-M0RRF3 UniRef90-B91713 UniRef90_UPI00042B9502 UniRef90-G4LVU9

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NFCNGSWR 170
180
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200
(TVNIEFDF QSLEI K GKMQ|VGAHYFEEGNVQ|L NF WN GRFRA AY Q FPVSSSSSTVTGNDHVDVHYYED GNVALL AF WN G L W K S E WT F A L A P A A S T Q V T G V I M I Q A H Y Y F E D G N M H L NFCNG $\square W Q S \square W N$ I EFKDDLVEIVGKI QVGAHYFEE GNVQL
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 N Y WN N H WR S G WK F P I T S S T T Q V V G I L K I Q V H Y Y E D S N V Q L
 NF WN GRWRSEWK F T I T P S T T Q Q V VG I L K I Q V H Y Y E D G N V Q L


 NFCGG
NYWN GRWRSSYワY T N Y WN GRWR S S Y N F WN G Q WK S L Y N Y WN GRWR STTY $\quad$ Y $\quad$ N N Y WN GR WR S T WT ST F
N F WN GR Y RA 1 T $P$ S S G T L T G S I DTS A GTI T G S V K V S P A K C Y L S G Q I



 NFWNGRWRSQYTF NFCNGSWRSVWNMEFK D Q MVVEVRGKF E V V G A H Y F E E E G N V Q


 N F WN GR WR S F Y
 N Y WN GRWRSSY IYT P S


 NF LS GR WR T A L L L
NF WN GRFR S I Y R V P NFWNGRWRS
N F C T G S WR S V WN
NFWNGRWRSRYVF

NFWN GRWRS F Y Q Q F
NFWGGRWKS RWEVDL
NFRGGCWQSVWGVLI
XGCXRS
NF L
NF C GRWRSVF LTY DTT D S $\begin{array}{llllllllllll}P & C & T & I & G & T & H & V & D & V & H & Y \\ S & Y & E & T & L & A & G & K & V & D & V & H \\ Y & Y & E\end{array}$

NF WT G S WQS SWTMLG
 DPASGTVEGSIRVDVHYYEDGNVRL
NFLSGRWRSTFLY D P
NMWNGRWRS NFWNGRWRSTY $\begin{aligned} & \text { NYT }\end{aligned}$

T F P P LT QVIG S YVK A H F F K HIIN F HLL $S F R S G R W R S Q W T L T\|E G A D C Q G S G E\| R\|Q T H\| F E E G N V Q L$
 K F WN ILWKS




 NF WN GR WR SE WU, TV N Y WS GRWK S

NGRYRADYTVPAA


 F F WN GR WR S E WK F T IT P S T T QV VG I L I I N F WN GR WR S WY L L D P A S G R I S G Sil E I D V H Y F E D G N V R L




NFW

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UniRef9 UniRef90-HoW7H2 UniRef90-A0A024U682 UniRef90-11BRB0

DAKHECNDSTVLQAPEDCAAATANUI RHHEAEYLVISLET ${ }^{2240}$ NATKPDNDSIPSVS AESUVSRVAAAERDYQETLNRA TAVKEAEETLLVTDEAQTAKDFAKLVEKMENETQSKIMEE TTEFTPTDTLPPSSPSQAARQLDAQITEQENTYQTSLSDT DAKLECKDSTIFQSPEDSAVSITNTVRHHETEYLASLEAS DAKHECKDATHEQAPDDCAIVSHANIIRHHEAEYLESLEAS VAHKDVQDLVTVSNEVQTAKEFIQUI ERAENEYQTAAISEN
 TVSKSVSDTLHMDDQSQFATDFVRFLKAEDTRFHTALLED TVSKTTEEVLHVIDQAQLAMDEVKLIKAEDNEFQVALEASN LTSKPVTASVSVNATGAATVKEISAVEKKYQEELNRS VSSKDVKESLALISNEKQTAKDLI RFVEESENDYQTATSSEN ISSKEIVEVASGSFPKEFANESIKRIKAADCAYQUAVGEN VSHKDUQDSLTVSN GFHSFYLLXTSDYYFLQTAISEN STSKK
 LTNKKVDVTV GSGASA LTTKEV SVGAGSGA TGP LTSRPVSDSISHDSTE VTEKAVSENLRSSTSAG
 STTKPVSLSLLSNS
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VSHKDIQDSLTVS
NNKKPVSDSIPSASPAET VVKRTATAEREHQEELNDA LTNKDVSLSGVAE KDVVRRIADVEKKYQEDLNRA
SSS STTHTVELNPLPST
DAKNEFHDSTIFQSADDCADVPSSAASSASKVLAVIEV
 TATDSVGHSMYLDNRAQFALDFEKLIEREHSKFQTGLVES NSTQDYSVSITASDPSTLAATVIKHI SKLEAEYQTTLNDQ STKKDF SNVAVDGGSGGDSVVRKI AA
 DTKHECKDSTIIFQSPEDCADSIASIICHHETEYLGSLEAS LTDKPQSATVAGGGSGSGSGSLAREIASLEKAYQEELNKK QSSKEVEEEVATQRPNGDGDAI LRVMKEAEDDLQTNLEDM QSSRAFNDTVLLQDGKDAGTVIVNSIEHEESVFLSNLEEQ
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QTATSEN
KTRKET GVVDAKSPLVVVNRTAQAESKYQEDVNRA LTTKPVSASDPSASAAAD DVVVEITVAEKKYQEEVNKG HTDVKKKATANASGDDQTAQSVISEIKKIEEEQFQTELVKD AVSKAVSETLNVIDAQSLI A T DFVKKFVKDKDTKFHGAI LK N VSSKEVKESLPUSSEKQTAKELURLVEEESENDYQTALUEN



FNRLSEGAFKGLRRQLPTTRQKVEWEKD FGALSEGAFKGLRRQLPI TRQKI DWDKISG
 Y S K LP P NTFKKDLRRKLPVTRTMFPWQNTL



 YTNLPDNTFK
F LSLSEGAFKSGRRQDPVTRQKDEWDKVAS FHGLNDHDFKSLRRQLPMTKQKINWENISS Y $\square$ NMSEETFKEMRRVMPVTQTKMEWS




 F G T L A E G S F K S L R R Q


 YQMMSDTTFKALRRQLPITRTKIDWNK VVS
CAN $\square N E T F K S \square R R P D P M T K T \square F D$
Y TNMSQETFKEMRRVMPDTQTKMEWN YLN LLPDSTFKDLRRKLPVTRTLFPWHNTL FATLSDNCLKALRRQLPI SRQKINW HSQLGDTTFKALRRALDI TRNRVDWEK Y $\square$ N MS E ETFKEMRRVMPVTQTKMEWS F SRLSSEGAFKGLRRQLPI TRQKVEWEKV YQRMSNTHLKAFRRQLDITHSTIDWGKIVT Y I NMSHESFKEMRRIMPVTQTKMDW


YQTMSDTTFKA LRRQLPVTRTK DDWNK ULS FVGLINENEFKALRRQLPVTRSKMNWGKAIG FNNLSEGAFKGLRRQLPITRQKDEWDKDAG FDTLSENCLKALRRQLPMSKQKI NWQN



$F T E D N E K Q F K Q L R R K L D V T R S K D N W G K A \square S$
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UniRef90-G0QST0 UniRef90-W5B221 UniRef90_UPIO004560BA2 UniRef90_W9R3V8



EASDEEK LQQ $\square$ AQRFLLAS
$D \square 1$ T QLLF DAPPRE $\square$ NS VY D S
D $1 \begin{array}{lllll}\mathrm{A} & \mathrm{K} & \mathrm{L} & \mathrm{V} & \mathrm{P} \\ & \mathrm{V} & \mathrm{S} & \mathrm{S} & \mathrm{S}\end{array}$
$\qquad$
MS SHEK E I L N S F L L Q S P P CE Y VE L VK D LK S IVS D HKA E A T D E E NLLQLA Q R F L L A S P P G Q A H E MSEFEK IVRDLVFDSPPEEISLVYDNLQVLDSDGQS

 |  | $V$ | $V$ | $S$ | $G$ | $D$ | $H$ | $P$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $V$ | $T$ | $T$ |  |  |  |  |  |
| $R$ | $L$ | $L$ | $L$ | $N$ | $N$ | $D$ | $N$ | $R$ VS D E E K V $\operatorname{R}$ R I A A K F $\quad$ ST H A P P G E F


 $M S K$ F E
V S D P E

K E A I Y K L



S IVAASMID DAPPGNNLNLINDIMULLNKEDS
 DII V S S L V I V S S S L V K S S S P P G E L D Gll S Q D L S A I L S S K S N
E S L V S S L V K S V P P G E L K GAAK D D L S T L S D D D N R L S L V


 E K K N N F I V
 EKKKF DRHVLSNAPPGKVFDLISNLKTIIFGSNAI

$V L S L L T Q S P P G Q T S Q V Y H D L R G \| L!D D A K L$

 ME IAS SFI RGAPPGEV

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




 Q LS E T Q K K E $\square \mathrm{A}$ K WFLL L S P P G E F Q Y V S K
50
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D TVLECDESRNVKTVTR|V|F|IPELDQFSLV|SEFNKDERAK REGAAHAFAQYNLDQFTPVKI EGYEDQVLITEHGDLGNGK


 KEGAAHVFA QYNMEQFI LAKMIDGFDDKA KHGVLRNGR


 LS KLLE T DVVHNK LLDQCMVVSLGMKSKSLVSKYNQLSKD T $\bar{V} S K L A P A F E R Y N E E Q F T T V K D P G G S Q K V I V S A H N S S L G D G R$
 ECIVPDSIVNYCNTNCLLVETEGKEGGIVLTKYNQVEQNE
 KQQ】AS IIQEFNEKHRVPA AKGEERYLVSEYNKSGGS S
K S I LDDA DEAYNVKNNDP IKVNGES VILSEYNKDGSK

 $\square E R N \backsim L A Y H E Q N N S$ V V T L KLE E GMTHACVLSSHCKDPDNR



 R P M L A G DA R A Y N N A N L R C A R A A D G T L V L L S E R G E L E P T L


 R R I I A ENLLEQFHLK DFKLVKDNGSD FALVSKYNKK GA K

 SSTVNTAIUKY INENSGVFSSTYIASKINKESSTK $\square$ N S S ILE QYiNETGAVVS GAYVASKYNKS GS S K
N
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$H$
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 HESIID QALEKYIINENSSVVF S GYI AS QYNDANS SK
 $P D L L K D E L Q R F N R Q Q F A V V Q H E P F Q H T S I I S E G S E D R E H R$
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 S

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QS A A A VA LLE EYNTQQQVTATWPSNDAAVII CQAGHVPGNR

 Q D GVLPADREYNLE QFTTVDVPGTEHQSVISSAAARIGSER ES F V Q E V T K V Y N ARR Gl
 QSAAA A L E E Y N T Q QL V TA T L P S A E D PVI I C Q A G QVVGV K R





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FWDPVAMCRFAVDHLLHKAVDVEDDVQEKALLNDAQGKTYE FLDPKNRDCFKFDHLRKEATDPRPCEVENAVESWRTSVET FLDPRSKTSFVFDHLTLAASEPEPVEIDAESEPFR YYDTAHSISFRVDHTSQSASDEEQHTVESPHAGTIUSELHK FVDPVNGIQFSVDHRHQKGLDVEEYSADIDADQKKADTD FVDPHNK【SLKFDHL FYDPRSSQSFKYDHLRKEASDYQPHTPDKEWETLRAAMES FYDPANGUSFSVDHENRKGLDVGPYSVMKDTEEQQSLDE YFDPKTSTSFSVDHLNRTGLDVESNDV KLTTSQELVYD Y $\|$ DP $\square G N R \| L G F D H \square K Q Q V V A D D V A E \square P E E R$ YYDVESSSSFAFDHTTQKASAVQSY PYQEKLLES YYDPVNQQI HKDDFYQMKVIESRPFITENDLELLRKNVQQ YVDSUGNRVLGFDHMKQEDVAEDPESMVTDFEKERQAVQK
$Y Y D P R S K Q S F E F D H V K L E A F D R A S C P N A D E L V S R R L S L Q E ~$ HVDSRRGYFFNADRTAQKASAVKTHMDEGPQVDLVTSTLK
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 YLDPRTAQVATVDHUKQKCTKLRPA ADEELPSAYUE
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FGRRTACT

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 RLELYGNNHYPSNYAFTIIPHVDK TVEVVIIGEKVNVE TLQSYGQFEYMHGGTAGVYIV GTKLVVNLCTERINDR $K L K E Y G D K Q Y P S K F A F T V I P S P D D V K$
$E F A E Y C A K Y P T F Y K S V I A D E S D P A V F Y F V I V G Q R L N K E ~$ ALKDYVTQHYPSGVCTVYGKTDDGQRT\|IACIEGHQFEPK QLNDYLSQQFNEKVCGVMYQGDASDYTFYIGITAKTHNDP KLSKYGEDHYP K SKYAFTIIPKEEETHILLVGQRLNS KLTEYGEDHYPSKYAFTIVPDGSDLQ QLEQYGEDHYP SSTYAYTVVPKGDEVFVII GQRLNND QLGDYIDSGSFPGSGTYTVLPADNADELVIIVVSRYSPN AMSRYAADKLPDATVTTYGFVRGGKQRVCRSRAAEASPS KLETYGEDHYPQFAFTVIPGDV VRVIIIGRRLNPD ELEKYTQEHFPDSYKVVLTPFEEG FHVIIVDVRYNDK QLSKYVLNHYHTGVSCAYDKQKEKENNLELWDEANQEQPR SLKAYVKDSYPTGHCQVSVSATNPQSFFTLEVVAEQNNKA KLEEYVQAHYSNCCSSVYATEREGRFNLLLIVCCDRHYCK
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 DLVNGRWRSLY TVEDPASGAVDGS: KVDVHYYEDGNVR TSNHHWRSEWKFTDPPTGQLGVLKIQHHYKDGNVQF NFCTGRWKSVWNVTLNSSNVEVTGSVEVFVHYYEDANIQM NFWGGR

NGHWQSQFAVQFKEDELQI DGWIQLKVHYYEDGNVQL
 KFWNGRWRSEWKFTDTHSTTQVVGILKMUQVHYYEDGNVQL $\stackrel{\mathrm{H}}{\mathrm{N}} \mathrm{N}$
NFWNGEWKSKY自 DSSSNSTEGETDVDVHFYEDGNVSF NFWNGSWRLNATYSTEEKT LKGSVYARVHYYEDGNVWL NF WAGRWRSTYVVDVNARAFSQARIQ QSHYFENGNVQM NYWNGSWRCDCNYNVSE KKLEGRSHIRVHYYEDGNVWL DFWTGNWVSEYDY NAVSDSVSGKVSVDAHYFEDGNVRF NWWSGTWSGRYTVAVGAGSAEVCGAVTVRGHYFENGNVQL NYYNGRWRCVCKY NAEKKKLSGTSF:RVHYYEDGNVWL NFWSGNWRSEWTVVLGDGEALVSGAVKVRAHYFEDGNVQL NYWNGSWKSQYVYDTN NKKLSGDITVQDHYFEDGNVNF NYFSGRWQSVYRVTVSGA VGVGHVNLDVHYYEDGNVR NFYNGRWQSFYK NFYTGQWKSVYSLK ANEKVLEGTHK DUV HFEEGNVRL NFYNGRWQSFYKY NSSTKQLTGEISVKIHYYEDGNVIL NFWNGRCRSEWKFSVSQSTAQLVGVMKIQVHYYEDGNVQL NFFCGSWDSTWELT NFYTGLWKSHYKI K NYYTGQWNSTYVI K NFFTGQWKSTYTI $\qquad$ NS PPLSNYWRSSWTLE
NFYNGKWQSFY
NFWTGRWRSTYKFDVST
NFWTGKWQSEWK VIVDP NFHASSWRSSWNVT
NFYTGKWHSQYQV DMKS S
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 NFWCVR KTQLKGDLKVQAHYYEDGNVQLL SGSVEGEAKLDIHYYEDGNVRL
 NFRTGILLMHFTC AEGNKGSTELKGHFYEKGNCTG NYWTGGWQSEWTVKDKKGPTKLEGRI RLKVHYYEDGNVQL



NLRSGS DK Y DFMNGRYRA 1 YTUPM PSADSVTGT $\mathbb{T}$ HNVHYYEDGNVSL

K पS GS $\square$ QVRAHYFEDGNVQ

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240
GSDVVQLTKEVETQFENEपMTS
TPTFSVPTDLTPSA APK LADSEKEGEHERALGDA QSGKDVSQPNVV DVVSTURDDETSFESDLDDS TTSKKVELSSSGADAVVREDAKAENKYQEED HSSKLVEET NIKDPVASTKELEHK HSSKLVEET NVKDPVASDKEREHKFEQDLQES


KFSKDVEHN
RSNKEVEIIKT
KAEKEVKL
K SKKDVVEITDS
EACEKV
KS SEKVDLGSVSESD

## QS SK DVEEVEI

$\qquad$
VGHKD
AASSAVVSTKNLENEVENEMSAS KDVVKTI QELEKDFEDLDDVS E DA T D V V RNESEKKFSVGCGTKNDFPKNLIKSIA EVEEERLHSQLDVI QSSKDVEEEVTTQHPGSLGDAMLRRMKEAEDELQMNLEDM KSTASLE SAQTDSPIVS
 VSHKDIQDSLTVSNEAGQTAKEFTK IVGATVERKYQEELVKG NSEKSFKE

K S N K K $\square \mathrm{N}$ पS
SVNDAVSALKEVEVEFEKELDSS
D STKDFSSTVENDS GLEQA
FAGCQPDLTLADATDDELPEATFSALHAYEQAYQDRLYET
DASRPTSATVEETS
KSSAPLEE VTVAFTSPKSTSTSPVVSIKRFENNFEKNLIEK

QTSKTCEATVAAASPADLGAAVAAFVEAAETDLQNGLQEM TSKKDIDNVSLDDNENVVDDVDI KKLETDFEKELDVS
 NTGKHIIHET
 NSGTKVSE VS PK
KNVNAFSEGTNVSTASESAKQ VVHTDAK DENKQLAGMDND NFKDEKQVKLTSDD NFEESTSGTLSSSN ASEIVNFINNAENEMTLKIVED
 NF NKAVK E NLSSA AN
NTSEVFD E EVVDVV
D V


K
LDEKDDGESVGGSASDVVNFISNSETKVTGKIIDQ NSHKRLNPT QAQHSMADPDFVSTPESLAKDVIQAIEHHEQVYQAKLFDA QSRHSFEFPDRLKDDRSIASYIVTRVANDEQNYHQQLFKT
 KETKKFTEEVLDFTGSENESQKIVKQUDNDEQSVQTSLESM KTRKVFEKRVSVTNDENFASSI LSSV RECENDVLYDLNHLL
 NNKKPVSDSUPSASPADTA F FKRGVTSEREHQEALNDA
 UniRef90-U1GP53 UniRef90_UPI0002742A1F UniRef90_J9HTV4 UniRef90_KOKRP2 UniRef90_Q5A893 UniRef90_A2FE30
UniRef90 A5DS30 UniRef90-M1CAT8 UniRef90_A2E2L7 UniRef90-X6MD02 UniRef90-C5M4H5 UniRef90_B9FWT8
UniRef90_UPI0003D23F8A UniRet90_UPI0003 UniRef90-V5F3G4 UniRef90_V5F3G4 UniRef90-R4V3R0 UniRef90_C1GRX7 UniRef90 E2LII1 UniRef90-W7TG86 UniRef90-R9P2L3 UniRef90-E6ZKH8 UniRef90-M9LVC4 UniRef90-Q5KLP4
UniRef90 G0QST0 UniRef90-W5B221

NLKKAFP PQKLKTLSAKADVDLICKLETDYQEGLEEM QSKK TSIEIDPKNLVKSIKKIEDDLQDSLNKE KFNES $\square$ NST LQSGNLINNASRIVNFI NEQENATMVKI DEQ QHDGDCNTTCSFGD KTDDE $\square$ SGTL GKSGDASGIVNF INKLENA DELK I IEQ

TQVSEFEDTYQGDDDGAKAEDDVKKDSKFF DKWNNALTQG NSTKNVFE IIRENDPSSTATALINTIRTDENDFQLRLEKF KF DEEISD D DTNDDCKDSTTLQSPEECAVSI TNDI RHHESEYLSSLEES DAKHKCKDTTLIQSPDDSAISLVNIIRHHETEYLASLQTS

T NSAKFSDTVKGNSDQE DANSVKQLLHQFKEKWESSFFNG


H VNKSYPV $\square$ SVS $\square$ RSDTA $\square \square V E C \square K \square A E E T \square S K N \square E A T$

UniRef90 GoV6M8 UniRef90-F8W9N7 UniRef90-L8XOY2 UniRef90 M2NKU1 UniRef90-Q6FN48 UniRef90-A7TLP5 UniRef90 H2VC88 UniRef90-C1C2D3 UniRef90-C5DGK9 UniRef90-J7S415 UniRef90-C5DQL6 UniRef90-H2AUD3 UniRef90 G4Z489 UniRef90-G4N6W5 UniRef90-Q75DS4 UniRef90 G1U7B8 UniRef90-UPIO002C3DFE7 UniRet90-M4B6G0 UniRef90_E5SI64 UniRef90-074232 UniRef90-E9EQWO UniRef90-G5BAA8 UniRef90 I2GZ23 UniRef90 ${ }^{-}$G7Y925 UniRef90-UPIO003337DBC UniRet90_G8BQN9 UniRef90- B6JZ69 UniRef90-M5EIN4 UniRef90_Q10434 UniRet90_W0T7 UniRef90 D7FYI5 UniRef90-S9RGC4 UniRef90_COPF18 UniRef90 FOYJQ7 UniRef90-GOWI28
UniRef90 C4YAU8 UniRef90-12JT15 UniRef90-W2QWI3 UniRef90-G8XZ09 UniRet90_W1 QACs
UniRef90 Q4RII6 UniRef90-AOCLJ6
UniRef90 A5DP73 UniRef90_Q6BNP4 UniRef90- $\mathrm{G3B077}$ UniRef90-A3LXRO UniRef90_G8JPB3 UniRef90 R1FKR8 UniRef90 G3AIZ9 UniRef90-F2QUA9 UniRef90 A8Q512 UniRef90 UPI0003F4A250 UniRef90-A5K974 UniRef90-H8WW85 UniRet90 W7X8T2 UniRef90-C5H5G9 UniRef90-G7KXIG UniRef90 A0A028JM98 UniRef90-W6MID3 UniRef90_M3JA42 UniRef90 UPIO002742A1F UniRef90-JghTV4 UniRet90_KOKRP2 UniRef90 Q5A893 UniRef90-A2FE30 UniRef90_A5DS30 UniRet90 M1CAT8 UniRef90 A2E2L7 UniRef90-X6MD02 UniRet90 C5M4H5 UniRef90-UPIOOO3D23F8A UniRef90-I2G4S8 UniRet90_V5F3G4 UniRef90 V5F3G4 UniRef90-R4V3R0 UniRet90_C1GRX7 UniRe990 E2LII UniRet90-W7TG86 UniRef90-R9P2L3 UniRet90_E6ZKH8 UniRef90-M9LVC4 UniRef90-Q5KLP4 UniRef90_GOQSTO UniRef90 W5B221 UniRef90-UPIO004560BA2 UniRef90_W9R3V8

FTDLNEKQFKNDRRRपPTTRSKVNGKATG
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DQAMSD TFKALRRRLSVTH
FSNLNEKEFKLLRRRDPVTRKTNWGKGTG FSELNEKKFKTLRRRLPITRSKVNWGKAI G FDDLNEKQFKSLRRRLPITRSKVSWGKAI G FTELNEKQFKQLRRRLPITRSRVNWGKAI G FTDLNEKOKVLRRKLPTTSKVSWGKA G FNGLNEDSFKALRRQLPVTRSKINWGKSUS YПNMSEETFKEMRRVMPVTQTKMEWS FTDLSEGAFKGLRRQLPVTRQKDEWDKVAS FSKLNQTQFAKLRRKLPVTRSKVNWGKAIS FSTMNDTTFKSLRRQLPVSREKDNW YTNMSEETFKEMRRVMPVTQTKMEWS R RLMSEFNFKGLRRQLPVTRSKMDWSKMVS

 VLPPHHPHFRATEGEL

YDNMSAETFKAMRRVMPTTRTKMKWN
FTNLNEKQFKSLRRRLPITRSKVNWGKADG FNTLNQNSFKNLRRLLPVTKSKI NWGKAIG FVALNEHQFKNLRRQLPINRSKVQWGKSU YINMSEETFKEMRRVMPVTQTKMEWS FNDLNQRSFKNLRRLLPVTRSKINWGKATG FANLNEDLLKNLRRQLPINRSKVRWGDA!G
YNSMPDFFFKAMRRPLPTTGTKMNWN
FNELNHKQFKSLRRLLPVTRSKVNWGKATG
FNELNQKYFKNLRRLLPVTRSKINWGQAIG FNELNQRYFKNLRRLLPVTRSKI HWGNA: G FNDLNQKYFKNLIRRLLPVTRSKINWGSA:G YTTLSESVLNALRRRLPITRVKFDWDN FNDLNQQQFKNLRRLLPITRSKDNWGNAG FNNLNEGVFRNLRRQLPINRSKVQWGKSIG MCTLDQDSLKRLRRVLPASGSKIDWDQVQS LLA DKELIKNTRKI PFNGDKFDW FQHLNQQSFKNDRRLLPVTRSK DNWGSA $\square G$ YERMSDQFFKNMRRILPVTNMKMSWD IANTSSDLIKNTRKIIPLNGDKFYW Y Libp S TFKDGRRKLPVTRTLFPWHNTL YQTMSDTTFKAMRRQLPITRTKIDWSKएVS FNRLLAEGAFKGLRRQLPITRQKVEWEKI


YNEVSEKLLKGMRRDLPVTRKFDWNR F LKL NELIFKQLRRQLPITRSKMNWGKATG


FELLNSEGDNK【RRRपP $\square$ NAQK $\square$ NWQQE $\square$
YVQMHDSTFKNMRR
FNNLNQQSFKNLRRLLPVTRSKTNWGSATG
YMNLSDATFKDLRRKLPVTRTLFPWHNTL Y LKKPDTTFKDLRRKLPVSRTLFPWHN

TEDLNEEGDNVLRRKDPTNKTKVNW FSRLSEGAFKGLRRQLPITRQKVEWEKV
CQELSTEGLHS LRRK【PVKVKMNS

YENMSDKFFKGMRR $\square$ LPTNQKMNWDQTV

UniRef90_M7WYY1
UniRef90-Q4XEF0 UniRef90-W7FJV7 UniRef90-F0XVA3 UniRef90_U5H7X2 UniRef90-W7FUV1 UniRef90 UPI000273A7B0 UniRef90-B7FXZ8 UniRef90-Q4YWQ5 UniRef90-B6AGD5 UniRef90-A0A024WKC4 UniRef90-Q4DHJ6 UniRef90_W4IVI1 UniRef90_A0A024VCG6
 EKKNF $\square$ R H VLMNSPPGK $\square$ Y D $L V K D \square N \square L L G S S V S \square$ S LQ D R LQAASEFLLQSPPGEVNDVFSDVRLLVSDDNAL


EKKNF $\square$ RHVLMNSPPGK LYYDVKD DN $\square L L G S S V S \square$


UniRef90_M7WYY1
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UniRef90-B7FXZ8
UniRef90-Q4YWQ5
UniRef90-B6AGD5
UniRef90-A0A024WKC4
UniRef90_Q4DHJ6
UniRef90-W4IVI1 UniRef90_A0A024VCG6
 QK ILEEVLKDYNEKNYNF ILTDKNEYQUVI TCKKFKVNHLL


$\square$ I CKESKSG N N


lupas 21
lupas_14
lupas_28
jnet conf sol25 sol5 sol0 jhmm
jpssm

UniRef90_M7WYY1
UniRef90-Q4XEF0 UniRef90-W7FJV7 UniRef90-F0XVA3 UniRef90-U5H7X2 UniRef90-W7FUV1 UniRef90-UPIO00273A7B0 UniRef90-B7FXZ8 UniRef90_Q4YWQ5 UniRef90-B6AGD5 UniRef90-A0A024WKC4 UniRef90-Q4DHJ6 UniRef90-W4IVI1 UniRef90_A0A024VCG6

 Y VCPSSQTSYKVNH $\square R \square T A S D P R P F P \square E H E T Q A D R D K V A D$ SPPGKLYDLVKECDK F LINPXNRVYFKSDHDXKEANY LRPCEDENA Y LHPNLK LIAKEDFFEEGATRTCIVPGEAGSNPLVDALQD
 $F$ L LQQQ E DSRYVQACFGEEAEETAMQAERGMSHDMG DVDMFSSNGLSFTNDTNVLETVKELKYPEEDENYRKECDK

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UniRef90_W4IVII
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130
140
150
160

LLLS S Y V|ANHYA S GVVA A V V Y KLVDYVQEHYPNGCSSVYAYNEEDIFYLFFII CCDRSYLK
 LLAKFVKNHYHDAKSEVVVLEDGN KL VDYVQEHYPNGCSSVYAYNEEDDFY LFF I I CCDRSY $\quad$ KK A KA YVKEFNPNG WKEF DKIAEEVAENDYQTF DSENY ELREMQEHYRAKHVSSRFTICLDDENNDVIRTYAEQLDAH KLKEYQDDYYKKCASSVYASECENKYNLGLLICCDRYYGK K




NFHASSWRSSWDVKFTDQEDPDTGTDDVVLTYFEDANTNF NFHASTWRSSWQFFVDNDHVLLSGTI DI SLTYFEDANINF NFYAGGWASTWTAAVDGAGYAVSGSVRVRAHYFEDGNVQL

NFHASTWRSSWQFF VDNDHVLLSGT $\square \mathrm{D} \square \mathrm{S} \square \mathrm{T}$ YFEDAN $\square \mathrm{NF}$ NWATGYWAT $\square W N L T \quad R T G E L S G K A S V H V Y S F E D S N V Q M$ NFHASSWRSSWNVNFADQEUILTGTDDVVLTYFEDANI LL
 NMWSGRWKS $\square F V V E P T K D T S S I K G E T Q V Y A H Y Y E D G N M H L$ N F
NFHASTWRSSWQFF VDNDHVLLSGT $\square \mathrm{D} \square \mathrm{S} \square \mathrm{T}$ YFEDAN $\square \mathrm{NF}$

KTQKVFEKRVSVTNDVEFASS $\square$ LSVIRECENDVLYDLNHF KTSKCFEKKVRVN
QSAKTVEAAKCADVAAVAALVETEGALQRGLEDM KTSKCFEKKVRVNRDVDFSSN $\square L S A \square N E Y E N Y \square L Y D L N N F$ RGSR VFTSVNDPHE HHAKGVVKK $\square$ AE YEKALLEDLSDE RHGKCLKK VYSRENFKKLNFSDEDNFVEESVSKDNEAENNFHDSLKLE KTSKCFEKKVRVNRDVDFSSNDLSAINEYENY ILYDLNNF EVA Q ELDLLTL

K T S K

 YENMSAETFKAMRRVMP I S RQKMK WN

FTN $\square$ NKN $L \square K S T R R \square I P \square S G Q K F D W$ D A VMS S LK Q $\square$ R R $\square$ LP $\square$ T R T R M K W VNKFRDESLTK L R R I VPVNKVPFDWTK FTNDS

YKND $\square \quad \square \mathrm{KSTRR} \mathrm{\square IPLSGQKFDW}$

```
lupas 21
lupas_14
lupas_28
jnet
conf
sol5
sol0
jhmm
```



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jpssm
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