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1
10
10
20
30
40
$H$ F A $\bigvee G$
$V$ V Q G S V $V$ L



V T S G T Y K V S DI R P WD Q P R L E N L G
$\vee T S G T$
 $V$ D Q G A V V A Q G A EVIM F S D F E H D G P M WE GPREEARVAV T F G E A

E P A K T A S KR Q IF S Q E
TGPDVSKFNTMEVRPWDKP QEKS SK TVVNFSKD TGPDVSKFNTMEVRPWDKPQEKSSKTVNFSKD
TGPDVVSK F NTMEVVRPWDKPQEKSSSKTVVFSKD

V Q G S KVL F S DFEND GPMWS GPRATRMPVRFSQK

TGPDVVSKFNTMEVVRPWDKPRKKTSKTVVNFSKD




D A GQFSTMEVRPWDKPHMDNNNV
DAGQFSTMEVRPWDKPHMDNNNV
$\begin{array}{lll}1 & F & Y \\ 1 & F & Y \\ 1 & F & Y\end{array}$
ID S GETVVLFSDFQD GGEMWT GQRERRNH I
$Q \square G \square E Q G S I L L F S D F Q D G G A M W T G P R E L R R V V E F S T P$
$F D A G Q F N T I V V R P W D K P Q A N N D \quad K V I Y Y Q K K$

$R$ VNTGELGILQQGQEMLVTDFDTSGETGDREVRAHMDRERKR


$V G \square G D V V L F S D F E D D G Q M W E G P R Q S R A T V R$

| $V$ | $D$ | $G E S V$ | F S D F Q N G G Q M WT G E R E R R |
| :--- | :--- | :--- | :--- | :--- |
| $V$ | $D$ | $S$ |  |

S GTANTMDI RPWEKP QLENSAQ
S GTANTMDI RPWEKP QL ENSAQ
S GTANTMD』RPWEKPQLENSAQ
I K V P F D

PWDKPQQHDNDKKVI YYHKK
TDQGSETLFSDFETGGVMWTGSRECRVPVKFSEK
$V A Q G S L V L F S D Y L D G G V M W T G P R E L R R L V V F D E A$
I DQGSALLDFSDFED GGQMWTGPRAVRDQARFSES
I QQ GDEAMFSDFENGGDMWTGSRERRKPVLFEQT

V Q Q G QV Y T GD NG

| $V$ | $A$ | $Q$ | $G$ | $D$ | $T$ | $L$ | $L$ | $F$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $V$ | $D$ | $Q$ | $G$ | $D$ | $D$ | $V$ | $L$ | $F$ |
| $V$ | $F$ |  |  |  |  |  |  |  |

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

$K \square Q S G T V V N G S D A G W K L H Q E \quad P \square G E R M F T R A V Q F E S K$ F S D Y I D D GPM WT GT R E HR F E V T F E E A
$R \square S T G N V V Q G S R V M F S D F A D G G V M W T G P R E S R H V V S F K A E$
I A Q G DVEVVFSEF DS G GTMWT GERERR L H L L R F D D A
$R F L S G Y V D H G Q Q V L F S D Y E N G G P M W T G D R E V R T K V V R E N D T$ $V$ QS GTWSVKE GQA GYNLHTN G G G R ATTMSVMRPTP

FDCGEFRTKNVRSWRNPEHVTPGE
F DCGEFRRTKNVVRSWRNPEHVVTPGE
F DCGEFRTKNVVRSWRNEHVTPGE
VAS GADDTRNYRPWYPAQEKNG
VAS GADDTRNYRPWYPAQEKNG
VA S GA DDTRNYRPWYPAQEKNG $\quad$ RKVVDKKA G
RCESGNLDTPKK KKASFFPPGYGNRYHDLTATFSRA
$R \square Q T G T K A S Q D \square R P G S A V$ G $\square$ G S L D Q E DK
MFSDFANNGPMW
DWTKP QLENSKE
F NTMDVRD WTK P QLE N S K E
F NTMDVRDWTKPQLENSKE
F NTMDVRDWTK P QL E N S K E


| $A R F$ | R | P |
| :---: | :---: | :---: | :---: |
| A R F K | V | P |

VDFKAG
RKVDFKG

| $R$ | $K$ |
| :--- | :--- |
| $R$ | $K$ |
| $V$ | $D$ |
| $D$ | $F$ | T G E S L D D Q E $\quad$ I K F A A P ID QGELDPF DDFETGGSMWTGARELRRRVDFNLA



QUERY
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RTWADTRVARVRMSWMAT
RTWSDSRVARVRMTWDA I
RTWGDSRI ARVRADWMAI
RTWADTRVARVRVRWMA
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DTWHDTTGYSAGCTWF
DSWADTTIYSA
DSWADTTIYSA
DSWADTTIYSA
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D S WA DTDI YSA
DS WADTDI YSA
D S WADTDI YSA
D S WADTVLYSASLT WL
D SWA DTVLYSASLLTWL
RTWGDTR A R $\square$ R I A WMA $\square$

QS WADTTLYSASMTFL


QSWADTTLYSASMTEL
QSWADTTLYSASMTFLL
H TWGDTRIARMRVGWTA I
RT WADSRAARLRAGWLAAI
RTWNDSR WARI RAS WL A I
RTWADTRVARVRMSWIAF
RTWGDTRVARLRVAWMA D
RTWSDTQVARVRVAWTSF
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RTWGDTRVARVRMAWSAI
GT WS D SRIA RLRVS WLA F
D SWNDTVQYSAGFSYL

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QSWADTTMLYSASMTYYL
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RTWGDTRVARVRADWDA I

RTWADTRVAR LR RGWTA I
KTWGDTRVARVRADWLA I
RTWGDTKI ARVRVA WQA i
YTWSDTRCYSLRADYDAVE

| $R$ | $T$ | $W G D$ | $S$ | $R$ |
| :--- | :--- | :--- | :--- | :--- |
| $R$ | $A$ | $R$ | $V$ | $R$ |
| $R$ | $V$ | $G W L$ | $W$ | $A$ |

VTWGDTHIARASVNWQA
RVWGTTKAYW门EASWIAH
RVWGTTKAYWI EASWI AH
RTWSDSRVARVRAA WMA D
RTWGDTRVARI RADWTAI
KTWFDTILYTVWANWMAF

RTWGDTRVARI RADWTA I
RTWSDSRVARVRAAWMAI

RTWGDTKIA R V RVG WQA I RTWADSKVFSIS GYWDAHE VA WANTKHHGSGCSWL | VA WANTKHHGSGCSWL |
| :--- | :--- |
| VA WANTKHHGSGCSWL |

D TWGDSLCYGVGVSWI AF D TWGDSLCYGVGVSWI AF DTWGDSLCYGVGVSWIAF GT WHNS EMYQAKVH WMAC ETWADTSSFFNDMAS WLLA Y

DAWYDSKMYSAGCTWL
D A WYDSKMYSAGCTWL
H T WS DSRMARIRVAWTA



D Q GEAVVFSEFAD GGATGSGTRYRDLTATFSKP ITQS GTFTMFS DFY KVVGEMNNGEMWTGTRSATGEVVKFSE
 S GCT WLE QF ND R D F Q S G QE Y T TVVDV V T F R R S A
$K$ V Q S GTWSVNP S VAGYNMDKNTGERTMTDDVVEPKP
V R S GTF GI E DVRPSSAHRPKNHG
RV S WGAP
VRS GTFGI E DVRPSSAHRPKNHG

RCESGK LS I P Q | D | $T$ | $G$ | $V$ | $F$ | $S$ | $T$ | $E$ | $E$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $D$ | $T$ | $G$ | $V$ | $H$ | $H$ | $S$ | $T$ | $E$ |
|  | $E$ | $V$ | $H$ |  |  |  |  |  |

D T G V F S T E E V V
RCESGVLKTPQNVFTS
S GSWSTTEQREWFPPAALLN
S G S WS T TEQREWFP PAAL N
HFESGAWTSPY
GGLA G GVS R RVS WGA
GLA G GIVSFFNLTATFSMP

> | $D$ | $T$ | $Q$ | $E$ | $V$ | $R$ | $P$ | $W$ | $D$ | $V$ | $P$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $D$ | $G$ | $Q$ |  |  |  |  |  |  |  |  |
| $D$ | $R$ | $P$ | $W$ | $D$ | $V$ | $P$ | $G$ |  |  |  |
| $D$ | $T$ | $Q$ | $E$ | $V$ | $R$ | $P$ | $W$ | $D$ | $V$ | $P$ |

$R T L N S G$

$V D S G D E \| L F E D F E D G G E M W T G T$
$R \square E S G \square F S \square N K T K G W K G T L T N G K G D N$

E S R DRHLDD LTATFSRRD

DYEDGGPM

$$
\begin{aligned}
& V Q V G R T S I G D G A L N S G \\
& \text { QVGSYSTLEDRDLSGVPAKDNATGS }
\end{aligned}
$$

> RCESGLMETPYDGVFST
> HSEEGVVE
> $\begin{aligned} & \text { CGSSAYWPA } \quad \text { STM RG } \\ & \text { TAS GELDFNHVDASLPMWS }\end{aligned}$

RCENGTLVTPAGAFMSVF


T G N R S VK Q H IT Y P R K
TGNRSVKQHITYPRK
TGNRSVK Q HI T Y PRK

A GRGAKDHRTLIQFPES A GRGAKDHRTLI QFPES A GRGAKDHRTLIQQPES

VEQGDVTVFSDFEDGGEMWTGPRVRRRAVEFTAA $F E S G S Y Y L R Y Q T D W W G \square R S D H P Y S N$ $R \boxtimes Q G G Y \vee D \| G A F R G N N Q V S$

SQELTKRANFS SQELTKKRANFS

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FRRPPAV|H|V|SIIS LWDMNTDAATRAELVAEHVITEDGFD\|VFF FASEPVVYIALNDIDSDNDENLRLKVDVTDVNREGFHYVL
 FAKPPKVVIGGLSGLDVDGSKNTRVQVNAKNITXSGFEVEY FEKEPTVMVALSGLDIDKNHNARVKVYVDNVTNRDFTLCD


1 GI NM
FRTTPVVT
FRTTPVVTI GI RHLDINQRIINTR
FRSVPVV
FRTVPIVQQVFMTMWDFDGTTANTRGDIVRAVDVMNDGFDAVF F $\square$ NPPSVTLNTS LDWDVHETNFRMKLQAIDITESGFTASF Y ASAPKVTCWLTAFDLDKDKDWRDDVSAVDVTEKGGKLKF
 FDTKPTIVESVTQLDTDKDANSRFNVEAMSVSRDGFTVKV MARPPRVFTALRMLDFRDGKFIRLSMNTSEVTTTGMTWHM MARPPRVFTALRMLDFRDGKFI RLSMNTSEVTTTGMTWHM FRTTPVVTVGFQELDSSRDRNLRVYARVRSVYATNMTVGITV



 YATAPKIAVGLNELEVGEAANLRVKVSTSPPTTDGFVVNV
 Y A A P P S V A V GLT GLLDVSNGANDRVSASATNITRRTSAYMRL Y A A P P S V A V G L T G L DVV N G A N I R R V S A S A T N I T T R T S A Y M R L

 Y LS DPTVQL S S LWDMDAGTVLRADVAAEAVTEKGFDMVF









 Y K E P P EVVI CWLNRLLDSGPDYNYKI RAFADA IDNRGFTGHL

 FPRVP EVVCTLTTQIDCANDKNLRDRVFAKDITKDGFTBVF

 Y S S P P A MV WGFNHLDI PSNRNLRIQANDTDKG Y S S P P A MV WGFNHLDI P S NRNLRI QANITTDKGLD Y S S P P A MV WG F N H L D I P S N R N L R I Q A N I T D K GLLD H F K A R I



FAAMPDVIPFFSLI DVEKSSPTSVRTVVQNWNESGFDLVL


 Y S S A P L I S A GIIS F M D F D N S D N P R V K S L V E A V L P S Q A V L N L







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DAWSDTRLYAAGCTWL
DAWSDTRLYAAGCT WL
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DTWADTRLYSAASVWFT DTWADTRLYSAASVWFT:
 GT WGNTRLDSARIRWMAC RTWGDTRVARDRISWTA HTWGNTEVWGCDVN WLLAY $K T W A S T S L Y T A Q V S W M A C$
$R T W G D T R A R V R L A W T A T$ DT WGSNDLYDVTVNYIAVE ETWADTVIC SASASWVAH ETWADTVCYSASASWVAH ETWADTVCYSASASWVAH DSWGDTQLIFNATPTWIEF DSWGDTQLFNATPTWIEF GTWEDSLLYSASVHWMAC VT WGDTHIARACVSWQAI GTWSNSKLYGASIHWMAC KT WNDSRIYN TTASWVABE GTWGDSILYSATVHWMAC NTWDDGGLNGAAMCWIAF NTWDDGGLNGAAMCWIAF NTWDDGGLNGAAMCWI AF EPWHNTYLYDCGVSWI AI

 TTTWNDNTVYDVAVDYVAI RVWGTTQAHWI EAS WITAY RVWGTTQAHWIEAS WIA Y
GTWMNSEDHSAGMTWM
GTWMNSEIHSAGMTWM GTWMNSEIMSAGMTWM QAWGDSIMHRAGVSYLA ETWGDTHVYGARCTWL ETWGDTHVYGARCTWL GA WANSHVWSASCSYLAF GAWANSHVWSASCSYLAF DAWGDTQLYAAGCTWL DAWGDTQLYAAGCTWL HSSGGGGRHDAGMSWL HSSGGGGRHDAGMSWL HSSGGGGRHDAGMSWLS
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40 T S P P
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 A T R DRDPQETGWY G GS R $R S L N S G B G G V R E A L R H V N F D E P$ E Y VT P I K F K D A
SAGVVSGTCHTNDVNSGYTAELTNSGRVDFPAAA SAGVVSGTCHTNDVNSGYTAELTNSGRVDFPAA RCESGDLGTPSHAFTSG DGDRHLDLTATASRA

 $R\|Q T G L C P\| G E T S S A G L I R D K L G G P D N C R \| I T Q E$

GPP S E G $\square$ D R E F S A R V E F E R E
R A Q N G S V
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LG D N N GQYGE K R

N P N WDVA HS RKTT
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FVAPPKVAISINTMSSSKESSTVIGVAAQNVTRSDFUAVE FIRPPFVSSSLHNINMSKGQSFKYSFIPHDITEDGFTMLI


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| UniRef90 S3D178 | STWEESRFFCLR |
| UniRef90-S3D178 | S |
| UniRef90-N1Q206 | A |
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| UniRefofo-AOAO24F UniRef90 AOAO24 | GTWGDTVMTKVGFCWI AVE |
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| UniRet90-C3XSX0 | GT WNYSKLYSAKVYWMAC |
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| UniRef90-E3EXZO | ATWSDTRIS SATVS W |
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| UniRef90-D6RC | KEGRGH GQI H |
| UniRef90_D6RQ | HKEGRGH GQIHWLAF |
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| X8JT70 | DTWYDTTLVSAGCTWL |
| UniRef90-F4PLE0 UniRef90 G2YP1 | MTWFDTVLYSAEATYV |
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| UniRef90-R7RWN7 | ATWGDSVVYNGVLSWL |
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| R7P | ATWGDSVVYNGV |
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|  | AV |
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| UniRef90-O86A91 | KRYM |
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QF Q T GYDNSTFQNP $\square K S P G Q T$
SGTFDVAVSRADPNFLSGSVEGRGVREW
$T V N$ QF QN S
SGTFDVAVSRADPNFLSGSVEGRGVREWEYYI KFSKQ YFETGNK LLFLGIHMLHLESYLPRYIEFQFNFQKT


VETGTWNTMDVRPWQKPEQSTKG

RCESGFSETPRDAFTSGH $C L S G E V E T P D N C S W P H D$
$V N D G R V S C B$
$V$
$V$ $T G A R E \| L V D V L F P V E$ CETGALAT NPYNVQQSNPQSNGSRQVAKTTNFQSL RCETGALAT NPYNVLASG YGYRYNYQTVNFSRA QYDSGDDQSWAQTPYHPLQQS VERSFQTLVKFNKP RFQSGEVRQTVDCGTWKVAHPGRAWNSARQEAYIVKABKN $R F Q S G E V R M H D G C G W P H L$
$V Q V G M S M P Y Q T$ $V Q V G M W S M P Y R Q P T \quad N T A R P G L T T F R Q$ SGAYSTNDVRTADPPQLT TSG SGAYSTNDVRTADPPQLTTSG

C L S GEVETEDGCGWPHVH
$\qquad$ S $\square \mathrm{N}$
RFDCGTFEVVSKPGGTAMNFTGTVDFTKW

RCESGELETPHEAFTSGA
HMSSNGAQNGT Q
F N VT D $\square$ R P WD R P Q LL $\mathrm{N} \square \mathrm{G}$
RFES GA $\square Q \square Y S G Q \square P E M \square N A K C E K D L Y R$
GYDYP $\square D D N F \square Q S G N F T \square S Q T N T \square N$
FTKNVQFSSP
DGPASNTGRI AFPRA
YRQDI KFNNN
$T Q \square G H V Q S D T N G A L N A G T G A R E V V Q E P V$

T S GTFDVAVNRSDPNFLT GAVEGRGVQEWS IVFSRA HVEAGTLKCGYPRY

E WQTGDDNVIKNQPQLTLTSNYPDHTQVEELLEDKQ
$\square$ QHGSQDDFQSTPTHMF NDGSTGDRNKTKTFSFPKP
 $\square$ TYDTGFASQFHYEDGFLGNTNYLKEFSF
 THWQSGMYDTPARGGAREFDATITGADT GTDTSLSENPIRGPGG

RTVSI EFKVQ HWQS GMLDTPARLGEQESGQVDVSFTNLADY R R ERA

H T E S VT
QTTATF
ERTQDVN
QRTQDVRFQDS

$\vee T Q$

QS GVME
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## F

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## 90

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D
DNVGDFNDSTVRVNW【AC

VA LS P A T $\square F$ GFDVS WAA I

T NVGNHSLSSVRVSWI DGGGDTKVYSMGASYMAF DYSQNSQVF QVDYNY A ASMGNQSLTSAARVSWM RNWDDNYA WSTAAISW GKD $\square G Y N S Y N M S V T W M S V$ N DTYVAMAT YKYYAYSVDNVVVNWDSFK ANMGNQSLSSARVSWM K GD H $\dagger$ D Q $\square$ S YNWMAT D NS
EVWDQTIIENLVINYFA
ATYCEGMLAVASGSWLAA



 QVSYFSSLKQANYSYIA ETW V S F S WV A Y EKGRGYNAYNMTVSWMSV

 YCEYE VP V Q w I A V ETETQNMEFGADVEWLAFD
 EAPPG ARIDVDWIAF
 QSVVGTTFYELANI GLLAAVD ES F G T D D Y E KC TEGQVNGI HYRWLAMD


 LINGPADIPVLRIRWVAF NKYGGTCIIFGMKISYFA QCYEKESEFNF FFLYTAFQ YGSADTRSTSAPVSWMAI Y S G IDD TS S WQSVN S S YGHSRDA WAS GSFDAVD
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ADDGSETGLGDYTVPITFTTP
WTK $\square P N G W \square I Q G G A T S N S A R V$ VAFD S S

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