## QUERY

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UniRef90 C3Y7T5 UniRef90_11MJ14 UniRet90 W4Y4S0 UniRef9-VGLBP6 UniRef90-A9NQV2 UniRef90_10YVE UniRef90-A0AO59CYK7 UniRet90-F2CRQ8 UniRef90-C1BKF3 UniRef90-V4BK13 UniRef90-K1PGA1 UniRef90-UPI0003EAD3D0 UniRef90-A0A022RYC1 UniRef90-10YRH6 UniRef90-UPIO0032A6C0C UniRef90 B9RAY6 UniRef90 UPIOOO2B4A5F1 UniRef90-U5CW10 UniRef90_W9aRNO UniRef90-Q148C9 UniRef90-UPIO002B415ED UniRet90_W5LE95 UniRef90-UP10003EAC6F2 UniRef90-UP100032A67CB UniRef90_C3ZTB1 UniRe990_C3ZTB1 UniRef90-C3ZTB1 UniRef90_C3ZTB1 UniRet90_C3ZTB1 UniRef90_C3ZTB1 UniRef90_C3ZTB1 UniRef90-C3ZTB1 UniRef90-B4FSU4 UniRei90_UPI00042B6EOB UniRef90 D7SHN2 UniRef90- MOTHKO UniRef90-S8D5A1 UniRef90 UP1000328DFBA UniRef90_D8R2V0 AVETPGWKAPEDAGPQPGSYETRHYGPAKWVSTSVESMDW SLEEPKW EAAAPNQASDYEVRQYEPAKWVATPVKSMDY
GLQNPKFTAEEKKG DYEI RTYQPTKWVSTSVSGMQL $T P N W R G L E E A V Q E P G S Y E: R E Y E P A K W V S T S V E S M D W$
$C P K F T$ GLDCPKFTTMOSA ATEMNGYEURQFEPSKWVGTTVSSMNR GLQKPEYEVDQQAENPVNYEVRKYKATKWVCTTVKS DSR GLDKPAYEVLSS EKNYETRKYHPAKWVSTAVQSMEH KREASDYERRYESAKWVCTSLKTVDW PKEAGPRPGGYELRRYGPAKWVSTRVESADW S पDCPRFTVVN RTDTYEVRHYSASQWARTQVESANY
GYENPKFTPQESKGE GTETAPYTVLRK LCCPPYEVTETGGK
$\qquad$
LECPKYTTVKTVVP T
$\qquad$ K DY VRTYH

SLETPQYTVVHA $\qquad$ ES DFEI GYEERK

SIETAPYTVSKTWTQE ELLELF $\square E C P S Y E L V H S G$

N
GDDCPVYKV TGKMGKYELRHSY ETWPCRVLNKGEKDEVAYEERTYEGGKWVGTVIRGDSF DCPTYTVVAKKE
 DDYEERQYEPSKWVGTTV GSDSY PGKYE DDCSKYTCVNGKQYETFEERSYEASHWMTTLVEGLQY KQYETFEERSYE GVENNEGKLVSKGEK
SVETWPWQ LSKGGKG Q A
G
K


TECPSFETVHVG VETWPWRVLGTGQTE LDCPKFTVVNT $\qquad$
VENWPWEVLSGGKEE LDSPNHSVVSSS TETPSYEVI SKN GTETRPCQTLSSETKGD AlESPQYAVVHA G ESDFEVRKYEPAKYASVTVTGKF SLECPAYESIH LDCPEYDVVEKN AAELPPYTVVH

QE LLY Y A VVCE LDCPKFEVVKDVK
$\qquad$
R
 DCPKFEVVKDVK DKYQIROYEPAKWVVMEEKSYIM
LDCPRYTVLETKHKEYELRQYSASSWMSTNTAGVDY
IECPTYDVIHAGT
$T$
ECAPYTVID

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SLDCPKFK ..... G
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WPWQVLSKGRNAD
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DK
EECPVYDVI

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| UniRef90_K1RXG9 |  |
| UniRef90_V8P9P6 |  |
| UniRef90_UPI0002C68605 |  |
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| UniRef90_V4A1V5 |  |
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| UniRef90_A9SAK9 |  |
| UniRef90_UPI0002653985 |  |
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| UniRef90_G3VWV8 |  |
| UniRef90_11GC52 |  |
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| UniRef90_C1BY65 |  |
| UniRef90_H3АНІ6 |  |
| UniRef90_H3AKL0 |  |
| UniRef90_Q6DJ66 |  |
|  |  | DSAASTGFMKLENY:QGKNEKGMKIEMTAPVTCHVAPGAG DAAVQAGFTKLHNYMQGKNEKEDKVKMTTPVTSYVEPGAGG DSASSQGFERLFNYUEGNNEQKQKIAMTAPVATYVIPGQG KDATSEGFGRLFKY:QGNNEEKATVEMTAPVTTTVVPGEG DAADNAGFMKLLNYIKGKNEKGTKIAMTAPVTCYVQPGAG TTATADGFQRLFSYMSGANVDVKHIPMTAPVTVQVYPGSG DEALSTGFKRLFRYYQGNNEKQVKVDMTSPVTCLI NPGEG DKAVRTGFMRLEAYYSGANEGQQR1EMTAPVRVEMTPGAG

GKATQDGFNREFQYYQGANENNTRVEMTTPVLTGVVPSAG
TQAGSQAFHMEFOYSGANSQNQKVPMAVPVATKVVPGDG
DEALREAVLKLLKYVGGSNNQGAGMGMMAPVCSTVEPAED
TSALDDGYSKLYKYRNGANKGNVKDPMATPVATKVEPGQG

$$
\begin{aligned}
& \text { EDAMYDGFMRLEKYINGNNVAGEKIPMTAPVLVGVIPKKG } \\
& \text { DEASGAALKLGKYGGENESGYGGMTAPVVIVAHPNED }
\end{aligned}
$$

KEARRQGWKVFYVQGKNEKEMKDDMTVPVTCLVKRGCA
DEACREAPKVMKYVGGSNKG1GMGMVPVSFAVPSAD
EVVVSRAFRKGFKYTGENEAGAK DMTGPVTIUKVNGSSN

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60
70
80
DSATQTGFTKLNSYDQGKNEKEMKTKMTAPVTSYVEPGSG DQAMSTGFRRLFKYIQGSNEKKSKVEMTTPVSCLIDPGAG EAALSTGFRRLFNYIQGNNKNKAKVEMTAPVTCHVKPGAG DSAVQTGFTRLSSYAHGRNETETKIKMTAPVTTCVEPGAG

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UniRef90_D8R2V0


## QUERY

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UniRef90 C3Y7T5 UniRef90_11MJ14 UniRef90_W4Y4S0 UniRef90_V9LBPE
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UniRef90 C3ZTB1 UniRef90_C3ZTB1 UniRef90_C3ZTB1 UniRef90_B4FSU4 UniRef90_UPIO0042B6E0B UniRef90_D7SHN2 UniRef90_S8D8Y7
UniRef90 M0THK0 UniRef90_S8D5A1 UniRef90_UPIO00328DFBA UniRef90_D8R2V0

130
140
150
160
VRSFDGFSSAQKNQEQLLTLAS ILREDGKVFEEKVYYTAG $V$ RSFGGFSNATKNQEELLTLAESLKRDGKVFDEKVYYTAG
 V R T Y G GF S N D N M K R E E L L K K L M E S LiM K R D G V Q Y V $V$ R SF D GF S S A Q K N Q E QL L T L A S I L R E D G KVVF DE K V Y Y T A G
 VTS S P GF AKEK DD DGHAEALLAQALTK DNDAFNSTVYYY A G
 ARTYGGFSNDRVTQQERQNLFVSLAE EDLVNQTAPYYYAG VLDS Y G GR TN E K E I V D K A A S L M Q L L E D Q GL T Y D A S T F F H A G VRS F G GF A S P E K YAE E A Q A L A R LL K NVGQS F HEDF Y Y T A G ARTFGGFAKDDDWLTNSQELAKDLKDKPL NQSYWFTAG VKSFGGGFAKEK DWTETAQALAESSLDNATISYHKDFYYTAG
 VKKF G GNANDEKYMEEMKKFDP ILLEKDGHQVIKDDVYYFAG
 $V$ RQF S GFVVSDDS I GE QA A A L D S S L K E D G GVVGSDSAY TVA Q $V R S F G G F A S A E K F S K E A K A L A D T L Q K E G Q S F H S D F Y Y T A G$ $V$ D S F S G F E S N D D L K K H T E EMMK A A L T A A GVVQYVVH D F S F TA A


 VR SF G GYMEKSDFVANADALEEDLKAAGKSFNEKYYMSAG STMQF G GF A K E V D Y V A A H A A K L


 AKSYGGGWMT T F S D S S N A N D L
 $V$ K S L G G WM F S L V S S K Y Q T Q G L K T A L D N A Q A T Y E T D
 VA Q S G G F VMMDD S V TMRMA K R L T


 VRRFGGYAGEKEI I QELKKL RASLSED QYKDGCFYFCG STHFGGYAKEADWVEHAGNLCAALLGEQ AAYHREHFLCAAG V R K F S GY A K D E NVVAR E A K R L A V S L S M S P WV NVTTSSSY SI A Q $V R R F G G Y$ VT D S N I GE EA A KLL QASLLID T P WAK DPS LIFSVA Q $V$ S Q Y G GF GMD DTI SAKAAALAKKLLLAKGESFQEGVFFTAG $V$ R RFS GFAKDENNIVREAEKLAASSLLSRSPWANMTSAYS IA Q $V$ R R F G GF VA DA DVVGKQA ALL EA SLLQS DGRKA DP S E Y TV A Q




 $V$ R TF S GF AK D D N I V V K E A K K L A A S L A R S P WA N R K S A Y S I A Q $V$ R Q F G G F V T $\quad$ D A N $\quad$ G

 V R K F S G F A R D E K V V I K E E A E K $V$ R S Y G G WMVS LT A K Y Y GYRL RESLNSVQASYNKEYHYDVG $V$ K S Y G G WML S MT S K L Y S RLLLA K ELL N NTQAS Y HNVVFHYGVG





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ARSFSGRARDKNVVEEAEKLAMSLLSRSPWANSTEYYSVAQ VRKFS GFATDDSVLKEAARLATSLLSLSPWANSEYSYSIA Q | $V$ | $R$ | $K$ | $F$ | $S$ | $G$ | $Y$ | $A$ | $R$ | $D$ | $D$ | $N$ | $V$ | $V$ | $K$ | $E$ | $A$ | $E$ | $K$ | $L$ | $A$ | $l$ | $S$ | $L$ | $R$ | $S$ | $P$ | $W$ | $A$ | $N$ | $S$ | $N$ | $Y$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $V$ | $A$ | $Y$ | $S$ | $I$ | $A$ | $Q$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| $V$ | $S$ | $F$ | $S$ | $G$ | $F$ | $A$ | $R$ | $D$ | $S$ | $N$ | $V$ | $V$ | $K$ | $Q$ | $A$ | $E$ | $K$ | $L$ | $A$ | $L$ | $S$ | $L$ | $S$ | $R$ | $S$ | $S$ | $R$ | $W$ | $A$ | $N$ | $G$ | $Y$ |
| $A$ | $Y$ | $S$ | $V$ | $A$ | $Q$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | $V$ R Q F S GF A R D S N V I K E A E K L A I S L S Q S S WA N D K N A Y S I A Q




UniRef90 A0A059a692 UniRef90-W5KXM5 UniRef90-M1BJL9 UniRef90-H2LNC6
UniRef90_W1P437 UniRef90 S4RZK6 UniRef90-M1CN40 UniRef90-H2MFD7 UniRef90_G8HTA8
UniRef90_G8HTA8 UniRef90-A0Y8M3 UniRef90_U3J7G5 UniRef90_H2Y612
UniRef90_AOA022QPS 4 UniRef90-UPI00032AB2E5 UniRef90-A0A059BP41 UniRef90-13T2Y8 UniRef90_G1KKC8 UniRef90-K4CGL3 UniRef90-UPI0004572F79 UniRef90-A0A059B0X8 UniRef90_UPI000333CFEO UniRef90-A5BXB9 UniRef90_UPIO0032A528A UniRef90_G5E3G1
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UniRef90 F1QJ51 UniRef90-M4F1U2 UniRef90-B9IG30
UniRef90-V4SP77 UniRef90-V4SP77
UniRef90 E9HJ15 UniRef90-A7SAG2 UniRef90_UPI0002B412E8 UniRef90_UPI0003F1B9EB UniRef90-A4SYR4 UniRef90-B9IFU6
UniRef90_UPIO002B4BFDD UniRef90_W5NFM0 UniRef90-H2ZYS1 UniRef90_D7KVB2
UniRef90_B3EPP7 UniRef90-D5AD04 UniRef90-W5LM33 UniRef90-T2M5D1 UniRef90-D1FV83 UniRef90_H2ZMX5
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ESD 20
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 A DEEPKYEVLENA
GYEQPNF VLADSQPEDES LE CPKYEVMHSGKQ ATESPQYTIIHS


IE CPNYDVIESGK E C L E Y VV

 L E T V K K F T V L
$\qquad$ ESE N

Q D PD

PD
S Y E ERECEGGRFAAVEVEGKPF

> PKFEVL

A $\square E S P Q Y A V V H$ LD EPP C Y E E L V L D D T $G$ D CPAFDVVKT
APETPAWQAPEHAGAQ A PETPAWQAPEHAGAQTDAYEVRKYPELKWTTTTVTGLLY
 LDCPKYTVLQSF ECPPF AEKNS GV AEKNSTDDYELRCYEAAKWVATKANGTPM
 DECPSYDVVDKG ATEEPKYDLLEKSEP TE CCDQF DLL


## F K VMKDE

 SVETWPWQVLSKGGKEEVFYEERTCEGGQFATVEVTDKPV AI EEPKYTVLEKTID
 GL QLPPWKPVE

$\qquad$

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


 LETVPYTVISKEKCGESDFEVRFYREDSWMSTSPQEDSF
 GLDCPPYTVERVV GYEQPVYN LTANQPKDGSYEVVKYATSKWARTNVTAWSW CVETPKYQVLKS TVADYEIVRYPPSVIAQVTYDPSVF
 DETVVKRVL RKEKMKTNEYE
 A VETPKHTVVK S G TEETEYKLLSSETKDGDGYEIREYPPAVAAEVTYDPSDF TEETEYKLLSSETKDGGVFEVRRYDAAKFAAVSSEGRTF GTEQPVYEVVATLA DDDIEDRHYGPRDAAETDVDGTE
 LETVKFKVLS RKDQYE DREVEPYFIAATTMPGKNG GYQQPEF VLADNQPEDGSYQVRHYKRAKWTSTKTTSEDH
 ATEEPKYDVLD LIETVKFKVL HYEKRTY HYEKRTYEEGVL HYEKRTYEEGVL

VETPKYEVIESG HYEKRTY Y
SEYE $\quad$ R KY A EPPFTVLEK LSDGKNGA CPAFTTVSKG
$\qquad$ VE ECPKYEVVQS A TESPQYKAVVAGY SVETPKYEILAA ECPNYKLVEAGYA E DE T DP YDLVR ATEEPEYQIVRKL


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UniRef90 U3J7G5 UniRef90-H2Y612 UniRef90-A0A022OPS4 UniRef90-UP100032AB2E5 UniRef90-A0A059BP41 UniRef90-13T2Y8 UniRef90-G1KKC8 UniRef90-K4CGL3 UniRef90_UPI0004572F79 UniRef90-A0A059B0X8 UniRef90-UPIO00333CFE0 UniRef90-A5BXB9 UniRef90_UPIO0032A528A UniRef90-G5E3G1
UniRef90-A7SDW1
UniRef90-V4TT69
UniRef90-Q8KDD5
UniRef90-W4YLY6 UniRef90-C1MUT5 UniRef90-UPIOOO3292E41 UniRef90-C1C3Q5 UniRef90-K1QB13 UniRef90- $55 Z \mathrm{ZJO6}$ UniRef90-UPIO0032A5B4A UniRef90-I3SE15 UniRef90-Mos9.j8 UniRef90-M1SH78 UniRet90-F1QJ51 UniRef90-M4F1U2 UniRef90-B91G30
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UniRef90_M1BJL9 UniRef90-H2LNC6 UniRef90-W1P437 UniRef90_S4RZK6
UniRef9O_M1CN40 UniRef90-H2MFD7 UniRef90-G8HTA8 UniRef90-G8HTA8 UniRet90-AOY8M3 UniRef90-U3J7G5
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L ETVQFRVL
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$\checkmark$ E TP KHEVVHTG EPQYQLLS SVETPKYELV AVEEPSYTLVRTF $A V E E P V F K V V$
$G$
$N$

】ETVEFKVLR
E CPTYN IKYVGK
A $\square_{\top}^{\top}$ S PKYTV $\frac{1}{1} Q \frac{V}{S}$ $Y T V V D$
$F K T V$ A $\square E E P A F K T V R S$ S
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IE SPQFRVVH TR
$\qquad$
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L E CAP Y QVI H S QK E HVP F T L L R K E K C G NLD LYE KR S Y R T A T WI S T S V N S N S Y AT E E P P A H T T V L $\quad$ R K E K
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GTEE E P S Y Q V V S
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 A GYEI R RYPPCVAAEFTYDPKEW
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 $R N D Q Y E \square R E V E S Y F \square A E T T M P G K G F$ MS APSDD DS F
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110
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 A G D G K T WV V R F I M P P S R Y TAATVDP Q P N N N A R V

 $P$ LHS S A Y F V S F Y L P L K F F Q A N P P S P L P E D L K S S H T W D S H C V A Q Q T D G K WR V Q F T M P S Q Y T I D T P P K P N N P R K V
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 D A A T GTYRIS FVVMPSRTLETPRPTDPRIELRQEPERLMA

 S LDD S MTMMFMVPK K N K ETVLPQPSNSEI K F HEEEPA KTVA
 A A ES D T YVVIS F A M P E S F T E A L P R P N N P R I R L R E E P A G R V A



 PFCKNNFTISFFQPFEDQKNPDAPSSKDVEI STMPEMCAY KAEENKVTMQFLLPSKYAEEAPKPTDERVVLRDVGERKYG
 S S G N N K WS I S F VVVP K K F NLLQVP QPDN Q S V K I K N N P D L K V

 KRENDSWVSFMMPASYTMETPQPKDPKVTRRQVPRQRMA

 T MLELLVPK E Y K E S L L P K P N D A S I E F K E MP A K KV A E E QT G K VT M Q F L L P P S K Y A K E A P P R P T D E R V V L R E V P A R R K Y A
 S K S D G R V T M Q F VV LP S G L T E S I P P R P V D E R V R V V P L P Q Q K F G
 GGTQ Y NMKFMDP TASMQNDPKPDDSKVTMIDDPAS IVY EKMDMTWKMSFVMPSKYGANLPDPKDSNVTIVEVQKRVVAA



 NE Q S E S P S M S F VVMM A D F T E T TP S LIE DS MTMMMFLVPKKYKE DLPNPN ESSNI EFKEEPPEKKMA
 GD A E Q G WDVR F Y L P S G M T M Q S P AP D D S R V R V VE L P E Q S V A


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| UniRef90-H6F | ALQFKGWANDNKDEKYKQKL DAALDKEGISHTNKFYFL G |
| UniRet90_V3Zs | VRSFSGYPTKLEWESEELALEQSLNSDGLTFDKSYFVTAG |
| UniRe990-WOE3 | AHRYSGGWGEGRYREHESQLLAAVQGVGLSPVGTPUY AR |
| UniRef90-H3AJF | TRTFSGATNEDTDMYEDNLLAEDLDSPEL |
| Ref90_I4BDZ8 | VLTFSG |
| Ret90_D7TDL3 |  |
|  | RFSGLVNEKKRAAKIAELRQWL |
| UniRet90-Q212 | ALRFSGSTGDAAVAARSAELVALAA |
| UniRef90_M5XI: | VRKFTGFAKDDHFHKEFETLVNSLNK |
| UniRef90-F7DMD0 | TRSFGGPTNEESTMREIHLLAELL ESPELCLQD |
| UniRef90-04RH | VLSYGGWMTSLNEKRQARALSKALDDAGAKYIKGKHYAAG |
| UniRef90-UPIO0046B | VRSFGGWLTDANRGTHIDRALDASLGRDARHFDHS |
| UniF | F |
| UniRef90-A0AO1 | V GYSGTWSQSRYEENLRKLQDALSEAGLPWHGEP |
| 㖪90-C8R1 | VRRY GRPOA NYA |
| UniRef90-Q4ZJ76 | SFGGYALDYDYKKKAKALAEKLGNQGLSFDDSV |
| UniRef90-H5TBQ7 | AI RFSWTLSDSNVQKHTETLEKWITENGYVASDSPV |
| UniRef90-V4F | VIRFSGLAGETDITTRTQQLKAWLNARHLT |
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| G4 | RFigSidea |
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| UniRef90 U5D525 | AFSGFVTDEEVNCREIKKRNSLKKDP |
| UniRet90-A5EP23 | AIT S SGSYSDGUIAEKTREL |
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| UniRef90_19P5A6 | A RFNGTLSRRNVQRYSEQLQAWLASNGYSAV |
| UniRef90_G4QIX1 | AVQFSGTLSDSNVEEHTK |
| UniRef90-UP10004081141 | AITFGGWVNDEKDETYKKKL IASLDAKGIPY TNRFYLLG |
| UniRee90 W5KA | VRVFGGFASEDDARKNRAML |
| D3RUX | ARRYSGSWS |
| UniRet90-F2CWA7 | VAAFPGLVTDDDUSQRESRLRKALCKDTRVKED |
| niRef90_F7C | EELLTLANT |
|  | AIKYSGTWSRERYEAKKALLEKAI RKRGLKPVGEPIF AR |
| UniRet90-A1AK91 | AVRYSGTWSEKNYLDYKERLLENWIRENGFQUSGEAV WAR |
|  | RFSGAPAEAAVQNKMA VAAVDAEGL |
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|  | VRTYPGFGNOLKVEKAEALLGEALQKAGL |
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| UniRef90-UP1000360AA57 | VITFSGLFSNENTKENEAKIRNYIKEKGLKIEEPAIY A |
| UniRef90-V7AL10 | VVKFGGVASEEVVREKVEKLRVCLETDG |
| UniRef90 A8JF62 | AVR AGWPLDE ${ }^{\text {V }}$ |
| UniRef90 K K XLR4 | VARFSGVAAEKTVREKAEGLRAALEKDG |
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|  | SGGPTDDVVREKEKQLRSSLTRDGLKPRSDC MLAR |
| UniRef90-UP1000478B361 | A T F G GWANDEKIASYKMKLIJKALDKEGLKYTN |
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| UniRef90-_9UFM2 | $\checkmark$ VRRFSGL |
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| UniRef90_W5D | VRSFSGYARDHNVVEEAEKLAVSLSRTPWHPRKNAYSIAQ |
| 1 K | RQF GGFVKDSNI GLQVSALNDSLTGTTWAIVKNKYIVAQ |
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| UniRef90-L8F | VLRFSGDRCADAVARHTDKLRDALRSTGF |
| UniRef90_UPIO00262576A | VLQFSGRMGTQDLHEREQELKQWAMK |
| UniRef90_UPI00042B83B6 | D D V |
| UniRet90 | V ${ }^{\text {CYSGGLHSESNLRNYAGKLTEWLEKKRFRVLSQP }}$ |
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|  |  |
| UniRef90 H3C4N3 | AF GANEVT |
| UniRef90 F1VXP3 |  |
| UniRet90 H9GXM |  |
|  | VKVFGGGADEENDKKAKALRDELKNDEKDYNKEWLYAKS |
|  | VLRFSGVGSTGAVEAHKQTLMTQLAPGPWRAVAEPVVWF |
| UniRef90-B9HTV2 | SGFARDDNI GEEVEALGTSLNENGTLENKSSYTIAQ |
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EPVPYT LSSQHEKCEE LA YEERDY PA GK WAC IT K QEPK Y VETAKYEVIKS ATSEYEDRKYAPSVVAEVTYDPS QF


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 REATNEGFRLIAAYIFGANQPKAKIEMTAPVVTQQGGGAR
 DQVGDRAFRILVDYi QGGNQGGRNLPMTAPVNQQTSYQAA GKASRKLFRYI QGKNEKEAKIEMTAPVTCLVQPG

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| :---: | :---: | GEDMSAFWRLYGYUNGKNDQSKKMSMNDPVRVH1T UNEN GSSGRAPFLAVFKYFNGDNAEKAVIEMKSPIVVQVKTPSE GSSGRAPFLAVEKYFNGDNAEKAVIEMKSPVVVQVKTPSE DDAGNRAFRTLVSYMGGNNRSQSSVAMTAPVVQSVVQQPA GAAIISEGFRRLAGYIFGDNSPQQKIAMTAPV RAALSAGFGPLAGYIFAKERGGESVAMTAPVTQTTVPVGQ DRAGNAAFRHLFNYMSGSNNARQKLAMTAPVLQQSGPVPG

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DEAARDAFRTLFGY:SGNNGATDK: SMTAPVTQ KKGGKGGFMILANY:GASQDEGEKIAMTAPVETHAEQTTD TEAFQKALSSLLLYLNGGNGDKSMVDMTKPLYAKVNMSSP $T E A F Q K A L S S L L L Y L N G G N G D K S M V D M T K P L Y A K V N M S S P$
$G D A Y D E G Y K R L Q K Y V S G D N V D A T K L P Q T N P S F M Y V A D A K A ~$ AQAQNKGFMANFDYISGENSEGEKIPMTAPVTFRRAPDDQ
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VRRYRGGWSQERYRAEERKLLEALQEAGLTARGTPDF NR ARRYSGGWGESKYRANEQALEDALQRERLDTVGTPDFAR
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## v

 VI SLKK GVTTD AVRYSGRWS AIRFSGLIAGDDALAENQAKLLDYLKQQGLSPKDAPQYV F VLGFSGSGSASAFQKRNDGLQAALTHAGLTPVGTPRFAR

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| UniRef90-UP10002A47C15 | YENPG VPRRRNEIWFI |
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| UniRet90- UPIOOO4 | YNAPYOFPGRRNEVVSVR |
| UniRef90- UPI000255D | FDPPYKPFLRRNEIVLSLED |
| niRef90-L11X | YDPPFRDFGRHDEI |
| UniRef90-G2E6U2 | Y NDPFTPFLR R N VMl |
| UniRef90-IORY14 | Y DPPWT Pr L R NEVAVTVRD |
| UniRef90-UP100035FC310 UniRef90 |  |
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| UniRef90-W9G264 | FDPPWKPFDRR |
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| UniRef90-J7QU41 | YDP |
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F A

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LQSPTYQUL
TEQLDYETV

40 G ETGPFTPVSCHEKGEVLYEERDYPAGHWACVTKGEDLY AVEEPRYTVLVSEPP KYEVRRYAAFTVAQTQDSGDD


#### Abstract




EMRIN
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UniRef90_1N1J7 UniRef90-V41W53 UniRef90-G2T9X6 UniRef90-QOANW3 UniRef90-G30973 UniRef90-D8R041 UniRef90 UPIO002EA9488 UniRef90-C1DZN5 UniRef90-E3FRQ9 UniRef90-W4YCS4 UniRef90 UPI00037B28FF UniRet90-B9KMK6 UniRef90-KOURE1 UniRef90-G7WK53 UniRef90-J3L5W0 UniRef90-B6BTA88 UniRef90-GORLTM UniRef90-Q8L9P0 UniRef90-E9FWB0 UniRet90-W9B684 UniRef90-M7BLD6
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 D Q $\square$ S GELVRKLLMYI GGSNEQGEAMGTATPI

GSSGFNSVAGYI FGKNSAAEKDKMTTPVFTQTFDPE
 R
RTAFRRL TAFS ILANYIAFGGNSEGDRI SMTTPVTT D S R S I GFRRRLAS Y I F GANTKPGKIAMTAPV DAMTAP VAQ
 K E A A S D A F R R L F R Y I S GENE DNLDE I SMTS P V A Q T L A N Q N Y



 TTPV


 GSSGFNNVTGYI F GKNTREEKI PMTTPVETQM
 RVAF GRLL E Y I S GANERREEI A MTAPVRTDRTEGTD REA EALGS GF GPLARY

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 $Q Q$ VA































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UniRef90 I1N1J7 UniRef90＿V4IW53 UniRef90＿G2T9X6 UniRef90＿Q0ANW3 UniRef90＿G3Q973 UniRef90＿－D8R041 UniRef90 UPI0002EA9488 UniRef90＿C1DZN5 UniRef90＿E3FRQ9 UniRef90－UPI00037B28FF UniRef90＿B9KMK6 UniRef90－KOURE1
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 GKPPQPNPELLR RK
 S T S D R L Y K M G F Y M S A N D C P S P P M P K D S S V F NS GDGRWQVSF $⿴ 囗 十 ⺝ 刂 P S S W T M D T P D P D D P R V A L V E V P A R R L A$
 G
 WGGRTRYTVSFYTPRKRAVDFPTPLDRRI FI EDL R PSRFY GSHDRGWVVRFFMPAGSTEALPVPEDARVELVQIPAETVA


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## G

## D V

EGRP
G K A G
PFIAFVIP
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A P N I
$S K W S N F V M P$

RREADEWVIRFFMP

| $T$ | $E$ | $L$ | $L$ | $R$ | $D$ | $V$ | $T$ | $T$ | $T$ | $Y$ | $Y$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| T | $S$ | $F$ | C | P |  |  |  |  |  |  |  |
| K | D | V | L | T | A | Y | Y | L | P |  |  |

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TELEREVLTA
NEKNKMVTMQFTML
$P$ LH S S A Y FV R LY LP LDEF QA S PP VP DP
G
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 Q
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ANGS $\square$ CYV K $\quad$ YY LT A K S ARGPAEFVVGFVLPAGVTAPPQPNSENLEI EKWTSHCDA

 A DE NK WK M S FVVMPS K Y G P DLDP Q A K D P S V V T I K E V V P R K I V A

 SDVS Q VLPNKDMESLPAPNTEAVNLRKVEGGIAA SAEPADFVVAFVLPAGVTAETPVPANPDVRVRALPGSLAA

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 G S F Q Q K VK V S L R I P S Q F Q D S P P C P T D E S I K I E E R Q G M T GA Q VETEAGVRMAFYLPTEYDESAPRP

 N S TKQEWIVSFSMP D RELLS QVHIQ V VLP LE RQSELPEPLLEGVKLKKTEENFAA D E G D D G V VP A D G S V R M A F Y L P S E Y D E DA P L P T D P S V R L V V D P E R T L G


UniRef90_1N1J7 UniRef90-V4IW53 UniRef90-G2T9X6 UniRef90_Q0ANW3 UniRef90-G3Q973 UniRef90-D8R041 UniRef90_UPI0002EA9488 UniRef90-C1DZN5 UniRef90-E3FRQ9 UniRef90-UPI00037B28FF UniRef90-B9KMK6 UniRef90-KOURE1 UniRef90-G7WK53 UniRef90-J3L5W0 UniRef90-B6BTA8 UniRef90_MORLT9 UniRef90_Q8L9P0 UniRef90-E9FWB0 UniRef90-W9B684 UniRef90-M7BLD6
UniRef90-W5KAS7 UniRef90-S8E4H2 UniRef90-ROLGT1
UniRef90 G7JRA4 UniRef90-K1YG26 UniRef90-W5DH35 UniRef90-UPI0002630FA8 UniRef90_UPI00047A325F UniRef90-M2XHW0 UniRef90-J6LKU8 UniRef90_UPIO003F663D2 UniRef90-W9RCP1
UniRef90_C3Z527
UniRef90-C3Z527
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UniRef90_UPI000370FBDA
UniRef90_LOH056
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UniRef90 UPI0003
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UniRef90-A9NVD8
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UniRef90_W0JVI8 CMS1

 VLGFS GF RH GDVEVDRRKA QLR Q S L T A S GWTA S GEAVV A Y F












 $V$ M E F S W G Y A R D D H N $\operatorname{V}$ V V








 S TQ Q G GYAKE A D Y V A H A T Q L




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




 $\begin{array}{ll}V \\ V & R F S G G D R G P G A V A S S H T D E L L\end{array}$ V SKK F S G K P S D Q I A L E K E K Y L R L $N$ N L V N D G L K A K E G C











 R S S $\square \mathrm{R}$ A R

|  | 70180 |
| :---: | :---: |
| UniRef90_I1N1J7 | Y NSSHNTADRLNEVVW |
| UniRef90_V4IW53 | Y NDPFTPFLRRNEVM1 |
| UniRef90_G2T9X6 | Y D P P F S PFL R R NEVAV P V E |
| UniRef90_G7Y3Y6 | Y A S PFQLF YRRNEVWL VA |
| UniRef90_Q0ANW3 | Y D P P WVPPFRRNEVMI |
| UniRef90_G3Q973 | Y E N P G V P R R N EI WFLKR N |
| UniRef90_D8R041 | Y NDPSTPFLLRRNEVLI WLLED |
| UniRef90_UPI0002EA9488 | Y D D P F T P WNRRNEIL |
| UniRef90_C1DZN5 | Y N P P WT P F LK T N EVML |
| UniRef90_E3FRQ9 | Y HSPFPPFLRRNEI LVEVR |
| UniRef90-W4YCS4 | Y D T PMKLT DRHNEI LI P L K |
| UniRef90_UPI00037B28FF | Y DP P WTLP R R R N E I A P V E |
| UniRef90-B9KMK6 | Y D S PMTPWQRRNEVAF |
| UniRef90_K0URE1 | Y D P P WT P F R R R NEVAV |
| UniRef90-M7BQZ3 |  |
| UniRef90-G7WK53 | Y N D P WT P P F R R N EVA M |
| UniRef90_J3L5W0 | Y NPPFTPPLRTNEI M ${ }^{\text {P }}$ |
| UniRef90-B6BTA8 | Y N P P WT P F FRRNEL MV |
| UniRef90_M0RLT9 |  |
| UniRef90_G3IY35 | Y D P P WT $\square$ P L R R NEI H |
| UniRef90_Q8L9P0 | F S WP F QWS QR\NEI WF |
| UniRef90-E9FWB0 | Y D A P M R $\square \mathrm{F}$ NRRNEVWF |
| UniRef90-W9B684 |  |
| UniRef90-M7BLD6 | YENP SVPQRRNEI WFI R R |
| UniRef90-W5KAS7 | Y ENPG V P S R R NEI WFI RQD |
| UniRef90-S8E4H2 | Y NPPFTPFSRRNEI SVEVE |
| UniRef90_R0LGT1 | Y Q N P S VPQRRNEI WFI R |
| UniRef90_G7JRA4 | Y NPPTIPPMFRTNEVLIPVE |
| UniRef90-K1YG26 | Y NAPWTPWMVRNEVLV |
| UniRef90-W5DH35 | Y NSPFRII GRVNEVWF |
| UniRef90-UPI0002630FA8 | Y NSPFIPPLRRNEVLI |
| UniRef90_UPI00047A325F | Y NPPMIP F L K R N EI MI E VE |
| UniRef90_M2XHW0 | Y NPPFTPPLRRNEI LV |
| UniRef90-J6LKU8 | Y D P P WT P F L R R N V V AV |
| UniRef90_UPI0003F663D2 | Y D P P WT LP M R R N El AVVT K N |
| UniRef90-W9RCP1 | Y N S S H HLLT G R L N E V WV |
| UniRef90_C3Z527 | Y D P P F T |
| UniRef90-C3Z527 | Y D P P F T |
| UniRef90-C3Z527 | Y D P P F T |
| UniRef90-C3Z527 | Y D P P F T |
| UniRef90_A8E5Z5 | Y H D P T L I G R HCEVWF LA K |
| UniRef90-M0CFH2 | Y NDPWTPFMRTNEI |
| UniRef90_UPI000370FBDA | Y NDPSTPFLRRRNV |
| UniRef90_LOH056 | Y D GPMTPFL R R Y EVLI |
| UniRef90_F4L4U3 | Y N P P Y Q L L GRKNE |
| UniRef90-UPI000333A59D | Y D P PMK P Y GR L N EVWLVK |
| UniRef90-C0QBL7 | Y NPPFMPFLRRNEILI |
| UniRef90-UPI0002658ADB |  |
| UniRef90_UPI000399C889 | Y D P PWTLALLR R NEI AI |
| UniRef90_UPI00032A896B | Y N D P WT FIMMR NEVLI WLY D |
| UniRef90-A7SV76 | FESPFSLKKK T H EVMV $\quad$ LAK |
| UniRef90_V5XD56 | Y D P P WT PF LR R E V V AV |
| UniRef90_V4TIR6 | Y NSSRHQA GRLLNEVWM |
| UniRef90_UPI0003690A78 | FDPPFKPFLDR R N EVL |
| UniRef90-C6SXU6 | Y NTP\R\VKRKNEVWV |
| UniRef90-A2SU42 | Y NPPWIP F L R H N EVGVEVRR |
| UniRef90-M7Z8G9 | Y NPPFTPFARRNEI AL |
| UniRef90-W4ZA94 | Y NGPYT LF NRRNEVWFVA |
| UniRef90-A8LKJ2 | Y DGPFTPWTRRNEVALLV |
| UniRef90_UPI000197AC30 | Y D A P WT LWFRR NEVMF |
| UniRef90_UPI0003EAB8D3 | Y N D PRTSF\\|MRNEVLIDWD N |
| UniRef90_UPI00047D9433 | F D P P K P F L R N EV |
| UniRef90_B0RBC1 | F D P P Y K P F L R R NEVLI |
| UniRef90-A9UM08 | Y S D P L T F F NRHNEVWY I A |
| UniRef90-V712S2 | Y N P P F P P F LR R NEVLI |
| UniRef90-B9LND3 | Y NDPWTPFMRRNEVAVAVVN |
| UniRef90-U5WXX0 | Y D P P WTVPLRRNEVAV |
| UniRef90-Q4SCH1 | Y DPPLKP P GRCNEVWFLQ |
| UniRef90-A0A022RD92 | Y NDPGRTF $\square$ M R NEVLI WLE |
| UniRef90-L0IP05 | Y DPPWTPFRRRNE |
| UniRef90_A6CFW6 | Y D P P WT P P F R R N V V |
| UniRef90-17CHM2 | Y NDPWTPFMRTNEI EVVALED |
| UniRef90_LOKXU0 | Y D P P WVIP MRHNEVAI EVE |
| UniRef90_A5G119 | Y D P P WT P WL R R NEVAV PVEE |
| UniRef90-W9GLS9 | F D P P F M P L R R N EV |
| UniRef90-Q01CF4 | Y N P P WTP P M T N EVM V |
| UniRef90_U2WSP7 |  |
| UniRef90-UPI000370B57E | F D P P WT P FLRRNEV |
| UniRef90-IOYTF3 | Y DPPTK L L HRRNEVLFDA |
| UniRef90-H0ZX60 | Y DPPMK PYGRRNEVWFVKE |
| UniRef90_A0Z2A5 | Y NPPWTPFMRRNEI |
| UniRef90-M0CC64 | Y D GPGT LP L R R NEVAVVV |
| UniRef90_UPI0003DE8960 | Y NPPFTPFQRRNEI ALEVEE |
| UniRef90-D8UK61 | Y NDPSTPPMRRNEVLI |
| UniRef90-H3AXC9 | YENPG $\square$ ¢ NRRNEL WF IR R |
| UniRef90_U4V2K3 | Y N D P T PFLRR N EVM M ( V Q |
| UniRef90-A9NVD8 | Y NDPGRTFIMRNEVLI W |
| UniRef90-M0D9Q8 | Y NDPYTPFMRRNEVSVLV |
| UniRef90-D8JAN5 | Y DPPLTPFMRTNEVAVVLED |
| UniRef90-F9UAX2 | Y NDPFTPFLRRNEVLI DVE |
| UniRef90-A0A059CMS1 | Y NDPGRTF TLLRNEVLI WLE |
|  |  |



TPKYQUL KRAANYEVRKYEPFIVVEGSADKLS

 SAEQVEYVVERTDDDRT EVVRRYPELVRAE

$$
\begin{aligned}
& \text { T S SPGED W } \\
& \text { TSSPGED W } \\
& \text { TS SPGED W }
\end{aligned}
$$

LKTPKYVTLR


RYRDFEVREYEKFFVAETTVNSNTE DRPADAVEIRRYAPRVAAEVALDREDR KKAANYEVRKYPPFAVAEAKGEKLT
 GSRKGGFE: R RYPSVTMNELKSSG


UniRef90_C1BL83 UniRet90-B8HDM2 UniRef90-WDDSP5 UniRef90-D7TFI1
UniRet90-FOT810 UniRef90-R4VS88 UniRef90-V6DNL1 UniRef90-UPIO002654AD7 UniRef90_W1NFQ4 UniRef90_UPIOOO35A0737 UniRef90-FOM2Z4 UniRef90-R1FP20 UniRef90-Q4FMY2 UniRef90-D8TLUO UniRef90-COHA49 UniRef90-A4RUNO
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UniRef90- M5S1Y6 UniRef90-MOE4ZO UniRef90-M0Е2M5 UniRef90-L9X878 UniRef90-10QZT4 UniRef90-UPIOOO36014C3 UniRef90_UPIO003682FB7 UniRef90-M0MZP6
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UniRef90 Q2N8Y9 UniRef90-Q4TAL5 UniRef90-11JLU7 UniRef90-S4RJC0 UniRef90 V7EEX5 UniRef90 KOTB71 UniRef90-A9T3T6 UniRef90_D5P475 UniRet90_12AWQ3 UniRef90-Q2CB82 UniRet90_S8DX64 UniRef90_10Z4N7 UniRef90-F2XG12 UniRee90-UPI00037A7B52 UniRef90 A5AKX5 UniRef90-H2Z114
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UniRei90_UPOOO35FD9A4 UniRef90-J9YXT1 UniRef90_D7FVU1 UniRef90 A0A022Q6L1 UniRet90-KORJVO UniRef90-UPI0002C36EAD UniRef90_C1BJJ2 UniRef90-F6US82 UniRef90-B3QFU8 UniRef90_V9L9D3
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UniRef90 $\mathrm{N1R3F6}$ UniRef90 ${ }^{-}$F211R7 UniRef90-B8BTQ3 UniRef90-J3JEH6 UniRef90-UPIOO03EC67F8 UniRef90-V4TN53 UniRef90_U6CY04 UniRe90_UPIO003764806

E Q S $\square$ S M GFMK|L|MRF|I|CKENSAGRY|L|GMTVP|IVNNDHTTED DRAGNVAFRRLENYI SGNNTGGAKLAMTAPVVQQAGPLSG
 K D AVGRGFNDLFAYI QGNNDQRAKI DMTAPVLVDDFPSTG NEAMNMGFSVLAANYI F G GNKKRSSIVMTAPVIVMTTPVTE


## R S A

 $\begin{array}{ccccccccc:ccc:c}V & R & G & F & R & S & L & S & Y \\ G & T & G & F & N & D & V & G & Y\end{array}$DRAGNAAFRHLFNYワSGYNRAEQKLAMTAPVVQQRPVPSSG GEGGGAGFNALASYLFGDNADGAAMAMTTPVGIDVSGGGA GNSFRKLIFNYI S GNNTKNEEDKMTTPVVQ $L G \square G A B A R Y$ R G D N DQAA Q L A DT T P L L
E Q S I S D

E

D
A QGR

Q
S

G | A $P$ |
| :--- |
| L | S A

Q G
 GNETEAFGRLFDY GNEDNGAFQLLFNYI

S SAKGQAFNSLA GY I
QRTAFRRLFDYLS GANATMDELLEMTAPVATMTAPVRT A K A F E K G L S S L L L Y L N G K N E D D K S K I









 K K D S N S GFRALSGYI F GKNKNGVKIAMTAPVISR
DEASSKGFEPLASYIFGRNAPGGTIAMTAPVTATVTTAAT
GSKGFNSV$A A G Y I F G K N S T N E K I P M T A P V E T H$


DAY
 GRNNSFRKLAGYIFGGNDKEMKIAMTAPVIADCASEG
 D H P S R S M C WH LT Y L NTNS E QMEMTTPVFTRKGEPNG

REGTTKGFMNVAGYI FGDNVEPAQVAMTAPVRTEQPQKAT EKSTKFGFHRLIFQYI EGANLNNSRIQMTVPVLTT\|VQRAG EQSEGEAFNALAAY LGGANDKSE』LDMTTPVTTT



D K A L S D G F R QI A G F I F G K NV A A D G A S M T S P V T LE T S P VT A




DSEAGQAFNRLAGYI FGKNEQNEKMEMTTPVL

 GAFRKL F KY I N GANNTSEK I K MT DP V T Q
ESASKSSFGALAGYLFGKNQDEKAMKMTTPVLT
GEAA F R R L F D Y I T G A N E S S E EVVSMTAPVVVSMTAPVRT



UniRef90_C1BL83
UniRef90_B8HDM2
UniRef90_W9DSP5
UniRef90_D7TFI1
UniRef90_F0T8I0
UniRef90_R4VS88
UniRef90_V6DNL1
UniRef90_UPI0002654AD7
UniRef90_W1NFQ4
UniRef90_UPI00035A0737
UniRef90_F0M2Z4
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UniRef90_M5S1Y6
UniRef90_M0E4Z0
UniRef90_M0E2M5
UniRef90_L9X8T8
UniRef90_L0QZT4
 G G GSAEFVVVAFVLPAGLTAETPVPSDPTVVI RAVPGS LAA EKN GNMSMQF YL P S KFSEN APNPSREDVVKIVNI E G GY Y A PFCNSSF DMYFYVPTKYQNNPPLSAQAH QVVLPK HK YA A
 D A A S E E T P T P $V$ V L I Q $\| V L$

 ASS
MEKKGNMTM MSFVVLPRDAARAPPRPNDGGVALDEVPARDVA S D S R G R D ATAATR YVVMQFVLPKE GAAQAPRALDPEVAVVDVPARTMA S LDE DS MTMMM MV P K E WK E D LDP EP N S G DI QRFREEPAK TVA PNCKQTFTMAFYVPEEFQENPPVPTNPAVGDEDRPEFELY GA A G

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

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

 G G D L R V M R F F L P A S V T A G P P VP T D P K V R I A R L P A S T Y A
 VEVSSSETMMFFLPSKYDDKAPVPTHKDVVLVTVPARTVA QA GD GTWT IIR F F M P A K WT L D T T P V
 KNATMMFVVSGDSVDALPASTNENVVLREESGGUFV

 SVP ENLT D DPPKPI ENTGGQKVMKFMLPAEYDDKDPKPTNPAI TIIEDIPP QTGA PNAPAEYVVALVLDPAGTTAETPAPTDPKVTVRAVPGSGAA | $D L M G T E D W E M F$ | $F$ |
| ---: | :--- |
| $L$ | $L$ |
| $D$ | $P$ |
| $P$ | $D$ |


 GETN K M V T M Q F VL P AVVYA E EAP K P T D E RVVVI RE E G E R K Y G


 E P S A D G A K I Q Q V L P L S C C K S E LDP A P EA D N V M I Q Q V D K R VA A SADENGYAI RFFMPEKWTMETPAPDDDQVRLVTVPPVTVA AEDDKSWTIAFVVLPAQYTLQAPKPTSDKIKVVEKPETKMA
37A7B52


## 



E G R R V S SIS $V$ V
EES S E MVMQFY
$P$ L
$P$ LLHS S A Y F VRR Y L L P S K


 P N GE A G MVVMK FI L P A A Y D S M I P Q P T N P R V H I E E I P P P A V GA


 $P L H S S A Y S V K F Y L P E N$

S S GQMRFY L NK S GDSNFPEPVQENVVVEDVPPATLA






 E D C A Q T V $V$ T T C L T T L L P K A A Y D N P P Q P K D G R L
 F S N K N Q K M Q FVVEESSSNS $\square$ K P VD G SVVAVKDRERM LVA
 MNKNNTSVMMEYLPSKFSKKTPNPTNSEVTIGTIKEGYFA VGEGDEKTMSFVLPS DYWSDAP QPLDSAVKIVSVDGSTRA




VT K F S G K P T E D V VLE K Q K A LR S A LL R D G L K A Q P G C L LA R V K A F G GYA S Q S D WL K NAKELAAMALLK DGKK F DK D Y F Y SA G VARFKGSGSEASFARHNEGLQAAI RLAGLTPVGAPRYAD $V$ KAFA GVVT DGEVRRRQRDALEAAI EADGAPVEAGAFSVLQQ

 ARRRFS GRMMRKE E I M A Q T E A L K K K A L K K A A G V Q L $A D S F$ GG WA N S E K $\square$ K T Y K E KLL T S A L T K E G $\square$ S F T N Q F Y F $\quad$ L
VLRR F S GTATTEVRE QQS R I L A EV VLDRAGQKP TEPPFFM G








 L S L Y K G K Y V P A K L K Q HL L ME MF E D L D S V HRFNGAFDDEHNREMALK LGRQQLMQDGVKNDTEAYQSFG AARFSGSGSRRAFERHTEGLQAAMADAGLAPVGPPRFAR


VVVF G GVAS E QVV R E K V E KLL R E SLL E K D GFKVVGE V




| UniRef90_C1BL83 | YENPG VTCRRNE\\| WF $\square$ RR |
| :---: | :---: |
| UniRef90 ${ }^{\text {B8HDM2 }}$ | FDPPFKPFLRRNEV |
| UniRef90-W9DSP5 | YDSPFT $\square$ P NRRNEAMFK VE |
| UniRef90-D7TFI1 | Y NSPFEYENRVNEVIFW |
| UniRef90-FOT810 | Y NHPAVPF LTR R EIMV |
| UniRef90-R4VS88 | Y D D P WTPFMRHNEVAVVVE |
| UniRef90-V6DNL1 | Y N D P WT P F MRRNEVAV |
| UniRef90-UPI0002654AD7 |  |
| UniRef90-W1NFQ4 | Y NDPGRT |
| UniRef90-UPI00035A0737 | Y DSPFR\LDRHNEVWY $\square$ A Q |
| UniRef90-FOM2Z4 | FDPPFKPFLRRNEV |
| UniRef90-R1FP20 | Y NAPYAPWRRRNELA $\square$ |
| UniRef90-Q4FMY2 | Y DGPFTLPNRRNEAMF |
| UniRef90-D8TLU0 | Y NDPATPPFRRNEVLLP |
| UniRef90-COHA49 | YDNPG VSCRRNELWFIRRD |
| UniRef90-A4RUN0 | Y N P P WT P $\square$ M R T N EV |
| UniRef90-S7VFM4 |  |
| UniRef90_A3F585 |  |
| UniRef90-UPI0003474252 | Y D P PFSPFLRRNEVAV |
| UniRef90-UPI00041A766E | Y NPPlVPPMRRNEV |
| UniRef90-K7ATI2 | Y N GPLTLP WR R E M M I |
| UniRef90-M5S1Y6 | Y DPPFTPALRRNEVLI |
| UniRef90-M0E4Z0 | Y NDPWTPFMRRN |
| UniRef90-M0E2M5 | Y NDPWTPFMRRN |
| UniRef90-L9X8T8 | Y DAPWTPFLRRNETA\VEVE |
| UniRef90-IOQZT4 | Y NAPTTPFLRRNEVLLSLK |
| UniRef90_UPI00036014C3 | Y DPPFAPFLRRNEIV |
| UniRef90-UPI0003682FB7 | Y NDPSTPFLRRNEVMF |
| UniRef90-M0MZP6 | Y NDPSTPFLRTNEVAVDVE |
| UniRef90-K0CP13 | Y D S P F P PWNKRH |
| UniRef90_L7V5A5 | Y D P P WT $\mathrm{P}^{\text {P }}$ LR R NEI A V |
| UniRef90-A0A017TE54 | Y DGPSTPILRRLDEVWV |
| UniRef90-A4RYB4 | Y NDPFTPFLRRNEI I I PVV |
| UniRef90-L9WPJ2 | Y NDPWTPFLRRNEVAVTVE |
| UniRef90_C3Z529 |  |
| UniRef90_C3Z529 |  |
| UniRef90-B8C764 | Y N P P WT P F FRRNEVW |
| UniRef90_L8TME6 | F D P P FKPFLRRN |
| UniRef90_B9QXI4 | Y DAPS L P K R Y N V Q IE VE |
| UniRef90-I3KQF0 | YESYFSPA HHNE |
| UniRef90_LOJLS8 | Y NDPWTPFMRT |
| UniRef90-Q2N8Y9 | Y D A PMVPPDRRNEVM |
| UniRef90_Q4TAL5 | YENPGVVRRRNEIWF GRR |
| UniRef90-I1JLU7 |  |
| UniRef90-S4RJC0 | N NPAAANRRNETWF $\square$ R R |
| UniRef90-V7EEX5 | Y D A P WTPAGR\L EVV |
| UniRef90-R1D2V2 |  |
| UniRef90-K0TB71 | Y NDPFTPWKRRNEV |
| UniRef90_A9T3T6 | Y NDPGRTWFMKNEVLA WLED |
| UniRef90-D5P475 | Y D P P WT LPMRRNEVAV |
| UniRef90-I2AWQ3 | Y NPPWTPFLRTNEVM |
| UniRef90_Q12TR6 | Y NP P WF P PMMRNEI AV |
| UniRef90-Q2CB82 | Y DGPQTPPEKRWEV |
| UniRef90-S8DX64 | Y NDPGRTSNMRNEVVIWLED |
| UniRef90_I0Z4N7 | Y Y P P F A P |
| UniRef90-F2XG12 | Y D S P Le L L N R H NEVWVV |
| UniRef90-UPI00037A7B52 | Y NGPFTLPMRRNEAMF |
| UniRef90-A5AKX5 | Y S SPFQi F GRDNEIWVDVK N |
| UniRef90-H2ZI14 | YDSPFHLFNRRNEVWIAARN |
| UniRef90-E1ZGJ1 | YDPVQKL $\square$ RRHNE |
| UniRef90-UPI00037CF0A2 | F NAPYVI MFRKNELMV |
| UniRef90-UPI00036A66A0 | Y NP P WIIP FFRRNEVWI |
| UniRef90-B0U7N0 | Y DPPMTPFLRRNEVAV |
| UniRef90-B7FZG1 |  |
| UniRef90_J3LDH4 | Y NPPFTPFTRRNEIALLEVK |
| UniRef90-UPI00035FD9A4 | Y N DPSTPF L R R N E I M V |
| UniRef90-J9YXT1 |  |
| UniRef90_D7FVU1 | YQPPFMPFLRTNEVAV |
| UniRef90-A0A022Q6L1 | Y N S PFRFVSRVNEVWF |
| UniRef90-K0RJV0 | Y NPPYTLPLRRNE |
| UniRef90-UPI0002C36EAD | Y DPPMKPYGRRNEVWLVKSN |
| UniRef90-C1BJJ2 | Y Q P WDlFNHHNEVWVEA |
| UniRef90-F6US82 |  |
| UniRef90-B3QFU8 | Y DAPFTLPFRRNEAAV |
| UniRef90-V9L9D3 | Y D P PMKPLGRRNEVWLVRQ |
| UniRef90-W9RXK5 | Y N D P |
| UniRef90-E1Z7Z0 | Y DPPFQWWLRTNEVLFEVED |
| UniRef90-A3WAN9 | Y DAPMVPPMRRNEVLI |
| UniRef90-M0M3C2 | Y DDPSPPFLRTNEVAVEVE |
| UniRef90_C3ZTB2 | Y D D |
| UniRef90_C3ZTB2 | Y D D |
| UniRef90-C3ZTB2 | Y D D |
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| UniRef90_-Q21YR7 | Y DAPFTPFLTRNEAAV |
| UniRef90-N1R3F6 | Y N D S T |
| UniRef90-F211R7 | Y NAPFTPPFRRNEVMF |
| UniRef90-B8BTQ3 | Y NDPFTPWKRRNEVSVLVE |
| UniRef90-J3JEH6 | Y NDPYTPFMRRNEVAVDVE |
| UniRef90-UPI0003EC67F8 | YESYFS FTHHNEI WI |
| UniRef90-V4TN53 | Y S P P LQ F $\square$ GR VNE $\square$ WV |

## UniRef90 A9LH63

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## DECPAYDVVDSA <br> NGFEIRRYKDAMWVSTPUED ISSL

A VETPQFELL
KRTDSYE $\square R$ RKYGPLVAAEVRASEVFA E CPVYTELADYGLDMWK RR DEPGVWARKVAPTCNR E E E P R F RLVVE TE位 DPTPSYSVLS ETPDYEVV CPDYYVLEANE GTERVPYKTVE
$\qquad$ 1
Y GNFELREYGEITFVSTSSNDID
YPGFEIREYKPCVIAEVK SSANY $K K F K D F E V R R Y D R M L V A E A D M D S R G P$
$R H P G F E L R R Y P A H L V A E M Q D Q A B F$ H RHPGFELRRYPAHLVAEMQDQA SF QDDGFEVRQYPPTDWISTVVEGPDL GVKEPQYSLI QKTP YQI RKYESYVIAKTAMKEDNK YQI RKDQSY। I AKVQDKNKNE GLFFPDFKVL GQFEGYE:RQYPT II AETKMTSETA SAERVEYTVERTDDD AVETWPWTVLSRGG RT $\qquad$ ElRRYPELVRVET
 KPADDIEIRYYPEMVIARTNASS LETPAYSVL AKKANFEVRMYKPFAVCSVAMSKPDP HEKVRDWDGFTEFRFDVGKWVCMKTAGCE EEPAYTVL LHEKVRDWDGFTEFRFDDGKWVCMKTAGCE

GLKEPPYTLVA LEGPEFEVIKAV

TNEYETRDYAGYKVVSTNMAPRDS VEEPAFSVLSAVLE

| $K C P Q Y E L V$ |  |
| :--- | :--- |
| $K C C Q Y E L V$ |  |
| $E$ |  |
| $E P A Y T V I Q R D$ |  |

PQTSYELRRYEPATYSSTVLDEGS

 ARASTYEVRRYARSVVAECSYGAGGW $Y Q F S R W V C S E A R S C G L$
$Y Q F S R W V C S E A R S C G L$
$Y$
EMVPFQTSQKKKCDQVLYEKRRY EPPETLSFKVLCKTAHYEMRNYTASVWAKTGLMYYRW TESPAFRPVRTMRBGIFELRRYAPYLVAETVVTG SR GTERVPYKTIE SVDGLERTYPQVRVETTASN RIDGVELRRYPEMIRVRTTASN LETPRYQVLR RYAAYEVREY配FLVAETRTAAEGA CPQYQVLEANK RY CPKYQVVETNE
LSTPAFELVDTA GLAGPPYTVVS A Q QKDFQVRRYADFSVVRTARRAPNP LECPVYTTLEEFGSNMWK $T E T P A H T V L Q G G G R$
$E T P Q Y E S G G G P Q$

पECPTHDVIES PEYDVLGHG

TERQEFRVLQTFR GYETQTYELIQTFSEG DFEVREYQPCVLAEVRVSAH Y CKTYECPLFNVDTSNGYEMRTYPQVMKVKTN NTSRGS LETVPFRVL KREADYEDREVESYFVAETTMPGRSG IETPRYAVLR RFASYEVREYEPFLVAETSTPGAF
RDDVERKKKHWITSTNTGAKW VETPGWKAPEDAGPQPGSYEDRHYGPAKWVSTSVESMDW VEQLHFALVSRHEKGEVLYEERVYPAGYWACVTRGEDLY VETPKYSVVKALAGASGA ELRKYCPQVRAEVLYDNHGI CPQFTVVNK TAFYEKREYEPERWITYDVLSRNL GLY SPEYDVVKTGEQNKAYEERMYNPSVWVSTSTNGTTA ECPVYTTLEETGSDMWK RRVEPSVWVHKVAPTCDR SLECPTTTILEEFGSNMWKKEUREVEPYFVAEATMPGKSF EDVSYEERDCEGGKFATVEVTDKPV

G $\square E T P K C K V I$ KKRDYERRCNSEDWVETMDENSTY VPYVALLQHEKCEERLYPAGKWACVTKGEPLY LECPVYTTLEEIGSDMWK RRMVPGVWAYKFAPTCDL


RVpydVLDRFGPVELRAYPPSVLVETTAASD GLSCPSYRVISUK PDYEEREYQPSVWASTRVDCNSU ETPHFESLGRUGP NKDUEERRYDP EYTASVSSTDVPD PGEEALYATLEDENNFEVRMYEPLIIAQAATEGPY WVCAEVIDCGK WVCAEVI DCGK WVCAEVIDCGK WVCAEVIDCGK


VQATRTGFRCDFDYQGKNNYKRDEMDAPVITEVSPSDG EDDR FRTLAKYIGAGGDAGENIAMTAPVVTMTAPVVV FTRKEEVRGETMEMTTPVITK
STASSSAFSSLRRYDSKGNKSSEKDAMTAPVI AAQRSD NKSGFSSLFKYISGNNVQQQKIAMTTPVHMDKNTGKG YMGQSRMFNRLFRYISGDNEAGTRIDMTVPVLMKFEDLQN LDGSSQSFNVLASYLFGKNTASEQMEMTTPVFTRKGEPSS SGGNAFGVLAQYIFGGNETNEKMEMTTPVYMT
GDAYDEGYQRLQDYVKGGNADGRKLPQTNPSFTLVYVSDA MTAPVLVDIVPSSS
DSADQTGFTKLNSYDQGKNEKEMKDKMTAPVTSYVEPGSG EQSISMAFMKLMRFICKENSAGRYLGMTVPVVSHDHMMDN MDGLNAPFRALAGRVCKRAVQSAQVAMTAPVVMQTGATEG TETKKQLFVP:HEYSRGR GNGIPFSYPLLLKGQNTKV KKDENEPCCKLFGYDQGQNEGNHYMDMTFPVINDYTTENG TDGSGEGFNTLAGYLEGDNKQEVAMDMTTPVNDDVTS
 DEADREAMPKVMKYVGGTNDKGDGMGMTVPVSFAVAEGOKD ESATTTGFYRCTN

## UniRef90 A9LH63

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90
100
110
120
PGQ MGFVV|PASVVANAPVPSDGNV|E|L|RSRHGGRFA DRRDGATRMRFFLPTQLTADTPVPADDRVRVVKVPEETVAB SSSSGKTKISFVIGSKYNDNVPRPVDRAVTVKKVNGHYLA ENTSNEWFVSFVMPSGSTGHLPHPDDPHVTLRDLDAHTCI PFCVSSFVVSFYVPAKNQA
PFCPTEFDISFYLPTAFQTNQPEPTNSLTTVREQPAMKVY MKTEEGGVMAFYLPSKYSESAPKPGDERVHLVQDPPRKVA PCCDEDYALLFYIPAVSQATAPPPSDSGVELVHMEPREFY GWRTRFVMPAARRASLPAPBSGI A ASLPERRVA VGDDTIVNMSFILPAEYSADTPSPTNPEITIHNVSSRKVA NGTEDEWFVSFVMPAGSTADMPDPDNSKVVLRELGAEVCV GEWPGAYLIQFVMPATFTAATPEPGDPRVRTREVPGQLAA G QKVTLSWFIPPGTNDEM SDSSVTVEHRPPAVVF GTRADDATMSFFLPATYTETAPEPTNDDVELVVDPPRTLA TAFENGYMSFVLPEKYKEQSPQPDNKEISLEKVDEKNIA PVLNQNEFLSFVLPFEYSDQVPEPNDKEVVFEKVDEQVVA KGEPEETMSFLIGEDSVEAVPKTLDDTVKLREQAGQVLA
 ME
Q

G | G |
| :--- |
| A | APNDRMTRMRFFLPATFTETAPKPSDPRVKIVTVPEQTVA PFCNSPFVVHFYVPKKYQ PDTPLSDQVHPVRMPGTYAA MRFYL AQNDETPPEPLAQDILIQDIPPARLA PTEDGDYT TRFTMPKKWTMETPKPESDSVRLIEVPAKKLV DRFRDRFSVSFFVPFRYQDKPPSPSNPDVFLVDVKEVDVF ASCEKLVKQCFYLPAEHHENPPAPLDSKVYISAAVDQLEY ASCEKLVKQCFYLPAEHHENPPAPLDSKVYVSAAVDQLEY AEGQATHTMAFVLPASSIADAPKPLDPRVTLRQLPERVQA


WT R D TVT
WLRD
LYY H
S PVDGKL
EGQDEEVTMS
PSTSLSW FLAPGSN
MEFVLPEAYWSRAPAPT PCCDKSYALLFYIPAASQASPPRPQDENVNGQELPGATLA KGEDVEVTVKMYLPYNFQEEAPKPSSKNVKVDKFPEWTAH GAHERTHSMRFLLPSRYREEAPAPTDAAVKLEMAPAGRVA SNDSVDMSMSFLLPSKYTAQPPTPGDPKVR1KKLDSRLVA CKHNLTVSLYLPRRLHSNPPSAGAPPVKINRVNDLIVY SFCKSSFVFSFFVPKLNQANPPP AKGLRVQRWNNVYVA GPGTGTSTMQF MPKQFKSDPPTPDSRVSLREVPEAVYL SADENKWKMSFVMPSKYGPDLPQAKDPSVTIKEVPSKIVA GAGPDDWFVSFVMPSGSSGHLPHPNDPQVVLRELGAETCII ETMEMTWKMSFVMPAKYGSNLPRPKDPSVTVKEVPSKIVA DAGKMQFVLERKFNGDLPKPKEGTVETKLREGGVYA HADSSTFTDEYFVPFELQ
PLCNSTFAVKFYVPKKHQKKPPV SSQVEPEQWPGQYVA PFSLS MDFLVPKR
GVTD $\qquad$
SEKDAMTMSFПMPSQYKSDLPAPKDPRVRLFEDPERTFA EYALKTYTMMMYVPKSYK TK K K PRGESKRTLSFFVPREFEEKTPLPTDPDIYINQQPAMTVY


 SERLLQDVTVAYYGCGEFQPNPPGPTDPDLRGEERPPLRALU SADRADDTMSFILPSKFDKEPPDPLDSKVRIAKDPSRVLA GDGDHGFKMCFFLPARKAADAPTPTSPEVAIVRVPARVMA
ERKKKVTMQFLLREKYAEDAPRPTDERVVI REEGGRKYG DGTDSGVRMAFYLPVEYDVHTPRPTDPAVELVAVPARTGA RLLPRFPEQRHGCAPEPPEQ
SHSNVDETMSF LPSKEAKEPPDPDDSKVHDTKVASRVLA A WR\RFLLPQG\|DRDGLDPPGPGISIAEIPAREVA PLCSTSFIVVSFYVPKNNQQNPPKSAEGLHPQKWESSYAA ENVNGVWLTSVALPEAYSATDPKPMDDSITFKVLPRLKVA GVCHDVFELCVPVPASNDGEPPAPTEKGVVLKKGATLHTY GVCHDVFELCVPVPASNDGEPPAPTEKGVVLKKGATLHTY


## UniRef90 A9LH63 UniRef90_Q133S5 UniRef90 V9LGY8 UniRef90-KOSVE0 UniRef90 UPI00037C404D

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UniRef90-D8TMZ5
UniRef90_V3ZOJO
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UniRef90-M1CN42
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UniRef90_C3Y2Z1
UniRef90_C3Y2Z1
UniRef90_C3Y2Z1
 TLRFTWTGRDLAARQQ QLIAALENSRWQPTAAPYGL F
 $A T S F S G P P S D E K V A Q E R Q D V V A A D Q N E G V V T N K D E V V V Y G$
$A T S F R G R A T P E K A A H V A K Q L R A A A A K E N N S L S D E T R I C Y R ~$

ARTFTGFADSVAWKTEAGKLYADLLRNGVTDDKRMMDCAG VAlIFSGNTDMRRSRTQAEELFAALVVDQIRMKGDPWWLAR G| TLGGRPVNENVTANYNQLSKYLDEQGIRFDDDAFLVAS A I RFGGVPDDARLAGREAVLRNWMHRRGLIADGDA EHAF
 VASFSGVADPQNAAERESALLRQAMQKRGTVLAGSDRLLAR







 VKRFGGFSNDSNIPAQAAALDKSLKAANHKRVTASYSVAG VRRFPGFATAGEQARQKEDLDAALSDDDVELDVPHHVLFQ AAGYVGPRNEETAASDNAKLDSFAAANDIVLABGAMISAG VHQFNGSFTDSHCHEKIRALALQQLDDGVVLDKVKYEWWG YSTRYNVPRGESYQQAVGDLLQNL
 VRTFSWNFRPEAAKKNLDILLDDLAKDGCWAVEPRWQAAG

TSSDMGSLT
VKQFQG SPRKAREQAS LLGKSLTDNRVDFDPMRYYVAS TAGVEGAPNDANWNVTMEKLDA WIAERGWTGMGABHELAS ALRFSWWAPRFRVSLKERTLRTTLAQAGDEPAGETRLL R $A L R F S G D A T D A V A S D A E A R L L D L I E R D G L T A S G V A S S L A Q$
$V S S F D G F P G D S G A Q D H V D V L K K S V A K A G R K F K P H T F T G A G$

 GITFGGRPFNHNATEKYEQLSEYLDEQGFLYDTTTYFVEA VRSFDGFPTRRKFKEHARTLMDYLEEDNKDYSDE
$V L R F S G N M D M G V A A Q R A A E L G R L L E E D G L K P T G A W D A C A$

 VHQFSGNMHDA AERERQVAVEKVASEGGAFSESKFLVAR VAAFPGLVTDDDISQRESRLRKALQKDTRVKEDSVVEIAQ
 VAAFS GPY
ARRFNGDASEAGAEAEEKLLTDA LVADGLVAAGAPASLAQ VLSFGGFATEDVVVTRGFEFLANLTGDGLDVATEYFGVAQ
ARRFGGFMNDSNVAMEALALKESLEKSPWASRSSEFTVAG
ARTFFGTTTEETVGHQ SSLLWE VVGVADE FCTDAYMVAV A 1 RFHGRMTQAVAKVKEQELRAAAAKADVKDSDEPHYCA VRSFAGHNSNQRWEYEANELKNALLENKLDFKNESYYSAD A M
VREFPGFATDGEVGGQ DDT L $\quad$ WA $L Q \square E A S T P V G R S Y R D M Q$ GITFLGPNHNE EEQYEKLRKYLDEQG』LYYGSYYDVAV VVAFSG
GITF $\square G P N$ HNAVEQYEQ $\square R E Y \square D E Q G \square L Y Y G T F Y Y \square A T$ SMSPPSYPSRSDA
VRQFSGFVSDDSVGEEAAALKASLEKSHAADHTSVYTDAF LGPFGGFPTDKDYAAKVVELKKALDRDGLKYDEKSTLFAD A R

 TKTFSG VTRRTGY $|\mathrm{V} T \mathrm{RRTGY}|_{\mathrm{L}}$

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Y D P P WT P P WRRNE LLI
YHDP! TTPNRKNEV $\qquad$
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Y D A P WRPQPHRNEI LI DKK
Y N S P A I P P LRRSEVVLI
Y NP P WI P P L M R N E I AV E VE
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Y N D P S T P A FR R NEVLIP VK
F D L P WK P F L R R NEV
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Y N GP STLPNRRNEI ML
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Y DEPFTEEVDRR
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Y N S P F N IF NHVNEVI F W
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Y D GPNTPAKRRWEVM
$Y$ S P P F Q VQ
$W L L L R$
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Y D P P F APF LRR REVA
Y NPPFAPFMKRNEVLVDVQ

Y
YNSPDIPPDRRDEV
YDDPWTPFMRRNEVAV Y DAPFTPWLRTNEV $\qquad$

 YNDPFTPWRRRNEVLVAVE Y N P P Y T P $\square$ L R R NE I
Y DKPWDPQPYRNEI RDF
WAVF RHNEVLFPAE
Y D P P FP PMMKRNEVHF
Y NAPYTPWFKTNEVAVLLDD YDFMVRFHGRQNEI WFLA Y DFMVRFHGRQNEI WFLA Y NDPFEYEN VNEI WFL Y D P P WT P F L R TNELLWF Y NPPFTPPFRRNEVQLEVE F DPPFKPFLQYNEIVI Y N SP YAFFNRKNE LIF YDSPMT FGRHNEVWL

Y N D P L T P $\square$ QR R NEVL VK L E Y D
Y D S P YE Y D NRVNEVM $\square$ V L N D
YENPG VVRRRNEDWLIRRN Y NPPWCPWFATNDILI
YE®V WY T WS L H NE I WF $\square$ AK
Y N P P Y T P WQRTNA $\square A \sqrt{V}$
Y DKPTDPQPHRNEVVI
Y DKPTDPQPHRTE L I
E D $\square \mathrm{P}$ VH F F G E T WM
YSSPLQFRNRKQEV

Y D K P T D P Q P HRNE I LI L
Y N APFTPWCRTNEAAVLLDD Y NPPWTPFLKKTNEVML
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40 | W | $V$ | $C$ | $A$ | $E$ | $V$ | $I$ |
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DSEDRCYRMATWVST
D GVEI R RYGPRVAAE TA $\quad$ ID A

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ETGPVLVPFTPDQKTKDYS RRDFDAYPVAEVEYFRRD DCPEYTVWQKNF
 $L F Y$ L RAD Y DGYEVRTYKPATYAFTTVTEFGY

CPSFTV KNSTATYETRQYGPEKWDANDVVEQPL

| A T E E P K TVLEKES P | K FVCTTVTSCGY <br> KFVCTTVTSCGY <br> K FVVTTVTSCGY <br>  |
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$P Y T S D S N \quad H S D G \square E E R E Y E S V V L P S T S \square S C D T W$
$P Y Q V L R V \quad T D T Y E L R \square Y A A Y Y V A C A P Y S N R E Q$ GKDEKYYAYRAATYHYQGE Q P LYYEVLES YES P LY EVLESYESE NFKKAS DRAS


LDCPRYTVLET $\quad H K E Y E L R Q Y S A S S W M S T N T A G V D Y$ E GQDEVKQYPAYRSATVRYSGE L SFECPVYMSVHK DEEFEI RRYNHTLDWAEINVNN S F
$\qquad$ TEPGK IEVKQYPGYRAATYRYQGE L


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DEADREAMPKTMKYAGGTNDQ
EGYDRLGTYASGWNVENRKFKPFSPSTMRT DKAVEEGVERMREYWAGDNDRKEVLEGTTTIAAVMTEEN $\square F P T K Q \square F M P \square D K Y$ DT KDGGGGEKI AMTAPVVIKEGGGGG L QSAKGKGLSRLLSYFNGNNNGEVVMDTARPVLVEVSTVAS QSAKGKGLSRLLSYFNGNNNGEVVMDTARPVLVEVSTVAS
QSAKGKGLSRLSYFNGNNNGEVVMDTARVLVEVSTVAS KDAAGRGFRTLYSYFQGNNDQSAKITMTAPVLTNITPSIN DQASSQGFRLIAAYVFGQHQVSEKIAMTAPVMVMTAPVGI QDGWVGAENGMLRYFDGENSQNEK PFGCPMVTKDDPSEG

DGFSMDGSFTNG

$M T A P V V$
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$V$
EKGEPES $\square$ AMTAPVVME
HRDGGSAFSADTAYLLGANGRAELLGGSAPARDDVAAGPD GYGSLGAFS QENSKKTFFALADY GAQNREAQKLAMTTPVECIMEKGEF SSDFVDANHQLKTFVQDAQKTTDNLDKTWPVLI SMATFRAFDPLERHINDNE ISMTSPVETRYDPNNT REASKQADSKLLSYFNGYNKQQQRMDMPRPLFHYDNTTSK REASKQAISKLLSYFNGYNKQQQRMDMPRPLFHYINLTSK REASKQALSKLLSYFNGYNKQQQRMDMPRPLFHYMNLTSK
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 RQATRVAFDPLFQHISSNQAY IAMTAPVEARYLAEAH

GF GSLGSFIAGMNAY TSMTAPSLMKVWNNDN DAAPSRGFSPLFRHMSSNN KTELNSAFRALGEYIKPKNSANEDUAMMVPULVQDKLENN
 EEGLATLMEYMEGGNAERAMYPPTQPLTTRYFEG
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 SEANLVNPRVRNTVIVPGGGWTVIRFVANNP DEGYDGLGAYFDGANVQGLRLRQTQPVVMRFNP
SKASSTNFMRLFRYDSGTNADMCAIDRGTQHLQTTDPSNK SMAANRAFDPLYRHISSNN I SMTAPVETRYPVSTA RQTTRAGFLKLFNYVRGNNGQHEQUPMTAPVVTEVVSSQG AGATSAAFAPLFAHIGTNE RMMIAMTSPVECLAMANSF RQUVDVAFPALQSL

QNSAFFELINHリKRND
FESNNGLFRPLFRYDQKND NSADGVLFMTLFNHISKND

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MPNDLKMDLPFVTQTYVSSA
MPNDLKMDLPFVTQTYVSSA I AMTTPVEAEDDPG IAMTTPVVNTYDEVET

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GTGRERYRVAFVLPEGFTENAPRPTDSRVRLRRVPSTVAA GSKKMQVHVVLGGADSALPPAPSNPDVVLGVAGGEVVA PGERRTYSVFWFI PYEYQAEPPEPSHPALWLYRSPANTMF SRSLLSNYTMAFPLPNNLYGNPPRALDKEVFIQDEPPRKYD MSFVMPSKYGPDLPQAKDPSVTVKEVPSKGVA
DKNEKDKTMMWPVGFSNDDALIPAPADEII RMTSVPVQVVA QVLPDTVEDAWYISCQSQKDPPVPNNSLI TLSKVPEQSFA GGDKKMVTMQF IL PSEKAEEAPKPTDERVVI REEGERKFG $P G A D Q D Y V V A F V L P A G L T E T A P V P D E S R V K I R E K P G A D S A$
 S S C R K
ESSAGKWVVSFVMSAEYTMETPKPMNS
LS DVSI QIALPMNKDLDLPAPNTEAVTLRKVEGGTAA PACESQLTFAAALPNKWT QVPQPRTDELTLSQWPKLHVY DADLSKLSDQUVLPFKETESLPNPNQETARLRKVEGGIVA GSKTMMWPLDFAAPGS DYPPKPAAADCRIVTVPEKVVA



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 Q IDAP QAKVSFLYPAPN ESNEKTATVSFL YRNTDIVPQEIANNITVVEDIPAMTVV NVEQN FTVFLFIPY LVVDPPQPTDDRVKFTTVADFTAY GGRKGKTKISFVI GSKYNLQVPRPDDKSVHDRKVDGHYAA
 GSFRSCWVN FFLPSSSKPNP E L S SLKLDERKAQCVA



EGCSYGLS GCSAl P TSAAVSFL
GKTMELALLGRRAKES
$P D Q Q G K A K V S F$
$F D S P S T A E V S F$
GR RAKES
YNNT T
FDSPTAKVSFLYPSPN
DAKDKVMT
WP $\operatorname{L} E Y S A$

TEDVVGKTMELSLGAGVADPPASAEPEAVGVAAAGGELVA
PFQS
$F A Q V G E A Y V S F D Y H R R N \quad D T P E Q D E R N D K V E D D A P M T V V$
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DKADSEVQTGFVMPKEVAEGVPSPTGADIDVRKRAGGRFA
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DKNSSSKTMELSLGKGVN NPPDSNQENVTVRGAGGELLAB


ENQKTEVSFLYSTP
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DENSGEAQVSF L YRNSQUYPDQVAENIVVEDDPPMTVV

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M L P
PDERGEALVSFL YRSTD $\square$ YPSE $\square$ A QN $\square$ QVED $\square$ APMTVV PSCDTAFVIRLPVAKRFEE
EG MRFFPPEESASSLPSPDHRDVQDKKDEERYDA PREHGQAEVSF YGS $\quad$ A ADPGRTAQGVAVEDHPAMTVA MSFVLPSKYWAEPPAPLESGVQLGRNGGGALA

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PGEKGVMTMEF I YRTPRMGNPAGRDGAVEVKDHPAATYV
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|  | UniRef90-E1ZKU3 |
|  | UniRef90 ${ }^{-}$W4XEE7 |
|  | UniRet90-B7PQF8 |
|  | UniRef90 W5IA84 |
|  | UniRef90_UPI0003330AF7 |
|  | UniRef90-W7TM01 |
|  | UniRef90 A0A059LNB7 |
|  | UniRef90-13T5L1 |
|  | UniRef90- V3ZIF1 |
|  | UniRef90-A1R997 |
|  | UniRef90_C3ZG05 |
|  | UniRer9o-C3ZG05 |
|  | UniRef90-C3ZGO |
|  | UniRef90 V4S599 |

VTTRTGY|LTQGMVEEALDSIVQHSLLDAQGLDYDASIVIVV VTRRTGYLTOGMVEEALDSVQHSLDAQGLDYDASVDVV LKRFGGFMNDSNLHEQVLTLKKA

160

## A LRFSGRDTPEARAAQAG】 LIAAVLAAAGRAPAGAPFVMG  VITFSGFLDDKDTLDSNTTKLKAWVKANNYQUVGQP EAAG

$A D T F R G G M S A A V A A R R E A E L R A A A A A E G V A D D K G Q V Q F G A$ VI RFS G DMNAKTARQAEAKKLREWIDKKGLVAEKKA ETA G AldRFRGRWSEANYRKHLEKLRTTLCSENLSSVGPPRFAR ARQFEGNATQEACERCRGQLVAALERDGLAEAGGYFRDAQ GITFGGRPETPNATEKYEQLHAYLVEQALPDETYDSIVAA VKVF GGTPTEQDWLRQAEGFDQKMRKDSRVL TDHYYVAR


 $V A R F T G N G S A A A F Q R H T V A L L E A L Q L D A D L T P D G S P K F A R$



K N S T WK $\square$ S D D Y M S $\bigvee A G$
VKKFSGRPEEE VAKKEKELRSQLLKDGLKPRKGC LLAR
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| UniRef90_C3Y2Z1 | Y D |
| UniRef90_C3Y2Z1 | Y D |
| UniRef90-U5GNB4 |  |
| UniRef90-Z5X8Q5 |  |
| UniRef90_B1M2J3 | Y D P PFAPF LR R NEVAV |
| UniRef90-M0PJ67 | Y NDPWTPFMRRNEVAV |
| UniRef90-C6FBH0 | Y NPPWTPFLRTNEVML |
| UniRef90-A7N973 | Y NP P WT PFLRTNEVML |
| UniRef90_UPIO0042BA191 |  |
| UniRef90-A8HRW0 | FNPPWCDWFKTNEVLI |
| UniRef90-UPI000255DD93 | FDPPFKPFLRRNEIVLVLQD |
| UniRef90-E1ZG57 | Y GPLLHSLSTRMNEI WL |
| UniRef90-E1ZKU3 | Y NHPSKLPRRHSEVWM |
| UniRef90-W4XEE7 | Y DAPGQPQPHRTEI LI P VK |
| UniRef90-B7PQF8 | Y DLVFWVLERRNEI WLVKK |
| UniRef90-W5IA84 | Y NPPFTPFARRNEVALEVE |
| UniRef90-UPI0003330AF7 | Y D P PMKPY GRRNEVWL VK |
| UniRef90-W7TM01 | Y DA $\square \mathrm{F}$ S VGTRRNEVWAVLE |
| UniRef90-A0A059LNB7 | FSPSTQHLNRYNELMV |
| UniRef90-13T5L1 | Y NP P WT $\triangle$ PMRTNEVM |
| UniRef90-V3ZIF1 | YSEPWATWASHNEI WFIAK |
| UniRef90-A1R997 | F DPPFKPFLRHNEVVLDVK |
| UniRef90-C3ZG05 |  |
| UniRef90_C3ZG05 |  |
| UniRef90-C3ZG05 |  |
| UniRef90_V4S599 | Y N S P F N ENR $\square$ NKVLLW |
| UniRef90_B1XTX9 |  |
| UniRef90-W5HBL4 | Y NDPSTKFMKRNEVLIWLND |
| UniRef90-G7YG77 | PDPPNEPTE NQVWFLVE |
| UniRef90-UPI0003DE852A | Y NDPWT F $\square \mathrm{MR}$ R C MLLI WL D D |
| UniRef90-B7GBC7 | Y DADFSMGKRRTEVWI DLED |
| UniRef90_F4BTH5 | Y NEPRTPPFRRNEIALLVAN |
| UniRef90-K0SIE2 | Y NPPFTLP F R R N V V WL |
| UniRef90-A0A011P230 | Y NPPFMPFLRRNEIWLKLR |
| UniRef90_R1CSF2 | Y D A PLT P WL R R NALAV |
| UniRef90-KOTNS0 | Y DAVHSMGKRRSEVWI DLK D |
| UniRef90-U6MS95 | Y NSPFCPFFRRNEI WI |
| UniRef90-Q4S211 | Y D HFDSLV H H N EVWI |
| UniRef90_A0YN70 | Y D S P F IP ALK R S E I |
| UniRef90_C3Y311 | Y |
| UniRef90-C3Y311 | Y |
| UniRef90-C3Y311 | Y |
| UniRef90_K9TF61 | Y N S PMTP |
| UniRef90-K9VN02 | Y NSPMT |
| UniRef90-T2JPV0 | Y D GP Y K P A K R E $\square$ |
| UniRef90-UPI000457187F |  |
| UniRef90-B8LDD6 | Y H D P $\square$ T P F L R K N E VCDVMV |
| UniRef90_W4YCS5 | Y |
| UniRef90_W4YCS5 | Y |
| UniRef90-A0A059B269 |  |
| UniRef90-U9VIG2 | Y D G P F $\square$ P |
| UniRef90_C3Y2Z2 | Y PFDTSDEPWY 1 A |
| UniRef90-C3Y2Z2 | Y PFDTSDEPWYI A |
| UniRef90-C3Y2Z2 | Y PFDTSDEPWYI A |
| UniRef90_C3Y2Z2 | Y PFDTSDEPWYI A |
| UniRef90-C3Y2Z2 | Y PFDTSDEPWY $\mathrm{P}^{\text {P }}$ |
| UniRef90-K1VYY5 | Y N S PM T PPDKY SEV |
| UniRef90-A4RU47 | F GP L Y S LKTRRNELLM |
| UniRef90-L8N2H3 | Y D P P T P PLKRREV |
| UniRef90-UPI00034ABB0D | Y N S PMTPSLKRSEV |
| UniRef90_B8BZ38 | Y DAVHSMGKRRSEVH $\square$ E L K |
| UniRef90_UPI000474B027 | Y D GPF L |
| UniRef90-B6AB52 | Y NPPWTPWFRHNEVWI |
| UniRef90-C1E1N2 |  |
| UniRef90-B9T9S6 | Y DAPFHLI GHVNE |
| UniRef90-F4XYD3 | Y DSPFVPPLK R S EV |
| UniRef90_Q01CZ0 | F GPLLYSLKTRQNELLVKVE |
| UniRef90-M5TTE2 | Y D P P T P P L R R EVLI |
| UniRef90-T1IY34 |  |
| UniRef90-C1ML85 | Y G Q L Y S LK PRDNELILLHVK |
| UniRef90-B7K9B0 | Y D GPYVPALKRSEI |
| UniRef90-E0UK58 | Y DGPYIPAFKRSEI |
| UniRef90-Q5D8L5 | YDPSLVANEDGNEI WF K LE |
| UniRef90-Q10WC8 | Y NSPMTPDLKRSEV |
| UniRef90-A0YXG2 | Y N S PMTP |
| UniRef90-B7JZ68 | Y DGPYTPDGKRSET |
| UniRef90-14IU49 | Y DGPYVPALKRSE |
| UniRef90-M7YDG7 | Y NPPWTPPLRTNEV |
| UniRef90-10YXD8 | Y G P L N S L S T V NEV VL |
| UniRef90-K1Q7M7 |  |
| UniRef90-K9WR39 | Y D A P Y VP P A K S E $\square$ |
| UniRef90-H9W292 |  |
| UniRef90-U6G8E9 |  |
| UniRef90-Q7ND96 | Y D S PYVPAERRSEV |
| UniRef90-R1G7P1 | Y NDPFTPWQRRNEVAL |
| UniRef90_FOSH30 | Y N S P M $\square$ P F M K Y E V |
| UniRef90-C3ZG00 |  |
| UniRef90_C3ZG00 |  |
| UniRef90-D5EM21 |  |
| UniRef90-E8QXF3 | Y H GPMTP |
| UniRef90-R7QB48 | Y N P P F T P WF K R N E T H V |

UniRef90 K8ELG9 UniRef90-U6ME52 UniRef90_R1ET63 UniRef90-K1PEJ3 UniRef90-10ZB02 UniRef90_A6DP45 UniRef90-Q4T8C6 UniRef90 G4VKU2 UniRef90-W4YU30 UniRef90-B4W515 UniRef90_U7Q7V4

1
 ETLSYAVDREA PNYEI RHYEATPI IDTT W ELLPFALLRRAGDYEVRRYPLFDCAKVEYERR R पDCPKYTV LQSSPEDSG


Y DVLESYES GKVKK GSVRTSEWMGYKNESMT F
 $T Q A G V I E I K Y Y P A Y R G V T Y S H S G E D L$
lupas 21
lupas_14
lupas_28
jnet conf sol25
sol 5 solo solo
jhmmm
ipssm


UniRef90 K8ELG9 UniRef90_U6ME52 UniRef90-R1ET63 UniRef90-K1PEJ3 UniRef90-IOZB02
UniRef90_A6DP45
UniRef90_Q4T8C6 UniRef90 G4VKU2 UniRef90-W4YU30 UniRef90-B4W515 UniRef90_U7Q7V4

lupas_21
lupas_14
lupas_28
jnet conf sol25
sol5
sol0
jhmm


[^9] ARRFSG VRSFSDPTTEP $\square V R \quad L L R Q A \square R R D G L A P G G S E F R L A Q$ V
A GR
S $\square G \square R G S E S K Q K \square A E A D E K D E A Y L L E K N Q W E V T G E P R D L G$ VRKFTGTPSVENGNENSKELLSSSRGRSCPNLDLVEYSGAG IKRFHKS $\square$ KQDEFMDETKDFIEQLSEGNFNYLPEPYYW I


UniRef90_K8ELG9 UniRef90_U6ME52 UniRef90-R1ET63 UniRef90-K1PEJ3 UniRef90-10ZB02 UniRef90-A6DP45 UniRef90_Q4T8C6 UniRef90 G4VKU2 UniRef90-W4YU30 UniRef90-B4W515 UniRef90_U7Q7V4
lupas_21
lupas_14
lupas_28
jnet
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$\begin{array}{llllllllllllllllllll}1 & 5 & 7 & 7 & 7 & 7 & 7 & 7 & 7 & 7 & 7 & 4 & 1 & 4 & 6 & 6 & 5 & 0 & 8 & 9\end{array}$

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