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20
 $M T R F A L L V R G I N V G G N K V V M A E L R E E L Q T I G L D G V E T Y I N$


T R Y AL L L R G MTTYAALLRGINVGGNKVPMAELRALLQESGHGAVRTYLQ MT TYAALLRAVNVGGRKLPMAELVRLMTGLGYEGVRTHLQQ K Y V L L L R GIINVGG N K V S M S K L K E Q L L S I G F E NV S S Y I N


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




TTYAALLRGINVGGRKLPMAELRALLVELGHGAVRTHLQ MT T Y A L L L L R G MT R A L $M T T F A A L L R G L N G G R K V P M A E L R Q V L E G L G H G D V Q T Y L Q$ $M \square T Y$ I A L L R G I NVGGGN K I K M Q A L K K A M F E S L L G Y G R V MTVY LLR R G NVGGNKVEMRELSALLLTAAGFEEVGS YI N
 MTRYAALLRGINVGGHKVPMAELRTLLTELGHGDARTYLQ
 M T T Y A A A L L









 M GKYI A I L R GIINVGQKKI KMAELIKAHLLSELDFGNI QTYI Q M K R Y I A F L R GI N I G K N K I P M V G L K A GFFE E L G F L E V V K T Y L N
 MTTYI ALLRGINVGGNKIKMLDLKAMFQALGFANVRTYI Q M K R Y I A L L R GII N I G K N K V P M A E L K K K G F E N L A F E E V K T Y L

 $R Y V L L L R G I N V G G N K I V M A E L R Q A V A D L G Y D K V E T Y I N$

 YAALLRGINVGGRKVPMADLHSLVTDLGHGHVRTYLQ TMYAALLRGINVGGNKVPMAELRELLGGLGHDAVGTHLN



 MT TYI ALLRGINVGGHKIKMADLRALFNSLGYDHVQSYI Q

 MKRYAALLRGINVGHRRVAMTELRALLERLGYQRVVTYLQ

 R Y I L L L R G I $N$ V $V$ G G N K V $\quad$ DM A D L
 $M N R Y$ I
 MKKYI ALLRGINVGGNKI SMQQLKETERQAGYTDAQTYIN M N K Y V A L L R GI NVG G Q KI K M D ALK S I FEALAF Q NAKTYI Q $M K T Y I A L E R G I N V G G N K L P M K E L A V V L E G L G L Q G I A T Y Y Q$ M N $M T V F \vee L^{L} L R$ M NVGSNRIKMAELRLFFEELGFSGVATYI Q MKRYI A F L R GI N I G K N K M P M A E L R Q GF E R L D Y T E V K T Y Y L N M S K Q
 MT A Y I A L L R GVVNVGGR K I A M A D L R A V L $M N T Y I A L L R G I N V G G N K I K M Q E L K A M F E A L K Y E H V R T Y I Q Q$ MSSQIALLRGINVGHNKFPMARQRELMRDLGFEDVTVHLQ


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SGNILFESNEDEATLRVRIVELVEKSFQDTLSVIIRTSEQ


S
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SGNVLFDSEDDPATAKARIVAALTVERGYEAYTFVVEQSY


 SGNLFFDSTKSRGDIVADFQTFFATTYPFVKQFALLDAQD

 S GN A V F R S D G S D E D T A A E L E D A L E Q H F G F H V A C M V R G A E Y




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90
100

120 LKAVREACPFPAAELEAKQLHVTYFSGPVDAERFASLDQP

 YAQDLDALLPAWWQEDLARKDVLFYTEGLDQDAVWELVSSF LRAADEDCPFPAAS LEAKQLHVTYFSEPVAASRFDALDAA | $Y L K E K A G \\| P D W W N G E F A R R D V I$ |
| :---: |
| $M$ |




 LKAVADACPFPAAELEAKQLHATYFSTPVEAERYAGIDQA LAAVAEACPFPAADLEGKQLHAVYYSGPADPERFAAIDRE
 LRAVREACPFPADRLEGKQLHATFFSGPVDEERFASVDRG LAAVA EACPFPADGLEPKQLHVTYFSGPVDEERFAGIDRS $\begin{array}{ll}L A A V A E N C P F P A A E L E G K Q L H A F Y F S G P A D P G R F A A & D Q E \\ Y M Q D Y D K L P D W W Q D D L A R K D V L A Y T R S D Q K E L A Q D M V G E M\end{array}$ $Y M Q D Y D K L P D W W Q D D L A R K D V L F Y T R S D Q K E L A Q D M V G E M$
$L R A V A D A C P F P A A E L E G K Q L H A T F F S E Q P G A E R F S G I G G P$
 YLEERDADPQWWHEEMARRDVLFYACGMDTDRDRDFIEKA LNADAANCPFTEEQLEGESLYVTMLQEKPDSDKLDKLQQY LAAVAAEACPYPAAAELEGRQLHVTYFDRPVDAGRFAALDAE YLQAREEDPDWWGGELARRDVLFFSHNSDKSADLEFFDQT


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 WA A V V A A N P F P D A V S E P K T L H V V F L S E Q V A P S R L D D V D R A
 LE D I L K N AP E W W G D S N K E DIY L I F M F P D I I S Y D S F Y N E V G N P LA A V A G A CPP F P A A G L Q G R Q L

 MENVI A NDP F LSSEPE EFKRWYVTFLPAEPSAEALDKMATY



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QQTFNNAPDWWNTDNKEVYHIFMVSPTTVAEVVQVMGEP


LEQVIQQNPYPEAESVPGTLYVNFLATVPPQPNLEGLEKL

FERLVAENPYPEAAGDHTKLHAYALERAPTPEEVAPLTER



LEAAI AGNPFPQSEPEAYKLYVSFLAAEPAAEALEKLRPY
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E L K DEVLY F G K L G DF WGKFSEESYSK TAYHKY LLKVVP F YR A F L P E E F R L G D R A L Y L Y A P D G L G R S K L G E T L A R P R L L K G I
 SLGDEEI I HRGRLGI YWGKYSE ET Y T K TA Y HRQVLKMP DYR
 T Y LP E E F RVGD RAVYLYYTPD GLGRSRLLADALARPAVVKGL A F L P E E F R L G D R V L Y L Y A P D GL G R S K L A E Q L S R P R L T K D L
 E L Y N E KV Y I G K N A V F WA K M DEGE F L K T T Y HK QL L K QP F Y K $\begin{array}{lllll}A & \text { A P E D F R L G D R A L Y Y Y A P D G L G R S K L A E Q L }\end{array}$ A HLPE EFRLGDRVLY LY A P E GLGRSKLAE QLSKPRVNK GL







 AFHPEDFRPGDRAVYLHTPNGLGRSRLSDPLTRADPKAAG AF DNERVHDGKHAVFLGKEDEAEY LTKSTYHKQLKKQNFYK
 S Y L P E E F R L L D R A L Y L Y TP D G L G R S R L A E A L S R P R V Y K GlL
 AF LPPEEFR L GDRA L Y L Y A P D G DGRSR L A Q R L S GAGSDK D L


## K




 D P NLLE CIEVGKRVLYW QVVKGSTLDSAVGKQSGSARNKA

 ENGPD K V R F V G R E M Y L L Y G E V S V S Q S P L F K V P F D K IL G M K K DLDEKI K D YK EVVIFWS FSSRKDYQK TNWWS KTASA DI SA N A DLL MLGDE IVVISA YAI YWGKYSEDSYLQTAYHKQLAKSPFYK AFAPEEFRLGDRALYMHTPDGMGRSRLADVLARPALLDTGLL NEEYEKSYHYKNAVFWS FCRKK YRKTNWWSKTANSNDGG A H LPEDFRLGDRALYLYTPGGDGRSRLADALARASVSKGL A F L P E E V VRAG D R A L Y L H TP G GL G T S R L S P A L H R P A V L G G I

 KP E Y E R I A HHK R VI Y WS A P A KT FA K SR WS K DA S S T V N N VN DYE RI EVAGENAY L L F R D S VR H S K LA G Q L H $\quad$ K L G E K E GLLE QIQ EYE QAVFWS FS RKEYQKTNWWSKTANSNIGS




 K P E Y E K I H F Y N N VI F WS A N L K N F S K A R W S K L A S S S V N N
 K P E Y E R V A Y Y G R VI F WS A P M E T F S R T R WS K VV S G K T Y Q Q N G VDE I RALEREVY L L CRQGYGKSQFSNNFIEKK LRV

 C T GP E S F V I R D DVV Y Y L H A P D G L G K S K $\quad$ K A E V L P R V L K V







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| UniRef90-S2Z908 | RNW |
| UniRef90-F3A0C3 | K T R A ANTFEK\|AKILEE |
| UniRef90-C8N198 | T IRNGKTFDKı AELLQK |
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| IRet90_B4V | D ${ }^{\text {a }}$ |
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| UniRee90-X4ZSN3 | VATGRNW |
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1
MPRQ|I|A|LL|RG|I|N|VGNKFPMARQRELFAALGHRDMTVLL|Q MTTLI ALLRGINVGGNKLPMKELSALLTEMGLCDVQTYYQ MEQY AFLRGINVGGNKISMPELKEVEEQNGFNDVLTYY N MKTYIAILRGVNVGHNKINMKELKSLLEEHGYENVTTYIQ RYALLLRGINVGGNKVLMADLKKDLAGLGFENPVSY:N MTRYVALLRGVNVGTTRLAMADLRRDVTDLGHDDAKTYLQ MTVFI ALLRGVNVGGNKLPMKDWRGTEGLGHTRVRTYIQ MQTYI LLLRGVMPGKNRVPMAQLRQVLSDAGFGRVRTWIQ MRRY AFLRGI NGGKNKIPMAELKKSFENQNFSQVKTYLN MKKRIALIRGINVGGRKVHMKDLKVLFEDLGFTDVVTYI Q MSTHI ALLRGI NVGGRNIAMADLRAVEQELGCEPVATYLR MTMFIALLRGINVGGHKIKMADLKQLGGTMGTNVQTYI Q MTDYDALLRGINVGGNKIKMADLRKMLEGMGLARVQTYi Q
NTY A ALLRG: NVGQKK:KMAELKVVLEDTGLKNVKTY: MTRYVALLRGI NVGGINIKMADLRQVFVDLGFDEVKTVLA KYAVLLRGI NVGGNKVVMSELRDLVRQLGYEQVETYI N MTRYAVLLRG| NVGRHRVPMAELRELLTAEGHAGVATLLQ MTRYAALLRGI NVGGDNIKMADLRSTFAELGFENVKTVLA MKTHMALLRGLNVGGHKIKMADLKLLFESLGFAEVTTYI Q MAVFVALLRAVNVGGTTLPMAELKALCEEI GFTDVKTY: Q MAIHAALLRGINVGGNKIKMAELKAAFEALGPGRVQTY।Q MRTHVALLRGINVGGTKVPMADLRRVDAGRGFTDVATYIQ MPVYVALLRAVNVGGTTLPMAELKAlCERLGFADVKTY: Q MKRYALLVRGI NVGGNKVVMEKFRHDLDKLGFKNVSSYI N MKDYIALFRGI NVGGNNIPMKELVTLLESLGLQQVKTY:Q KYYLLLLRGINVGGNKVVMSELRAQUEALGYEAVTTYIN MTIYIALLRGINVGGHKIKMADLKTLCEGLGLSRVQTYi Q RYVLLLRGI NVGGNKVSMNDLKMNIGELGYQNVVTYIN MKRYVALLRGINI GKNKVPMAELKKCFEALDFMDVKTCLN TRYVALLRGVNVGGRRVPMADLRRVLTELGYTDVKTLLQ MMKWIVLLRGI NVGGNKLPMAELRSLLEGMGCHDIKTY। Q RYVLLLRGINVGKNKVVMADLKKSLAEMGFEHPVSYIN MKTYI有LLRGINVGGHKVPMADLKQIFESLGYTSVKTYIN

 KYVLLLRGANVGGNKVAMSDLKDMISKLGYENVIDY: N MKTHLALLRGINVGHNMIKMDALKATLEN:GFKNVQTYI Q METKI AILRGINVGGRKI DMADLKTLMQNLGYENIQTYIQ MTTYISILRGI NVGHRMIKMEALKKICTDLNFTNVQTYI Q MTRYAALLRGINVGGNKVPMAELRKVMTGLGWGDVRTYLQ MTVYVALLRAVNVAGTALQMTELKTICEGLGFTDMKTYIQ MQTYI ALLRGINVGGHKIKMANLKLLFEELGLTNVSTY Q MAAY ALLRG: NVGGND:KMAELKRI FEALGLCEVQTY:Q
 MNRYIALLRGI NSGKNKISMSELKKGFAELGFTEITTYYN MTRYAALLRGINVGGRKVPMARLRALLEDLGFTEVATYLQ MTRYVALLRAVNI GGSSMVMTELKEVFVSCGFDGVATYIQ MTYYAALLRGINVGGKKVPMAELRTLLTGGGGADVATYYLQ MTDYi ALLRGI NVGGHKIKMADLRKMLEGMGLLTHVQTYi MKSYI ALLRGI NI GKNKI DMSELKASFVELGYSEVSTYLN KYi ALLRGI NVGGNKVSMHDLKNCFENAGFLNTRTYI N MPSYLAFLRGINVGGHKLPMQELDALDESLGCTNVKTYI Q MPVYVALLRAVNVGGTALPMAELKAI CERLGFANVETYI Q
 MITYUALLRGINVGGNIIKMAELKKTFEALGLFNVKTYY:
 MVMY ARVVGGNVMA Q mVMY ALLRGVNVGGNRVVMATLKERFEQHGFTNVSTYLN MTDYIALLRGINVGGHRIKMADLRHLDEKMGLDKVQTYIQ MEKYI ALLRGVNVGGNKISMPELKLAFEEDGFLDVITYI N MKTYI ALLRGINVGGHKVPMAELSELLTKSGFESVRTYIQ MTDYI ALLRGINVGKNRIKMADLKNLLETDGLEKVKTYUQ MSTYVALLRAVNLGRHRLAMSDLRALVAAAGHGDVATYLQ MT TYVALLRGI NVGKNRI KMADLKLAFEETGFSKVQTFIQ KIFVALFSGINVGGNRIKMADLRSFFEELGFGDVASYVQ MTTYI ALLRGINVGGHKIKMADLRSILEDSGLERVRTYUQ MPVHVALLRAINVGGAMLAMADLRAICEGLGFNDVKTYI Q MPVYUALLRAVNVGGTSLPMAELKALCEGLGFSDVKTYY Q MKTYTALFRGTNVGGNNLPMKGLVALLENGGLENVKAY: MAGYi ALLRGI NVGKNRIKMVDLKQLEVNMGFGEVQTY: Q Y A ALLRGINVGGNK:KMADLKKLDDMGLKKVKTY: TRUVLRAVNVGGAKLPMAELREI ATELGATDVSTY:A MKVY円ALLRGINVGGKKLPMADLRTMLNDMGFLNVKTYI Q MAKYVALLRGI NVGGNKMKMADLKVVVEKAGFSGVQTYVQ MSVKI ALLRGINVGGNKTKMADLREALTAMGLHEVQTYIQ


## UniRef90 L8EL29

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UniRef90-10KX18 UniRef90-10KXI8
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 SGNVILQSDLAPKELEHRVHALIKKHDGPTVAVVARTADE S GNVVI F DYA Q DPPVLDIEKCK E I L E E E F K F P I D L A L I D G E S




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 S G N V L F K S N E Q E E S LiR N RL E H QL EAA T F G F S V TVV V L R T S A E


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| UniRef90-V4N554 | DMTARNLRTVETLIGMARE |
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| UniRet90-C1AUE | N |
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| UniRef90-W1Q | Q $\\|$ T 1 R ${ }^{\text {a }}$ |
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| UniRef90-G8T141 | TATTRNWKTTNELFKMTTK |
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| UniRef90 A0 | N |
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| G2FZL9 | TRNW |
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UniRef90-A0A017HB98 UniRef90_K0K2S6 MK TY|I|ALI|RG|I|N|V|GGKVMKMAE|L|RAALENLTGMN|V|ETY|I|Q MTDF:ALLRGINVGGNIMKMNDLKSVLESLGLISEVGTY| MVKY:ALRG|NVGRNK|AMPQLRAAEEOKGFTKVMTY|N MKTYIVLLRGVMPGKNKIPMAFLKEIGGKGGFVNVKTYIQ
 MKKY AFLLGGVVGKNKI AMPLLKKAFEALGLSEVATYIN MAVYi ALLRGINVSGKKI KMEDLRSLLESMGLQQVRTYiQ MKTYIALLRGIINVGKKIKMVDLKAMFETMGCTSVQTYIQ MTTYYSMVRGINVGSKRLKMADLRDTYTFLGFKPVKTY/Q MSRQI ALLRGI NVGGHNFPKARQLALAESLGLKEVSVLLQ MkTYi VLLRGVMPGKNRVPMAQLRQVLADAGFQQVRTWi MKKYVALLRGI NTGKNKISMAELKKGFENLEFQEVKTYLN mTTYUALLRAINVGKNKITMDVLKQLFHTIGFAQVQTYIQ ALLRGVNGGIVNVKMADVREALIGAGFENVBTVLA MPKYDALLRGINVGGHKI KMTELKILFQKLSFSEVVSY! Q
 MTIYMALLRGYNVGTSLPMAELKAVCELGFTDVKI MATH YL NGGGKLPMAELREATELGADVSTYIA MEkKVAILRGI NVGGRKI DMADLkSLFEDGGKEVLTVL mTYYVAFLRGI NVGKHKIVMTQLKKLCEDLKLQQVKTYi M Q A F V $L$ L $L$ R $G$ MTKYA A A FL R G V N V G G R K V K M A E L K V V L Q E LD F F Q N I A T Y I Q M T K Y $\operatorname{V}$ A A




 MYTHLALLRGI NVGGNMIKMDVLKSLLENMGFQNVRTYY: Q
 $M T V F I A L L R G I N V G G H K V R M G D L V E L C R S L G B G A V R T H L Q$


 MTRYAAFLRGVNVGGVNLKMAEVAKALEEAGFTNVRTILA MTRYAAFLRGVNVGGVNLKMADVAAALTDAGFANVRTVLA MKKYDALLRG| NVGKNKISMSELKANFDELGFDEVSTYLN MTRYVGLLRGI NVGGVRIKMADLRDSMTALGYSDVKTVLA KYIALLRGINVGKNRIRMNELVDSFQALQFKNVKTYIQ MTRYVALLRGVNVGGITVRSARLAEMARGMGLDDVRTVLA MARTVALLRGI NVGGNKVPMAQLREVFGELGHEDIKTYVN MPVYI ALLRAI NVGGTKLAMTELKAICEKLGFTDVKTYI Q MERYI ALLRGI NVGGNKISMPELRQGFEELGYEQVVSHLN
 MA IYI ALLRGINVSGHKIKMAELRTIFAKMGLQQVQTYIQ MTRRVALLRGVNVNGTAI RSADLKALFEELGFGAVRTVLA TYVVLFRGVG GATQLPTKPLREALAKAGYANVATYIN M IDYVALLRGINVGGNKIKMADLREALIPLGLQNIRTYI Q MSTYIILFRGVGGATQLPTKPLREALTEAGFGNVATYIN MQMYVGLLRGVNVGGNKIKMADLKLLLENMGLTHVRTLLQ RRIVLVRAVNVGGVKLPMAELREMATELGASDVATYIA MSPRI LLRAVNVGGSTLPMADLRALIASELGATDVRTYIA MKRYVALLRGINVGGNKIAMTELKAGFSEIGLLEITTYLN KYIALLRGVNVGGNKVSMPELKAAFENAGFTEVSTYIN MTVYIGFLRGI NVGGNKIKMAELKKMLVTMGFVGAETYLQ MTTYAALLRGI NVAGHAVAMADLHAVFAGLGFAGПSTYLR RYALLFRGI NVGGNKI AMADLVKRVEELGYRQVETYIN TAYVALGRG1 NV SRNRIAMADLRALLTDLGDDDVTTYLQ MQTYI AFLLRGINVGGNKMPMLALRQALESFGFKNVRTYIQ YULLRSVNLGKRKVSMPELKKRLAALGYENVTSYIN MPRQ1 ALLRGINVGGNAFPKARQLELARSLGFEEVSVLLQ MTEWI ALLRGVNVGGDTTRSAELRTVFEGLGFDHVRTVLA MSTRIVLIRAVNVGGAKLPMADLRSIATELGATDVSTYIA MPVY CLLRGVNVGYNKIKMEELRALCTKLKFEGAQTF: MTGYVALLRGINVGPTRLPMQDLRRLDEEIGGTSVRTHLQ MKKSI ALLRGINVGGRKV DMQDLKLLFENIGYAEVSTYIQ YiALLRGINVGGNLIKMTQLKAIFEDIGFQNVKTY:Q MASYVALLRAVNVGGTKLPMAELKAMCVAEGFEKVQTY:A MNRYTILLRGVNVGGNLLPMKELKALLENNGFNNVTTYI Q MTRHIALLRGINIGKNKISMPELKAALIEKGFSEVSTYLN MPRRVVLIRAINVGGAKLPMADLREMAAEDGATDISTYIA MTRYSVFLRGVNVGGVNLKMAEVAAAFREAGFDDVKTLLA MI YI ALLRGINVGGNMIKMVELKRILGEMGGNRVQTYIQ MRKYI ALELRGINVGGNGLPMKELAALCSGLGFGQVRTYY: RHLALLRGINVGHNLIKMEQLKNJLETAGFQNVETYI Q YiALLRGINVGGRKVQMNLLRIAFEDAGFTNVRTYIIN MARYVALLRGVNVGKNKLPMALLREADEATPDYDVTTY: Q MKRYVALLRGINVGGNKLVMTELKKEMTILGFTEVVTYLN MTAYVLLFRGVG GATQLPTGPLRAALSEAGFARVATYI N


## UniRef90 E4RUJ1

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UniRef90_K6X8W8 UniRef90_K6X8W8
UniRef90_A8LUY8 UniRef90_S7WUL8 UniRef90_UPI00047D0255 UniRef90_V6IUH5 UniRef90-I3C3P0 UniRef90_J5DV77 UniRef90_E8X403
UniRef90 C7PXQ0 UniRef90_UPI0003A22FEE UniRef90-N1WBX2 UniRef90_D1CIT7 UniRef90_UPI00047ADA4F UniRef90_E4T153
UniRef90 H8XSM8 UniRef90_H8XSM8
UniRef90_UPI000479F82A UniRef90_V6SMQ6 UniRef90_B8GEP5
UniRef90_U1HET6 UniRef90_U1HET6
UniRef90_A0A059N UniRef90-L7LNA8
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UniRef90_Q3Z6Q2 UniRef90_UPI00035D8959 UniRef90_E3J6X6 UniRef90_G5JRT3 UniRef90_A0A010ZN13 UniRef90_W0AIY5 UniRef90_UPI00047B8703 UniRef90-E3H033
UniRef90-X0P263 UniRef90_XOP263
UniRef90_UPI0003 UniRef90_M0QHW0 UniRef90_Q1IUC9 UniRef90_UPI000365AD48 UniRef90_UPI000248E7F7 UniRef90_U2N6Q6 UniRef90-A0A011U5J8 UniRef90_B1KJL4 UniRef90_I0X8W8 UniRef90_K6WQ41 UniRef90_UPIO0036EDA5F UniRef90_W7YIN5 UniRef90_GOA8J3
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UniRef90_R3W660 UniRef90_R3W660
UniRef90_A0A017HB98 UniRef90_K0K2S6

## NZ8

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## E



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## UniRef90 E4RUJ1

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UniRet90 U1HET6 UniRef90-U1HET6
UniRef90 A0A059MNZ UniRef90-L7LNA8 UniRef90-T2KQE9 UniRef90-LOJOR6 UniRef90-W4HY14 UniRef90-UPIO0047E6210 UniRef90 UPIIOOO368833DD UniRef90_UPI00028834A5 UniRef90-C5C6E3 UniRef90-UPIOOO4032843 UniRef90_UPIO003770A40 UniRef90-R2PRM4 UniRef90-M1MMU2 UniRef90-R4K095 UniRef90-H3SA50 UniRef90- J2L1T8 UniRef90-UP10002D6FC2E UniRef90-W7SCE3 UniRef90-HOHVU1 UniRef90-SgUSW2 UniRef90-M3V5U8 UniRef90-E2S816 UniRef90_W7BH11
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UniRef90 XOP263 UniRef90-UPIO003B473EE UniRef90 MOQHWO UniRef90-Q1IUC9 UniRef90-UPIO00365AD48 UniRef90-UPIIO00248E7F7 UniRef90-U2N6Q6 UniRef90 AOAO11U5J8 UniRef90-B1KJL4 UniRef90-10X8W8 UniRef90-K6WQ41 UniRef90-UPHOOM36EDA5F UniRef90-WTYINS UniRef90-R2RFF2

## UniRef90-G2Z3N2

 UniRef90-Q38Z16 UniRef90O Q26EY9UniRef9- R3W60 UniRef90-R3W660
UniRef90-A0A017HB98 UniRef90-KoK2S6

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 KNQNNKYKIIGQEVVLLFHNSDRNSKLANNLH
 AFAPERMRATGREVYDDMPDGDHRAKDPLSKLVERRAPG

 KADFERVYPYKDVVFWS FDRKEHQKTNWWAKTAKPKVKD AFAPDQYRLIGRELYLWCPGGDGRSK LAETVSRARLGV DFAPEKLSLNSTAGY MYGPQAYSDSKLSNNFLERKLKV APEEHLVLTDTAAYF VATNGYGKTKDTNALADEQKLHV KYKNERFFIGRDYIYGKCLAGMG KAKLGTNIGEKRLGV VLDPENDAVGDRVVYQWCPDGDGSNAPVDGPWLERRWKV KSEGEGCHIEGRVVYLFF KKSDRNSKLMNQF QKLHT DFGDDVRRVDGSLHRYADGAGRK RPGAPADARGLGV TLGADRIMVRAGTCYLWFADGPRNHSPLGRVLSADKLGV SFDNEEFVIADTCIYYKK CKAGYGKAKLNNNLDERKLKV D GEDQYKIVGRDVYLLFHHSDRNSKLAYQVEDEKKLSS TGPDEKVRRGDGVIYW QVAKGGTLDSSVGKTMGKPRYKS
 EYGPNTFAFGTREVYSWYPEGVSATKSELVGQKKRYAPGV RQAGERFTLRGRTFYFHAPNGVGRSKDFAS I EALGGV DTGRDEYRIVGRETYWFFNQSMLDSKLPRKLQKIG
 VKPDEASVDASRTYTKYDVEGAGKTKFDQKYUEKKLNV AGPDRYVIVGREVYLVFCPDGYGRTTFTTTFFEKTLGI DPAVERVARGNGVLYW DVERGQTVKSAFGRNTGKPRYKA


## A



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













 E T G E D K Y K AS QTEERFELLLDK IF Y L H A P D G I GGR SKM VAN
 $P$ VGN E L DS RGHGVVLYW QVARGDTMSSAA SKTMGKKR YK S RNENENYRNNGREI YFLFRNSVRNSKLAAHMH


 NAAYEKVFSYKETIFWS F $\square R K E H Q K T N W W S R T A R S N V V D$

UniRef90 UPI000478C01A

| UniRef90 E4RUJ1 | K G T T R N WK T S T K L |
| :---: | :---: |
| UniRef90-K6UBQ8 | L VTVRNWKT I N K L Y Tli A K |
| niRef90_S0SB29 | R N A N TVKKLLAMSK |
| UniRef90_G0J6M7 | KATTRNLK TVRKLCELS Q |
| UniRef90_UPI00039 | AT T R N F NTL S KLVAMAE |
| UniRef90_UPI00035E3895 | TCTARNWNTVTRLAEL |
| UniRef90-R2R629 | QVT $\square$ R N A N T I N K L L L M S Q |
| UniRef90_F8FG98 | M ATTRNEATVRKLLDMGR |
| UniRef90-UPI0004712853 | P A T T R N L R T M T KLI ELL |
| UniRef90-F0T609 | NATTR NWKTVNKLLEI A |
| UniRef90-TOVGT2 | Q L T $\square R \mathrm{~T}$ A NTVRKIVD |
| UniRef90_J1S0W5 | TATARNWNTVTKLLA |
| UniRef90_J1FMS9 | A ATTRNFNTI SKMIEWAE |
| UniRef90_UPI00047E3DC8 | K LT $\square$ R T A N T I K K I V S M |
| UniRef90-K1HP73 | V A T T R N Y K T CLLKL L E L A |
| UniRef90-M2XG52 | T T T N R N L R T L R K L L |
| UniRef90_UPI0003670922 | NATARNHKT TLLKLLELA |
| UniRef90_W7IUD0 | AVTGRNWNTVGKL A A L L |
| UniRef90-F2A6X8 | P GTSRNLNTVRKL |
| UniRef90-J8EVB5 | PATVRNWRTVNKLKA |
| UniRef90-K6X8W8 | Q GTGRNLRTVRKLLDLT |
| UniRef90_A8LUY8 | SMTMRNWNTVRKLLCLA |
| UniRef90-S7WUL8 | RATTR NLL TVAKLCELS Q |
| UniRef90_UPI00047D0255 | LAT T R N Y R TLT T K L |
| UniRef90-V6IUH5 | P S T T R NWK T |
| UniRef90-13C3P0 | QATTRNWKTMMKLLEMLD |
| UniRef90_J5DV77 | STTTRNLRTLDKVL |
| UniRef90_E8X403 | V S T A R N W T I G K L L E M M E |
| UniRef90-C7PXQ0 | KATTRNWKSVTTLHDM |
| UniRef90_UPI0003A2 | VA T A R N WNTVTKL L A L L E |
| UniRef90-N1WBX2 | A A T R NWKTI VALLCALS S |
| UniRef90-D1CIT7 | P GTARNWRTV CRLLEMVD |
| UniRef90_UPI00047 | P A T M N WKTIVKMDELAR |
| UniRef90_E4T153 | FATARNHSTTTKLLT |
| UniRef90-H8XSM8 | $\square \mathrm{AT} \square \mathrm{RNWNTV}$ W K L L E M |
| UniRef90_UPI000479 | TATSRNWNTVNKL |
| UniRef90_V6SMQ6 | T A T $\square$ R NWNTV SN |
| UniRef90-B8GEP5 |  |
| UniRef90_U1HET6 | NGTARNINTI A K L A ELbA |
| UniRef90_A0A059MNZ8 | V T T T R NL R T L R |
| UniRef90_L7LNA8 | T G T GRNLL T T A K L |
| UniRef90_T2KQE9 | SATTRNFKTMQKLL S L |
| UniRef90-L0J0R6 | STTTRNLRTVEKVL |
| UniRef90-W4HY14 | S T T T R NLR T L D K V L K |
| UniRef90-UPI00047E6210 | K $\quad$ T $\square$ R T A NT T V K K L V N |
| UniRef90_UPI000368A35D | PVTNRNLNTLHKLL |
| UniRef90_UPI00028834A5 | $\square \mathrm{A}$ T T R NWK TVNRLF |
| UniRef90-C5C6E3 | STTNRNLRTLRKL |
| UniRef90_UPI0004032843 | VLT A R N WRTVEKL |
| UniRef90_UPI0003770A40 |  |
| UniRef90_R2PRM4 | N $\square$ T $\mathrm{I}_{\text {R T A N T L }}$ |
| UniRef90-M1MMU2 | A T TVVRWK T L S K L N S L A K |
| UniRef90_R4K095 | TV V N WK T I N K L M L L A K |
| UniRef90-H3SA50 | PSTTR NWNTVKKL S A M A Q |
| UniRef90-J2L1T8 | S T T T R N L R TVVEKL L |
| UniRef90-UPI0002D | VS TARNWNTVRAL ESLL |
| UniRef90- W7SCE3 | PATVVRNWKTI MKL T T M |
| UniRef90-H0HVU1 | P NTARNWNTVLKL K E L |
| UniRef90-S9USW2 | NVTTRNWNTMTKLAALA G |
| UniRef90-M3V5U8 | Q GTARNLRTVRALLELAR |
| UniRef90-E2S816 | PGTARNLNTVTKLI ELL |
| UniRef90-W7BH11 | LI T TR T A NTVKKI A |
| UniRef90-Q3Z6Q2 | Ni T $\square$ R N A N T I K K L L Q |
| UniRef90_UPI00035D85 | RVTTRNWNTMTKLSEM |
| UniRef90_E3J6X6 | T GTT R NWRTVVAL R D |
| UniRef90-G5JRT3 | E $\square$ T $\square$ R N H K T Y A K L A D Y L |
| UniRef90_A0A010ZN13 | A GTARNWNTLS KL LTTMLD |
| UniRef90_W0AIY5 | TVTTARNLKSVEAI DALLL |
| UniRef90-UPI00047B8703 | VATARNYRTMQKVLALVD |
| UniRef90-E3H033 | QLT L R N A K T Y N K I L DLL D |
| UniRef90-X0P263 | TATARNWNTVTKLLALAD |
| UniRef90_UPI0003B473EE | TTTNRNLRTLVKLLA |
| UniRef90_M0QHW0 | TGTGRNLLTVVRKLI D L A D |
| UniRef90-Q1IUC9 | TATARNFNSVMKILEIA |
| UniRef90_UPI000365AD48 | T A T A R NWNTVTRLIA M M |
| UniRef90_UPI000248E7F7 | SATTRNWKTSQKLAELL |
| UniRef90_U2N6Q6 | SATTRNWK T I N K I R D L V |
| UniRef90_A0A011U5J8 | GGTARNDNTIAKLAELA |
| UniRef90-B1KJL4 | RATGRNLNTINKLNEMMD |
| UniRef90-10X8W8 | $\mathrm{M} \square \mathrm{T} \square \mathrm{RTANT} \mathrm{L}$ R K I A E M |
| UniRef90-K6WQ41 | Q GTGRNLK T I R K L I E L A |
| UniRef90_UPI00036EDA5F | STTTRNLRTVEKVLA |
| UniRef90_W7YIN5 | PATVRNWKTI R K L V T L V D |
| UniRef90-G0A8J3 | $\square \mathrm{A}$ TVVR $\square \square \mathrm{NTV}$ T K L L A L A |
| UniRef90_R2RFF2 | QVTI R N S N TVVK L L Q M S Q |
| UniRef90_G2Z3N2 | TATI R NWNTV SKLLELL |
| UniRef90-Q38ZI6 | W $\square$ TIR NANTARKL A ALA Q |
| UniRef90-Q26EY9 | RSTMRNYNTTLKLLTEL |
| UniRef90_R3W660 | S $\square$ T $\square$ R T A N T V K K I A |
| UniRef90-A0A017HB98 | P NTARNWNTVRRLLELLDD |
| UniRef90-K0K2S6 | VSTTRNWKSVLTL TELLV |
|  |  |

UniRef90 10 H 3 K 6 UniRef90-A0Ао24K3Q2 UniRef90-UP100047D92B9 UniRef90-D7UX93 UniRef90_R7M782 UniRef90-UPIOO2026CD664 UniRefefo-J3C5D1 UniRef90-H5TTW3 UniRef90 UPIOOO16C4B68 UniRef90-W0Z9U22 UniRef90-Q2NC07
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UniRef90-UPIO0036D6D73 UniRef90-DoLVR3 UniRef90-UPIoo0363253D UniRef90-B7IJG7 UniRef90-UPI00047A23AF UniRef90 L8TVW8 Uniref90-G8X635
UniRef90-A3VDS9 UniRef90-V5XBW8 UniRef90-FOM5S4 UniRef90-UPIoo0476240F UniRef90-F5YV86 UniRef90-UP1000046F4BBE UniRef90_UP100037ECFB7
UniRef90-UP1000380BB64 UniRef90-X6D686 UniRef90-F6EKT6 UniRef90-A2TV60 UniRef90_K9DWU3 UniRef90-D1BU02 UniRef90 UPIOOO376D237 UniRef90-W7VYA5 UniRef90-M7АЗ72 UniRef90-D6ZFE3 UniRef90- $55 L 161$
UniRef90 UniRef90-G5KEZ5 UniRef90-ETREK5 UniRef90_KOUIT9

MTRYAVLLRG| NVGRNRIAMADL|RELLTGAGYAN|V|ATTL|Q MTKYAVFLRGVNVGGVNLKMADVAAALTDAGFGAVARTVAA
 K Y I V L L R GI N I G K N K I S M N E L K A GL E K I G F E N V S T Y L R WA A L L K G V N L N E E R K L P M A D L K A L V V E W L G Y R D V T T L L L A
 $M T R R A V M I R A I N V G G A Q V P M K E L R S I A R D L G A T D V A T Y I A$
 MPRYLALLGSINVGGNRIKMIDLKAALEGAGFEDVATVAA MT THLALLRGINVGHNMMKMDLLKTTLEK DGFANVETYIQ


 $M A T Y V A L L R G I N V G G N K L P M A E L R D L F A T L G H P G A R T Y I Q Q$ M N N WL LLERGIINVGGNNIPMKKLTEVLMSMGCAEVKTYI Q MGAFVALLRAVNVGGTKLPMSELKVI CEELGFSAVATYIAA MPSHVALLRGINVGGRKLPMAQLRAVLESLGHRDVATYI Q

 M A R L L V $\operatorname{F}$ L I 1 MKRYI ALLRGI NVGKNKIVMTELKTGFEELDFVEVTTHLN

 MPRYAVFLRGVNVGGVNLKMAEVAKAFTEAGFDNVITILA MTTYVAFLRAVNVGGTKLPMADLRAMCES\|GLTNVRTYIA
 K Y I A L L R G I N I G K N K I S M S E L K L E L L E K N K Y Q N V S T Y L N


 RYAALL R GVNVGGDRI KMAELKACVEALGHTNVKTVLAA




Y L L L L R GI $\operatorname{NVVGGNRVPMATLRDLLTTAGFTAVRSYIN}$ M GRRRI I L L R A V V N V G G A K L P M A D L
 T A Y I V L F R G V G G A T Q L P V MK T Y I L L L R GI N VGG R K I K M A D L K L L L S S L D L K E I R T Y I Q
 MT A YVALLRAVNVGGTKLPMTELKAMCEEDGFAQVKTYIA

 MVRYI ALLRGI NI GKNKI SMQKLKECFEELSFHEVKTYLN M K I Y L L L L R GII NL G N N K V S M P I L R R Q Q L E T I G L E E V S S Y I S






 1 ALLRGINVGGHKMPMAALKVLLSGIGLSGVVTYIQ MAKFAAFLRGVNVGGVNLKMAEVATALTDAGFCNVRTILA $M T R W V A L L R G V N V G G V K V A M A D L R A A A E G L G W R D A Q T Y I A$ MS Q FVLLLRGVNVGANNLPMAELRAMLKGIGCRAVATYVQ MS H Y VVLLRGI NVGGRRVPMQALIRALAAEL GCRDAQTYVA $M T D Y V$ A L L R G I N V G G H K I K K M A D L K K R L
 $M K K$ H L A LL L R G I


 $M V R Y A A F L R G V N V G G V N L K M A D V A A T L D T Q A G F T G V R T V L A$ TLHLALLRGINVGGNNI RMADLKAAFAALGFGAVQTYIQ R H V A L L R Gli NV G G R R V P M K D L K K A T F F E R L G F P E V R T Y V Q K Y V A F F F R G I N V G G N $V$ I V K M T K T FVALFSGINVGGNRINMAELRSFFEDLGFSDVATYVQ MGSRIHLVVRAI NVGGAKLPMAELRADAAALGASDVRTYIA M N T Y I C L L R GI N V G G H K I K M A D L K T L L L T S L G Y N DVVVT Y I Q MTRYI ALL R GVVNVGRKRI AMADLVRKVVESLGYTGVRSLLN MSTYVVLLRAVNVGGTKLPMADLRRLAEDAGFTGARTYIA





$K Y$ V A L L R G I N V G G N K V

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LI |EERFGF
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SGNVVFKSRETADTLKGKIANKIEDHFGFEVKIVLTDFER SGNVVFETEDTNRDRVGKLETKMYKEYGYDVVIYMMDIDND

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 $M T \square Y V A L L R G V N V G G N R L P M K N W R E S L E T Q G F A K V R T Y I Q$ MSARVLLLRGINVGGNKVPMADLRALLTDLGHTGVSTHLN FIILLRGVNVGGNRVPMSVLKQYLIDTGFTNVRSHIN MTRRVILI RAVNVGGAKLPMAELRSIAADLGATDISTYIA MPSYAVLLRGVNLGKRKVPMARLRELLSGMGFDDVRTELQ M H P Y V AL L R AVVNVGGTKLPMSELKAMCDAQGFVAVQTYIA $M T R F V A L L R G V N V G G V T V K S A E L A E L F R S L G F D G V K T V L A$ MK K Y L A FL R GI NI GKNKI S MAELKTELEAAGFQEVSTYLN



 HI ALI R GI NVGRNKV AMADLRALLTDLGYGDVRTLLQ MS R Y L V L L R GI NVGGGNLI GMPALKAAFEAQAFDDVVTYI Q M K Q Y I AL L R GI NI G K N KI S M P L L K E A F E K K G F S E V K T Y I N MTRYVALLRGINLGHRRVAMADLRSLLAGLGYGDVATHLQ R F V L L L R G I NV G G R R V P M A D L R R V L L T D L

 K Y I A L L R GVMMPGKNKVMMA DL N E V V S K A G Y D N V T T T Y I Q T R Y IV V L F R GVVG G A T Q L P V MSTYVVLIRGINVGGNLVPMKDLKLRLQDAGYENVETYI Q MTNYVALLRGINVGGNVISMGALKECFTDAGFADVVTYIQQ




 Y V A L L R G I N V G G N K V D M K Q L K Q A A F E E A G M S S V V
 MTA Y I A ALL L R A V $V$ A L L R G V N V G A H K V P M A R L R E L A A A G L G H R A V R T H L N $M$ K N H I V V F L R GI N V G A K K I K M V TPYVALLRGINVGGRNVRMPELVACFSDAGYGDVSTYLQQ
 $M \operatorname{K} R$ V $A$ MTKYI SI L R GIINVGGRKI LMKDLKELVHNLGFLNVETYI Q MKTYVALLRAVNVGGNKVPMKELKEAFEKFGY!NVKTYIN





 MATWIVLFRGVGGGATLPVKPLAAALTEAGFDSVETYI N





 $M T R Y A A L L R G V N V G G D T M K M A D V R D A D E A A G F A G V T T V L A$ MSPHDALLRGVNVGGRKVLKDDLLGLAKDLGFDDAKTLLA MSAVVALLRAVNVGGRTVKAA QLRAAAEGLGHTDVATYAN

 MKKY IAFLR GI NVGNDRIKMSDLKKAFDDMGFHNATTYLQ

 Y I C L L R GVVNVGKNKVSMSDLKTELENNGYRNVCTYLN
 KYVALLRGINVGGNKVSMAELKTVFERCGFSDVRTYIN

 MT TYVALLYSIVLGGRRVVMSDLARMAADLGLADPRTLVA

 MTTYI ALLRAVNVGGTKLPMAELKAMCERAGFAAVQTYIA K R Y I A L L R GI NVGRKRI A M A DL R QL V V E L L G Y T G V V R S V L N
 $R Y V A L L R G I N V G G R R V P M A D L R E V L A G L G H R A P V T H L Q$ MT THLALLRGINVGHNMMKMEALKTMLENIGGTNVRTYLQ Y I A L L R G I NV G G N K I E M K K L K Q T F E N T G M G H V T T Y I I

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

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UniRef90 A5KT25 UniRef90-A3U763 UniRef90 ${ }^{-}$C8X144 UniRef90-B4UKU7 UniRef90-R2VEK4 UniRef90-D7B1H6 UniRef90-UP10003743C8B UniRef90-G4R7Z3 UniRef90-A0JXY0 UniRef90-UPIO00414AB9B UniRef90-K2NXD2
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UniRefon-UPIOOO475CB1D UniRef90-UPIOOO475CB1D
UniRef90-UP100037C95EA UniRef90-E6TN18
UniRef90-A5PB89 UniRef90-UP10002FO1BB2 UniRef90-UP10000422E537 UniRet90-EORJJ57 UniRef90-L7LCPO UniRef90_M5PIH1 UniRef90-UP100041E1E59 UniRef90_A0A011USK5

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SGNVVFTTKKTGAQVKAGLEAELAKFAGKPVGVIVRTAEE
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 T G NVVVFE S DK NDS EI K I I L E K V L S E T F H Y QVVFVL L Y A Y DV S GNVVCTS GLDTADELLKSHSEQLLARERFGYDAWVVVLEFRT

 S GNAVL T A T S
S GNVI FE
S GNVVFRTKGDAATLAKAQI EMAFEKKWGFHSRIMMVRDDSW
S G NVVFESKASSRRVVKSELVARLLAYA GKPVAVGVRTADE
 S G N V V F E T R K S E A A I K A A L E K R LIE T Y A GK PVVGVLVVRS GA E
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 MARVAA DNPFPKAKPN YTQVAGFLDHAPPA DALASVVRRQ
 LA DIV A DNP LLP LA ND HARLFAFIL H GEAPRQLVESLCAK
 L R A VAA R CPY DTAALDPAKLLVVFFLDGAPDRAADARLDA D L E L C F K N S P Y L K E K D I D T K Y V A F V A T E L K K E N I N DL K I S Q

$L R D A L A A Y P ~ F$
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SQNLEKIEEFENVIFW FTARKAYKCHWWKKTASPGIAE SQNLEKIEVFENVIFW TFDRKAYRKCHWWKKTASPGUAE

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$K$ KEYEKIAHSGNVIFWSAP RKTFNKARWSK I ASSSVNP AHPRERMAVVGDQVYTHHEDGLRHARDPDTHALVARHVDG FAPDLWTLSGRDEVYHVYYPGGTQAARLTHALLERRLG\| LDGTQQQRLGPEAMAWLAPAG GTDDSPFSRLSSKARYKS

 $G L E P G L T V L G P E A A A W W A P$ RGGTLESPLSKLTAKPRFKN
ASAGELIEAAGDA NTGPEQFA 1 DGVVLYYYPPQGAPESKL EDDDQVFYVPG ALLWAVDRQLVTRSGM MKLAGSALYK ELKDEVLYFGKDGI FWGNFDKKPTDKDPITR
SEIDRVNYVPGAILWS VDKDQVTKSGMVK IVGSPLYK KAEDEQYFMTADVVYLGYCPSGYGKTKLTNNFLGNKLNV NPEDDTAWAGPGALYYRRLSALATGKSRLGRTVVGTPIYAA HRNREELALGRREI YVFYADGПG AHAPDDYRI GDRVLYLHTPDGLSRSADATELLRSARLPGL TFANEDFIITDSCIYLKRGNAGYGKAKMNNNLVEKKLKL NTPDDFLVLGPEAAAWLAPGRGGTDESPLSKLTAKPRFKN DFGDEELHQGSQCLYMYLPGEAK KKKLNTNFLEKKLGN VTEHESMYVYKNVFYWRAKLS AFQKTVLSK FASSKVNN
TGANEKDHRGDGVYW QVPKGATLDSTI GRTMGKKRYKA
 KPAYEKVAVNGPFVFWSAPVGKTFGRTRWSTVVAKGDGYQ R DEEGLGPREVFDHYPSGMG RSRLWLAGME N DEQLQLGRREIYVAYGSGMGNSR PNTYTVKYV PGALLWS VAKKNVTKSGMAK TVGTKMYK DSKDDRFKIVNSEYYLDCPGGFGRTKLTNNFFERKLKT AAATEHVAVIGADLHLRYDDGAA GTKLTPAVIKRTLGH S PDQAAVVGR KEGYYVSLKAGVSDSVYSNKFVEKVLQV
 VKPNEQURGGTREFFVEYPDGAGLESMADTRLRDPGGR VKPPERFSVGKHAAYLLACASGILLESKAGEALIGKAGK TDEVVRLGSQVIYCHYPSGMGRSK PFKLSKDKASD TPGDGTLLFAPHAV YLFAVDRADAGRSGMNK LIGSKLYA LDESEQLAAGDGVLYW QVPKSQTDGSPVGKTTGKKRYKS RYGE EVVVWHGTEAYVHYPTGQG RAVRGTLDVLSRAAGR KPEDETVKYAPGAVLWADDK NVTKGSMTK KGGGTKLYK TEEEPVISGGNTVIYWKVPKGESLTTPFAKDTAKAKYKS SAGEPVQALDSTALVWQAPSGGTLDSPGNAFSNRARIRS SDADEQ DASDREIYVHYASGQGRSRDKDEAQ VASTSTKD SDALIEK MEYNNFIYWS FDLLKNYKANWWVKTASTSTKD WGEEAALHLTERCAYYYYSPKGYKNTRLTNNALERYKR


 GKKNEVLADGKREIYVHYGDGMADSK RLS MDKDP AAA EWGREALALGRRAAYVWCPEGVLDSAAAAALGKQ DGD DGVDE V WPGPGVVYFTRVSAERTR SMMNRIVGKPEYR
 FKPDEASDDGNR FIDKYAV GAGGKTRLEGKYIEKKLNV PGDGHVIYTGGAVLYKSVSKEQVTKSGLTKKLVGKKLYQ



| UniRef90 UPI0002F50C2D | $\mathrm{T} \square \mathrm{~T} \text { A R N M R T }{ }^{170} \mathrm{~V} / \mathrm{R}\|\mathrm{~V}\| \mathrm{AELL} \mathrm{~L} \mathrm{D}$ |
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| UniRef90-F5XTW2 |  |
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| UniRef90_C6WPF8 | RATARNWNTVLALRD |
| UniRef90_U5S7G8 | K V T $\square$ R NRNTTHKLLNYLE |
| UniRef90-D0L7C1 | QGTGRNLRTVSKLI ELLA |
| UniRef90_F4CVK3 | TVTGRNWNTVTKL AVML |
| UniRef90_W0PJ02 | NGTARNMNTV VKL A S ML |
| UniRef90_UPI0003B43150 | ATTTRNLRTLRKLL |
| UniRef90_UPI000362C742 | $\mathrm{K} \mathrm{L} T \mathrm{~T}$ R T A N TV K R V |
| UniRef90_UPI000255CB16 | RMTVRNWRTTTRLQELV |
| UniRef90_UPI0004115A02 | T A T I R NWNSVTNLLKMYEE |
| UniRef90_A5KT25 | TTTNRNDNTLEKMV |
| UniRef90_A3U763 | S IT A R N Y K TV S KLI TL S |
| UniRef90-C8XI44 | AVTLR N WNTATKLAELA |
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| UniRef90_R2VEK4 | HVTIR NANTVNKLLHL |
| UniRef90-D7B1H6 | TVTGRNWRTVLRLLEMAE |
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| UniRef90_A0JXY0 |  |
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| UniRef90-K2NXD2 | A MTARNWRS MLLAL AK L A R |
| UniRef90-B8KLY8 | SATGRNLNTVSKI QLMLD |
| UniRef90_UPI0002897BA0 | RMTVRNWRTTLKLLRDLLEQ |
| UniRef90_UPI000467DD9F | STTTRNLRTLLQKVLA |
| UniRef90_S9R8A8 | PVTARNWRTVLKL HELV |
| UniRef90-X1PZC3 | A ATARNWNTVLKL G Q L AEQ |
| UniRef90-W3AG33 |  |
| UniRef90-H0R3G1 | QGTGRNLNTVAKL DELAE |
| UniRef90-I0W236 |  |
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| UniRef90_J3HP88 | A ATARNWNSVLKL Q A L A |
| UniRef90-W7DG17 | RATARNWNTVLKMSEKLN |
| UniRef90-UPI000370E331 | P A TVR NFKTL HKLIDLA D |
| UniRef90-14BN45 | S T T T R N L R T L D KVL |
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| UniRef90-T1B9T1 | A ATTRNWATVLKLQALDA |
| UniRef90_UPI0004189877 | STTTRNDRTMIKVRDAA |
| UniRef90-A3JMZ4 | Y GTVRNMNTVAKLVSMAHQ |
| UniRef90_UPI000378ECD2 | QMTVRNVNTTRKILKLMRE |
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| UniRef90-R4PK76 | QMT $\square$ R NVNTA RKLAELLVQ |
| UniRef90_V7GLV0 | P GTARN |
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| UniRef90_UPI000361D506 | VGTSRNWNTVRRL G D M V |
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| UniRef90_UPI000475CB1D | EGTARNDNTITKLAAMAAE |
| UniRef90_UPI00037C95EA | GTTSRNWNTLLKL H G L C |
| UniRef90_E6TNI8 | $\square \mathrm{MT} \square \mathrm{RNWAT}$ TS QMLS L D |
| UniRef90-A5PB89 | RGTARNMTSLKRILGKME |
| UniRef90_UPI0002F01BB2 | LA T A R NWRTVT KLRELA GE |
| UniRef90-UPI000422E537 | I VTMRNWNTIT NL LTM |
| UniRef90-E0RJ57 | QMTVRNVNTTRKLMQMAEQ |
| UniRef90_L7LCP0 | $P \mathrm{GTARNLLRTVTTL}$ |
| UniRef90-M5PIH1 | L V S $\square$ R N FK T A Y Y L A |
| UniRef90_UPI00041E1E59 | TGTSRNLRTVATLIDRA |
| UniRef90 A0A011USK5 |  |

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UniRef90_S3WWP7 UniRef90_UPI0002F0AC18
 Y V A L L L R Glil N V G G N K I

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


 $R$ Y VA F L G S I NVVGGN R L K M V
 MSRSVLLLRAVNVGRNRVPMARLRELLTAAELNDVSTYIAA


 K Y V V S L R G I N I G K N K I A M M C E L K E L L K K N N N Y K N V V T Y L N M Q T Y L L L L R Gll MTSYVALLRAVNVGGTKLPMTELRTICENCGFQDVRTYIA R Y I S L L R GI NV G G N K I A M P V L K K A G F V MPAYAAFLRAVNVGGTKLAMADLRAMTEATGAGNVQTYIA MTAYVALLFAVNVGGRKVPSTALRDLAGDLGLAHARTVVN
 MARHDALLRAVNVGGTKLPMAELVAMCQAEGFTGVRTVLAB WIIL L R GI NVGGGKRVRMADD K EAALEAAAGIDEV K S YI Q $M T R Y A V F L R G V N V G G V A V T M A D L R R V L A D L P L G Q V S T B L A$
 K P Y I A L L R GVMMPGKN RI P M A D L Q E L L S S E F E GVVRTYI Q MTRYAALLRGVNVGGRRVPMADLMRVLAGLGHTGAATLLQ $M R P L A V L L R A V N V G G R T L K M D E W R A L L A A E G F E E P E T Q L D$ MTAYVALLRGINVGGRNVDMTELAALVEGLGNTDVSTHSA



 M T M MS K AFLRAINITNHFVKMEELRDVLVAHGFSNVQTYIQ PA Y $\quad$ A MTRYVALFGSINVGGNRVTMADLRWAFEREGLTGLETVVA

 HVVLLRGINVGGDNIKMVDLRQALSQAGFEPVRTVLA

 KYCAFLRGVNVKGTNMKMADVCQVFKEAGMQDVSSVLAA MEKYVALLRAVNVGKNKVNMKNLKAALQEEGFQNVITYYIQ






 MS K Y VALL R G I NV G H H KV P MAEELRKEMENLDFEKV DT IL N RWIVLLRAVNVGGTKLPMAPLRAALTEAGAANVAS YI Q
 I GLL R A V NVGG G T L T S A V L R A TA S D L G Y R DVVVTYAA


 MPSY I AF L R AVNVGGTKLPMAELRAMCES GLLTGVRTYIA

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




 $M R T Y I$ AL L Y SIV VLTQRRVVMA DLIKAMAE GLGFANLIRTLAA




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 S G N I I F S S E Q S NE E L S L QL E Q AI L E D F S L P I RVIVVRN IT E
 S GNVI FESNQDPKTVFLAITTGLEKNFDFEIPTLVKTEKE
 S GN A V F S S P L D E A GVVR G S L A A K S L H A Y A G K P V G G L V R T A A E S GN A V F R A A EA P E VL A A RI $\operatorname{S}$ S H G L A R R F G DA TP V L L R S LA Q S G NVV F E S R L A E A TVVK A R I E S G L Q A Y A G KP V G V L I R T GP E
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 S G NiV C T A D A S AP E L K A MME S L L R E R F G Y D A WVV V F S L G Q
 T G N I I A E H E E T N H E T D DQ K V E R F I K H H H F D L D V P V V A F H V T E S G N V I LLD S D D S K E N V A S N I



 S GNLVVVAPASSPDDVARLVRRGVAERFDVDTAVAVLTAER S GNI I FSS DDSAENLLKTKLEKKLLSEYFDYEAFLGI RNEAE S G N VVVF D S D A S P A K VVK A A L E R R L L G Y A G K P V G V LVVR S P A E S GNLI A GRGGTEDEVVALI E GAFKERFGFHSEAMLRTVEQ S GNVVCTFAGSSADLKEMVERALRDGFGYDAWVVVLTAER S G N V A F T G S G G E E E L



S GNVLFAAPSTPGRLDEALETRLLAERFGFADPTDVRSHDE S GNVICET DLS DE QL S QLI H Q TVVKEKDGA ELAVI I TN Q S E S G NVVAF ESSD GARA S L E S S D I EA L L V R L L E S P P V V V V R S H R Q


S G N V V $V$ F E A A LDE E V
 S G NVVV F D D P Q S Y A E A E H LI A A T QL E D C F G F A V A TAFL R S A A E


 T G N V L L S S P L S P A E L K P A I E K T L A D T F GYEA WV IVVLDPA T



## 

SGNVI FESNKPPELLVTEIVSGLREKTGANISVLVKTVDQ






 SGNVVVVDKAKAADIVELI KDVFGLDVRVMTRTHAE
 T GNLVVFESEKS DT T L GTRLE SAFEQAFGRHVVIIVRAAE D S GNLVYFESYHD KD DLGYGLLKKALFNSHYDFPIPFFVIDEKQT S GNVVFQSRLAETTVKAKLERCLEDYAGKPVGVLVRTGAE S GNVLLDSSRAGAASVREKAQKALRDAFGYDAWVLAYDLDT
 S G NVLWGK G G S D A D I E R R L E D G L E K R M G L R TAEFMV R S P A E S GNIV F D Q S R T H GELLA A L L E DVI Y T T F HLLRDR V LI R S LDD D
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VIVKKNTKSGMTK MI GTNLYK KRGIGNVMYTPGAI LFS VSKENVTKSGMTK LVGSSLYK
 KKDFVDVNYVKGADFW NDKKEDVNKSQLAK LISHKLYK
 AVDGETLVVANDLAWLHAPVGDGRSRDAEADG R R DK $P G P G E Q V A P G D R V V Y W$ QVRRTQTLTSAMGKTMGKKRYKS
$R E G V D A V W P G D V I Y W Q R L S A E R T K S R L G K$ REGVDAVWPGDGVIY SQRLSAERTKSRLGKAVGTPPYK
 MFAPDMVTMINDTRYTLYATK HSDSKFNNNFFERRGKV LDGTELARVAPLALAWQAPVGGTLDSPFSKLTAKAKYKS
 FGGGERFAVIGADLHIDYEGAGATK LTPAKIAKLLGV DDNUDRTENYNNVIFWS FDLNNYRKSVWWKGTAKYYIKD SWGEAELHLSEQCLYWHAPGVTYKNSRLTNNALERHLKV AC EEIADGVREVYVHYPGGQADTR NAQDEQESSDHNLIFWSFVGREDYQKSSWWSKTAKKKDKD
 R ESAEERFAVRGREVYLLFH GSDRDSKLAVKDG RLIAP DPEAEETRLGPEAVAWLAPVGATLS SVRSTVASRSRHRS AYAPEAMAAGAREVYFDLPDGLGRAKLPDAAA RALGGA TFDGEELAMVGDKVYMYLPDKDASRSKLNNNYVEKRLKD ALSSERLQLSGTELYY YCPNGYGKTKLTNNLLEKKLVL REGVDAVAPGPGALYFSRVAALAT KTRTTR LMAMPVFQ D GGDEELHLGSQCLY MYLPRDARKKKLNTNYLEKQMGD
 PEDDTVLYVQG AILWTVDRENDTKSGMQK LVGTTLYK
 DVPGERLALVGHDL WIDYAPGGVHTTKDTKAVLDRALGV QNERDTFR1TGRHVWWLRHKKRGESKFSGAKLERAVK KEFLDDRYVKGAIFW NVKRDDYNKSQLNK IINHKSYK
$H G K Q E Q F Y P A E G N A F W I D P K G E T L S S A F G G K V L G A K Q Y K A ~$
 SPKGDWEMIGPGEAFVMHLRNGRLNGNPATAFPKS YRG AGPGDYIAVKGRVIY SVVIPELRNKSAILK ISRTPEFG GRAEEDAALGGREVYVSYGPTMGRSR SKVDHEKGEITNNLFYWQVPKGNTLDSSFGK凹LGKKSGKD V TETVLYTPGAVLL VANDGYGKTKMTNTLI ENKLKA

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$K \square T V R N V N T A R K I V E L M Q$
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R I T ARNWNTMQKLLTMA
SMTDRNDNTARFLA
DGTARNINTIATLAQWAAQ NGTGRNINTVTRLAAMAAE $P \mathrm{~V}$ T A R NL R TVVALAK $\square A R$ A GTARNMNTI ETLATWATE STTTRNDRTLERIV
SMT $\square R$ SWSTTTKLLDLLSK RGTARNVRSLARIAAKM RATARNMNSMRRILEKMD ■ATTRNFNTLSHLLEM A GTARNLRTTRTLIEL TTTTRNVRTLVKVREAL T GTMRNITTTLTNLAGLAGE KATARNWNTVLKMAEKSKQ TGTGRNLRTTATLVERAR $K \square T \square R T L N T V R K L Y E L C G K$ TCTTRNLNTLRRILALV MTTDRNGNTFRKLTQMV SGTARNMNTVAKLVE
K $\square \mathrm{T} \square \mathrm{RT}$ T N T V R K I A N L
$N$ GTARNLNTI RKVRTLLAE PVTGRNWNTVTRLLALAEE RLTSRNDNTIEKI L KAMSK A GTARNMNTVARLVALAQ
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AVT D R N L R T M I K V R A A L D
VATGRNWRTVLRLLEMAEE
$V A T T R N F N T L S K L I T M V D E$
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TATTRNWKTLLKLCQL
PGTARNWNTVRRLAE
SMTVRSWKTTTRLLQKLD
TATMRKLSVVSRLSEM
$L M T \square R N W A T T T R M L T W L D E$
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MATGRNWKSVCKLYQMM
Y MTVRNVNTTRKI YE!MK
SATARNWKTVLKLTDMLAK F L T GRNWRTVL RLVEMAK PGTARNLRTVRKLI AL A GTARNITTIRAMIA
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QATSRFLHTTGKIVAAARK
QVTVRGANTFKKLAAKL
S GTARNMNTV
QLT SRNDNTFEK I L K K M N
LTTTRNWRTTAKLLTLLD


Y M T I R N VN TARHLAGL
K M TVVRNVNTARKLVELMK
RMTVRNVNTTRKVYAIMQ

A MTIRNVNTARFLA
TMTMRKLNVVEHLVELCKK VGTARNWRTALALQALAHE

$P \vee T L R N L N T V E A L L A L$
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TGTSRNWRTVLALAALLAHE
VATVRNWNTVQKMLDL
SLTTRNGNTLRKMMA
GTSRNWNTVRKLAEMV E VT $\square R$ N ARTSSFLA
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TARNWNTVLKL A A MV
LMT $\square R N$ N L T TRKKLYDLMK
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GTSRNWNTVRK L A E MVDR R S S T S R NTTMLTKLAA
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GTSRNWNTVRKLAEIL
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N $\square$ T T R N WN T I L K I E K K L N
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TAT A R N WN T L E K I A T K L

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 $M K$ K I I L L R G V T P GR N R I PM A Y L A E I L T E A G F D N V Q T Y Q MTTYVVLLRGVNLGHRRVSADDLRAAATQAGLVDARTHAT WVALLRGINVGGNKVPMKELRHSLEKEGFSRVKSYDA





H V $\operatorname{A} L$
 MPRTV ALI R GVG GPTAMKMAALREVLASAGLGEVETEQV MEKYVILERGINNGGNLLPMKALVPLLEEAEFEEI SSYI Q $R R V V L V R A V N V G G T T L P M A L W R D L A A S L G A S D D V T Y$ I A


HVA LL R S V N L GK R K V S M A A L R A L F A D L G Y P GAR T Y I Q MTRLI ALLRGVNVGGRTIKSAELADVFRGLGYDSVKTVLA



 T F I A F L R G V M P G K N A V K M A D D R R R V L S D S G L Q NV R T WI Q MDHR I FRAMNTGGVVAPVTEQRAMAGAMGLNNPRTLLA




$Y V A L L R G V N V G G V T L R S A D L R A T F S A D G F G G V R P V L A$
 $M \square R Y$ MKS YVALLYSI ILGGRRVVMADLRQMAERLGYRSPRTLVA LT T A V V L L R G V NV G G R K V P S A D L R A I G E T A G WT R VT T I A A
 MDFYAVFLRGVNVGGVKVLMQELSALLHDAGFSHVRTFLAA MTTYVALLHSIVLAGRRVVMSDLREMAEDLGFTNVITLVA


 $M R T Y V A L L Y S I L L S G R R V V M A D L K A M A E G L R L K N P R T L V A$ MTVFVVLFRGVGGATQLPTAALRAALAEAGFEKVATYIN PTHCAFLRGVNVKGTAMKMADVVAVFEKAGDKNVISSILA MT RYA A LL R GI A PMNPNMTND K L R GVVTGLDGFEAVA SVVV
 MTVYVALLHSIVLAGRRVDMSDLRDMATSLGYRNPRTLVS
 MK V $\square \mathrm{A} L \mathrm{~L} R \mathrm{G} \square \mathrm{T} P \mathrm{C}$ K N R $\square \mathrm{P}$ M S Y L A Q I L Q E A G F Q N V K T Y I Q Y C A F L R GVNVK GTNMKMADVCRVFEDTGMDKVSSVLAA
 $M M K A Y$ V $A$ T P Y A A F L
 Y I ALL R GL NVPGRSVKMERLRGLFTELGLASVRSYI Q


 MTT
 $M \square T Y V A L L H S I V L G G K R V V M A D L R A M A E E L G C R N C R T L V S$ MKNYVAALRAVNVGKNKINMKELSVADQNAGFTNVKTYI Q







 TDYVVLLRGVNVGGRTDKMADVRAALAEGAFPGARTVLA


 $R Y L A L L R G V M P G K N R \square P \square S D L V I V L D S E A G \square Q R V S T V I Q Q$ MA EL REVA ETVGASEVVS Y I A
 MS V H $\|$ A L L R G|V N A A G N R V T A D E|L|TAMLD D L G H A D A R T G P K



V E VL WN S I P ${ }^{90}$
100
110
120 EKNDTFH\|YGF\|GMPGVEK\|LMEEFQKA L S A V VA A NPFSSSEALDHPSHVLVTFMKTPLPADEDULRAA

## 

L

## 




| $\mathrm{L} V$ |
| :--- |

EGKFVHFYFCHNAI ELNQ

WE EAVRACP

LSA AVDAYP A AVA AERDGWHRYVVFSMRA | I | $A$ | $A$ | $A$ | $A$ | $G$ | $N$ | $P$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $Y$ | $Q$ | $K$ | $I$ | $E$ | $E$ | $A$ | $P$ |
| $V$ | $R$ | $D$ | $V$ | $A$ | $A$ | $Y$ | $P$ |

L K D V A A Y P F E P
$Y \vee Q G V L Q K P$
LQQULAENPFT G
WA A MMAANPFEGAASDPTRLLVMVMKGEDRPGAVEALRAF
 WDAL AA GNPFSDASASEAPNIIVRAMRTPLSDVLPGLQRH


| L |
| :--- |
| $\stackrel{L}{L}$ |
| L |

VA SL Q N N P YL K E K DVVD T KYF TF I S K E L N A N S IH ELLKM S Q
 DQS LVE RNPFKK QVTP ET R L Y V T F L S Q K VK S K L K I P Y E T P






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 $E G \square D T A H Y V P G A B L L W N V L R R N Q G K T G L Q K \| T B T D D Y K$
 GEAE ESIRRGSD GVI Y W TVVERGNTLLGSVFAKQTAKARHK





 A DADDKI APGGGVMYW QDPKGDTLTSAVGKTMSNKRYKS

 ATGDEGVVAVGGNLFFWHPHGVGSSKMA EKAQPRLIG
 ADNAHEFHVAGREVYWLAH DNQADSKLSNATDERALGQG








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



 HRSVVEE RPGPRALWWHYPE GM GR S KEYIQLIVV E GALI WNVRRGDYNKSHLNK II SHKVYK $R G S R D E A V P V G R V L W L H T P D G A G B R S V L M G L L D R A P D V R$



$\begin{array}{ll}\square K T E H E X G Q U T & A \\ M & T\end{array}$ A GGADA VA LG PEAVAWQAPVGE TLGGSPAGRLLTMGREYKA

 NHQAEVVA I GRVLYVHDFSNQ VHALK LD DF LGEYKKTLS

 DPRVRVVGFDE EAAFLAVLDNGDPGKTPDVMRWLDRTYGK RGSSLDTPVAKTLARARY
 GAE QKLLGPEASAWTVARGSTLESPVNKLSAKAKYKS



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| UniRef90_B9XNZ7 | QVT TRNWNTV |
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| UniRef90-Q9A6I6 | T M R NWNTVLKLADMV |
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| UniRef90-B9JFG5 | GT L R NWNTVRGVARM |
| UniRef90-K4PRJ0 | TVTMRKLSVASR |
| UniRef90-D5VFS3 | VGTTRNWNTVMALA GMMD |
| UniRef90-UPI00037A6B1D | A ATGRNLNTINKVSTL |
| UniRef90_L8DHK1 |  |
| UniRef90-M5ESL2 | GTS R N WNTVRKLAEMVAK |
| UniRef90-UPI00037D194E | P NTARNWNTVLKLRALLAEQ |
| UniRef90-C2FUY4 | T FTS RNMNTFEKI LKKM |
| UniRef90-H6R860 | D 1 T T R T W LTVQRVVKKME |
| UniRef90-UPI000367A290 | VGTARNITVVRAL |
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| UniRef90-FOS8S2 | QFTSRNINTIEKI LKKM |
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| UniRef90-M2CLV8 | D MTVRNVNTARH |
| UniRef90-UPI000364CDA0 | D A T TRFFHTLVK |
| UniRef90-UPI0003B57449 | Satarn |
| UniRef90_UPI0003FFBD6D | GTLLRNWNTVKGLRAMV |
| UniRef90-UPI00046781CF | T S TMRK】NVVK |
| UniRef90-UPI0004412E75 | S GTARNWRTIS AVAALMM |
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| UniRef90-W6VWV2 | GT $\square$ R NANTVAGLAEM |
| UniRef90-G2ZB23 | VTT SRNWRTT@KLQT F L Q |
| UniRef90-C6X5R2 | KITS R NINTEEKI |
| UniRef90-E6J7Z2 | HLTMRNI RTLRKI LA L |
| UniRef90_UPI00047B1DCB | VCTTRNLRTLQKVRE |
| UniRef90-UPI000347373F | TTTTRNVNTLRKL |
| UniRef90-Q8U586 | GTTRNANTVNGLAEMLR |
| UniRef90_V6RVL3 | TAT】RNWNTVTNLLSLI E E |
| UniRef90-K2NW82 | LF T SRNDNTMEK |
| UniRef90-D3UP71 | S R N WRTTLK L Q T F L Q |
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| UniRef90-W1Q652 | RMTMRKLSVVNRL |
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| UniRef90-W5TC68 | E I T T R T WLTVQ K V La K L |
| UniRef90_UPI000349A827 | V S TMRKLGV |
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1
10
20
30
40 MHRYAALLRGI MPSNPNMRNDKL|RGVFEGLGFEKVATVLS MQTYVALLYSIVLGGQRVVMSDLKAMAEGLGLNNPRTLVA




 MPTYVALLRAI NVTGRFVKMQTLAEAFHRLGFEDARTYI N




 HI I L L R GVVPGKNAIPMSYLVD L LIDEADFQHVRTYIQ $M Q T Y V A L L Y S I G L G G R R L V M S D L K A M A Y E L G F K N P R T G V A$
 $M T V Y$ VALLHSIVLGPRRLVMADLRAMAEGLGFRNTRTLVA
 $M N S Y V A L L Y S V V L S G R R V V M G D L K A M A E R L G H R S P R T L A A$ $M N K Y A V F L R G V N V G G V K V L M K D L T Q L L E Q G G F S E V T T L L A$ MHSYAAFLRGIMMSNPNMRGEKLVGVFEGLGFEKVSTLLS
 M K K Y V I F L R GI N T G G L K I K M E E L K K T L E L P E F K T V T T V L A MNTYAAFLRGINVGKTRIKMVDLKDAFESMGFKNVRTLLA ALL R GVVNVNGKNI AMADLQA $\quad$ MA A S $\square G \square A S P S T L L N$
 $R I A L L L R G V N V G G V T V R S A D L K A L L E G A G L D E V V T V L A$

 MESCVALI RGI NVGKKRIAMADLRRMAAQLGAEDVSTLLN $M G S W V L L L R G V G G R T Q I N P R L L R A V L G A E G F G R V A D V G Q Q$ $V$ A F R AVVNG GRVVVMAAI A A HFRAMMGHDVS TF LA
Y I A F L R A V NV P G R KVVEMARLRE VLT QLGFM GARTY I A







$K Y V V L L R A \prod N V G G N K \prod K M A A L K S T L F E K G F Q N V T T Y Q$
 Y I ALL R GI NVGGRKVQMNLLRTAFEDAGFTNVRTYIN
$T H V L L L R G I N V G G G H R V P M A H L R Q D A T A A G A L E V T T H L N$
 $M T R Y V A L L R G \square A P T N P S M R N E N L V R V A E G L G L T G V R T V I S$ MPTYLAFLRAINLGPRKFPKDDIVRVDESVGFTDVETHIN



 MTHYAAFLRGVVVGGVNLVMAEVAAALSAAGFSAVRTLLA MSTVWVFLRAVVVGARTYPMAELIRDLLTKEGYGDVETMI Q MT R Y L A F L R GVVSP



 MT T Y L A F L R A I N L G A K R V P K E DI R R V V MPRHLAFDRADNLGHHKVPMAELRERLTTDAGFTDVETHMQ

 MT THVAFLRADNLGRRKFPKEADRAACEMAGFSDVFTYM MK T Y I A LL R GI N V G Q K K ILDMK DL S S L F E S L GF M N V Q T Y I Q



$M T H Y A A F L R G V N V G G V N L K M A E V A A A L S A A G F S A V R T V L A A$
 ME NSDFF NVV R T Y I
 MCED L K F R N A V S Y L Q
$M L R G \square N V G Q R K L A M K E L V S L C Q S L G F A E V E S Y L Q$

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



## UniRef90 Q5YRQ6

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| :--- | :--- |
| $K$ | $D$ | PGEGEAVAAGDGVVHWSNP KGTTDSSAFGKALERRARD EGDDDVLSVVTPTELFWHMPNGRGEGLDADEKQFPK






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| lupas_28 |
| jnet |
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| sol5 |
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| jhmm |
| jpssm |

lupas_21
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sol5
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 $T G N V D V Q Q T M T K K E D C M E \square S N V L S N R Y Q M E K P L V M I G N G E E$ SENII FRSSRDNLPFF CQNLIKDKFGLELTCQILSAEG

I LTADE T GN VVLDCDLEEKEDEKNDSFTLENSFNVSNPMAI FNLDK NGTVAFSARGPARKIARTVQQALATGHGFDEPVFVRTMAY SGTVVF QAMDPENASAAAIIRDRAT GYQPTVVIRADE SGNLVADSDLSMLDVSERLRQLLASSMGVVMCAVVVKSATE S GNVLFESEEEEEPLRERIEQEVAVAHGFSVSVVLRTAEE TGTVVFDADDPEPLIGQA $\qquad$ $R N T L T A R G F H Q S F A T R S L T E$
$A A L R A S A G V E A G V V L L T E K R$

TGNDILDANDDKKADDKEVCNDLTDNFNMNKPLLIFNDDE SGNVLGTPDTGDDDVAARLRALLAERLGVDTSVMAAARTE S GNVLLTSPRSAAEVAADLESAYEADRGFAVPTIVFPLAE KNKLGGDIQVI ARTPTY MSVI 1 KNPEQ
 MRSA
$M G V I V R T A A E$
FFFDSPMMKEELLLADEEFLNKSYAFDNVFSLFTLEE
 NGTVRFDSDE PAEVTATVTASIEARTGLERDCFWIPFTV $M \vee R T A G Q$

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D $\square$ A DETLHFRELGVYWGKHDKTSYNQTVYHKNLLKSSFYS NEDFR\|IGVYDRTI

A R R L K L E H TEVVFSAYVPDE KGAALGALLERKFGK GWTAD RAVPGDRCLYLCLPPGRDRQRLLDRRARRGDPG
 $L K N E P V R S G K R E L F A L Y P D G M A H T H L H L D P L E K$
 $R G D V E V F R F T G T E A L S L S R K \square G N T A G S P \quad N A L L E K Q L G L$ VEGAR LAVDGSE IFTAYVPQPGN PAFMRLIEKTBGA STDADELELLDREF MSESPLFKVAFDKKLGV GYAPDLYALRGKVAY VYCPDGYGRTKLNTRFFERLCKT


EGEGEATVVRGRAVHLVLDGKDRYHQVKLPAABHDAMG ATAA GRMLVRGRAV HALLDEPGYQDGTV DPDGAAK LLG REGILEKIVKKYKAAVFWS F SRKMYQKTNWWRETASANI SG ETGYENVYHYNNVI FWS FSRNDYQKTNWWSKTASSGVSG
 $R S S P D E F V V C G K E L Y L R L P G G G G A E T K L T N Q Y F D S K L R M$
$H$ GD D R P A GPDRTA LLLLWT RCATGVADSPLTPARLDRTVGV APSPGAADASPGASGRVGPSGGMVVRGRAAHALLGAKLLG

 DGASVVVKNATEVVFSAYVPDPK $\quad$ K GPDVFMRLLLERSSFGK QAS ILLRLERTEVFSSYVPNE RGPAFMALLEKTBGK GPGEK】AAGDGVIYWGQVPKGNTLDSAVGKTMGNKRYAA

 QTES E HYCLTTPKVV Y L Y A P D GVGKSRRLA A A A A E K I I GV


 VK P P ERFS $\quad$ GGK N A A SKKDDRYTWDSAGL KNEDE QYY IA GRE I L L LF S R S VR NSKLSANLQK LDVR DGLVEVRGLYDSHAWSACWKPKNT A GNVTGFLLESLLLEV E I A P E AV R L G D R T V Y Q W C C P L GVVSK S F L P A A F W R A V G A NDRVLLHFGQTAFFYRNSDQTDYLKSNYHKKLLKSNFYK
 A HAPD DYRIGDRVLYLHTPDGLSRSALATELLRSARLDGLL








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VWTNRNLTVVRELA
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RYTARKYRTCNKCLDLMK
PATTRTWGTVARLV
SATTRNWKTVDTLSE
$P \vee T T R T V A T M Q R L L A$
A ATTRNWATVLKLQALA

VATARNQRTVGRIL
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PATTRSWNTVRRLV
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VGTARNLDATVRLA
SLTARNWKTI SKLYEDTRE QGTMRTHDVLRRL
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RMTMRKDSVINRL
SGTARNMNTVAKLAEDA VATMRKLSVVSRLSEMTK

## $\square \mathrm{AT}$ T $\square \mathrm{K}$ LSVVKRLY DMLD

RATSRGLPTLVRLVD
TVTDRNWRTVLRLRGMA



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[^1]:    lupas 21
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