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 RLDE KTIIDATRCGNLARFINHSCDPKAFARIVAVEGG MFRILDENRVIDATLSGGLARYINHSCSPNCVAELVQIDRE $T \mathrm{~L} N G G E V I D D A C A K$ GNLGRFINHSCDPNCRTEKWMVNGE $N \mathrm{~N} D$ FFR\|DKEHIIDAT

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CTNGERCTNSKRENQQHRQGWCRVVFRTEKK
G WG A F L K GWG Liccer

 | G C G | T | A | E |  |
| :--- | :--- | :--- | :--- | :--- |
| G Y G | L | F | T | K |

 GTCPCGDLCSNQQFQKKYAKMKWDRFGRKGFGLRML CNPEYCRAGDRCENQMFEMRKSPMNDRGFGLVCR K CPPSCYNRVGQRGDKF

SGERCGNQDF

CTNRAFATLTARRNKRVGVEVIGTSDRGYGVRSN KCSEDCKNRVVQRGLDEK
$1 \mathrm{G} V \mathrm{E}$ ECNHACSCWRTCKNRVVQNLRTRLQLVKTQMMGWGVKTL

SCCSSNCKCENKCANKSFQLRPDKTEKCGFGLDAE






CRNQR LQRPDLFP H

K R Q Y C QVETFRTLSRGWGLRCV
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NVGAEHCSNREFQLAERTASKNAYVEVFKTPNRGHGIRAS ECNDSCT CQHNCRNRVVQKS QDHFEVFKTGDRGWGLRSW ECGSRCT $\square$ GERCTNKRFQKEYANCQVFRTEKK GFGI QA S

DSEC $\square$ NRRCQNQSFTKRQYTEV E DTFRTLSRGWGLRS I $K$ CPPTCRNR VSQRG $\square K F$

 $P G C G N R N F Q R T K A G G K Y N V G V V V D K T A D R G Y G V R S N$ TCPCGEYCSNQQFQ RRSYAKI SWFCKKGFGLQLK ECNQMCSCNRTCPNRVLQNGRVVKLVVVKKGKKGWAVRAG

CPCS $\quad$ HCKNQRFRKEYAKMEPRHRARGWGLRSL CSEQCKNRVVQRGLQFN LQVFKTDKKGWGLRT L
 $\vee R R S R L B \quad G N G V \mid F A T$ CNSRCSCDLECSNKVLQQGRKYI S DRKTPGKGWGVFAK ECSTNCAC CLLPYSCRNKVVVQLGMDFSTSEKGDGVVEAA

SCKNRVVQNGTRTPLQLVECED QAKGWGVRALL
 KCPPSCYNRVSQHGD KVPDEDFKTNSRGWGVRAD ECNSMCKC DATCPNRVLQKGIQVKIVRTEKKGWAVRAG C S K V C R C S E N C T N R P F E E K K K T CP CGK LCANEDSTQEAPPVALF LTETKGWGVKAT ECGESCRCSNCRNKVTQKKGVRDHFEVFKTGNRGWGLRSW
 CRNKNVQFGRQVEVEIFRAAD GRGWGLRCT $C$ S CPRSCPNRVVQSLDRTQLRQLYRTAAAKGWGVRTM ECGPSCKCPPTCHNRVGQKMKFRLQVFKTKSMGWGVKTL ECGPSCRCPPTCHNRVS QHP K $V Y$ L $A S R V Q \quad G L G L F A A$ $K C S S S C \square N R V S Q H G \square Q F Q S R R \square T V E D V M T E K G W G V R T R$

CGDHCRNRVVQRG $\square Q F$
SGCLNRHECHPDQCENQLFEL RKSPMNERGFGLVCR STECSCSFFPDKCKNRCVQLGCSLPLNKGYGLVRR E C S P L C T C L P S C L L N R VVVQK G R L


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IF LT F Y SFVLVA YRKGDKLKFANHSPDPNCYAKV DMVAGD 1 S D EVMM DATDK GN IAAR IINHSCMPNCFARIMCLSGE MFRDDDAFVVDATRRGSASRFINHSCAPNCTCRUVVCDSG RLDATTI IDATTR GNLARFINHSCDPKAFARSVIVEND YLCDTGVYT DATVYGNPSRFVNHSCEPNAVCERWSVPKT YLMYFDQNMI DDATRGSDARFVNHSCEPNCRMEKWTVAG FMDLNGSEVDAYVKGNLGRFINHSCDPNCRTEKWMVNGE QHSEESGYTTDAAHYGNVGRFMNHSCSPNCEYQQNVIHDCK RLDK DIVDATQTGNLARFINHSCDPKANARIISIDGN YSGQDMETFVDPTYDGNIGRFLNHSCEPNLLMDPVRIDSM TDD KDRTIDAGPKGNYSRFMNHSCQPNCETQKWTVNGD MFRLNENTIDATKWGNVSRFDNHSCEPNCFCKMVSCDQN 1 D ATTGSITARFVNHSCNPNCRMIKWIVSGQ $\stackrel{1}{1} \mathrm{D}$ ATTGSUARFVNHSCNPNCRMEKWTVSGQ M LCEVSSNCVDARFYGNISRFINHH V DFNEGGFTI DAAKCGNVGRFI NHSCSPNLYAQNVLYDHE Y GMG PDQSLIDDGTSGSIARFVNHSCSPNCRMIKWIVSGQ YNDGDCAYTIDAKKYGNISHFINHSCDPNLVFGVWVDDPQ DFNSDNPYTIDAAHFGNIARFINHSCDPNCIWSVWVNCLD KMSNSTTYHVDGKYFGSAMRFVNHSCNPNARCFTVQTHRK YIQMSNGVYI DARHRGGFTRFVNHSCNPNCKAEKWTVGGE YFSLEDGSVIDAKYGGNRARWINHACKPNCEAREKDG MFRLDDQYIVDATRKGNMSRFINHSCDPNCDCRIITCENG MFRLDDNFVVDATRAGNVSRFINHSCEPNCTCRILVCEAG MMEMAPGLIIDARSKGNLARLLNSSCDPNCETQKWDAGNS TLD KDRIIDAGPKGNEARFMNHCCQPNCETQKWTVNGD SDGHDMETFVDPTHDGNVGRFLNHSCEPNLFMVPVR】DSM GLEDKDMYVI DGEFMGGPTKFINHSCDPNCRQYTVSYNRH TLDKN RII DAGPKANMSRFMNHSCQPNCETQKWMVNGD MLTVTKDRIIDAGPKGNYSRFMNHSCNPNCETQKWTVNGD HDGRLMETFVDPMYDGNVGRFLNHSCEPNLVMVPVRVDSM A
 LMRTTNNEVIDPTYVGNFARFINHSCRPNCETRKWTVLGE AIAYDRDEIIDSSSKGNSARFINHSCDPNCVLRKFDTLGD WNDGTOPSGSVARFVNHSCNPNCRMIKWLVSGQ WNYKQLPDIISAKRTGNIARFMNHSCSPNVFWQPVLYDHG ALRSDAIIDATTK GNISRFINHSCDPNAETQKWTVNGE LEDGRC DDGKVDGNNARWINHACSPNCEARE TLD KDRIIDAGPKGNESRFMNHSC YLMDFHQNMI DDATRGSVARFVNHSCD HCIDARLFGNTGRFINHL MFEDSSVYTVDAQNYGDI SRFFNHS YLMYFDQNMI DDATRGSIARFVNHSC EPNCRMEKWTVAG GLDRVTOTFVDPVNGGNVGRFINHSCOPNRTEKWMVNGE LVEGQVNYVIDSTNYGNVSRFINHSCSPNLVNHVESMDSQ T
C QTGQIIETFVDPTNDGNIGRFLNHS FFILSSGRVIDGGDEGNDARWINHS

## $\stackrel{\rightharpoonup}{F}$

A

## A

H

## L

 GSERILVKDCLDATFCGNVAREDNHRCDANLIVEVVTPDRH $\square M E L D K N V Y L D G R V K G S D S R F I N H S C D P N C H L L K W E V G E Y$ GLEDKDLYVVDGEFMGGPTKFINHSCDPNCRQYTVSYNRH TID K K DII DAGPKGNYSRFMNHSCQPNCETQKWTVNGD$\qquad$
 $\stackrel{\mathrm{E}}{\mathrm{V}}$ DEEEE E GYT I DAAKCGNVGRFINHSCSPNMHAQDVLWDRR MFR $\square$ DSEHVVDATRTGGLARYINHSCAPNCVAEVVTFER G F


 DFFIDSAE ENCDGRKYGSITRRFMNHSCRPNCRMFPVSQYRN $M L T$ LTKDRVIDA GPK GNYSRFMNHSCSPNCETQKWTVNGD LFDLTEDSVVDATRKGNKSKFANHSMKPKCFARIIMFVNGBD



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CYCGT
C Y C G A Q

C Y C G S

CHCGAK

C Y C G T K

Y F R C Q

CHCGSK

C Y CATK

E A K A

C F C G S

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AFQC
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C

C $\square \mathrm{CGS}$

E Y E CR
CYCGAK

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SAGCQN $C^{10} D|L| Q R G$
20 LL 30
30
RHKALLLGQSQLEGVGYGLLFTA
KEEGMEVGQ IDGKGRGVKAT D S Q C L L N R M L Q A GD R C E N Q CF S K R L S K TE G C G WG L R T N
 KRVRIS DRGYGR S N SK TVLL GK S QLE GCGYGLTTA
 CSKNCRCSGLCTNKPFCKDK KI K V VK THQCGWGAVAL ECGESCSCPPSCRGRDSQGLKDHLEVFKTDNRGWGLRSW CGGRNCLDNNIL QTR KF PK TVVVRLTEAK GHGLGAT$C$ G N RVVQQRGIMCK
CPSGERCCNQDF

$E \mathrm{~V} R \mathrm{NGNCRNDSLQQGFK}$
E GK G WG
 CSDNCPCPNTCRNRLPD G DQI IVVKLVRAPQLGWALLHTR RRIVARRSPI $\begin{aligned} & H \\ & D \\ & \text { G K }\end{aligned}$

R S R $G R G \vee \stackrel{F}{1}$

C GPDCGNRVVQRG】QY
DCKNRVVQHGRKY CPPECMNRVIQRGRAKETK ETK D D RKTERHKGWGVVKAR ECGPSCKCP PLCYNRVSQHKFQLEIFKTESRGWGVRS L

 Q $K C D S S C P N R V V Q D G Q N S T M Q F C I F R T S N$ K CPPSCKNRVSQHGPRY C S LQ C G N R V A Q K G A T Y P $\square E \square V R$

## HLEVF

 TTE


S G V

LVKKS GVH | $V$ | $K$ | $K$ | $S$ | $T$ | $L$ |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $V$ | $H$ |  |  |  |  |
| $V$ | $P$ | $S$ | $K$ | $L$ | $H$ |
| $H$ |  |  |  |  |  |

Q CNNFRLR L $N$ QK R R V LV GR SVV Q QSCCV K Q TK I E | V | $R$ | $K$ | $S$ | $P$ |
| :--- | :--- | :--- | :--- | :--- |

0 40

[^0]
 D R
R S S I V V K S S P I H

 $N G R G$

 ECHESCACSKNC $\quad$ N R IVVERKVPLLEDFRTSGRGWGVFAA ECNSSCTCDSSCQNKVLQKLLVKLELFRTENKGWGVRSS


SCKNR VIQTGGLKS
RCPPTCHNRVSQHGP
$\qquad$
$\nabla Y$ L A R S R L Q G L G L Y A A
$R L E V F K T R N R G W G L R S W$
$K \operatorname{V} P \mathrm{P}$ S K G F GL K T L K K G L G L K T

 MTKLSKTPASSDKFLVRNSPVH

K GRGVIAT
ECTAALCACSKHCWNRVVERGRVGLNDFDTGVRGFGGRSP
 $P R S$ QR GLK
$K Q C G N R V V Q R G \square S C K F Q L G F T S D$
$E \square R T G R C R N N R \| Q L G L P A P T T R R A P S Q Q$
D H GLGGL F T T NMKPAEGPFRIGRSEGGYGYR $P A E G V V D R A K \square H K G G W G F A T$ ECNSSCSCDSETCKN
 K K R K K P VKFA RSA IH N $\square$ IENVFD SRRAHKKVGIAFSSVH WGLYAM
 ECNSRCQCPNR\|VQKGTQYS LC $\square$ R RTSN

TEEKGGRGGVKTA
CGCG PNCGNKVSQKALRLEVFRTPNKGWGVRTW


SKCGCMKKCGNRVVQQGHNK LQVFFTPGRGWGLRTL ECGEDCVCPNDCKNRLVQN LK LHMEVFKT INRGWGLRSW
$Q C G N R V V Q R G D A C N L Q V F F T Q \quad E G K G W G L R T L$ $K C D P S V C L N R L I Q K G P R K K L K I F \quad D S D L F L S G K G L T T$ ECSSRCPNGDYCSNRRFQKQHADVEVILTEKKGWGLRAA

$D$ VS D DTCANRVVERG
 CNKHCGNRVVQRG $\square$ T CK R R I P L
Q Q $\quad \mathrm{D} F \mathrm{~F}$ R T E D T


K C G D S C A C L L E C K L R RT Q N Y K $\square R$ V E V F K T E K C G W G L R S L ECNE LCGCPPECMNRVIQRGRARI EI FKTKEKGWGI RA R



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| :---: | :---: |
| UniRef90 V9KR14 |  |
| UniRef90-UPI0003B37942 | M $\square_{\text {T }}^{\text {L }}$ |
| UniRef90-E9FAN1 | YLMSFDQNMI DDategs |
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| UniRef90-L11Wh | Dati RHNIGHYINHCCDPN |
| UniRef90-M7SFW0 | LFTLLEQWVDAAIYGNLSRYINH |
| UniRef90 K3YXR0 | MCEISKDFTI DATFKGNVSRFLNHSCEPNCKLEKWQVSGE |
| UniRef90 S8EA43 | SPPPFPVVISGKRWGNVARFMNHSCFPNVAWKPVLAEGW |
| UniRef90-V6LAI4 | A QLTAKKY।DASKTGSKMRFTN |
| UniRef90-B9GI | CVNDEEALCLDATFYGN |
| UniRef90-O4S66 |  |
| UniRef90 A4SU | YFSLEDGRVIDAKYGG |
| UniRef90 A7EBU3 | WVIDATRMG |
| UPIO0047E9 | NDEYLIDANRKGNTARWINHSCDPNCQA |
| $\begin{aligned} & \text { UniRef90 E4XHU8 } \\ & \text { UniRef90 } \\ & \hline \end{aligned}$ | I |
| UniF | dagrfan ${ }^{\text {d }}$ HFVNH |
| UniRef90-L1L | MPCID |
| A0 |  |
|  |  |
| C15 | PVNGYVVAARCGNDSHFVNHSCDPNLVYNVFIEGSD |
| UniRet90-W5KJS | VDDVY |
| iRet90-F6YD | DSENPLTVDATRYGNDSHFVNHSCSPNLVY |
| W4K5 | DWQNKYCVDAYH |
| UniRef90 UPIO003F49D4B | ADFCYSAYSVDAFHYGNFTRFFNHSCDPNA |
| UniRet90-U5GIP2 |  |
| UniRef90-S4RFG0 | DF CKDDYTVDATFYGNISHFVNHSCEPNLVYS |
| UniRef90-V5HWT9 | DDSDDNFYTVDAGKCGNVSHFVNHSCDSNMVYSVWUNNRQ |
| UniRet90_A0A022PI | GLKDEEALCLDTTYYGNIARFINHRCDPN |
| 9, ${ }^{\text {Nal8 }}$ | EGMWVDAALYGNLSRYINHASEKN |
|  | CPYTVDAAKYGNIAHEINHSCDPN |
| UniRet | EIPKRNGFTLDALRYGNVGRFINHSCSPNLYANVMYYHGD |
| UniRef90 A0A016TXA8 |  |
| Q07 | QYLSKTYCVDA |
| UniRef90_B3LVF3 | KHKNQQYCIDATVDTGKLGRLINHSRAGNLIMT |
| UniRef90-F4GMT1 | FFSLSCGKII DGGQRGNDARWINHACAPNCES |
|  | GKIVDGGQGGNDSRWIN |
| UniRef90-A0A059LE42 | KHVIDARRCGNNDRFANHSTNTNCRVNILLVDGD |
|  | A |
| UP100047A8 |  |
| UniRet90_W0 | FFSTSSGKNNGGDGGNDSRWINHGCDPNCETQ EEGSG |
| UniRef90_L8FYF4 | DPDSIDEREVDGEFMAGPTRFINHSCDPNLRDFARVGDHH |
| UniRef90 C5Y097 | Y |
|  | CMNMNENEIIDATWMGNIARFI NHSCAPNARTQTWDVNGQ |
| UniRef90_W5MEX | YFQYKTYCVDATKETSRFGRLINHSKNGNCQTKLHDINGIL |
| 90-UP0035 | MFRLS |
| Q9C5 |  |
| 矿 | DDDDDDDY |
| TOS |  |
| OVUK0 |  |
| UniRef90-Q3SQM6 | TDDGSMR DVA |
|  |  |
|  | 㑑 |
| UniRef90-A6SU22 | ( ${ }^{\text {d }}$ |
| UniRef90- Q5BS94 | QRYCVDATEETSRDGRLINHSLKPNCIVKVIPVDGII |
|  | G |
|  |  |
| UniRet90-W4JQF0 | DATSAGNISRYI NHADDANCYSRLLQVNDE |
| UniRef90-V4TU28 | CLDATCYGNAARFLNHRCDANLVVQUETPEHH |
| ef90_V9DQK5 | $\frac{L}{S}$ |
| 14YL51 |  |
| Ref90_A2D7F8 |  |
| UniRef90 A8P8G7 |  |
|  | DDTVIDATKKGG\\|ARFINHSCMPNCTAKIIKVEGS |
| UniRef90-A0A024G7R0 | LFDVNQQEVI DAARKGNKMKFANHRPMSRATLEKIVVVRG |
| UniRef90_E9DIF0 | LVDDEDVYVVDGRKFGSVTRFMNHSCNPNCKMFPVSHKHA |
| ef90-G9KRY4 | NHSCDPNLVNVFIDNTR |
| Ref90_G7 | VHNGQRYCVDATQETPRLGRLI NHSLHPNCHVKVIPLDGI |
| UniRef90-UPI0003 | EFCIDASSFGNVSRFINHGCVPNLFVQILSSHRD |
|  | GFTIDAAEYGNI GRFINHSCSPNLYTQNVLWDHD |
|  |  |
| DMN45 | GDDKDGTHYGNISRFINHRCDANLIVHVETTDLH |
| UniRef90' ${ }^{\text {RoGGND2 }}$ | NVFWQPIEYDGY |
| UniRef90_K3ZR38 | H |
| UniRet90-UPIO003299A1B | MNEQREEGNUDPSKKGNUGRYLNHSCDPNCEIIRSVRVDCP |
| UniRet90_UP1000274142A |  |
| UniRef90 KO | PDDWHNKYTMDAYHAGNFTRFLNHSCDPNARLFPCYITNEE |
|  | E |
| UniRef90 | MMELLHKGLTTVDAARYGNISRYINHSCDPNAVTKVFVVKK Y |
| Ref90-U7Q0L | + |
| Ref90 UPI0002B4C7C8 | + |
| niRef90 12 IM68 |  |
| Ref90 R1DRN1 |  |
|  |  |
|  | N |
|  | E |
| Ref90_V4LG06 | FVQCVLSSHQ |
| UniRef90_B7Q222 |  |



UniRef90 G0RMS1
UniRef90-V9KR14
UniRef90-UPIO003B37942
UniRef90 E9FAN1
UniRef90 R8BGV8
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UniRef90 K3YXR0
UniRef90 S8EA43
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UniRef90-J0BG87
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UniRef90 W0P6M4
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UniRef90-TOS1X9
UniRef90-EOVUK0
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UniRef90-R7TSU0
UniRef90-E2B9A8
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UniRef90-V5I605
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UniRef90-R1DRN1
UniRef90_V4SFL9
UniRef90-V4KKU8
UniRef90 E6REK2
UniRef90-V4LG06
UniRef90 B7Q222

CRCGAK

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UniRef90 M3VYR2 UniRef90－A0A024XAH5 UniRet90－D2A3V8 UniRef90－L8WMZ6 UniRef90 GoPGz3 UniRef90－E2AF28 UniRef90－A8WME2 UniRef90 B2JHN3 UniRef90－B5WBC7 UniRef90－R4FML7 UniRef90－B7FP74 UniRef90 V4KT86 UniRef90－A0A026W9T1 UniRet90－D8ROG6 UniRef90 E3LCK1 UniRee90 UPI0003C4D77F UniRef90－W7T1W7 UniRef90－L2GWH6 UniRef90－UPIO0047EAAC4 UniRef90 C5K7K1 UniRef90＿UPIOOO359C098 UniRet90＿B7G2Y2 UniRef90－T1KT89 UniRef90－K2A9B3 UniRef90－E3LPA8 UniRef90 11HJX7 UniRef90－A4S9KO UniRef90－A0A022Q217 UniRef90＿UPIO003693A45 UniRef90－UPIO002654B51 UniRef90－K7JKLO UniRef90－H5WLO6 UniRef90 W2MF11 UniRef90－K2F7V1 UniRef90－＿J9JR09 UniRef90－G4VIC2 UniRef90 M1AR90 UniRef90－TOS657 UniRef90－U4UXF1 UniRef90－T1G9G3 UniRef90 A8WKP8 UniRef90－A8WRTO UniRef90 W5KQD5 UniRef90 N1PZ87 UniRef90－W4XYX4 UniRef90－E3LWZ4 UniRef90－UPIO003942E39 UniRef90－UPI0003C817A7 UniRef90－K7JTE2 UniRef90＿A0A022RA52 UniRef90 V7CLH6 UniRef90－U6ISN1 UniRef90－MOT287 UniRef90＿S8A0L5 UniRef90 W4XIW6 UniRef90－UPIO0032A0066 UniRef90－UPIO003345066 UniRef90 A0A017PKB9 UniRef90－W5L7W3 Uniinefol W2TN56 UniRef90－A9t9R9 UniRef90－UPIoo00221045 UniRef90－FOVHB3
UniRef90 I1EZ09 UniRee90－UPI0003F1BA7C UniRef90＿UPIooo47AD144 UniRef90＿G7YGE9 UniRef90 G7XXW3 UniRef90－H3B843 UniRef90－C5CVP5 UniRef90 UPIO0047ECBA6 UniRef90－G5AAX8 UniRef90－TOMHO3 UniRef90－W2HDF8 UniRef90－UPIO003508716 UniRef90－G0U6A8 UniReftoloberpc3 UniRef90－D7PF88 UniRef90 GomDB5 UniRef90－UPI0002654FA1 UniRef90－V4TCP3 UniRef90 A719Z4 UniRef90－AODWT5 UniRef90－W2IM15 UniRef90－A0A017S5E8 UniRef90＿UPIO003AF88C4 UniRef90＿UPIO0047389CC UniRef90－C3YCV5 UniRef90－D6RQL4 UniRef90－F9U9X1
UniRef90＿w9sDV1

1
ECNSRCRCGGY DCPNRVVQKGDRLCIIFRTDGRGWGVIRT｜L ${ }^{20}$ CSGNCLCDPLKCTNKFEGLHYPLKVVKTKD\GWDIVSC SHC $\square$ NR $\square$ TQCPSKAQCQNQR $\quad$ SDKGRGVVTS PWCGWGVRAS RTSGNAPCMNAE LGKGAMV VIHVKRSGVPGKGRGVITT RRLSVRRSPIH GKGVFAL RR』TARRSPVH GKGVEAL SKVH GWGLFAD
ECGDSCPCSN DCKNKMDGUEVFKTMDRGWGRSL ECGPACSCT四CCHR पSQRASAELKVVRHPTKGWSLHAA DNSCENCRANCSEFCENQRDRVKQSV DTGNGLFAK DERCLNRSMLCGKGCGNQRDEVQSGGGKGWGLYゆG

YYFINTSRTH GNGLFAS CDNCRRSEAFDVAVRKAGGKGEGGFAT KGKGVTSK RVVKRSATSSGLGGFTT
 VPNKGYGIFAR ECGPNCGCGPKCVNRTSQSPRFRLETFRTPKKGWGVRSW EKQLEVKESNIPGAGKGLFTN ECSRACRCWRNCRNRVVQNKHMQVFRS PSMGWAVRVM NKGRSLFAT YQKFAVTVAPSTTDGT GLDFAA c河ECCSSGDASTNQRMQVGVKKLPGKGLDLFLD VKRSK PNKGRGLVAV
TDCGNRRLLLNAAYQDDKYSFNVVRTDNRGYGLKTG VDVYVTKHAAKGWALHAA VY $\square R$ RSNTENKGSVEAT
SACNRNSFKNSKVKSTRSRM A K TGTPAVMDSDLLKLNKFRKKKLRFGRSRTHE WGLFAM CRNANMQRGV SKHT ILGDSGVH GLGLYAC ENKGRGIVAQ VY冋ARSRDQKGRGLRTK DSECDNRMLLCQNQCFTKRQYVEDFRTLQRGWGLRTK LKMPVRGKGMGIRTT CSKACRCSKNCANRPFQ KMKKI RVKTESCGWGVVSA CGPGCVNRTSQKGLRY DASCDCGN CQCPKNSKGPAKVQIFGTTNKGVGLKVL PVRGTGVRAL

SCKNCS $\square$ QRGपK
KHLLLAPSDV ERK

KFRKKK $\square$ RFSRSH $\square$ HD
VCSGKCEGAHQEKПDTESKRSVPTGDERNHKTGGVRAA CGPECLNRTSQKGLQY DRRTGSFLSASVL ERNSRCRCGY SKNQDPPRDPTEIKTSTLSDHNRGVFAT QCDSKNQLPPRLPTFKRYQVMSFDFNRK GLIAL SKSDLNSSNMVFKPPVE VPVQVRSHVQKNKKILKAA

DKC CVWEELCANRPRESAKVAVKQDLASGK YAVVAT DRRTSKCLGMLKAMRNRPDQNCVAYRK GLGVVCN $E S K G Y F L R A V$
$A T W G Q G A F A G$ KSKCRNNACQKGRFPLIEDNAATWGQGAFAG
ECSDACGCSHPRRHMQRSHQKPFVVYYEGPQKGNSLRAG $D K S T S S C K N V S L Q R G W K R \quad H L L L A P S D V A G W G I Y \square T$ MNTNSWLNPLLEK RSSDTE GSG IFAR
 $D \square K M N Q C S C F P S \square F G S V R S P A P \square Q U F H$ TTSGRNNGVIAR $M \square E \square K A S T \square S$ E $\quad$ K G K K G GVVFA

CDDSCRNRVVQRP
R C P P Q CRNRVT Q H G $\square \mathrm{L} K$
$K T Q P I V I F K T K K C G W G V R S T$


## UniRef90 M3VYR2

 UnRef90-A0OO24XAH5UniRefo- DAA3V8 UniRef90-D2A3V8
UniRef90 L8WMZ6 UniRef90-GOPGZ3 UniRef90-E2AF28 UniRef90-A8WME2 UniRef90-B2JHN3 UniRef90-B5WBC7 UniRefofo-R4FML7 UniRef90 B7FP74 UniRef90-A0AO26 W9T1 UniRef90-D8ROG6 UniRef90-E3LCK1 UniRef90-UP10003C4D77F UniRef90-W7T1W7 UniRef90-L2GWH6 UniRet90_C5K7K1 UniRef90-UPI000359C098 UniRef90-B7G2Y2 UniRef90-T1KT89 UniRef90-K2A9B3
UniRef90 E3LPA8 UniRef90-11HJX7 UniRef90-A4S9K0 UniRef90-A0A022Q217 UniRef90-UPIO003693A45 UniRef90-UPIO002654B51 UniRef90-K7JKLO UniRef90-H5W106 UniRef90 W2MF11 UniRef90_K2F7V1 UniRef90-JgJRO9 UniRef90-M1AR90 UniRef90-TOS657 UniRef 90 -UUUXF1 UniRef90-T1G9G3 UniRef90-A8WKP8 UniRef90-A8WRTO UniRef90-W5KQD5 UniRef90 N1PZ87 UniRef90_W4XYX4 UniRef90-E3LWZ4 UniRe990 UPIOOOO3942E39 UniRef90-K7JTE2 UniRef90-A0A022RA52 UniRef90-V7CLH6 UniRef90-U6ISN1 UniR Refo-MOT287 UniRef90-S8AOL5 UniRef90_WXIU
UniRef90_UP100032A0066 UniRef90_UPIO003345066 UniRef90-A0A017PKB9 UniRef90-W5L7W3 UniRef90-W2TN56 UniRef90-H3EG97 UniRef90-A9T9R9 UniRef90 UPIIOOOO221045 UniRef90-FOVHB3
 SFIKANSLLIMHYVGEITTRKEMISREHEYDKKGYFNYFET RPFTKGDFVVEYSGELDDDNEAKRREDKYAQNTGCYMYYF KT SKNDFVYEYVGDVVNETVLRKRMREYAEEGIQHFYFM REFAKGEFVVEYDGELI NQGEAKEREKDYAQDQNAGCYMY QSVKKHECLGEYVGESIPDEEAERRGAEYHFSCSYGFNSG QP LAAGERII EYKGELTSWRRAAARQRAEAGHT RAFARGDYVVEYAGELTTSDEAKTREALYAQDQNTGCYMY QPFDKGDVVAEYLGEYISYAVADNREK EGYYQEQRDQDY NEFAKGEFVVEYAGGELYNQGEAKEREYAQDQNTVSKYFQW




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|  |  |  |  |  |  |  |  |  |  |  |  | EDISKGEFLLEYPGQLI SAQEGNQREEEESSGFRFFFKHQ TDNDKGDFVVEYRGVMMEYSEAKVIEEQYSNDEETGSYMY KD DKK MMVIEYUGTIIRNEVANRREK TVNYEEQNRGUY KNFATNEYVEYTGELISKAVGYKRMSKYAKDESFGNFSF

 DAIRAGTFICEYVGEVTESDQGVEYDEENDHDFQPRHADQ KEFMEGEFLLEYKGELLTEEEALERDYSSWRHHYQYFFQW
$M P F H K G D I V V C Y H G Y Y I T E A E G K R R O S G Y L F F F R C D R G M$

 EPIPEQTFICEYAGEVLDKEEVEERMFKHDHNYTLIT DFMPAGAPICEYFGTLRRNDENDESMLDNSYDFEDDDEDD VDVEKGDCVGEYDGHH1SMEETERRDE

 ADIYPGEPVVEYHGICMLLSEYNE CNFERGTVIGEFTGEGVDVMLGGSRGRTYQDYQGQ
RDLPPDTLI TEYRGKFMLREQFEANGYFFKRPYPFVLFYS RDL PAQAFLGLYEGRRYTQQEDAARTWNDQTYDFTLSNQE SA\AKDAF!VEYVGEV
$V L L G P A A D T R$
$G S Q D E A D R R G K$
$\qquad$
 KKFGEDDFVVEFFGEVYPSWRWYEKQDPEFYNDMLERPKG $R D R A G E L V F D D E G K V I V T R P G V K Q W S E E D K I V F K E Y A W$
$R S U K S G T M G E Y V G E A L L L A E A D E V Q S L L N R Y G L N Y S F$ AKFKEGEFI GEYNGHLKIPVAGENQSYEASVE VPVMKNEF SEYCGE SSQDEADRRGKVYDKYMCSFDFNL ERTKKGERVVEYRGEQVTQSDADLREK MQYRKEGKDCY NDISKGQILVEYRGKIINAKYSWAQCFMLEDRMLQUNRFN EFIEREELVIEYTGEVMDNNEYKRRQQL TNGLRGTRHFY MPFNKGDVVCDYHGTCDTKAAGNQR RQSGSGFFYRDECH QD $\square K K G D L I H E A P V I D A Y P N E E H E H D E K T L L A D Y$



UniRef90 M3VYR2
UniRef90 A0A024XAH5
UniRef90-D2A3V8
UniRef90 ${ }^{-}$L8WMZ6
UniRef90 GOPGZ3
UniRef90-E2AF28
UniRef90-A8WME2
UniRef90_B2JHN3
UniRef90-B5WBC7
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UniRef90 V4KT86
UniRef90_A0A026W9T1
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UniRef90 E3LCK1
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UniRef90-L2GWH6
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UniRef90_UPI0003AF88C4
UniRef90_UPIO0047389CC
UniRef90-C3YCV5
UniRef90 D6RQL4
UniRef90-F9U9X1
UniRef90_W9SDV1

ECNSRCSCG PDCPNRVVQK G $\quad$ Q $Q$ C $\quad$ R KTD GRGWGVVRTM $R Y \vee Y(I N S R \square P N A G K G V M A$ GRGVFAT




 K GRGVVA T
E S P K L F LGK S VR T K A LGVVA A
CPSHCRNRVTQKG】KY R LIEVFRSN ETSWGVRS L S T I A G G GS GLF T A S HVVE E K P L G L F A A
 L R A A VYTQRSTLRSAGLGLFSD $V T$ VK T S TLIP N A G K G L F A T R GYF V C A N VCRPRSEV GGGLGLFAT


Q C K N M Q F L L K

CNKKCGNR $\quad \mathrm{V} Q$
$M \square E$ VR T S P L S



 L R A A | $G$ | $K$ | $G$ | $V$ | $F$ |
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|  | $T$ | $N$ |  |  |

$R S N A L Y V K K \quad V P G K G R G L F A N$
 GQGFGVYAT $F R \square H P K G M G V \square C R$ ECNEKCGCSRSNCHNRVVQQK DP LELFKTEKMGWGVRSM $L Y \vee Q K K$ T T Q W G G W G V H A S

N S K VF A G F S K L
$R G L \vee A K$
$G \vee V V G$
 $S N \backsim Y L S T T W Y D P R A E V Q A S S \square H \quad G M G M V A S$ $P$ LD Q H K L N L E L K S HP VR GR G VF T K


VI I A Q S S $\square P$ GE G L G $\square$ F S K
$G F G \vee F A T$

UniRef90_MOZXQ3
UniRef90_U3INB6
UniRef90_I1MMN2
UniRef90_O41094
UniRef90_W2X7C0
UniRef90_Q72N64
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UniRef90_Q4TF76
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UniRef90_C5YLN0
UniRef90-W5NAU2
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UniRef90 UPI00032AAA15
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 K DI P K GTLL L F S Y S E WI E D E E F G WK VLDTVEEA ES LIP D S E K

 E TI GK D DFV F V F VGE
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 T D Y E K D E F
 D P LLA GTFI CEFTGLVLTREQFLNRSTQEWGDLSMMDANH R AFRKGELVTVEVVGEILDRAEAERRCSVGQFQYDGTQQAQ


 K DVKR GEVVVEDEGRSIVTRPFVDKHWGEEEKVTFAE YAW Y GL R K GEVV WAERARAGPDPEKSRRAYCHFMYKTGDDEYQ

 CDDP E G T LI HEAPVVA YENE DDVH DE QT DLADYVYQ K E F GEEDFVVEF LGEVYPVWKWFEKQDPEFYNI YLERPK G Y S LK K NE YL GEYTGELDTHDEANERGRDVE DYLFTLDNDQL


 DS CVVKGELI QEYLGGI DF QKNYQTDPNNDYRMMGTTMPKVV


 A K I S $A$ A K E R L L E E C
 RPFPKGSSV V












 K FI K Q G Q EI K Y L S G TL V P M T R E E E R D L D L K R K D F S l





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KF HGLEMCVVARSFGNEARFDRRSCTPNAEVVR HVVEDG YVFEYGKNH TAVVLGYGMLFNHSYQPNADYDINFS CVLDAYRKGDKGKFANHSPDPNCYPKVDMAGGD SLLNANEGNI DATKEGNVGRFLNHSCCPNLFAQVETHNRS LLTMND I S L DVSTMRNVACYMSHSSTPNVWVQFVLHDHM DY LFSRKNMSAMALGFGADFNHSKDPNARHEL TA G TPSHPVRVAVNAEDMGGLMRFANHSCNPVAEFGEVVNGR D $\square F$ MK YGYDVDD QYVINH SNFMNHSCDPNMWYDQDDN RN M M Y T I D A K RVGGGSRFFNHKCDPNMDAMRDFREHQ
 $R S T R R Q K L W I E A R D K G N D A R L M N H S C E A N C K F Y E V Q N R R F$ GNACRFFNHSCQPNCRLEKWQVDG D Y VEDVYTVDAAHHGNDSHFVNHSC S P T THFYRDATDPHHSNWTRFVN R R QAC C A L G Y V S MY RFGDKWHYRDAST D DGHMGR LIDYSSNCDYEMDYNARLL Y D GEES CY I DD A K LDE GNLGRYL NHSCSSNLEVQVDTHDDR VKDNQALCLYAASY GNAARFINHRCDANLIVEVEGPSHM KF HGLEMCVDARTFGNEARFIVRRSCTMNAEVRHEDQDGT S DDASRT CNAS R F DNHACYDEMIQRFPAQPNCTAFNDTSATY


 RPSWPVKVVINAKKMGGGMRFANHSCEPVAKF VEVANGR

 LY Y V N F K E GYYSAS S E Y G N S
SKFNDVEMCVDARTFGNDARF $\square R R S C T$ PNAEDRHMDAEGM KPSLYLD GEKDPKPY DGGGSFANDGSANNSRFWKWYDERE $P$ LNTTPRKYVDSACTRSVGSSLNGKFKHNCFTRYRPVGDG PLD T DGHVY A $\square W E S N P S E W R P \square N H S C D P N C \square F \quad G E$ SLAEFNEEEYPTVRTVDVSNYMNHSCDPTCD.WFVDGGA


 D M Y K E R E FHI D CK WQ G N I S R T L N H S C VP NLE CLRRVFRRSV | $\square$ |  |
| ---: | :--- |
| $L$ | $D$ | DADGYDLVVVDAMHKANYASRワCHSCRPNCEAKVTAVDGH $E \square D$ A R RKGNKFRFLNHS

$Y P S P D R L G F / V$
YEVDNGRFMNHSERPN
T D F MFR $\square$ DNERVI DATRTGS IAAHLINHSCE EMC E H G N M CII S A A E Y G N A M R CII N H S S T P N A A F T S A V C T G I


 GNRCAMA LGWVPVY NHSF LVSNEYEMDYETN KFCMCVNLNDSAFMNNGGKDGSNDAPKPN
Q $\square$ D P 1 AR YVVFG LAS L VNHSLRPNAQT VWADEES LF HP HWP IVHIDARLC GNVARYMRRSCKPNVEATIRMPATN
 VLL P D F Y N I M V DPMQK GN Y S S R L S H S C DPN C G TVVATIS K G NV EKEK HNAGVDLGDSNDGYYS D DENNC HIMMDDP ARF L N H S CDAN DFHPHWPLY I DARLT GNLARYVRRSCNPNVEATEVQTGSK YPRDYKA YD GVIDEYNADNARFMNHSSRPNTYAQD R $\square S$ GS N MIRRHRPFTVDASEMGNESRFDNHSCEPNLVWR LHLVDVPTALGGGMNHSCDANLWMR
 SVLWSERKNCFCLLLGBARFVNHDCRNNVEFQL V

PHHY VDSNSEQTGNWMRY

Y S Y P H M Q K K G $\square$ WVL E S D N GRFMNHSE Y I D GS D P R Y S NWMRY IDNSSRFEN S I VLSS SRRKRPSLG LGGPARFANHDC FFPPHLP DY DDTRREGN\|LLRYARRSCSPNMSMK\|LIDSSN
 A R H G G L G P K V N H S C D P N C GVRLN F VQDDRMYINHSCDPN TWW

 DTRYYRDATDESRSNWLRFVNRGVEPQLNA


 S M H N A H L F N D A A E QY IIG DA C R I N H D C D N N A NVGIR N WN E K $F S V M Y S C R K N C A Q L W L G G P A A A B I N H D$ VRCF VDAS QEDQRSWMTYDKCARNE



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| :---: | :---: |
|  |  |
| UniRei90-S9X270 | DIPAGTRIGSETPEALSSKTKEEQEAFHN |
| UniRef90 ${ }^{-97 F}$ | PIPPGTWIGPFEGQTVTREEVIKREYMWEWYSLHSKPQW |
| Ref90-E1EXP4 | DYıPKGAPVCEYTG |
| UniRef90_UPI00046A7D1D | D |
| UniRet90-Q4188 | RAПRRNEAIKYLSGVQITPEEEMA |
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| Ref90-V2N |  |
|  | RFISKGGLVAPGPLLHIPNRTSLINM YNVINLETGMPFE |
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| UniReef90-K9 | SLI KKGEEKHLLSGTLVSMTHEEELD |
| Ref90-Q0VQA7 |  |
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| G0 | KT PANVVV PYSGTY ETECTSCNSRTYTMGYGSLSDDY |
| UniRef90- U6IA ${ }^{\text {a }}$ | KGEVVTELLRGNMLMEEYEHFVDPTNESNRYVMIY |
| UniRef90-E6ZNV3 | A |
| UniRef90-W7AJL7 | K N |
| UniRef90-D80 |  |
| E3NBZ2 | CSKDY OEYSGMDSESOYV |
| UniRef90 |  |
| UniRef90-88P, | P ${ }^{\text {d }}$ |
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| UniRef90_MoU |  |
| UniRef90-UP1000022 |  |
| G8JUPF4 | KSLAQ |
| IRet90-G8JUF4 | QQCYSGTL EEFLGEVDFQKKYLEDPRNNYRLLGSPTQKV |
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|  | LQVKDTELIVEYVGELI YETTIDSRDDA |
|  | R |
| UniRef90-A0A016SF24 | VAIEKNAVVSDYRGETLSKMSQKKREFFGDYMVE |
|  |  |
| UniRet90_M5A2C |  |
| UniRet90_W2PCW2 |  |
| 19 | GVLGPGR |
| UniRef90 UPIOOO33349 | GHEGPYEGO T EDEAANSYSWMITKGRNCYE |
| UniRet90-G0R | RYK |
|  |  |
|  | GEL |
| UniRet90_B2AF | V S |
|  | $\checkmark$ |
| UniRef90-N4V7H1 | VVMEYPGPERGEVMWPRED |
| UniRet90_E1FR57 | G DV |
| UniRef90MMWOD9 |  |
|  |  |
| RRef90-N1 |  |
|  |  |
|  |  |
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| UniReif90-J3P607 | ( |
| UniRef90 W9YKP- | RRIKQGD |
| UniRef90-B7FUE6 | R F L |
| S8E |  |
| 2D |  |
|  | D |
| UniRef90-O0C9B66 | EFI PAGSVLFAERVVYLTSAEQDACDDLIDARKVRAMGEDW |
| N4UQ |  |
|  |  |
| UniRef90 UP100035FBE85 | RALAAGERVLIEKGEITRWREAVRRHRREGVS |
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| UniRef90 10Z8L9 | KDLPQFHLLGEYCGVVKTEEETFDSEDDLPKDHWAKDQEI |
| UniRef90 UPIO0038F1596 | ADLPLDLHFGPYEGQTTEDEEAGHSGYSW |
| UniRef90-J5T4A4 | EAVNAGG |
| UniRef90_E3NF02 | EPIQKSQIVLEMNGQVALSEEFPAKHGKQGCFKYDGV |
| UniRet90-J4G1H6 | RLIATGT L GELAREFFSLSNKKSGRKVLPGLGM |
| niRef90-F7WAW1 | FIKRNETIKYLAG何TPEEELE |
| W9X6 | RRIRQGDTIKYLTGTLVPLTSEESAD |
| UniRef90-A7R | EDLNKNQFLINCKGRMN |
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| M4CYV6 |  |
| UniRef90 B5Y3Y5 |  |
| UniRef90-G2Y2L3 |  |
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| UniRef90 COF | HSVTQGTHYGPYEGELTOKELLDMESGYSWVIYKSKQRDEY |
| Re90-W9 | , |
| -e99 | PLGLHFGPYEGRM |
|  |  |
|  | P PAGTV GVPG |
| niRe990 Q96 |  |
| UniRe UniRe | EDIESGSUVAEYAGVLTTHDYRPRKDKKRTSNYTIGGLAA |
| UniRet90 G4ZD | SLAQYEFLGE |
| -R7SZH1 | QPIQSSKLI |
| UniRef90_F1N790 | KPI LKGKKFGPFVGDKKKRSQVKNNVYMWEVYYPNLLGWMC |
|  |  |

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 FLDGENIMMNTSLEYDESGHCIRQSVEPVAFDVESDIGGK
 NIDSDDSYNRDATRAGNEGRYANHRTRDNIVAKRIIWHFA LRDQPTSY S IVVSSRSKCTS $\square$ FMG PARFANHDCDAN AK $R L V S A W P E G N D L S$ LIDNSPGRFTHRTAETEARQNVSTVLVG LI TTQQUTNYCFAHYTSPSAYDNHSDHANVRDEWADMAHV SGVMSSRRKAPSFFLG PARFANHDCDANGSLIMTRGNEG E ERYRVLCDLL RF $\square$ NHSKRANVVY
S VMS SRKKTPS LF LGPARFANHDCDANARLSTKGPHG ALD D AEFVGNYGRFANEGMVANLSAESRFTSRG
 DSDDPTALYLDSRFWGNESRFVNDAAKPNVEFRSFLQGDA QVTKRREA VNYKLFPLGYG LLYNHSDRPNAFVHUVLLREE

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 ALD QMKNSKEENDDATKEGNVGRFLNHSCCPNLFVQVETHNRN PVEDVIRTNTFGVTFNNVTHRINHACKPNAVTR FSQT
F SVMYSTRKQRAQLWLGPAAYI NHDCYPNCKFVPNSY
FDDTEERDIGDFETNSMPACRINHDCKSNA DYD WNTH FFHPLDP LYUDTRKEGSLARYVRRSCKPNAQLDTFDTNKS A 1 LSLHNNFPGANPFSNI DRRINHSCRANAQ HAWNEK PLASSVVVADNAEGMGGLMRFVNHSCEPDAEFQEVINGR TPSHPVRVVVNAQQDGGLMRFVNHSCAPVARFLEVVNGR YVDENEQGQMRAAVAFGLDSMCNHSVEANADFTV DPA SRMSRVVS IYYSNCYNCAGERDNHSCVPNVQ FSYHAG VVSSRKKNSLIFLGPARFANHDCDAN GRGVTRG LQPKNSKMDFFPYGPGVGLINHSDKANVEFKWKVATPG




 A WGKEQKRAALALGGLGSIYNHSYTPNAIY\PRENE

 SENGSKKLGLLDTNQNRNAMYTRRSCKPNCVLKHLISRHE
 SIVVSSRKKNSSIFLG PARFANHDCDAN GRLVTRG KLDHLCDC VDARTFGNDARFVRRSCSPNAEVRHFFSNG VDGKDNSWANWMRYVN DPSKTLVICPDKYGNDSRFDNHNRKQNCKCVRYSVNG Y ${ }^{1}$ DGSHPE WSNWLRY

 ARSEDEQNLVAFQYRGGIL LVICPDKRGNDARFING $\square$ N NHTMKQNCKC VRYSVNG GRNCYEYVDGKDKSWANWMRYVN CARDDEEQNLVAFQY ILDTNSFTVTLAKAWDHHALDLNHACRPNCQYN FNRR ADYFNVVFEELQGTFTPYINEPNEDETSNCAWDQETKHKE RSSRKENLWIEAKFKGNITRFMNHSCAANCLWCGWMLW G $\square \mathrm{D}$ AKGAGNEARFINDSKKPNAVFQDNRVG



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20

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$P E R G L S \underset{A}{V} A_{T}$
GQATFAK
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LL LAESRLHKKARRMFVE
PELCKKNARNVE IVSSUDGKGLGGLRAK
】P N K G K GVVAV
GYTVEAD
FGLFAT
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FELRESSIPGAGLGIWAR
 GGGVGLFAT





GV F S K
G V VS K
CTNNSMLLPHK K $\square$ FP $\square$ E $\square$ YRND P VVGFVVVRST
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[^1]

[^2]

| UniRef90_R1CN97 | A H |
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| UniRef90-E1Z943 |  |
| UniRef90-O44498 | E LQ A |
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| UniRef90-M5FY79 |  |
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| UniRef90-M4FWN8 |  |
| UniRef90-UPI0003503B29 |  |
| UniRef90-V7AVM8 |  |
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[^2]:    lupas_21
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