

## QUERY

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 K R GRRTVVE Y L I HFQG EHGRRIPKFLI KRGRKHDQYKVHFNGWNRSWDRWAAEDHVLRDCEENRRLQ

 EKGKTVPEYLI HFFGWNNSWDRWAPEDYVLKDTPETRDYQ
 K E T K S P Y H Y K V A K GKK S $\square E Y$ LI HF Q GWNS S WD RYVAES F I L Q D DQE HR LLLQ
 GKSRK PEYKI HFQGWNSAWDRWADECYVLKSTEENRKLQ ES GKK T P HYRI HFK GWSHSWDRWVSETNILEYNQENLRF $\square$ S G A KVVK Y F V $K$ QLK Y F V H Y A G WN K N WDE WV PE HRVLKYNDTNLQRQ K C G R K I P E Y R V H F N G WN S S WD R FVV P E E L ML E D N E E N R D L Q QAKDKQVRYFI HYS GWNKNWDEWVP ES RVLKFSDANQGKQ TS WRVLFSWLAVVFNPWNKSWDRWAAE DHVLRDTEENRKLQQ
 E K G K K V P E Y F F I H H F N G WN K S WD R WVV V E E S V L K N S E A N Q A L K KK GRKI PE YPI HLN GWNRSWDRWAAE DHVL RDTNENWRLQQ $K$ L G S V GP H Y L V H Y R G WK Q T W D E WVVP P QR L L K F N E V N $\square$ A L Q K DKTSP HE Y RVVHYKGWK NTWD D WV P Q DRR RK LTT D DNRELA A T T GLLGP H Y R V G H Y K G WK Q T W D E WV P P S R L L K WT D N N L GL Q G

EKQVKY LI HYA GWNKNWDEWVP E WVPESRVMKYNEVNVQRQ SA GK R V P E Y L V $\operatorname{L}$ H F N G WN H S WD R WAP E H F II L K Y T D E K DPKSPFEYKI HYK GWKNTWDDWVSFERLRKWTDENRELA S H S K K G DiH Y WV H Y K G WK Q S WD E WV P E D R L L K L N E D N L R K Q K S G A

E K G R
K S
P
E
N
$\stackrel{\mathrm{E}}{\mathrm{N}}$ GKMK
K Q $\quad \mathrm{K}$
D DRKSPDVQYY
 K N GEVVGP H Y F V H Y K G WK Q T WD E WV G Q LK EK A Y F Y L I
 SAGKKRPAYVV RAPD Y L I

E K | $K$ | $M$ | $K$ | $Y$ | $L$ |
| :--- | :--- | :--- | :--- | :--- |
|  | $R$ | $Y$ | $F$ | $I$ | G D G

 | F | F | H |
| :--- | :--- | :--- |
| F | l | H |
| F |  |  | H Y N GWNKHWDEWVP Y G WNKNWDE WVPEARVLKFNDANLTKQ HYKGWKSSWDD WVVPQSRVVKYNDANLQKQ HFQGWNS SWDRQVVGDSYVLRDTVENRELLM H Y M G WN K K WD E WVV S E S RIL L E Y S P A N VRRRQ H Y A G WN K N WD E WV P E S RVLLKYNEAN RQRQ LT G F S GPHFFVV Y K GWK S S WD D WVV ${ }^{\text {P }}$ Y S GWNKNWDEWV P HY K GWK N T WD E WV P $P$ T GLT GMHYFV GVMYFV

K QV K Y F K QVKYF HYSGWNKKWDEWV P
K AVK Y LV
P T G I P
G HVV Y V $V$ SDKNA G E D DN N L N E Y WV HY A GWNK S WD E WV P
K DKS SLYEYRV P SGES GPHFRVHYKGWKNSWDEWVP D DKK S GFEYKVV EDNRTGPHYFV

## K T NLP GP H Y L I <br> $K Q \square K Y \frac{L}{F} V$

DEARD DPQYWI DEARDDPQYWI HYK GWK QKWD E WV S DDRKSPYEY LVHYKGWKNTWDDWV P

## G S

WQ Y KI
 K TGCTGV VH Y L V WQCKI HYK GWK Q S WDE WL LP SRLLK WNDANLAA Q GSS WYK G WKATWDDWVPQDRVMKFNDDNKELA
 S S WR F KI HYKGWKNTWDDWVPEDRVRKFTDENKELA
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K D SFTVND|LVICYEP 20
20 - 30
40
A Q K D SFTVNDLVLCYEPDPHKARVLYEAK\|I D DD Q T K D
AQQKPKFKEGERVLCFH GPLLYEAKSLKAEFK D K Y S $\quad$ DGGE K L L C C Y H
MAPSK KFSVENEKLLCY H

VK N T G IF SPNERRVLCF M E

VKNTGPPFKEEERVFCFHME
TYK L G E R VV LCCFHM D R K G IF REGERVVLCY C P D P T R G

LY A E S E K V L CY H QPDQASFAKDERVLCFHHE S NVEQYAI NEKALCYH
S S QPVYSVNERCL Y H

## Q

A S
S E A R VVF S E G E K V L L A Y Y H
KQDPPNFDGQKLCFEPDSSK
ANEKKKF QD G E R V V
YKVNERVL
A MY S K D E K V L C F H H D YSEKETVLLCFH

LK K

SLFAKDEKVLCFHHD
QHPKPKFQEGERVQCFH
T GQFKEGEKVLAA H
$T P K P P F Q V G D Q V L C D H$
A D P K P K


## Q A

K P E F
PS F
$T G P F$
DKT QEPK

RQENEKVLVHQNT
LF Q G RVLCFH
F H K G E R V L C F E P D P S K
KQSAPPFKADERVFCFHMD
$P K A Q F Q A G Q R L L C H$
MAGAVPQFMVDEYVLABH FEAGEAVL C F H FKPDERVLCFH
ESSPYAEEEKVLAAHS LH TYQKDERVLCFHHE
SNTSLYYSEGEKVLAY H VS K S K I RFS E GEKKVLA Y H

D D A A VVF K P N A RVLAA Y H
QDPNPKFQEGEQ CFH
PFSEGEKVLAFHSF
LT S E L S QF E E GE II LAAKHS D
$S N S S$ L $\operatorname{L}$ Y S E G E R R V L A Y H H F VVGEKVL AYH

> S F
S D
Q N R DSEA
QFKDGDKVLAYH FRPNSRVLAYH
K QQSSHFKE GEKVLA Y H
PDSCPFSEGEKVLAA AHET Q
T F K ID G K CL C Y H
QFEVGERVLCF
TSTSDFAKGEKVLCFH
SDSCPFSEGEKVLAYHNDR
R G

QDLK PKF QE GERVLCFH

K SEFEVKKEKVLCYEPDENK
 VP D S K PLLYFE GEKKVLAA Y H

T Y E A A D G K C C V L
F E E GERVLAK K S D
 M A P S K P P Y A K D E K V L C F H G D G G F NVEECVLCYEPDP P K $\square K V$

DDERVLCFHME
S D S CPFS $\square$ GEKVLVYHNTR $K C L C Y H$
MFEVGGGKCLA F H
K Q K S D K V L G EGGEKVVL CY H $M F E V G G K C L A Y H$
$K$ VD D V V A Y H
A PLLFSAGEKVLAFHNSR
A DSKP MY AKDEK AL CF H

 | $N$ | $T$ | $L$ | $Q$ | $I$ | $E$ | $A$ | $D$ | $V$ | $R$ | $R$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $Y$ | $D$ |  |  |  |  |  |  |  |  |  |
| $Y$ | $E$ | $A$ | $K$ | $I$ | $M$ | $D$ | $I$ | $M$ | $P$ | $A$ | $\begin{array}{llllllllll}Y & E & A & K & I & M & D M & P & A & E \\ Y & N \\ Y & D & A & K & V & I & K & T & Q & C \\ K & N & E\end{array}$




 | $G$ | $V$ | $C$ | $V$ | $K$ | $V$ | $A$ | $I$ | $K$ | $D$ |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
|  |  |  |  |  |  |  |  |  |  |  |  |
| $G$ | $D$ | $A$ | $K$ | $V$ | $L$ | $K$ | $I$ | $D$ | $H$ | $G$ | $S$ |

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ATHOKRMEYF ATHQVGPHYLVHYDGWKKTWDEWVPESRLLKHNDENRALK VEGKKIY LY RVHYKGWKNTWDDWVPQERVRKLTDENKELA ETENDVYOYRVHYKGWKNTWDDWVAPDRIRKFTESNKELA KTGQLGPHYYVHYKGWKQTWDEWVPTDRLLKFDETNTAK KQDKYFIHYSGWNHSWDEWVPESRVLKYVDSNLAKQ KEWRYFVHYLGWNKNWDEWVGMDRLMKHTEENVLKQ T D KEWKYFVHYLGWNKNWDEWVTADRGLKINEENVQRQ KQVKYFI HYSGWNKNWDEWVPESRVLKYNEFNRLQKQ RVTKYLI HYAGWNVKWDEWAAESRVMKYNEEGLKKQ ADKKSVLDYLVHYKGWKNTWDDWVLEDRLRKATEENREGQA HHGERKPDYSIHFQGWNSSWDRVVSATFMVKKNNDNCQLM

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FYKi Y KGWKNTWDDWVRQDRLRKFNDENKELA ESEAEMVMYLIHYTGWNKNWDEWVPESRVLEYSDANLARQ KEGPDGPHYLIHYRGWKASWDEWVPPSRVLKNDADGLQRQ EDAEKEPHLRVHYKGWKSRWDEWVPEDRALKWTEENLATQ DDRKSPYEYLVHYKGWKNTWDDWVPQDRLRKFTEENRELA EVRKNEWRYYVHYLGWNKNWDEWVGPDRLMKHTEENDLKQ GEGKHQPAYFVHYKGWKAKWDEWVGPDRILEYNEANVQAQ K HVKYFTHYN WS VWDE WVPESRVLKYMGTNLQKQ
 EDRKKEWRYFVGHYGGWNKNWDEWVGMDRLMKHTPDNVLKQ EKGRKDPEYFVHYLGWSKNWDEWVGTDRLLKMTDENDHKQ EGKWKYFVHYLGWSKNWDEWIGEERLLPLINEENLEKQ EEGKKDPAYYVHYKGWNNKWDEWVPNSRLLEFNEQNLKDQ E WRFYVHYLGWSKNWDEWVHDDRLMKNTDENVRKQ KDGLERPLLVIUYYGWKATWDEWVGRERLRPYNEENLALLK

## E

$R K V K Y L V$
$K Q V K Y F$
$W K Y F V$
WKYFVHYGGWSKNWDEWVGMDRLLKFSEK KQVKYFI HYSGLLNKKWDEWVPESRVLKYVD GR EGEEPQYQYMVHFQSWSKAFDRWVTKDLLMKQTEENKAHQ ELRKNEWRYFVHY GWNKNWDEWVGADRLMKHTEDNVQKQ EDGRGREHWFVHYQGWKSTWDEWVGQERI RPYNDENLALK
 NGRSRVPLYFVHFLGWKQKWDREVSEDLLMDDNNFTRMLK GNPADDVMYRVHYKGWKASWDDWVTADRGRKFTDDNKQLA OLLQGPYYFVHYKGWKRTWDEWVPTRLLRWCDENIKMQ YLVHFRGWNSSWDRWVTKEHFLKDNPKNCILQ


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| UniRef90-W719E3 | K |
| UniRef90-C1GVS5 | A |
| UniRef90-J3PC71 | S Q |
| iRef90-B6JV | K |
| UnRef90-UPIO002658218 | ${ }_{\text {N }}{ }_{\text {a }} \mathrm{E}$ L |
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| UniRef90-D8Q9988 | R S |
|  |  |
| UniRef90-H2V1R1 |  |
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| UniRef90-U5D9J4 | Q $\mathrm{E}^{\text {L }}$ |
| UniRef90-C1LE | RK1 D |
| UniRef90-HOZHL6 UniRef90-Т2M3C | K EELQK |
| UniRef90-O13953 | K EL |
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| PCO |  |
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| UniRet90-G3VF | - |
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UniRef90 C5DHT5

1
10
QDQRPKFQECERVLCFH KQASAPYAVDERVVCFHMD
$G P \square$

30 | NClV |
| :--- | :--- |
| $\mathrm{R} I \mathrm{~L}$ |

LIVATMDK KFKFHSGEKVLCFEPDPTKARVLYDAKVVDVQVGKD
QDPKPKFQEGERVLCFH
PPPYVGDTVLAYH
SPSPYEVGEKVLAYHSQQ AAPYAVGEKVLVYHSD RPQKPRFQEGDRVLCF F AKDEKVLCFHMD FEVGGKCLAFH VTGSTKTFKEQEVVLAAKDSGQ QFEVGERVLCYH
$S$ VSPYTEGEKVFAYHT SNSNVFSEGERVLAYH VSQFEEGEKVLANHK


PGSMYSKDEKVLCFHHE
SVFELGDRALVY
ESEKFRPGSLVLAYH
$P$ PNFSFVVDDVVLA YH MFHVGERVLARH MSTVTPTYAQNERVLCYH Y $M T D K A K K F$
$V$
$V$ VKEEEQPYEKDEKVLCFH VKEEEQPYQLNGRCLAYH
$\qquad$
RGPFLYKAECLNVSVK $\left.\begin{array}{cl}M & M L \\ G & Y \\ Y & E\end{array}\right)$ GSLLYEAECVKVSVK


 GPLIYEAKI KVVRALD | 1 | $F$ | $D$ | $A$ | $K$ | $V$ | $L$ | $R$ | $L$ | $D$ | $E$ | $N$ | $S$ | $D$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
|  | $L$ | $Y$ | $D$ | $A$ | $K$ | $I$ | $L$ | $D$ | $V$ | $R$ | $H$ | $K$ | $D$ | QGELLYEAKILKIFYFND

 G GPLMYEAKVLKAEVGNA GSLMYNAKVMDVKLEDD

MFAKDEKALCBHHE GP L L Y E A K L K IWWN SKE FTEGEKVLAYH
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$P K V D F S E N E R V L C Y H$
$R K O R F$ PRKPRFQEGDRVLCFH ESKS

MA DKSYQFA $\operatorname{P}$ PAGKKVFVYY
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PKME IN GKCLA A Y H QDPKPKSQEAERVLCFH MAADNYRFAEGDSLLCYH
$T K \nabla F A V N D T V L V R H G V Q$
TPASCPYQVNEKVLAFFQSH
FEPNQLVYAYH FAEQENVLVYH PPFVEDEDVLV ESEN
$S T \square R P N D R V L A Y H$

## Y S PNQ VY A Y H

MFE E LGGKCLAFH
DETFEFEIGDKVLAYYD
ADSTPFREGEQVLAYH
QFEVGERVLCY
KYEVNDKVLCKH

A APYAVGEKVLTNHSD KKEVKKYDLNDKVMCKH

FVVGERVFVPHVDRH
QDQRPKFQECERVLCFH SNSSLYSEGGEKILAAYH
 MPPRA $\square R Y E V N D K V L C K H$

YETNDKVFA
MFQLGGKCLAFH
FELGGKCLAFH
PPFHVDQRVFAOD G GPLLYEAKVLRDWDSKD $\square R D E T P L F H K G E L V L C Y E P D K S K A R V L Y T S K V L N V F E R R N$
 $\begin{array}{lllllllllll} & V & G & D & R & V & K & V & K & Y & G\end{array}$

## LLYEAKCVKVAIKD

E Y G G HL Y EAKCVKRRMKDG GP LL Y E A K DLKMDPKDP

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HYs
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| UniRef90-A8PV77 |  |
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Y A GK|l V $|\mathrm{N}| \mathrm{V} \mid \mathrm{S}$ T K D N

$D Q G V M Y E A R V V K T$
LK D GFLYY P A K I I D M R R L E D


K GPVEDGDRDKVYYGPTHESKVTYEAKVIDM
PYEVNSMILCSHTDN L F YEAKI I AVKVQAN FAKGERVLSFHD GLLYEAKI L HVVEKNN
 Y S L N D KV L CR H L D N
TYKVGEVI LCKHVP LDEA
QPDFPVEI G DKL KVVYHE Q

ASNKNKFKADDKV YAMDSGD LYEAKVIKFKPS
$V G D K L K V Y H S P S S H G T S T Y E A K V I V \square S V Q R G$

> T F Q V N E S V


 QYGVGDLVRCDWGAK PVEYEAK LDDVDNESE


N Q MVY A Y H
YKPNQTVYAYH
QFEVGTKVKVKYG RGK
GPLIYEAK GPLYEAKI LKTKSAKD QFEVGERV L CYH QFEVGERVLCYH
VP K P S DVYELHAKVLCQHLDN
I F K T N ${ }^{\mathrm{L}} \mathrm{P}$ Y E QK P Q Q $\left.\begin{array}{llllllllllll}Y & E & L & H & A & K & V & L & C & Q & H & L \\ F & D & N \\ F & Q & I & G & E & S & F & V & C & & & 1 \\ Y & Q & L & N & D & R & I & L & C & N & Y & N\end{array}\right)$ H
G KI
 G S L L Y DESSKEREGEEFECYPPGRGRNQKMYEATVVEVSDVEDG


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MS S P A P VF K\LGE|C\V F QKE T P
Y L A K VIGV
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    \(P R K P R F Q E G D R V L C F H\)
                \begin{tabular}{l|l|l|l}
    $D$ \& $R$ \& $V$ \& $C$ <br>
$E$ \& $I$ \& $A$ \& $L$ <br>
$A$
\end{tabular}

MS S P A P VF KLGE $\quad$ CVC F QK E T P
PRKPRFQEGDRVLCFH PSETYAVGEIALA
P PVAPYAKDEKVLCFHHD
P PKLLKFSEGEKVLCFH
APPTPKFRVGEEI AAMHTNA T T TFKVGD DLYCY KPRFQKGESLKC

S EK
GPF LYYKA E CMKVVSVK R N TMQGKAWEARVLDTR

LL L E AKVLD T R P TED


DAPRFQKGESLKKC LD GEEVYAAAKCLEIIDHD G N

MSAAEPDFAVNEKCVCLLYQET
VPY EAKI MGMKEVNG


KYKFEENETVLCHHRGS
STAAPFSKDERVLCFHHE F N I G D K V AVRY GRGRT QK V
S S K K NFEVGENVACIYKGKP N I G D KL I V Y Y G P T N E S K VTYYE A K
QS SPTFSAGELVVCVEKDCP

YEVGEKV HV HYGRGRTEK IVEAKVVDI





| $Q$ | $F$ | $:$ | $G$ | $E$ | $Q$ | $V$ | $T$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $Q$ | $C$ |  |  |  |  |  |  |
|  |  | $G$ | $G$ | $E$ | $Q$ | $V$ | $T$ |
| $C$ | $C$ |  |  |  |  |  |  | Q NGKP Y DAY I V D I I $\quad$ T D

KVNDRIKVMYG K GRTLYEAKVLEVD
$K$ VGD L V L V L H
GTKVKVKYG RGKGSLLLDAEVKEAKSDDQ


PQFKVNDKVLC HKHEDPAGSYREAQVLETKQTTT Y D G T A WWLA RVV D
K GKTQKDYEANIVSTETDDG
SPSFKEGERV L L A Y H
SPTPLFAVGELVGCVHGNHNE
D S K D L
D K D S P VVVV G DNVLVVYYGD
D SVA QFAVGGDVMATYPKDGHQATT
K Q
$H \quad D$
Y A V G Q K V K C WD E D Q E A $Y P$ P GMKVVQVRYG RGKNQK MYSA I QQ QQNQ

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WY A AKKEGRDAET



RK
TTLKRVAR
EQLKKQA
SDLQMAAK QTASQE GTLEDYNK

solo
sol
jhmm
jpssm

