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N M A A Q M R V W NMAA QMRVFWDATGKLWVKNALVGKVASIMTSNT QHGGQE
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I
A G G D G S R R L P S E N E

I A G GD GSRRQPSENELTDARFQGQHMAEMAAKLA G LSNSDGSRDVSENELAQCRFQGRHVAEDTKKMHG



 IANGDGSRQPSANELAGAQFQGRHVAQUAAMLK I A D G D G S R QP GE E E L $A$ A G A R Y Q G R R V ,
I A G A D G G S R R K P S S E K K E
YA GTDGKNPVSEE EQRLCFALGKRDATVVSKM N
$\square A S P D$ GS R QPS K N E LDD A HF Q G K HVVA E I T K K L



FAGADGSSRQPSADKEKELAARIQGEKFYQTVAK
VA G GQGERQP SANE LEGARYQGRHTSEIIAKKL

YAA DGTREPTELELQQAFHQGKYVAEIAKKLKG
LT A A D GSRRQPSENELA DARYQGRHVA GIAA KL





I A GGDGSRQPSETELAGAKF LGQHVADLTRKL


$\square A G G D G S R M P S Q T E$ I EMAKFQGRHVAEDASAL

 $\qquad$
LA GS QNDRPLTD TEATLCRALGKR』ANTTLKL
FA GAD GS R Q P T A LE LDEIA E I Q GK TFY ERVSK



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| :---: | :---: |
| UniRef90 S8FHW4 |  |
| UniRe | LVPDELLMKSG |
| UP10003646E68 | VSANCEATEADTPASG |
| UniRef90-Q1H | VSANHEATEPEIPQSGDPYVELADLEECAGLALGSPTRFG |
| UniRef90_J3CZE0 | VPESVAKNSFFKLDQQAPVATVDELANYDAIIVGTPTRFG |
| UniRet90_W6L | VSAVCEAVEDEIIPAAGSPYAHLDDLRECAGLALGSPTRFG |
| UniRef90 A9U3P8 | TLPADVLTKMSAPPKDIPVITAAQLPEADAFLFGIPTRYG |
| UniRef90-K4CX75 | TLPAEILAKMGAPPKNAPIIAPDDLVEADGFAFGFPTRFG |
| UniRef90-UP1000409A7C9 | VPTDVA |
| UniRef90-G4 | TLSEDILAKMHAPPKDHPTATPQTLKEADGILFGYPTRFG |
| UniRef90-G6F1 | VPEDLAKANHFKLDQAAPIATPAELAEYDGL LIGTGTRFG |
| Ref90 G9PAK1 |  |
| H5Y7 |  |
| UniRef90_S5Y7A6 | VPEELAKASYYKMDQKAPIATIADLENYDA I IGGTGTRFG |
| UniRef90 UPIO0036E1BD5 | ISPVCEKTAPSIPPDQGAVYATLDDLKLICDGLALGSPTHFG |
| UniRef90 ${ }^{-10}$ |  |
|  | STPIAEPDVLLKYDAILMGTPTRYG |
| UniRef90-G2YZ |  |
| UniRef90-UPIO004 | VPDHVAQKAGYKDDQRAETAAVAELPDYDAIIFGTPTRFG |
| UniRef90_G315 |  |
| UniRet90_H8Z174 |  |
| A1G | VSATCEAVDEDIPAEGPPYATLDDLRECRGLALGSPTRFG |
| UniRet90-A0A | DODAPVATPAELADYDAIIFGTPTRFG |
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| UniRef90 O2BLK8 | D |
| UniRef90-UPI0004411 |  |
| UniRef90-E1ZBJ9 | MHAPPKDHPIITANDL |
| UniRef90_C7YWM | M ${ }^{\text {a }}$ P $P$ K |
|  | A |
| UniRef90-UP100036A1D87 | AAVPDSGAPYVEPADL |
| UniRet90-H1S | $\checkmark$ |
| UniRe990-K2E3L8 |  |
| IiRet90_QYL18 |  |
| UniRet90_B8KQC0 |  |
| 22 | G |
| UniRef90 K1WN | TLPEEVLTKMHAPPKSEPVITPEILATYDAFLEGIPPTRYG |
|  |  |
| UniRef90-M5WCW3 | T |
| UniRet90 - 604 |  |
| iRet90_BodcY6 |  |
|  | VSANHAATAPPVPGDGPPYAELDDLKQCAGLALGSPTRFG |
|  |  |
| UPIOOO350 |  |
|  | SQEAYVESQKEQEVVPEATHEDLKWADGVIWG\|PTRYG |
| UniRef90 C5BNZ6 | VSATCDAVDPDTPAEGDIYCSEEDLRNCAGLLLGSPTRFG |
| UniRee90 ${ }^{\text {- W6MAN1 }}$ | VSAVCQATEDDIPPDGP |
| O |  |
|  | VSAVCEAVENDIPDDGAPYCTPEELKNCAGLALGSPVRFG |
| UniRef90-K4BFT6 | T S EDVLMK DQAPLKDDTDPEPEDLDDADGFLFGFPTRFG |
| 1 |  |
| B8KFTM | GPPYCSD |
| Unir |  |
| UniRef90 C4YLZ1 | T |
|  |  |
| UniRet90_K1ZK55 | V |
| UniRef90-D8PU50 | 析 |
| Ref90-H6BR03 |  |
| UniRef90-F6CZE5 |  |
|  | TLSDEVVLGKMHAPPKPTDVPTPAELEAFDAVLFGIPTRYG |
| W6MQV3 | LSEDVLKSLGAPPRPDYP |
| UniRef90- 66 | LPEDVLAKMHAPPKSNYPVATПDTIKDYNAVLFGTPTRYG |
| UniRef90-UP10004755FB9 |  |
| UniRet90_C5 |  |
| UniRef90_-11AX62 | D |
| UniRef90-1319 |  |
| UniRef90_M5BJW9 |  |
| UniRef90-R4 |  |
| (eat |  |
| UniRe990-N1PCX5 |  |
|  | NNCDVVSAVPASGAPYVTAEDLKNCAGLALGSPTRFG |
| Reet90-K6ZG85 | NNDDT VSAVPASGAPYVTLLDLANCDGLALGSPTHFG |
| UniRef90-G4T9G0 UniRef90 O6WGR |  |
| UniRef90 Q61 | LSPELLLVKAPPKPDYPVMDPLDLKNYDGFLFG\| PTRYG |
| UniRef90-G8YC |  |
| niRef90-F3LD59 | 俍 |
| UniRef90-BODFI5 | EELAKMYAPPKPAYPVAAPADLAQFDAFLFGIPTRFG |
| UniRef90 UPI0002E62E50 | TCEAVDNSVPDTGAPYATLDDLRHCQGLALGSPTRFG |
|  |  |
|  |  |
| UniRet90- ${ }^{\text {ali }}$ | QATAPAVPDSGAPYVTDDDLRGCAGLALGSPTRYG |
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| , | G |
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## UniRef90 U1ZOK7

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UniRef90
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UniRef90 K6ZG85 UniRef90-G4T9G0 UniRef90_Q6WGRO UniRef90-G8YC61
UniRefon F3
Un UniRef90- ${ }^{\text {F3LD59 }}$ (
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UODFI5 UniRef90-UPIOOO441711E UniRef90-UPIo002E62E50 UniRef90-K0KUK5 UniRef90-W9X1Z3 UniRef90-K0C9E4
UniRef90 M1E4U7 UniRef90-A5DPD4 UniRef90-WoSI44 UniRefo_Wossid4
UniRef90_ UP1000

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MMAAQMKNF LDDTGG|LWAKGALVNKGSVVMVISTATQHGGE NMPA QLKAFFDATGQLWAQGALANKYVSVVVSTGTPGGQE
 N M A A P MKY F L D GTA GL WLK G A LI GK PA A V F T S S G S H G G N E NMAAPMKYFLDGTSVLWLKGALIGKPAAVFTSTSSMHGQE $R \square A S Q M A A F L D Q A G G L W M R G A L D G K V G G A F T S T A T M A H G Q E$ NMAAPLLKYFLDSTGGLWWAGALSGKPAAVFTSASTHGGHE TMSAQMKAFFDSTGGLWRGQSLAGKPAGIFVSTGTQGGQE MMPAQFKAFFDATGAIWKNQQLAGKPAGIFYSTGSQGGQE $M M A A Q M K N F L D Q T G G L W F E N R R V G K V G A V F T S T G S Q B G Q E$
 $N F P A Q W K T F W D M T G G M W T S G G Y W G K K A G L F D T T G T P G G Q E$
 S MA A QMKAFFDSTGELWWKEQKVAAGVPAGFFVSTGTQQGQE
 SMASQMKAFFDSTGGLWHEQRLAGVPAGFFVSTGTQGGQE NFPA QWKAFWDKTVGIWWS G GYWGKYVGLFVSSGTP GGQE NFPA QWK A FWDATYSQWWTGGYWGKF A GI FVVSTGTPGGQE
 NMAAPMKYFLDGTSSLWLKGALLAGKPAGVFTSTSSHGGGQE
 QVPA QFK A FWDSTGGGLWTK GA L A GK GYS I F T S T G T DGGQE NFPA QWKAFWDRTGA I WAK G GYWGK YVVGTF V S T GTP G GQE NMAAPDKYF DDSTSSSLWLS GA LIDDKPASVFSSSSSHGGQE NQSAQWRAFWDAT GQLWQSGAL HGKYAGVFVSTGHGGGQE MMASQFKAFLDSTGGLWQAGALVGKPAGIFTSVATQGGGE NFPA QWKAFWDKT GKQWAS G GFWWGKMA GUFVS TA S G G GQE NFPAQFKAFWDQTGGLDQSGGLYGKYASMFISTSSMGGQE NMAAPMKYFWDSTVNEWLQGALAGKPASVFTSTGSMHGNE NMAAPMKYF LD GTVAQWLS GALTGGKACVVFTATGSHGGQE NMT A QMKNFIDQTGSWWNQGKLENKITGFFTSTSSSHGGQE NMASQMQAFWDRTGPLWAKGALVGKVGGAFTSSASQHGNE NMAAPMKHF $\square D Q T S G L W L S G A L V D K P A A V F T S T S S H G G Q E$ NFPAQWKAFWDQTGKQWATGGFHGKYAGLI ISTGMGGGQE
 NFPAQWKAFWDSTGGQWQSGAFWGKYAGLFVSTATGGGQE
 NFPA QWKAFWDSTGQLWAQGALAGKYAGVFVSTGQGGGQE NMAAPMKYF LDDSTSSSLWLGGALMGKPAGVFTSTSSHGGQE
 A MP A QM K Q F L D S A GA L WL N G E L E GK A T S SI T T S T G S H G GQE NFPAQWKAFWDAT G GL WAS GA L A GKYA GV F V S T GTP G GQE N M A A P LLK H F DD NT S GL WLN GE L NMAAPLKYFLDSTGDLWLAGALVGKPAAVFTSAATHGGHE NMAAPLKYFI DQTSELWWNGSLI GKPAGVFSATGSHGGQE N MA A A I K Y F L D GT $\square$ PHWLS GH LIGGKPATVFAS GASH GGQE CMAGQMKALFDSTGNLWKEQKL AGKPAGFFVSSGSQGGQE MMAAQMKAFFDATGGLWHAGALAGKPAGFFFASGTQGGQE NMAAPDKYFDDQTSDLWLSGSMIDKPAAVFTSTAS HGGQE NMA A PLK Y F L D S T GDMWLNGA LVDKPA GLFTS TG SH G GQE TAPAQFFEFWGAT G G L W WN GS LAGKPA GVFVTS GQGGGQE NMAGAMKHFWDGTSELWMKHALVGKPAALFTSSSSHGGQE NMAAALKYFLDSTGALWQSGALIDDPAACFTSTASHGGQE NFPGQWKAFWDTTGALWARGALAGKFASAFVSTASPGGQE

 NFPAQFKAFID GTGGLWASGA LYHKPA GI FVVTGTGGGNE NMAAPLKHFIDSTSAQWLA GTLIGKPACVFTSSSSMHGQE NFPAQWKAFWDRTGGDWAAGGYWGKYA GLFVSTGTGGGQE NMAAPLKYF $\quad$ MDTTSDLWFEGTLIDKPAAFFTSTASH GGQE $N F P A Q W K A F W D A T G G L W A K G A L H G K V A G V F V S T G T G G G N E$ $N V S A Q L K Q F L D T A G P L W A E G K L A D K V A A G F T S Q N A H G G Q E$ NMAAPMKYFLDGTS SQWLNGDLDNKPAAVFTSTSTLHGGQQ
 NF P GQWKTFWDSTGQLWMQGALAGKFAGIFVSTSTPGGQE NFPAQWKTFWDSTGGQWQTGAYWGKYAGLFVSTAS GGGQE NMAAAMKYF DDGTVPQWWGGEVIGKPATVVTSTSSSMHGQE NMSGAMKF FWDTTS GLWWLKGSLI DKPACTFTSSSSSH GGQE GFPAQFKAFFDAS GQLWQA GQLWGKFA GAFVVSGGPGGQE NFPVQWKAFWDSTGPLWASTALCGKYAGLFVSTGSPGGQE NYPA QFKAFWDAT G GLLWAS GA L H GK PA GI F V S T A T G G GQE N M A A P L K Y F LDD S T S SQWW N G DL DD K P A AV FTS T G S H G GQE NMPAQWKALWDAT GQLWATGKLAGKYAGVFVSTGHGGGQE NFPA QFKAFWDAT GQLWQQGALAGKFAGVFISTGGHGGGQE
 TYSAQWKTFDDRDGQLWQSGALGGKY FGLFVGTGTPGGQE

 NFPS QFKNFWDQTGALWANGELIGKPAGVFVS


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UniRef90_W6LY71 UniRef90- A 9 U 3 P 8 UniRef90-K4CX75 UniRef90_UPIO00409A7C9 UniRef90-G4Z8V8 UniRef90-G6F 158 UniRet90_G9PAK1 UniRef90-H5Y7Q2 UniRef90_S5Y7A6 UniRef90-UPYO002C35A11 UniRef90-UPI00036E1BD: UniRef90-A0A059
UniRef90 A6R537 UniRef90-G2YZN5 UniRef90-UPIOO04697CC4 UniRef90_G315M2 UniRef90-H8Z174 UniRef90-H1G196 Uniref90-A0 Ао $592 \mathrm{MP5}$ UniRef90-A5G020 UniRef90-C4JW16 UniRef90-Q2BLK8 Uniret90-CPIORO44115D5 UniRef90_E1ZBJ9 UniRef90-C7YWM7
UniRef90 U1HME5 UniRef90-U1HME5
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UniRef90 M5WCW UniRef90-Q604L8 UniRef90-BODCY6 UniRef90 WoTQP7
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UniRef90 F6CZ5 UniRef90-QOUVG1 UniRef90-W6MQV3 UniRef90-L8J9X2
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UniRef90-WoSI44

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【ALISTQWQMQHHGMIIVIPLSYAYQGQMGNDVGAPYGMTT TTVINLLSTFVHHGLIFVPLGYQLANLSEVRGGSPWGAGT TTUTSHATLFHLGMMVVGVPYSEKEMNEVTGGSPYGAST MTLMTMMDPMHHGMLMLGLPYSEPQGTTKTGGTPYGASH


\section*{

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UniRef90_UPI00044161B6

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| :---: | :---: |
| iRef |  |
| UniRef90-S8 |  |
| UniRef90_K2BNL4 | GDGKRMPSENELGUARTQGKHVAEUARALKN |
| UniRef90 Q1H097 | GAMDDHPSDEKKL |
| Ref90-J3CZ |  |
|  | W |
| UniRef90-A9U3 | FAG DGTRMPTETELAMAEHQGRLTANVAKLL |
| UniRef90-K4CX | D |
| UniRef90_UPIO00409A7C9 | D |
| UniRef90-G4Z8V8 | D |
| UniRef90-G6F 158 | - |
|  |  |
| Rer |  |
| UniRet90 | ANGDGSRQ |
| UniRef90-UP10002C35A11 | VLSGDGTRKP |
| $\begin{aligned} & \text { UniRef90-UPIOO036E1BD5 } \\ & \text { UniRef90 AOA059ANQ2 } \end{aligned}$ | RLSSLNNDRA |
| UniRef90-A6 | FAGADGS |
| UniRef90-G2YZ | ADGS |
|  |  |
| UniRef90-H8Z174 | LAGTNND\PLNEAESRLCQALGRR |
| UniRef90-H1G196 | $V A G A Q G N P L T D H E R L C H A L G R R ~$ |
| UniRef90-A0A059L | YAGPDGSRQPTDLELELEABQGK |
|  | D |
| UiRef90_C4JW16 | FAAGDGSRQPSAMEIELAELQGAAFYETVAKVN |
| UniRef90 Q28L | HVAGPDNREPDPLENLCVAGGRLGQLAQKLS |
| U170004 | FAGGDGSRQPSALEL |
| UniRef90 ${ }^{-} 7 \mathrm{YYWM} 7$ | FAGADGSRQPSGKELELAEIQGQHFYETVAKYSG |
| UniRef90-U1HME5 | FAGADG |
|  | PESRLPVTEVEKQLAMAQGRRLAEDALRLEG |
| UniReefy-M1 | VAGAKSDAPVSEDEAKLARAFGKR1AETKRMAG |
| Ref90-Q1 YL18 | MAKGDGSRMPSQDELDGARFQGRH |
| C0 |  |
|  | S |
| eef90_K1 |  |
| UniRef90-K5V995 UniRef90 M3API1 | AGVDGSRYPSALELELLATAQGKQFWNTVSK |
|  | K |
| ef90-Q604L8 | RHTGDAS PLSDEERALCRAFGARLARVAKALKN |
| Ref90-B0DC | FTGGDG |
|  | GQDSNL |
| $\begin{aligned} & \text { P25 } \\ & 110 \end{aligned}$ | GPDGSRT |
| UniRef90_UP | VAGPD |
|  |  |
| ef90-C5B | HASNTPSQDERNLCDAFGAR |
| W6 |  |
| UniRef90-Q0 | GSQ |
| $\begin{aligned} & \text { UniRef90-D4DPD5 } \\ & \text { UniRef90 K4BFT } \end{aligned}$ | VAGHDGNPALTAEEETLAFAQGQA |
| UniRef90-11H4 | K |
| N6 | WAGAEGGRAMDDTESLLCRALGRRVAQTCARL |
| UniRef90-UPIO0040FE361 | WAGGDGPR LTPSASELDGARYQGRRVAELAANKI |
| UniRef90-C4YLZ1 | FANVDGSRQPSTLELETAEKQGEAFVKSATKL |
| iRef90 D9SCB1 |  |
|  | MAGSNSDQPVSEAEKIICRTLGKRLAMVALKL |
|  | FAAGDGSRQPSAHELELATAQGKSFYETVSRVN |
| UniRef90-F6CZE5 | ALCEAQGER ${ }^{\text {a }}$ KMAVKLN |
| UniRef90 QOUVG1 | FSGGDGSRQPSKLELDI ATAQGKAFYEAVAK |
| $\begin{aligned} & \text { UniRef90-W6MQV3 } \\ & \text { UniRef90-L8J9X2 } \end{aligned}$ | ADGSRAVSALEKEEAEDQGETF |
| UniRef90-B6QRC4 |  |
| 4755FB9 | G |
|  |  |
| UniRef90 Q1AX62 | TDPLINGEG PGEAELAAARYLGRR |
|  |  |
| ef90 M5BJW9 | WAGS |
| UniRef90 R4YLX0促 | EGGQRT |
| UniRef90-N1PCX5 | FAGGDGSRQPTKAELELAHKQGEAFYGAVAKVN |
| UniRef90-G2 | G |
| UniRef90 K6ZG885 | P |
| ef90-G4T9G0 | DGSRQ |
| niRef90 Q6WGR0 | FANSDVSRQPTPLELEANGOMSSYYEYV |
| UniRef90-G8YC61 | GSKSNNALSDDEIGUCQALGKRVATIVA |
|  | FAGPTGARQPSPLELEMAETQGKAFHDUVSRVN |
| UniRef90-UP1000441711E | F |
|  |  |
| UniRef90 K0KUK5 | GD |
| UniRef90 Koctey | VAGIDNRTQPSDDEI |
| UniRef90-M1E4U7 | $V A G E N S S R N V S Q N E I A G A F F Q G K Y V A L I T K D I S N$ |
|  | FAGSDGSRKVTDLELEVAKIQGSSFFETIKKMKG |
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|  |  |

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UniRef90 N6Y9U5 UniRef90-U3Н4B8 UniRef90-UPIO00365DCE1 UniRef90-I2GL45 UniRef90-P30821 UniRef90-UPI00037E3B57 UniRef90-D8LTD7 UniRef90-G8BPX4 UniRef90-UPIO002F092EE UniRef90-UPIO002557F1F UniRef90-C7LXL7
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UniRef90-H8X617
UniRef90-UPIOOO3B56C74 UniRef90-Q4P9Q0 UniRef90-G8YBP4 UniRef90_-15JYY9 UniRef90-13TUU2
UniRef90 - XORLJ3 UniRef90_UPI0004629A25 UniRef90-UPIIO003B5D66D UniRef90-W3XPC3 UniRef90-11KE62 UniRet90_F5SVR6 UniRef90-UPIO00374BABF UniRef90-H3NXS7 UniRef90_UPIO004409BE3 UniRef90-UPIO003489E1F UniRef90-UPIOOO3662C29 UniRef90-V2UUA8 UniRet90 UPIIOOO37C12C5 UniRef90_C9P386 UniRef90_UPI0003A72427 UniRef90_HOE679 UniRef90_E8LS28 UniRef90_UPIOOO4272C39 UniRef90-A8P8W2 UniRef90-K5W3X6 UniRef90-F2P129 UniRef90-W1PFQ0 UniRef90-W7625
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UniRef90 - S9QW59
UniRef90-W1OFS1
UniRef90
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UniRet90

- 2 B 3 H 4 UniRef90-G0AlT8 UniRef90-12FY69

GAEVTLKRVPD








$S Y V A V \mathcal{Y} Y$ SKY GSVVA





C K I I Y V L





$K V$ AI V LTY S L Y H HVYTLA ESAK IGGVERAGVKA DLVQVKET
$V L V L Y Y S R H G A T E S M A R K D A L G V E R \quad Q G I E A R L R T V A P$



VLVLYYS
sk

KTAI VYYSMYGHI KQLADAEKKGIEKAGGTADLYOIPE

ANILI PYYSAYGHI FKMAKAVEEGAKKVEGIEVKLVRIIKE
KVLVLYYSAYGHI ETMAQAVAEGDRETGAAATIRRVPEL
AKVLVLYYSSYGHI EQMAEAMAEGARAAGAEVAIRRVPET
KVA VYYSMYGHIDQQLAEAEKKGIEKAGGKADLFQ
$V Y$ Y
$V L I L Y Y S R T G A T E R M A K E L A R G V V E S S G V A A R L R T V M P S$
$V L V L Y Y S R H G S T E A M A R Q V A R G V A Q V S G V E A R L R T V P P$

AKVLI PYYSAYGHI YKMAQAVAEGAKRAGAEVKIVMIPEF
S YVLVLYYSRHGATRSMANQ, AR GDE Q S GTEARLRTVVAA
A Y I LVL Y Y S K Y G S TK DMA HLI A D GIV A A A M S A K I R T V P Q
$V L V L Y Y S R H G A T R T M A Q R I A R G I E Q S S G D E A R L R T V A E$







$K L A V V I Y S M Y G H I A T L A E S V K A G V E A A G G S A T I L Q L E E$
I LVLYYSKGGSVKEMSKDI ARGIVSVDGVEAKLRTVPE
$I L V \operatorname{L} Y Y$ S R Y G S T L
R LVLFYSRHGATRDLARLIARGIESVVGCHARLRTVPP




VAI L F Y S TYGHVA QLAEAEKRGIVAAGGKAVIYQIPE I

$K V A \operatorname{I} Y Y S A T G S T Y Q L A L A V E E G A K G A$ GAHTRLREVEE


AKVLVLVHSFYGHI EAMAAAVARGARSVPDAVVDLVRVPE

ARVLVLYYSRHGSVAALAEKIAHGVQQA GAEAWLRSIPG
K V A I I L Y T L Y D H V Y D L A L A EA E Gll K S A G G E V D D

KI LVVFHSDTGNTMELAKAVAEGARE EGVDVVVVRVPE

AN II PYYSMYGHVFQLANEVVKGAEQTGAEVKLAKVREF
I LVLYYSRHGSTEALARHI AKGIEK GHCQARIRTVPP




KVAIVYHSGYGHTKKQAEAVHAGVLRAEGATPELIAADA
S K I A V I VF S L Y G HV A QL A T Q I E A G A K E A G A A T V DV Y Q i E


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UniRef90-P30821
UniRef90 V7AHL9
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UniRef90_D8LTD7
UniRef90 G8BPX4
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UniRef90-UPI0002557F1F
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UniRef90-R8AXF5
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UniRef90-XORLJ3
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UniRef90-Q5H551
UniRef90-D3RYKO
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UniRef90-UPI00037626B1
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UniRef90-U5T2M4
UniRef90_W1NBV4
UniRef90_A0K6T0
UniRef90_F7NU42
UniRef90-D2B3H4
UniRef90_G0AIT8
UniRef90-I2FY69
UniRef90_H9UFF3

90
100
110
120
NFPAQWKAFWDATGQLLWASGGLYGKSAGLIU\|S GLGGGQE RLCAQVANFLDQTTRLWKEGKLIGKVGGAFTCTAQHGGSE NMAAALKHFLDGTSGLWTSGALVDRPFGLFTSTSTMHGQE $N$ VAAQLKQYI DTSGGLWQRGVMADKPATAFTSHNDHGGNE NMAAPLKYFLDGTSSLWMSGALDGKPAGVFTSSASMHGQE NMASPLKYFLDQTSSLWDAGDLQGKPACVFTATGTMHGQE NMAAQMKNFLDQAGGLWARDALVGKVGSVFTSTGQHGGQE RMAAQMANFWDQTGSLWMMGALIGKI GAAFTSTGTQHGQE TMTAQMKNFLDQTGGLWAQGKLIGKVGSVFTSTATQHGQE NMASPLKYFLDTTSELWMNGVLADKPATAFTSTASHGGQE TVPAQWTAFWDATGSWWANGELNGKVAGFFVSTSTYGGQE
 NMAAPMKYFWDGLAGAWVNGTLAGKPASVFSSSASHGGQE NMAAPLKYFI DSASDLWLNGELINKPAGVFTSTASHGGQE MPAAQLKQFIDTTGPLWGQGKLVNKDTSGFTSCATHGGHE MMASQFMAFWDSTGGLWVQGALHGKYFGQFFSTGTGGGQE NMAGSMKHFWDSTTPLWISGDLIDKPACVFTSSSSMHGQE $T L P T Q M K S V L D A T G G L W Q S G G L V G K P A G V F D S T A T Q G G Q E$
$T C S A Q W S T F W D R T G G G O K G S L N G K A A A F F V S A S Q G G Q E$ NMAAQMRNF LDQTGGLLWFQQKLVGK\GSVFVSTAQHGGQE NMAAPLRYFLDQTSDMWDDGSLSGKPAAVFTSTGSHGGQE NMTGQMRQFLDGTGGLWAQGTLVGKPGGVFTSSATQHGQE
NMAAPLKHFLDNTGDLWLNGTVGKPAGAFTSTGSHGGQE NMAAPLKHFI DTTAKTWLAGTLDGKPAMVFTSGSMHGGQE NMAAPLKYFLDSTSKLWLKGSLSGKPAAVESSTSSHGGQE NMPAQWKSFWDGTGGLWAKGALRGKHAGVFVSTGTQGGQE NMAGALKYF
NMAAPLK
L
 NMAAAMKYFLDGTTALLWLNGALIDKPAAVFTSTGSHGGQE RAPAQVSAFFDQTGGLWASGALIGKFGAIFTSTGSQHGNE
$N M P S Q F K N F W D G T G S L F A K Q A L T G K C A G F F V S T G S L G G Q E$ NFPAQWKTFWDKTGGI WAS GGYWGKKAGLFISTGTGGGQE NMAAQMKNF LDQCGGLWFADRLVGKVGSVFTSTGQHGGQE SMPAQMKQYLDSAGGLWAKGELEGKATAVFTSSGS DHGGQ NMPSQMKNFLDQAGGLWAKDALVGRVGSVFTSTSTQHGQE R $\square$ S SQMAAFLDQAGGLWMRGALNGKVGAAFVSTAQHGGQE NFPAQWKAFWDRTGGQWANGLYHGKLAGLFVSTGTGGGQE
$M M A A Q F Q A F L D S D G L L W D E Q F L E G K P A G M F F S T G C Q G G Q E$ NMAAPLKYFI DSTSDSWLS GVLSGKPAAVFTSTGSHGGQE NMASPLRYFLDQTGDDWLEGSLTGKPAGVFTATGSHGGQE NMAAPLKYFID GTSPLWMGGALVDKPAGVFTSTASHGGQE SMPAQMKQYLDSAGGLLWAKGELEGKATAUFTSSGSDHGGQ NMAAPLKYFIDSTSSLWLSGALDDKPAAVFSSSSSHGGQE NMASEMKYFWDQTTTLWLSGALHNKPACVFTSSGSMHGQE NMAAALKHF $\square D G T S A L W L S G A L I G K P A A V F S A S S S H G G Q E$ NMAAPLKHFWDQTTPLWVKGSLIDKPACVFTSSATHGGQE TMSSQMKNFFDQTGGLWAKGALVNKDGSVMASSATQHGQE NMAAPLKHFWDKTGGQWVAGDLDDKPACVFTSMNSMGGNE NMAAPMKYFWDGTITAWQNGSLAGKPATVFTSSGSHGGNE NFPAQWKVFWDATGRLWTAGKLSGKYAGVFISTGTMGGQE NMPAQDKTFWDRTGSLWVNSKLAGKFAGVFVSTGGGGGQE NFPAQWKAFWDKTGGI WAKGEFYGKYAGVFVSTGTPGGQE
 NMAAPLKYFI DSMSPIWIKGAMEDKPASVFTSSGSHGGNE NMAAPLKYFLDGTSPQWLAGAMSGKPAAVFTSTTSMHGQE NMASAMKYFWDGTSPEWLAGSLAGKPACVFTSTGSHGGQE AMAAQMKAFFDSTGSVWEKQGLAGKPAGFFVSTGTQGGQE
 $G V P A Q V A T F F D Q T G Q L W A T G A L V G K F V S M F T S T G Q H S G Q E$ TPCAQFRAFWDATGGLWARGELHGKYFGQFFSTGTQGGQE A A P S Q $\quad$ T S LIFD STGAALWAT GALLYHKPAGFFTSTGTGGGGKE
 NFPA QUKAFWDRTGGGLWAKNALGRGKYAGVFVSTGTPGGQE $N V S A Q M R T F D D Q T G P L W M K G A L V G K V G S V F T S S A T Q H G Q E$ NMAAQMKNFLDQAGGVVARDALVGRVGSVFTSSSQHGGQE NMAAEAKAFWDSTTACWLKGELINKAAGVFTSSGSHGGNE NYPEQWKK LID RTGGLWAQQA LVRGKY F GVFVSTGTP GGQE GPAWQFKKFADASSKPWFAQAWKDKVAAGFTNSASANGDK $S M P G Q V K T F L D Q A G Q F C T T G E L E G K P T A L F T S A G S H G G H E$ VMS S QMK QFI DMTGKLWMGRKLEGKVGAVFTSNEMPHGGK APA A QLLKQFI DQAGGLWREGKMLANKPVTAFTSFNRHGGSE NMPA QLKQFLDSAGALWMNGKLEGKATAVFTSTGSHGGQE NMAAPLKHFLDSTSDEWLKGQLDDKPFSVFTSSASMHGQE NFPA QWKAFWDRTGGLWMK QAL H GKYAGVVVSTGTPGGQE
 NMAASLKYFLDGTTPQWLSGALTGKPASVFTSTGSHGGQE NMAAP LK AFWD NTS S LLWLKGALTVDKPAGVFTSSSGSMHGNE APA A QLK QF DD QA G GLWHEGGLADKPVTAFTSFNRHGGSE TVSWQFKKFADTSSKQWF GQKWKDKVVAGFTNSATMNGDK


## UniRef90 W4KFG4

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UniRef90_R8AXF5 UniRef90_DOICH4 UniRef90-W7Q9Y5 UniRef90_A5DYJ4 UniRef90_UPI00042458D8 UniRef90_K2GV81 UniRef90-H8X617 UniRef90_UPI0003B56C74 UniRef90_Q4P9Q0 UniRef90_G8YBP4 UniRef90_J5JYY9 UniRef90-I3TUU2
UniRef90-X0RLJ3 UniRef90-X0RLJ3
UniRef90-UPI0004629A25 UniRef90-UPI0003B5D66D UniRef90-W3XPC3 UniRef90_I1KE62 UniRef90_F5SVR6 UniRef90_UPIO00374BABF UniRef90_H3NXS7 UniRef90_UPI0004409BE3 UniRef90_UPI0003489E1F UniRef90-UPI0003662C29 UniRef90_V2UUA8 UniRef90_UPI00037C12C5 UniRef90_C9P386 UniRef90_UPI0003A72427 UniRef90_H0E679 UniRef90-E8LS28 UniRef90_UPI0004272C39 UniRef90_A8P8W2 UniRef90_K5W3X6 UniRef90_F2PI29 UniRef90-W1PFQ0 UniRef90_W7I6Z5 UniRef90_A0P7K4 UniRef90_UPIO0037CFE34 UniRef90_C1D514 UniRef90-I11466 UniRef90_E9CCX8 UniRef90_UPIO003A37BBF UniRef90_Q5KLR3 UniRef90_S9QW59 UniRef90_W1QFS1
UniRef90_D6TWG7 UniRef90_A0A059DPR2 UniRef90-B9WBX6 UniRef90_UPI0003675463 UniRef90_UPI000378D9BF UniRef90_19P576 UniRef90_C5M7Q5 UniRef90-Q5H551 UniRef90_D3RYK0 UniRef90_IOLA34 UniRef90_UPIO004789E93 UniRef90_UPI00037626B1 UniRef90_-_8WXU8 UniRef90_W1NBV4 UniRef90_A0K6T0 UniRef90_F7NU42 UniRef90_D2B3H4 UniRef90_G0AIT8 UniRef90_I2FY69

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 T T L L T M A L P L I MH Q G M VV WV G $\operatorname{L}$ STLLALLYNTFHHWGSVIVSPGFTDPAVYA A GGNPYGTA S TLLTMMMPLLHHGMVI AGLPYSEAATTTQS GGTPYGASH
 T T L V G I L A G L L 1
 STVVKNCMSY LVVHHG II Y IPPLGYKTAFSDEDHGGSPWGAGT





A A

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UniRef90_H9UFF3


## UniRef90 S6HK47

 UniRef90-D3FSQ4 UniRef90-F6EKZ3 UniRef90-J3PWH5UniRef90_C6C938 UniRef90-A6V4311
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UniRef90_S5JNS8
UniRef90-IBKM6
UniRef90-V4HMB1
UniRef90_V4HMB1
UniRef90_UPIO0035CE22B UniRef90-R8AU07
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UniRef90-T1CAN3 UniRef90-T5HVU0 UniRef90_ICLN9 UniRef90_W4QS12
UniRef90 K6GK19 UniRef90_A0QUX9 UniRef90-KOAW86 UniRef90-Q2STZ1 UniRef90-M5DQD2 UniRef90-UPI0003658041 UniRef90-R9AHD2 UniRef90_UPI00047ABC33 UniRef90-Q9PCP5 UniRef90_UPIO002EC2756 UniRef90-Q21VB3 UniRef90-T1C7E5 UniRef90_UPI0003B7408E UniRef90-B2JIKO
 KVAI YYSSTGTNYKMAKWAEEGA KAQGAEVKLVKIPE KLAVI YYSATGHGTTMAHRDAKAAENVGAEARVRHUAET AKVALLTYYSMYGH DDK LDA D SVEEGD

$K V Y V V I H S L W G H D K T L G E E V V V G L K E \quad S G V D A K L W T V K E$ ATVYIVIVTLYHHIYKLAVEIVKGLEAQGVNVKVFQVQE AKIVAVIVYSTYGHVRTLAEAEAKGAKEAGGADVTVLCQFPE ARVIIVYHSGYGHTRKQAEAVHAGVQGVAGTQTELLADDA
 MAEQIARGVEKHT
NVAVIYYSSTGTTATMAKAlIAEDAERA VLILYYSRHGAVAALADKI A 1 G GVQQA AKIVVVYHSGYGHTKVVAEHVARGA GAELIPDDAEG GVVVYHSGYGHTKIVVAEHVARGA GAEVVAISPEG SKVVIVFHSGYGHTQRVAEYVAEGAG A GAELLQISADG KI YVVYDSESGHTEALAQAIAQGA SVEGADVYLRHVHQ AKI AVVFHSGYGHTQRLAQAVAEGANAQLIA IDAD KVLITYYSSYGHDFKMAQSAAAADEDNEDYEVKDRKDPE KILVLYYSSWGHMEAMARAAAEGARDAGADVTVKRVPEL SKVLVVYHSGYGHTKVVAEHVAKGAQAQVVAISTE
AKI AVIYFSGYGHTKRVAEHVAKGANAELI AVDSN KVAI YYSATGTVHTLARAAADGAEKAGAEVRLRKVAE
 KLSV $\square Y Y S S T G T G Y E \square A R E \square A E T A E K E E G E V R L R K V A E$

| $M K K G A A S$ |  |
| :---: | :---: |
| $V$ | $E$ |
| $V$ | $G A A$ |
| $V$ | $G$ |



 SAVLVLYYSRHGATRRLAQQI ARGVQAEGLDVWLRTVPE KVLI AFYSRNGSTDULANAIAEGALQ EGAEVRLRRARE KLAB 1 YYSATGTDH GMAERLQQ A GEKAGAEVRLRQVPE KVAII YHSGRGHTKRQAEAIVQGVKSVEAVECKLIPVEE NVAVVFHSGYGHTARQAEAVHRGAAGVEGVTAHLIPVES
 IVVLYHSSHGSVEAMAHEIAESIEQQGATALLRTFV

 I LVLYCSQDGSVHKLAQQUARGVNSVTGAEAKLRTVPN

 KVVA VIVYSGSGHTAALMAEAVK S GASSSVAGVDVSLIPIE G $K V \bar{V} V V Y H S G Y G H T Q R M A Q S V A D G A$

GAELIADDADG KVLIVFYSRAGSTEILANAIAQGA DAEGAEVRLRRARE VAVVYHS GYGHTQVLAEQVLQGAKDGGAEALLVPVSD RILVVYYSATGNTAKLASALADGAREAGADVRVRTVPE KI LVLFY GYGS VVDLAMEIAEGA KAEGAEVKVVRVPE
SGIVVVYFSGYGHTQRVAEYVAEGAQASLIAIDNN

 K 1 A V I Y Y S M Y G I SIVYDSGYGHTARVAQAVAAGVQEMKGADVRLMAVAD KLAVI YYSSTGTNYQMAQWAADGAKEA GADVKVLKVPE
SDVVVVYHSGYGHTRKVAEHVAQGANATLIDADDN
S


A K $K L A V I \quad Y Y S M G G T N Y Q L A K W A E E G A K E A \quad G A E V V V L K V P E$ A YI LVLYHSSNGSVRNLAYEDADADEQH GMEVKLVRTFSA $N \vee$ AI V Y F S G Y G H T K K I A E H I


A KI LVLYYSAYGHDEKMAEAI AE GARSVAGSAVTVVRVPE KI YVVYDSEGEHTKKLAEAIAEGAGEHDAAD
A K V HVV DY TVVYH HVYK L GVEVVQK GLES S GVDVKMFQVRE $K L A V I$ YYSST GTNY QLA QWAE K G GKE A GAEVVKVLDKV PE K LI L F Y S A TG A V K NLA HA I A D GA E K R G L Q TR IVRTV P K

SNLVIVYHSGYGHTKKLAESVLAGAQEAG
KTVVVYFS GYGHTEHVANFVIDGANAEA $\square K \square D S N$ $R I A I V Y H S G Y G H T A R Q A E A V K T G V D Q V E G A E A L L L T V E E$
 $V$ C V Y D S G H G H TVQK QA E A V A E GV R R A A GAAEA Q LI A V A

 KVAIVYHS GYGHTAKLAEADAE GVTRGGAEVSLLKADDDL


UniRef90_S6HK47 UniRef90-D3FSQ4 UniRef90-F6EKZ3 UniRef90_J3PWH5 UniRef90_c6C938 UniRef90-A6V431
UniRef90 F4PBII UniRef90-S2JEB2 UniRef90_U5HOM2 UniRef90-W6M6W9 UniRef90-UPIO002FCB604 UniRef90-UPI000402311C UniRef90-11X178 UniRef90_NoCWM5 UniRef90-11E1N7 UniRef90-F1Z7V1 UniRef90_UPI0003708652 UniRef90_UPIO004104A29 UniRef90_A1TRK7 UniRef90-E4RKF7 UniRef90-15C7F8 UniRef90_UPI0003D2A4DC UniRef90_S3IWU5 UniRef90_S5TN25
UniRef90 M5E379 UniRef90 UPI000348EC27 UniRef90-B6U724 UniRef90-L9PHE5 UniRef90-S5JNS8 UniRef90_11BKM6 UniRef90_V4HMB1 UniRef90-UPIO0035CE22B UniRef90_R8AU07 UniRef90-UPIOOO41F169C UniRef90-R4LT72 UniRef90-K2ED82 UniRef90 UPIOOO37F42BD UniRef90_K9NK92 UniRef90-L8XOS6 UniRef90-E6RM64 UniRef90_A4U5L8 UniRef90-14YHJJ UniRef90-UPIO00420D543 UniRet90_B6BWV9 UniRef90_10YMG4 UniRef90-DONKJo UniRef90_D5QBR9 UniRef90_UPIO00174662C UniRef90-Q4UM15 UniRef90-A0A024IFR2 UniRef90 Q6DLR8 UniRef90_UPIOOO3806B08 UniRef90-R4SMR2 UniRef90-A4YDV3 UniRef90_UPIO00470D68B UniRef90-UP10003F76403 UniRef90-G2P3R5 UniRef90-D1C186 UniRef90-G4TDV8 UniRef90_-18UEY3 UniRef90-BOU590 UniRef90 UPIO00473D006 UniRef90-UPIO0046EBF7F
UniRef90 UPI0003ABCBE5 UniRef90-W4QH39 UniRef90-I2AH51 UniRef90-A0AO23URW5 UniRef90_K6CH12 UniRet90_A4CBB5 UniRef90-UPIOOO36E7B7F UniRefofo- 5 LL2TG UniRef90_J4KS62 UniRef90-A3UKM1
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$\begin{array}{ll}T T A F T A V & T \\ L & L \\ L & L\end{array}$



















TCPVDSDELIGEE GLELGRALGRRVAQVTDRF

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S


 KTVVVVYHS GYGHTERMATADADGA GAVLVTDDSEG $K I A V V Y Y$ S GYGHTKVIAETFAQ $N$ I A I I YY S MT GT NY QMA Q WA A E E A R S N G DHEVR LRRKVK E
 $K V A V V F Y S G Y G H T M K Q A E S V A K G A N$ KLAI I YYSAT GHGTAMA QALSD A GESAGAEVRVRHDAE RIIAIVVYHTGYGHTGRQAEAVGAGVDQVDGVEAMLLDV KLAAVVF Y SMGGGTNYQLSK WAEEGAKEAGAEVVKLLVVVEV



$K \square A V \square Y Y S S T G T N Y K L A Q W A E E A A K E A G A E V R V V R P D E A$ A AYHS GF GHTARLAEAVA A GARES GA DVVTVL



 $R V A V A F H S G Y G H T A R Q A E A V A R G A G N T S G A R S S L D D V T A$
 A HI AVVYHSGYGHTQRLAQAVAEGA GAQLVAD DEG
 $Y S$ L Y G H $\square Q K L A A E A K K G \square E A A G G$ TA D $\square Y Q \square A E$
NLLITYYSSYGHMFKMAQAARDAAAEHDDYQVKDRKDPE $N$ TVVVVYHSGYGHTHRMAEAVAEGA GGTLLADDAD G $N V A V I$ Y Y S S T GHV H T LAA A A A A E A A K K A D A EVRRLRKP Q A A $K V A V I Y Y S A T G H T A M A N R V A A A A E A A G A E V R V R H R D P E T$ MAEQVALGDEES GAQTRRVRTVPP $K L A V V Y Y S T Y G T N H Q M A Q V A A E A A R E A G A E V R L L K V K E T$ KLAI I YYS Q T GHNFQMAKWAKE EAEKNGAEVVRLLKVEEY

I S V V Y F F S G Y G H T K V V I A Q T F A Q E I $K L A A I \quad Y Y S S T G T N Y Q L A Q M A A E G A K A A G A E V K G V M V Q E V V$
$V A V V Y F S G S G H T H L M A E A V A A G A N Q V A G T K A E L L R D T G$ A I VYHS GYGHTRRVAEAVAE GAGGILIDADAD $K L A V I Y Y S S T G T N F Q L A K W A E E G A K A A G A E V K L V K V P E A$ I A IVYY S A N GRTERRIARTMA S GARRDV GCEVQLL Q
K L A I V Y Y S A T GTVVRAMAERLAATAA QAGAEVRLLRQVERR SKVAVVYYSGYGHTKVVAENFANEDQADLIDADDQQ NVAAI YYS MYGHVAKLASS $\quad$ VK A GVVTSVPGVKAS K I S I I Y Y S S T GT NY QL A Q WA K E A V E S I GTA A R LV R A P E
 $K V L V I Y D T R T G N T K K M A E L V A E G A R S L E G T E$
V GIV Y H S GF GHT A T L A D A V A E GA R R G GA Q V R L LP V V A KI A I I Y H S N Y GHT RKV A HA I E E GA QA Y A QDK V E V RA L K I A I I Y H S GYGHTEEEI A K SVVES GAASVA GVT TTTLDPAEN $V$ S A Y H S GY GHTAVLA E AVVRAGAADAGATVVHL




IA V I F H S N Y GH T K RVA E A VVQ G A
LA I V Y H S P Y G H T A K V A Q Y I A K GAA A $\square G V T$ T HV $M$
$K V A V V Y F T K T D V T G D L A K A L Q A G L A E S Y S I E V V E D Q D Q G$ S S I A I V Y F S G G G H T H R L A E A I A A GV Q E S GVVQVEL L R DT G E


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 GVSGDFKKFADASSKAWFTGQWKDKDAAGFTNSAS DNGDK $N$ I A S QMK Q F DDT T G G DWGK GLTVNKVVSAMSSAQNPHGGQ T I S S GLLK T WID K L G Y L WA E G K L I D K V GA V F T TAA T T H G G L E HMASSLQRFWESTSRDWLKGSLEDKPGAVFTSTGQHGGQE NMA GGLKTF LDTTAPLWKKGSLYGKPVGFFTEASTHGGHE SVSAQFKAFVDATGDLWAKQAWAGKVASGFTDGSNYS GDQ GPSWQFKKFADAS SKPWFEGAWQNKVVGGFTNSAS DNGDK SVPWQFKKFADA TSKKWFVRAWQDKVVGGFTNSASLNGDK $N V S W Q F K R F A D A S S A V W A R Q G W K D K L G A A F S N S A S V V A D K$ MMAAQMKAFFDAT GGLLWREQS LAAKPAGVFFSTGTQGGQE SASAAFKAFMEATSQRWMEQRWAMKLAAGFTNSGSQNGDK S LT S A L K QFME D S SKR WLLARTWQ GKL A A GFTN G G GLLS G D K SVIS WQFKKK A DASSKPWF GQAWKDKMFAGFTNSASMNGDK SQSAVF QTFAEAS GSDWAQQGWRDKDAAGFTTSAGDVGDK APSARFKQFCDSTR LA WNDLKWGNKVAAGFTNSGAQNGDK $G V S W Q F K R V A D A S S$ GRWMAQQWKDKLAAGFTNSAS DNGDK $N V P S Q M K Q F L D T T G G L W A Q G K L A N K A V S A M V S N N A H G G Q E$ $N V P G Q V K Q F M D Q A G G L W F Q G K L V N K V V S A M T S A Q N P H G G Q$ GMSAAMKAF LDEQASPLWRSNALLGRPAGVMAVASTHGGVVE NMASEMKYFWDQTTSLWWNGALHNKPACVFTSSGSMHGQE $N \square A A Q L K Q F \square D T L G G E W Q Q G L L A D K V Y S G F A S S A T H G G Q E$ GPSWQFKKFADSSSKPWFEGRWQNKIVGGFTNSAS LNGDK TAPWQFKKFADASSKLWYTRGWQDKVFAGFTNSASLLNGDK $N \| P S Q L Q A F L D T T G G L W S K G K L V N K V V S A M T S A Q N P H G G Q$ TVSWQFKKFADATSKPWFTQQWKDKLAAGFTNSASMNGDK $T V T W Q F K K F A D A S S K A W F T Q Q W R N K M F G G F T N S A S M N G D K$ STASPFQT F DDS LGGGLWADGKDADKVYAGYTSSNTHGGQE AVSASFKAFQEMTSSLAKGF LVWKDKIAAGFTTSGSRSGDK NMPS QMKQF LD $\square Q G G L W$ WA G GKTVNKVVSAMTSAQNPHGGQ
 $N$ I A S QL KQFI DT LGGQWAQGQLADKVYSGFTSSSTHGGQE GPSWQFKKFADASSRPWYSQAWKDKLFAGFTNSASTNGDK MMA A QMKAFFDSTGGLWQEGA LAGKPAGVFFATGTQQGQE NVPA Q K S FLD T G G LIWFNGKLVNKVVSAMASASNAHGGQ $N V S A A F Q A F T E Q T G R R C Q E G T W R D K V A A G F T N S G G K S G D K$
 SAS APMK QFMDASSKAWFTDAWKDKIAAGFTNS GS LSSGDK SMAS QMKAFFDSTGGLWHEQRQAGVPAGFFVSTGTQQGGQ NMAAPVKHF DDG LGADWASGTLAGKPAAVFTSTASHAGQE ATSAVF QTFAEATAA D $\square W Q E R R W Q G K L A A G F T N S A G \square N G N K$ S LT S AMK LF ME QS SK RWLA RTWQGKG A A A F TN G G GLLS GD K GPSARFKAFQEATSRAVMAKAWRNKIAAGFTNSGARSGDK GPSWQFKKFADASSKPWFSQAWKDKLFAGFTNSASTNGDK NMPA QMKAFLDTTGGLWFNGKLVNKVVSAMASQNPHGGQE
 $N M S G Q M R T F L D Q T G G L W A S G A L Y G K L A S V F S S T G T G G G Q E$ $N M P A Q V K Q F I D T A G G L W A E G K L E D K A T G I M S S T N T H G G Q E$ GPSWQFKKFADTSSKPWFADKWKDK川FGGFTNSAS DNGDK LP A A QLK QF I D T A G GL WA Q GKLANKVVTSFTSTS QHGGQE N MA A P L K Y F L D GTS GLL WLS GA L S DKPAAVFTSSTGSHGGQE GAASQMRAFI DTLGGVWGSGKLANKTTSAMTSQNPHGGQE $N 1 P F Q L K A F L D G Q G G V W A K G L L T N K V I S A M T S A Q N N N G G Q$ $N V S A G F Q A F A E K S S K R W F E M K W K D K L A A G F V N S G A Q N G D K$ TAP WQFKKFADATSSKKWFTSEWQDKI F GGFTNSAS LDNGDK $G \boxtimes A G Q F K C F D D A A S A T W F Q Q G W K D K V A G G F T H S A S P S$ G D K
 GVA A QFKAFLDAASTAWFTQQWKDKI A GGFTHSSSSLSGDK APSWQFKKFADASSKAWFVDAWEDKVMGGFTNSASLLGDK NVAS QMK QFLDTTGGLWAQGKLVNKVVSAMSSSNAHGGQE GVSAP LK A L MDATGPLWRQQK L R GRL A A GFTVVALPA GDK

 SLA S G LK S SFFEKT TPMFMTRAFQNKIVAGFDVGAS DA GD K LV S WK MK RFF D DVLGD LVWGE DDGK I ACAFSSSGGWGGGNE NVSA GF QAFAE QTGRRCME GAWRDK IAAGFTNSGAKS GDK SITA EFKTFMDSTSKRWFHRKWHGKWAAGFANSGGGSGDK SASAPFKAFMDASSKYW GKWRDKLAAGFTCSASHS GDK TASGAFHQFAEATSKRWFTDAWLDKLAAGFTNSGSKSGDK MSTPDRAFDDEVAPDWRQGALI GKVGAAFTSTGGMHGNE NMASQMKQFLDTTGGLWAQGKTVNKVVSAMTSQNPHGGQE SPAAQFKSFMDASSDNYCKKLWRNKLAAGFTTGGSLNGQQ SASASFKSFMEGTS GLWAAQRWQGRLAAGFTSSGGYS GDK
 SVTAEFKTFMDETSKRWYHRKWEGKWAAAFANSGG DGGA
 GVAAQFKAFADATSELWCKQQWAGKVAAGFTCGSALLNGDQ


## UniRef90 K2MB48

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UniRef90_C1GKG3 UniRef90-A0A02917Q0 UniRef90-E3DN60 UniRef90-B0T6H6 UniRef90_L8PA95 UniRef90-A1T6Z1 UniRef90_Q0ABB3 UniRef90-A0A016QPV2 UniRef90_B6WAU2 UniRef90_UPIO0045E62A5 UniRef90-R9BE67 UniRef90-K9FNH3 UniRef90_UPIO002D66A01 UniRef90_UPI0002E55501 UniRef90-K2M1X6 UniRef90-XOSQB8 UniRef90_UPIO002D50433 UniRef90-A6W7P0 UniRef90-N8YE36 UniRef90-DOPOY7 UniRef90-G4L6D7 UniRef90_C4XZA0 UniRef90_O67866 UniRef90-W9ASI9
UniRef90 UniRef90_UPIO0047205E2 UniRef90-UPI000377F702 UniRef90-W5YNN3 UniRef90-M1ZK61 UniRef90-F9SJJ8 UniRef90-XOPTN9
UniRef90_UPI00036FD2EE UniRef90_M5W063 UniRef90-X0RM31 UniRef90-V2UN06
UniRef90-R9PTW1 UniRef90-K9RUB4
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130
140
150
160
STLLQMAILIAAQHGMHWVILDLIPPANCSSTGFWLGAAAQS LSTLMQMLFAAQHGMHWVNLALPPGNCSSTGFWLGAAAQS QSTVEYFNVLTQ

 STLLTLALPLLHHGMLLTGGYPYSEPADQQTRDGGSPYGAS
 $\begin{array}{lllll}L N T & E\end{array}$
 LAVLQQ NFAMQHGMLWAGLPFMPTGPSDDNRMSSFGAMAM L S T HSLIS MALEAAQUGMLWVGGLDLKPGNNNRLDGSWLGAMAQA
 EATLLNLYTTMFHWGAIIAAPGYTGDADFASGGNPYGTSV QAAL GMMVQLMHLGMLMVPCGYATPDALLQRAGSPYGVMA ST LLTMLPPL FHHGMMLLGLPNS DPALSNTKPG
 QVTLIQLQTLSQHGGLWVSLGLDPANTDVNNLGGSVGLLV

##  <br> H H T


$\stackrel{L}{E}$

## 

 ES
S
E
ATLLSMHLPLLHHGCLIV
QVTL $\square G L Q T L S Q H G G Z W V S L G L P P S N N D \square N Y \square G G S V G L L V$ DTALSALVFAAQHGMLWVPMGGLAPGGEYSSQGFTGAMAQS

















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

 A T T L S L

 LAVLQQIS YAMQHGMNWIGLPLMPTGHEAHNRLSSF LGLM




$T \square A E E V I K G V E \quad A A G A \square A K P Y Q \square Q E$ $K$ VL:LYDSVTGNTKKMAEEVAK VVI AYHSGYGHTARMAEAV R R G $K T A V Y Y Y S T G T N H Q L A E W A A A A A K E A G S E V K L L K V K E T$ Q LI I YYSRFGA KVLILYHSNTQNTHRMAELVAEGAGQLEGADVRLR $R I D V G Y A S M N G H T K F L A D E I A G G A K S V T G T E V V Q K A D K D$

| AIVFHS GYGHTRAVAE AVA |  |  |
| :---: | :---: | :---: |
|  |  |  |

 RILVVYYSATGNTAK LAAAALAGGAADAGAEVRVRTVAE $K L A V I Y Y S S T G T N Y K M A N A$ AA QAAREAGAEVVVLDKVE V SI A Y H S GF GHTAVLAEAVR DGVIT A GATA HL

VV 1 YY H S GYGH T E RM
S NIAIVYYS QGGATAMDAHSVAQGVNDAGAHAQLLSAAAV I LV L Y Y S RHG S T S EMA R H I A R G I E L A GMEARRLRTVVA $K L V V A Y S S Q T G N T Q K M A K A V S E G A E Q A$ GAEVVVRNVQQ $K I$ AVVFYTTYGTNHAVALA AAEAAEAA GAEVRLVRIPE $R I A V V Y Y S S S G A N H S I A E A F V A G A A G A G A E V R L R R V A E R L$ V A V A Y H S G Y G H T A V L A E A V R R G A E Q A G A DVVVF V SKVAI VYHSGFGHADVLAHDVAQGVTDSGATAALLDI EPG K V A A L DY S VD D I IA TLA EN EK K G I E DA G G EA E I I F Q V P DV
 $A K I V I V Y Y S K T G N T G Q M A E F V R K G V E K E G G V R V E L$
 $A$ A AYHSGNGHTEVLAQSVQAGAESA GAEVSMVTVEA


 K I A V V Y Y S Q T G N T K K VA DLL | $K L L V V F S S T Y G T N L G M A R E A A H A A E A A G A Q V R L L R R P Q S V V$ |  |
| :--- | :--- |
| $M$ | $M$ | $R \square T \quad \mathrm{~V} Y \mathrm{Y} S$

 VAVAYFS GE GHTRRLAE GVAA GAQEAQ $K$ LA D $A$ Y S STGTNNHQMAKWAE EAAQQAGAEVRVAKVKET $N$ LIL T Y H S E S GK T QAMA EAVA K G VA EVVK GA DF V L

SKVIVVYHSVVYGHTKVVAEHVARGAEARLVADDAN
SNTVVVYHS GYGHTHRM
A E A V
$R I L V V Y Y S A T G N T A A L A G A L A E G A G E A G A E V R V R T V A E T$


 MAKWAEEGAKNA $\qquad$
$R \square L A Y Y S E T G N T E K M A G A D R D G A V S \square E G A S V T L R K$


UniRef90_X0MXM5
UniRef90_UPIO003B3B927
UniRef90_C2IU73 UniRef90-C2LMM7 UniRef90_UPIO003B61992 UniRef90_S4A2F7 UniRef90_UPIO0035E0CF3 UniRef90_A6CT14 UniRef90_F0GWS7 UniRef90-W5W461 UniRef90_UPI00047C3511 UniRef90-UPI0003B31C11 UniRef90_U2ZJR9
UniRef90-A0A023XCP3
UniRef90 M1I3B3 UniRef90-UPI000360D160 UniRef90_G8PJH8 UniRef90-A7C2Z8 UniRef90-E8VXG2 UniRef90-A6FA04 UniRef90_NOBDR8 UniRef90-G8QLS0 UniRef90-UPI000383127D UniRef90-C7PW04 UniRef90-X6MM35 UniRef90-E3IEG8 UniRef90_UPIO0039C18B7 UniRef90-A1VRF0 UniRef90-V5XDB2 UniRef90_D8P162
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UniRef90-B2A899 UniRef90-B2A899 UniRef90_A3K399
UniRef90-K6VNF8 UniRef90_K6VNF8
UniRef90_H2JTM9 UniRef90-TOK302 UniRef90_P38234 UniRef90-X6L6N2 UniRef90-X1N8G7 UniRef90-X1T9Y5 UniRef90-N9LRX3
UniRef90 UPI00037ACA82 UniRef90-Q6F8J8 UniRef90_DOSP66 UniRef90-D3U1W5 UniRef90_UPIOO04710773 UniRef90-G2FY57 UniRef90_UPIO003B6B864 UniRef90-K7MW35 UniRef90-W0RF85 UniRef90-Q8TWU3 UniRef90-Q16BE4 UniRef90-W3ABC0 UniRef90-S2E448 UniRef90_A3YEQ7
UniRef90_UPIO0046F20F4 UniRef90-A9CG77 UniRef90-D9V4E4 UniRef90_Q0EX75 UniRef90-A0A037XBC9 UniRef90_UPI0004787A44 UniRef90_Q59ZC1 UniRef90-J1RBT9 UniRef90_L8K072 UniRef90-K2FA00 UniRef90-Q01PG7
 D!P W RIDGKE VEGRF TNPTLFESGGLECDAMI MGSPTYMG DAYLDRDNENGDI SQSEWNDLDNAKS I I LGGSTYMG LAPDEAVHANPAWKQHI PEATDADLEWADAFI FSMPTRFG

IS SNPAWEOHGENTK
SSNPAWEQHLEN K
MSAAPEVIDTRPEWAEDVPE TAP
TIVEGRYHNA
IVSGRFQN
ERVTNDL
ER
DKVPVM $A P A Q D A W K E Q A E K M S D V P E V S M D D M T W A D G Y F F S A P T R Y G$
$L V$ $\square$
$M$ M S K K

KKVPAKVGDLADADAVIFGTPTRYG


LM

LAPQAADEANPAWAANHPEAAGADVGG I A S NPA WKA H LEATAEVPVASLDDI AWADAVI F VDSQEPWKANLQAMQDTPAATPDDMEWADGFVF TLPQEPWKANLQQAMQDTPAATPDDMEWADGFVFSTPTRFG VQGVEPWGKMGAPPKDVPDMTPNELPEADGLLLGFPTRFG VQGVEPWRATAERMAHVPEVTVDDMEWGNAYGESAPTRYG
 K D $\square$ K E GRFVNPT $\square \mathrm{F}$

$\qquad$ G D 1 AEGAEATDHADDAEGNLSEDGWAALDAADAM I F APPEA $\square$ ASNRRWQA WHHELAA LIADLE WADGLAF MTG AP D QDA WRE Q $\square$ ERMKD $\square$ P $V A T P D D \frac{L}{P} D E W S D G Y F$
 TAPDQA WKKHYDKTKDNPKATLDALLEWADAYIF A S A D D L VWA D A V I LSTPTMRG $\begin{array}{lllllllllllllll}A & D & W T & A & L & D & E & A & E & A & V & V & F & G & A \\ P & T & Y & M & G \\ A & V & L & D & D & L & A & W & A & D & A & V & L & F & G \\ S & P & T & R & F & G\end{array}$

 LETI DRADAVAFGSPTYMG
 ©

[^1] SNDPTR $V$ G SVPTRFG $G S P D V A$
$G D P T R F G$
$G S P Y Y G$




[^2]



#### Abstract












[^3]


[^4]



 | $P$ | $R$ |
| :--- | :--- |
| $P$ | $F$ |
| $P$ | $G$ |



## UniRef90 X0MXM5 UniRef90_UPI0003B3B927 UniRef90_C2IU73 UniRef90-C2LMM7 UniRef90_UPI0003B61992 UniRef90_S4A2F7 UniRef90-A6CT14

 UniRef90_F0GWS7 UniRef90_W5W461 UniRef90_UPI00047C3511 UniRef90 UPI0003B31C11 UniRef90_U2ZJR9 UniRef90_A0A023XCP3 UniRef90_M1I3B3 UniRef90_UPI000360D160 UniRef90_G8PJH8 UniRef90_A7C2Z8 UniRef90 E8VXG2 UniRef90_A6FA04 UniRef90_N0BDR8 UniRef90_G8QLS0 UniRef90_UPI000383127D UniRef90_C7PW04
## UniRef90_X6MM35

UniRef90_E3IEG8
UniRef90_UPI00039C18B7
UniRef90_A1VRF0
UniRef90_V5XDB2
UniRef90_D8PI62
UniRef90_C7Q368 UniRef90_UPI00030942FB UniRef90_UPI00035E1882 UniRef90_UPI00034CA8FA UniRef90_UPI0001FFFB2D UniRef90_UPI0002F1DB1E UniRef90_G0GA61 UniRef90_K9DN68 UniRef90-A5BUH9
UniRef90_J5R5D4 UniRef90_E7Q1D6 UniRef90_B5YAW8 UniRef90_UPI00037E7931 UniRef90 UPI000472A3FD UniRef90-I4EJR1
UniRef90_Q7URZ5
UniRef90_D5WVX0 UniRef90_UPI00047D54C7 UniRef90_M3AF33 UniRef90_N0D4J5 UniRef90_UPI0002626583 UniRef90- T0D0L9 UniRef90_UPI000287E896 UniRef90 K8DBQ7 UniRef90_R7WUW5 UniRef90_J8VE48 UniRef90-B2A899 UniRef90_A3K399 UniRef90_K6VNF8 UniRef90-H2JTM9 UniRef90 - P38234 UniRef90-X6L6N2 UniRef90-X1N8G7 UniRef90_X1T9Y5 UniRef90_N9LRX3 UniRef90_UPI00037ACA82 UniRef90_Q6F8J8 UniRef90_D0SP66 UniRef90_D3U1W5 UniRef90_UPI0004710773 UniRef90 G2FY57 UniRef90_UPI0003B6B864 UniRef90_K7MW35 UniRef90_W0RF85 UniRef90_Q8TWU3 UniRef90_Q16BE4 UniRef90-W3ABC0 UniRef90-A3YEQ7 UniRef90_UPI00046F20F4 UniRef90_A9CG77 UniRef90_D9V4E4 UniRef90_Q0EX75 UniRef90_A0A037XBC9 UniRef90_UPI0004787A44 UniRef90_Q59ZC UniRef90-J1RBT9 UniRef90_L8K072 UniRef90_K2FA00 UniRef90_Q01PG7 UniRef90_H5Y4L4

NVTS QLKQFVDTLGGLWQQGRLADRVVSGFTASATHGGQE GPSAVFKKFMEDSSSRWMKQEWADKVAAGFTTSSSQSGDK GVSA QFKAFADASSEFWSEQMWSNKVA A GFTSGSAPN GD Q
 TASGAFHVVAEASSKRWFTRAWQDKL AAGFTNSSASKS GDK TVVPWEMKK WWD DLVVDKNDWP YMD GK I GCSFSSSA GA DGGGQ $N V P G Q V K Q F F D G T G G L W A Q G K L A N K V V S A M S S A N S H G G Q E$ $N V A S Q M K A F L D S L G G V W A E G K L A N K Y V T A F T S Q N N N G G Q E$ TASAAFHAFAEETARRWLRQSWRDKVAAGFTNSGSKAGDK NPHSADRAFMESAGPLWFQGKLADKVVSAFTASNTHGGQE TAATAFHAFAEATSKRWMERAWQDKLASGFTNSGSMS GDK SPSAQFKAFMDASGDCYSNKAWKDKLAGGFTTGGS $\quad$ GNGQQ
 $G V S G P F K H F M D A T G G M W R Q Q S L Q G R L A S A F T V S S L P A G D K$ SVS GPFKMFMDATGQDWMHRGWQNKGAAGFTISASPA GDK NMAASLKYF LDDQTSGLWLLS GALVNKPAAVFTLH
GVSAQFKAFADASSEFWADQRWANKLAAGFTSGGGYNGDQ GVSAQFKAFADATSERWDSQQWRNKFAGGFTVGSCLDGDQ SASAGMKQFMDASSKAWGEQAWKNK IA A GFTNSASWSGDK GPSAKFKEFADASSKAWFTRAWQDKVAGGFTNSAS LDNGDK SGSAVFKTFMEASSK DWLNQQWKGK LAA GFTNSS GHS GD K
 NVPS QLLKQF LDDTT GGLLWAQGKLLANKVVSAMASAGNHGGGQE SVIP WQFKKFADATSKKWFVRQWQDKAFGGFTNSASLNGDK SVSWQFKKFADASSRPWYAQTWKDK LFSGFTSSAALLNGDK NISAGFQAFAEQTGRRCTTGAWRDKVAAGFTNSGAKSGDK NMAGEMKAF $\square D$ DWF GVVPEFK LVKNI GAAFATGGQ $\square S G K E$ SASGAFHAFAEATSGRWTTRAWQDKIAAGFTNSGSMSGDK $L P A A S L K Q F D D Q T Q P L H M R R G L V N K V M S S F T S T A T H G G Q E$ $\begin{array}{lll}N V S A Q F K S F & D A A S D R Y S E L K W A D K L A A G F T U G S N Y S G D Q Q \\ G A A S Q M R A F F & D T L G G L W A S G K M A N K T V S A M T S A Q N P N G G Q\end{array}$
 VMSWKLKRFFDESVGAAWGKAKGKI GAAFT TS G G L L G G GNE

 $N$ L P A QWS A F WD K T G G L WA K G S L N GKX A G DF V S T S S Y G G Q E
 $N \square P G Q V Q S F D D T V G G L W A Q G K L A N K A V S A M S S Q N E H G G Q E$ GMASAVK R LLEE ERSRPWRHY LYYRDKVVGAFTSSATHGGNE T L S WQ M K R WWDE QP DEN WGKR D GKI G CVVF T S A G WGGGQE GPSWQFKRFADASSRPWFVQAWRDKLFAGFTNSASVVNGGM S V S A KFKKEFMEWSSKTWYGRGWQDKVVA A GFTVVSASVQSGNK M I A A P LK HF IIELA WP LNARGGLAGKVMSSFTSTGQH GGQE GPAS QLKKSYLDTT G GLLWAK GKLVVDVVATSFTTASTA H G GLL $N$ VPS QMK QFLDTMGGLWAQGKTVNKVVSAMTSAQNPHGGQ TASAVVHAFAEASSKRWFNQVWKDKI AAGFTDSAGKS GDK GPSWQFKKFADASSKPWFKGEWNNKI FGGFTNSAS DNGDK G $\square$ A A PFKAFADATTGLWRAPSWRDKVAGGFSFSCRSS DDK $N M A A P L K Y F L D G T S S S W L G G E L V G K P A G V F T S T A S V L G G Q Q$ IM A N QVKEFLDD K S I KVH GKLE GKVGGAFASCGDDGGSE V VAS QMRAFI DTLGGLWGS GKLANKTTTATTSQNPHGGQE QPAA QLRQFLDTTSGVVWEGHLAGKPATGFTSSDRHGGQE


 NMCAQMRNFLDQTGGL
TMSWQIKKLLDES VKYHGKLEGKVGGAFSSAGG\|GGNE $G \boxtimes S G T L K Q L M D M T G G L W K K Q S L T G K L A A G F T V S S L P A G D K$ SAS GQFHSFA QTTNKRWGRQAWKDKG GS GFTISACKA GDK SVSADFKRFMDSTSKRWRDR】WQGKLAAGFANSGGLSGDK GVSGTFK QLMDLTGPLWKK QRLKGKLAAGFTVSSLPA GDK

 GAASQMMRANRNGGKLGAVFTAKFVGGGA E
 V S A S QL R A WI DT LG P L WQR GVLLANKAVSAMSSMNP H G GQE GVS A QL K A LI D RTR PLLRINWELKDKVGGADA IG GRNGGQE SAA APFKAFMDATSNFWLDGLWADKIAAGFTVGSAAS GDK $H V P T Q F Q Q F L D \square T G G A W S Q G K L A N K V V S A M S S A Q N P H G G Q$
 SVSAQFKAFADATSELWSKQQWADKVAAGFTSGSGLDGDQ $N V S W Q Y K K F A D A T S K G W F T R G W Q D K V G G G F T N S A S P N G D K$ GPSWQFKKFADASSKPWFSAKWQDKVVGGFTNSASLDGDK GPAA QLKSFVDTT GGLLWAQGKLADKVATSFTSASTAH GGL
 SVIAPAVMMEY, N S WP FEGKPLTKNKLGAAFSTGGGDSUGEE NFPA QI KAFWDRTGGLWAKNALRGKLPGCFRSSWTSRWWS GASAGFHAFAE GTGHRYVDHTWADK A A GFTNSGSKSGDK $N \square P S Q Q Q S F \square D T T G G L W F Q G K L S N K V V S A M S S M N P H G G Q E$ NMAAPMKYFWDGTVAAWQNGTLAGKPACVFTSSSQHGGNE $N L S V G A K R F L D R V G G K A G K T L G D G R T A G V F C T A G S P S$

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 SSTLNYLFTLMQHGGIWVSQGIQPSNSKAAQRNDPNFLGS
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## A Q T




 WT CMA L L S I L I N Y GF LVVGGLT D YT G DK F

 EATVLAMNNIFYHWGAIV LDPLGYGQPHLLESGNPYGGSF EATILS DYY T SMYHWGA VVVAPGYTD QVVFGAGGNPYGTSA
 R N TLLDYF A AL G MVWA DVDAS Glla P GASAGKRHASDFPADT ETH
 ATLLSLYTTAMHWGTIIVAPGYTDETIFAAGGGNYGFST ATLLALLHHTFFHWGSIIVPTGYVDYDLSHAAGGNPYGVSA

 $S T L L S L Y T T F M H W G A!L V A P G Y T D Q S \square F D A G G N P Y G Y S A$

## T T VMN I DK A L L I H G M T $\square$ P G N P K G D

QTLISLSTFCMQHGMLWMGNP ILPEQHEAANRLGSWSGLM


 VA E L S L A E L L VK GMMMVYSS GAA E G QP F D
 QTTPTSSIT QLVHH GMMVVPDGY

S N TLL LSFVTMDWVGQSEI GPPARPDNAGINQDGFWLGLAA EATVVLAVYTS MFHWGAVVAAPGYNNPAGFKAGGNPYGTSV


 EATVLAI NNIFYHWGAIV LIPLGYADPHLLESGNPYGGSF


## RTYH

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

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HYGAVQQGEPSDGEKEACARLGQRLAEWVS
TVDQDGNMVEDVEEAVKHQAKRTVAVTEAVKN TQDAQSQNEKTVNDDDAVEHQTKRLLTUASK QSNVDSKPEVHRADLATAEHLGRRVAEQAD VAGT GAPNEDTLQAARHQAGRVVQTTAALK QTPVDAADAVHPADLSTARHLGRRVAEQA VASPDEQGNVHPNDLKTAFYYGQRLAAL ATHLVDSALPQSDLCTAEYDGQRLAKLAKR RSCLIPGDTRPSKDELKFAYFQGQKLA MAQAGHASAADPGDLKTARLIGGHNFAHSLLRLS NVDEGPEVAPPNADHRTAESFGKR

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LSGTDGKRQPSDLEKRVARHHGAHVGHVTAALFN TVTVDQNGKMVEDVEAAVKHQARRTIQVAQWVKN QSPSDVDAQDPDGDLETVKDYAARVAKVGQRLH YSGAMSQSPSDPGDLETARAFGERVADVASRFR ATTEGDSPGIDAQELTGARELGRRVADVAGAVK QTWNDGPDAVHAADVSTARHLGRRVATHTRRF SVSRNEAGNVDDDNLAABEYQARRTVEDTAAD TA EESGGGVHELDRLATVYLIGERVGRVVSR HVSHDGATVDEATLAAIEFQTRRTIEVAKAL A GEKMEQTGVTEERLEVARYHGANVSRIASVLKG HYGAVAVGEPGEAQKKAARMDGRQTAEYVKRMAG AQAGHGAPAHDPGDMKTARMFGRHVAATLHRLD FSGADTREPSETELARAEHQGKYMAAVVKRF LAGPDGSRTASPLELRIAEDQGKTFYETAKKL HYGAVSVGYPKEAEQKACRMLGRHMAEYVKKF AVGPDGEMKTDRKALLQAAVHQAKRTVTVAKAL DAGPHGNREATEEEREAALEGGQRVAELTSWL HYGATSAGGPDEEVQEACRRLGRRLSEWTA TTPIVEASNKPREEELDLARHYGQYMANLLK QSPADASAAMHPGDLETARQFGERIAQTAGRLK QANSDGPEGVTAADRKTAAHGGKRVAEAAARWK VS RKSAEPDKESLEALRDQGHRLATVA TAVEDGS TDEATTAAIKHQANRVVTVASWVK QSNQDGVEGVHKADTATAAELGKRVAEVAR QTPADASEEMSSGDLETARLYGARVAKIAAQFS ASGMDAAYALDPADVIAGKQYGRNVAALVARLAG
HYGPVT T GEPDDRA $\square$ S ECK QLGERVANDADKVS
$K P D G F$
ADGPP DDAGKAAVAHQAKRLVEMTAKLVG
IV ADGPPDEHVLALARYQAGRLVADADAL
FWSGAGAQTPMDGDIATAEHLGARVARQAA
QAANDSPETPKAGDRATARSLG

H Y G P V $A$ VGG P D G R S E E N CMELLGARTARLVK K L AQAEHASNAFDFGDTKTARLFGQNFA

SWSQSAANAFDFGDI KTAQLFGQNFA
HVD GN G S L A V D DVA RA A A RIGQ A E RVVVRDA TAVR SLLTVDLS GHFDA K GLLEAVK HQ T R RVVVAVA DA L K


TA G GQG $\square$ Q DEVKDA $\square R$ F QA R R LVEFA GK L A G EPGDVEEDETGIETARNTGRRVGEVVKLI KG TSSSRDKLVLIEQPGMETARRFGCRIGRAAQRWH TA GENGMVVEDVED AVKYQANHTDEVAQWDKN GEGEFAEKEVQE DFLKKAEGLGKRVGEMVLKF VA QAD GTVA NEMDLASARYLGGRVSKLVMRLS
QS DADAAEEMSVGDLETARLYGARVANVARQHK $V S \quad R K S A A P D G T A L Q A D R \emptyset Q G R R L A T I T$
 GEAPFDKGKLAP DF LEKGFGLGKRVAEDTKKFN

QTPVDGTDAVHPAD\ATAEHLGARV
$T V D Q D G N M K$ K V R DAVVVHQAKRTVQQVEWVK $\square S G T S G N P V L S D S E S R L A F \square Q G Q R L A N L V K K L S$


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UniRef90-R6RAE4 KVSVAYHSGFGHTAVLANAMVEGVNEGSGQA LLKQVVGA $V V V A Y H S G F G H T A T L$ AQAVAG
TAVVYYSGSGHTKVL
A D A V V S K SILYFSQTGNTQRMAD\|VKTGMETVPNVEVRMF AK LI IYYSRSGNTKKMASLVEAGVTAEG
R凹LIVYHSDYGSTEKM $A Q A D_{\text {I }}$ MAQATAEGATKVEDTTVELLRVTG
 VAVAFHSGYGHT KVIGICGSKNGNTELLREALEAAASEGAETELVRINPC KILGISGSAEGNTTKLALEEAKGAEVEFISSAGKELNPC KISILYDSKSGHTKTVGENDKLGAEKVEGLQVKCMNINN KIAVVYHSRRGTVRTLAALAAHGAREAGADVRLDRVPEE KVAVIFHSVCGSTYLLAREYKEALEEMNDEDEVAKTLPQ KVAl I Y Y SRQGHTQFIVAQQ\|QIGVLSQKNIKKVDLLNAEH KISIIYHSESGNTREVAEDIKDGCLKVEKVEVKTM RIAVLHHPDCASTRDLADALARGARS AQAEVR DRP KITVLYVSVTGNTEKMAGYI EEGIEETGCVEVRLMNLAQ KLVVVYLSTQGNTKKMADA:|AEGAEDRGVDTHSVSFY KILVLDHSDTGGTYKMAQEI AKGDENNPHTEATIKL AGILVVYHSETGHTARMAELVAEGAREAG KI TVLYQTRSGNTERVAKLIEEGAKKVDGVDVKDMRDDN KIAIIYYSQTGHTREMGSVIAEGTERAGGEARLFSIEEP KALVLYYSRTGVTEKMAKTIAQSLQEEG
K TI Gi DGSKGGNTEDYVKKALEGAETE ITNLATAEDEPC KVLVIYDTMWGSTEKMAMETVEGARSA GVEVRLRHL K TYVVYYSTWGHVEKLAEEVGKKGADPGVGGVEVKVWQVPE KVLIYYVSAYGNTRKMAEEUGNGURDSGVIDVEDYNAKA

K TS DYWSGTGNTETMAKA RREGAKSE
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$\checkmark V V V V Y G S M Y G N T K D M A E V V A R S L S E H G I E D T K G Y D V S R$ SKVAVVYWSGTGNTEAMAEAVLEGVKEAGGEGVMMMCTDF
S
SKVAVVYWSGTGNTATMANAVADGAKGAGGVRVSDYDLEG
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LAA LYUSAHGATARLAQAIRDGAAGEPGVRVSLFDLEG SKISVVYWSQTGNTEAMAEAVGAGIAKAG
SKVNIIYWSGTGNTEAMAKLI AEGAQEKG
SRINVVYWSQTGNTEEMAEAI GKGITQAGG
SKI ALLYASAYGNTATVANAIARGVTKAGVAVESVNCEFT RVSVVFFSKSARLVTLANVIAEGARAVEGADVRVRVRDT
SKVAVVFWSGTGNTEAMAKKVADGAKEA GAEVSLFTASD KVSIFY FSAYGNTKKMAEKVAEGARS EGVEVGLYDLEQ KLN TYWSGTGNTEEMAKLI AEGARESGAT KITVIYWSGTGNTEMMAEAl AEGAKSNG
LI FYUSSYGNTQRMAEAVYSGAMQVQDVRVSपYDLEG
SRVAVVCDPAEPGDRALASAMATGAGKAG
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| UniRef90＿UPI00035EF62F |  |
| :---: | :---: |
| UniRef90－J2A1C2 | LHTLQFFTVLAQHGMSWVGLNLLPGWNDLNRLGFFLGAGA |
| UniRef90＿X1VXD1 | $\square \mathrm{Q}$ T S A VFATQHHMHWVN】G |
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| UniRef90－J3N2U7 | T T A WTADT QIV VH GMLLFVPI GYTFGSMDE\RGGSPYGAGV |
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| UniRef90－X1B9J6 | T TI T DIL K A MLI HGM |
| UniRef90－S3BSG6 | ATLLSLYQTAYHWGSW VLGAEPADDDRPGTGRNPYGLS |
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| UniRef90－D9PVD2 | TACGDIHNFFLIHEAVVVGDAAPTA HYGGTG |
| UniRef90－D5VSD2 | T T TEQIHNFFLIHSMIVV GDAEPTAHYGGTG |
| UniRef90＿UPI0003F87C67 | TAI LT L M NHLIVKGMLLYS G GAALGKPF $\square$ |
| UniRef90－UPI0002887A20 | A TLTSLHHTLCHWGCW |
| UniRef90－T3HIZ7 | ELALQAMNIFAQHMGMTLLSVPV CSVRGGYPAYG\｜LH |
| UniRef90－N9ETE1 | QSTL 1 SLFTFCMQHGM |
| UniRef90－E3DNC5 | NALLTMIS HLLVKGMLVYSAGAAAGHPYTHFGVVC口QAG |
| UniRef90－X0P271 | TALLALYDVLHHWGAVLVPPGYTDPAVAAA GGNPYGTA |
| UniRef90－T0JC24 | LAI SSVLSHMLVKGMLVYSSGMGCGRPF■ |
| UniRef90－D1YYG4 | ADIA KML RALGMEVVDPVLRVQ |
| UniRef90＿A0A013KM89 | L A GLQQLNIF CDAARHVV |
| UniRef90＿H1H1U0 |  |
| UniRef90－X0XRT3 | TTILS 1 L Q A MLIH G M |
| UniRef90－T316R0 | VAILTIVGHLMVKGMLVYSGGGSLGKPF！ |
| UniRef90＿R6Z | VALLTMI G HMMVK M MVLYS G G A S L GKPF】HLG |
| UniRef90＿UPI000360CBE7 | T TVLSILEALLI HGM VVKGMSEGS |
| UniRef90－U6EDD9 |  |
| UniRef90＿W9DQS9 | KGMEKMMESAKFE LDA |
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| UniRef90－I3VVE8 | $P$ L MEERLKSLRLN |
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| UniRef90－D8GSP8 | MTNW EDQMKEYGANLV |
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| UniRef90－H5Y667 | $\square A L Q S!L G M A L T R G M L A Y S S G T E F G R P Y \square H L G P V A L M A S L L$ |
| UniRef90＿W2V5H5 | EATQMDLLRAMMDFNF I VGGASQHQPFGASA】MD NAL |
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| UniRef90＿U4KLL7 | MDAW EERVLDQNLDLF |
| UniRef90－C9REQ7 | T T $\square$ QQ $\square$ HNFFLIHAS\｜VV GDSDPTAHYGGTG |
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## $\square A G D N S D \square R P N D D K \square G \square R D Y$ R $\square$

```
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EPG $\square$ KVNF DPS DDD DERCRDFGR पFA QSPSDASDEVPTGDL ETAKVYAKRVQA VVNK $\square Y G$
 MGMGKNLEASREELLE A A F GADVAEKTLEDS

ASAQRPAQEDPEAARRCR\|LGRRVAEVAEA DEQAGDFKLFGNRVAQKTLELFN
TRSDDPPQAVNSEF!KQGEALGQRVAEVVLRLH $\square K G L R V K$ LRPTTEELEYCRQLGQNI AEV GEGVI CNEMPDEEGLMQCEKLGERLVE QDGVMANYEPDDGALAAQCKALGEALAA NHF $\qquad$ EESKAMFEDFGQRFAEKT $\square D \square A G$ EKGLKINSTPSTDELETCFEFGARFAS I VGKSPEDCKNDTDGLETARNLGKKVAEVVKLIN GQGVIA QETPDEDALSQCRELGRKLAGL
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Q LDC C A NYEPDEDKKEECVELGKKI A Q
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$\bar{D} G K P R W R$ RSVEEDP I A L A H Q $\square G K D M V E L I Q Q L$

GEGLICQETPDDEVLAACEELGKQLVQ

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S K

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D $\begin{aligned} & \text { LE G GHAQPF } \\ & \mathrm{F} \text { SAD }\end{aligned}$
DERS
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NS UGSATEDDVKDVDRLAFGCPAMG

El I H GRYTNNH

DAFGASAERRSMVATPTYG

| Y H NQEE I | $G P G L F S$ |
| :---: | :---: |
| A S P 】EVE | E |
| F S | A D |
| $K K P E E$ |  |

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LD T
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AK L L S VS DATTKDVEEAEVVVLGCPS MG FCVVCSNPCTGACYKGTPLEEYELLRKADGVIIGSPTYFG
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$\square$ L N Y P
QKKDELAA $P$
$A D G V K D E D L D A$
 ALSKLKVVP CRRCSSPCSKACYE GLAKAD GII MGSPVVFG



T DRSEA
KTDDS
A DPSVV
 MA R 1 LIT S R A LV: 1 G G S C A A H N N
 ADYDAFAFGCPAMGDEELDPDFEEDWNDCASKFDGKPVFG
 V D E D F V K E A K G IVVVG S P S Y M A

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UniRef90-T2JA87
UniRef90-R6UJ83
UniRef90-R6VYP4 UniRef90-UPI00036B767A UniRef90-R7NM45 UniRet90 N1 NNQ UniRef90-C4M4N2 2
UniRef90-D2RNP9 UniRef90-G2E6G5 UniRet90-K9RRAO UniReffo-D4KUD2 UniRef90-A9BG95 UniRef90-H7CV74 UniRef90-G8LYB3
UniRet90_Tolu33 UniRef90_C1MMZ9
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#### Abstract

LIWQFKAF 90 ASGGपWET 100 A GKLVIG 110  AEVLEETSFEPMFSA VENSLSGKKIIAIFGSYGWGDGLW  TVSAQLKGFWDKTRQLRANKKLLNVVGGAVTVGARFGGQE EVLEEMSTMEPFVEEAEGSVSGKTLGLFGSYGWGDGQW EVPDEFDDFYEEDDEDDLAGNPKRKAAVFGSGDSGYDVY AMSGLMKDFFDRCYYPVLDRDNGRPYAAMACAGSDGQNA EVLDEETEMDMYPFVSEVEGFAAGKT AADFGSYGWGDGQW DAVKPVWDLLSSLTMVDVKG KLGAAFGSYGWSGEAV ENLEESEFEPMFTD CEGSLSGKKIALFGSYGWGSGEW AENLDESEFFEPMFTE AEASGAFHVFAEATSKRWATRAWQDKLAAGFTNSGSKSGDK ELLPDEAQDIYDRLDHLDLKGMPCAVFGAGDTSYELFCEAV SEVLEESEFDPMFTDLGEGALAGKKIAGLFGSYGWGDGQW TLPTPVQ $\qquad$ KVAAAFGSFGWSGEAV KPCGSFGSFGWSGEAV SEELEPDEFEPFFASI GRKDADF GSYEWADG DMTAGMKTFLFLAENNNTG KMGGAFGSYTHSGESA HAPTQlQ TALGITLANADKGKLAGVFGSYGWSG TNPRIIQTVLDK


AEQLEEGEFEPMFSSCESKLKGKRLADFGSYGWGDGEW SMAWPMKKLIDETSKLWMEDCLEGKVGGVFVTAGGFGNAG GISAQLKALIDRLHTPMRNTFSVKNMA
ELFPPMK QLVSADENRMMKNRK円GVFGSYTWSGGAL DVPGVVKTFDDRSQPDYYNKETDRRKVAAAVVMARRGGAL AEVLEEGEFQPMWDEVVKGSLKGKKIADFGSYGWGSGEW DAVKP WDLLSSLAVIELKG KAKGAAGGYGWTGEAV HMPTQVQ SEMALGLVLSHAAKTKLAGVFGSYGWSGEAV EVLEE GEMEPFVSEVEGTAAGKKIALFGSYGWGDGQW GLFP YMESLVQWLSHTNIKNHVLGIFGTYGWSGGGV ELLPP R LLANLNPIHGG KYAAAFGSFGWSGEAV NVTAEVKALIDRCGYVAKSNGGFGKGKVGAPVVAVRRAGS HMPTPVS NALGTIVKEASREYPAGVFGSFGWSGEAV SEOLEDSEFEPMFNDCEAN KKGKKDALFGSYGWGDGEW TSHWRVVEWLTKDRSTKLGGKLGGCFA TAHYAQGGSD QVYPSUGDLIFYLKGLNFARTGLKRKATTFGSMGWSGEAP AEELEESEFQPMFSSESVEGELRDKKVALFGSYGWGDGEW NEQLEDGEFEPMFEE VENDLENKPTVIFGSYEWNDGQW GKKVADFGSYGWGSGEWMESWESDCKAAG
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EVLEEAEF EVLEEAEFMEPFFCSVENKLSNKKVALFGSYGWGDGKW TCCWQDKRFLDT EELKGNVAGKLCAAFISQNQPCGGG
 EVGQLEESEFEPMYESVKSADSGKKDGLFGSYGWGDGEW SYDWGDGEWMR\|WTDRVKNAGAEVVGGEGFTANNTPD ELPDDFLDFYDELDDVNLTG KKAAVFGSCDSSYEKY HMPTP DQNALGA LSDTTARTKPCGVFGSFGWSG EVLEETEF EPMFESVESALGGKKTGIFGSYGWGDGQW AIAGGMKEFFDRSYYPVLGKIEGRPYAQM VICAGSDGENA
 AEVLEESEFEPMFSSSLSKLPGKK GIAGFGSYGWGDGEW TVTAQLKAFWDMTRDLRTNKALLNKIGATDTVGASRYGGQ ALSGQMKEFFDRCYYPVLGRLNGRPYAQM VCAGSDGENA SYDWNNGEWMDYW
E
QLEETQMEPFMCEDDGVDAGKQTADFGSYGWGNQEW AEVLEEEEFEPMFASCESKLSGKR IALLFGSYGWGDGEW SVYPK QP LLHKLENYGLKNRYVGDFGSMMWSGGGVRGDQ NMFPTVADMAVYMKGLRPKG R RIGAAFGSFGWAGGAV
 SFAPPVRSFL SYDWGTGDWMDTWRE
E ELEDLEFLPLYDEDEPLLGDMPTALFGSYDWNNGEW EPFPSVGDLDYYLKGLKFNRTGLKRLALAFGSMGGNGGGT QMTPQIHSW LFEKAGELEFPGKMGGAFATEQYTHGGG EMLPPMKQVLFMAERAKLEG KPGGAFGAYGWSGEAN GLFPTVAGFLTYLKGLL K KPQNKKAЉAFGSYGWNGN EVPKLEEETEMEPFVESTSSVVKDKKLVLFGSYGWGNGEW SEVLEEESMEPFMEEIKLEGGLSGKKVGLFGSYGWGDGQW


UniRef90 K7MCR3 UniRef90-UPI0003B58B35 UniRef90_K8EC62 UniRef90_F6D8C5 UniRef90 D5XA15 UniRef90-D6DHQ5 UniRef90_UPI00046E9847 UniRef90- Q46AU0 UniRef90-V2GNU2 UniRef90-R7QYJ3 UniRef90-B1A7S3 UniRef90 A0A011PFZ8 UniRef90-R6KZ27 UniRef90-F4GII3 UniRef90-E4L076 UniRef90-C4Z4A0 UniRef90-L8EED8 UniRef90_UPI0002890A32 UniRef90-UPI000375AA88 UniRef90-R6T3Z0 UniRef90-U2EI98 UniRef90-A4RTC3 UniRef90 C8PNW3 UniRef90-S7TPF8 UniRef90-T2JA87 UniRef90-R6UJ83 UniRef90-R6VYP4 UniRef90_UPIO0036B767A UniRef90_R7NM45 UniRef90 N1JNQ5 UniRef90-C4M4N2 UniRef90-D2RNP9 UniRef90 G2E6G5 UniRef90-K9RRA0 UniRef90-D4KUD2 UniRef90_R5LLA4 UniRef90 A9BG95 UniRef90-H7CV74 UniRef90-G8LYB3 UniRef90 TOIU33 UniRef90 C1MMZ9 UniRef90-R6QQQ9 UniRef90_R2STS4 UniRef90 FOTAT3 UniRef90-R6MV61 UniRef90-E3PV83 UniRef90_C2CKC7 UniRef90-D4M8Y5 UniRef90-F7Q1Z1 UniRef90-M5DYP8 UniRef90 A5I5L4 UniRef90-14A9U1 UniRef90-R4KE62 UniRef90_U6EF50 UniRef90 X1IJM1 UniRef90-R5ELC1 UniRef90-N1ZF61 UniRef90 G9RTD6 UniRef90-UPI000467B408 UniRef90-R5J604 UniRef90_R5TS97 UniRef90 F8FCR6 UniRef90_UPI0003B46ABA UniRef90_V7HYV5 UniRef90-E9SHR4 UniRef90-M8DZ25 UniRef90-D8R4M7 UniRef90_15AX38 UniRef90 UPI000376C46F UniRef90-D4W7B3 UniRef90_A0A011ANI1 UniRef90 UPI0002EEF8BF UniRef90 UPI00037B3F99 UniRef90-V9VUI2 UniRef90_R6H5D7 UniRef90 R5PAH7 UniRef90-R5QTW2 UniRef90-C3WC84 UniRef90-R9TA64 UniRef90_R6VMU0 UniRef90-S4XPX9 UniRef90_UPIO0016C0A3F UniRef90_S2ZLV3 UniRef90-R7CD77 UniRef90_UPI00036137FA UniRef90_G1WSV4 UniRef90 UPI00037CB4F4 UniRef90-O28752 UniRef90-C5VS48 UniRef90 B3E1N5 UniRef90-D6GSJ1

MRDW EDRCRAAGANLV
D $\ \mathrm{METR} \mathrm{L}$ KNAGFNFAFDA $\square$ RCKF
NKLADEL
EKCGFEV
TTVKA】HDMMLVQGMTVVGDGY $\square E D D A G H H G G C A Q R P A N A$ MRDWT
CGAVDLIEEKLKERGAVV
1 LIAAEKMRDMGMTVIDPVLR\|LH
$L R Q \square D R \square A T G W R L R S V A P G$
M R
LI VCTHAQT
ASLGKDL
PMIEDRLRRLK L R
MDDWA
MRDWESRTTA
MRLW
MADW
$\square \mathrm{L} T \mathrm{~T}$ QFFTVLAQHGMHWVS LG
NT I HKK L A ALG
THTLQYLQTFN
MRDWCARCEAANANLYDEN
PNDEARLKSLRMK
A MID KRLTDAGFK
E WMQT WVERAKRDGADVFEE
PMDYDTMEFVYKMDM
EA $\square \mathrm{DLLENKFRDGGYQFG}$
MRNWEETC $\square$ ADGAN LPCDFVI
GGGEQTLISLHSNFLEHGMVVIGFPKSLLGYADAGLQWGL
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RMDEDRMRGLKMR
DEIESKLQDAG
M R
DWERMNAAGATVVN
M R
STIVKYNEQMK W

GEYGFDV
DRCKNAGANLA
QEEVEGTGAKLLADG
 $\frac{L V}{S ~ A}$

TIEEMLS
DLMESRLT
MRNWQ
SAMMSLVG LLMTKGMLVYSGGSA
K ILAAQEL
MRNW
LGKPF ${ }^{\text {GH }} \mathrm{H}$

MRDW
MYDWQERCKDDG
GSTYWNMT

M
QDFEDQMKEYGAS $\frac{L V}{T}$
AS G GKPY
DSALLT LI SHLLVKGMUVYSAGASEGKPY
MRD WE ERMESYGAEDKVESLIHQG
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STLRALQDMMLCQGMTVVGDGFNDNDSGHLGACAQRMA
ESLARDLS ECGFKVMDQYEIYYV
FTFAQLMYWFH $\square$ HGFFM PGSTYWNTA
MRTW
EENCRDKGANLV
$M R \quad D W E E R \square P$
PNLTARMQQLR DWE R $\square P$ GAA L F
SFALMS I I A A GLIHGMLIYSGGMSLG
$M R$ D
DWEDRMKAAGAEVAC
MRDWCQ
A A VDT LIE K $\square$ QERGAE $\square V T E G \square K \square$
MRL W
$G V I E Q R \quad L K E A G \square E V V Q P G \square K E \square W N$
GAAVD L L I E K L E ERGAEVVL
EAVDEMEQK LK DAGFSFA
$M R D W K D R C D A A G$
$M K Q T A R D A K G W R \square K \square A Q E P$ RMEEAGAHLIDC ENCGFEVVNQM ESVCHEAGANLI EARMNSCGANLL

MKQTARIAKGWRLK $\square$ AQEP F $\square$ ICTHAQT
DNDMDRLHQLRM
MRSW
EAD\RRDCP
ETTISTLQDMMLIQGMMIVGDGSEDTDAGHQGACGQKPT ARQCARIATGWRLKAVQEPLIICT HAQT

MRDW
MRDW ETRCKEAGAVLI
C F
KD L Q N $\square \mathrm{M}$
RRMKE FTERVKWEPVCPPVEMKQGYSTANGEPCRQDA RAA LQAM VVSLSHGVLVQPPARAA MDPPDTAA

MEYW
KVLAEK L KECGFEVLDEYEDYYV
$T$ QV DQ S I LT TE MVKGMLCYSGGMACGKPVIHLGPVGVNNN KRIFDTMNYIFKMKMVSGPLMDKASWV

A VKEVQK VLEE $V$ VEK FET MEEWEERMDGYGANI
K M VE ER LK GMGFK
MRDWQ
NADQEILT F MMVMGMMTYSGGSSCG

UniRef90 K7MCR3 UniRef90-UPI0003B58B35 UniRef90-K8EC62 UniRef90_F6D8C5 UniRef90 D5XA15 UniRef90-D6DHO5 UniRef90-UPI00046E9847 UniRef90-Q46AU0 UniRef90--V2GNU2 UniRef90-R7QYJ3 UniRef90_B1A7S3 UniRef90 A0A011PFZ8 UniRef90-R6KZ27 UniRef90-F4GIII UniRef90_E4L076 UniRef90-C4Z4AO UniRef90-L8EED8 UniRef90-UPIO002890A32 UniRef90-UPI000375AA88 UniRef90-R6T3Z0 UniRef90-U2E198 UniRef90-A4RTC3 UniRef90 C8PNW3 UniRef90-S7TPF8
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PYG SVLELLEQAFHQGKY\| A NIITTKKLCK
A DGLMANNAPSDSDLDECKSLGRSL
KP TEE T L QLCEESGTDLAQLVLK
Y D N Y E VN Y VP T E E E L L K K Y E I G K QL A D E T GL L R A R I L GRRVVYEVAEATK GEDADCNGAPDADAEATDKELGKRLAA I QTS LK K $\quad$ Y G G TAMEKEDCRKFGQRFA
$K P T D K D L Q E C K R L G G D \square A E K L K$
PER I LA PK Q $\square$ GPEDLAARCAELGEGLA
GEGLI CQETPD D GALAAECESLGGK QLAADV
VDTCEVYYVPDEEENKACF KLLGQKLVVE EAKK I $V L G V K A R L T P T A D E F S A C H D L G R Q V A$ $\vee D P V \frac{1}{1} C N E A P D D D A K A S A R E L L G G A L A A$

FAAYDN PDQDALEECEALGKDLAR

LPDFKVDFSMSPEEEKKAEALGKRFAETV
GLMAHEAPDDETLEACRELGRKLA
TPGLK $\quad$ GNFKPNEDELLQAFNFGETIAA
FEPLRCKFKPTAETLVLCEES GTDLAAQAVRK $\square$
GLL 1 A Y D DP DEEA QKKCKEFGERFAK
FDP $\square \mathrm{K} V \mathrm{~V}$ FKP T QATLKTCEEAGTDFA QAVKK
CNEDPDDEA ПDACKK LGAA
CARTGNHEGMPDSALVAARSYGGHIAMKAHRF
P T QE D L E N C VVELGLNMASA ITK K

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

$G L R \square K F K P S T T E L K E A F E F G R D F S R T$ $\square A L Q P G D \square W K$ D E E G I A T F R T L G K N $\square$ A A L L K K $\square N$

PVADDAVGNHFEESKELFEDFGQRFAAKALEL KVNY K P S E DELLEKCYEMGVDLA KLVK
CDFVI ANEAPDDEAVEACKAMGAALA
A D GLI DNETPDA DALE QCK DLGGK
A D GLL I A Y D D P D DEALLD QVRALAK S L L E K $\square K$
TE GLIVNLT PEED DLIKCKELGEQLA
HF GAVCIQA GNKNQKERAE』VGERI SKKTVEL
EPDDSTMEECKAFAQKLV
$G$ VA A H R P A D Q D E
P D A D E L E K C F Q A GK K L A Q El K K
F GREKGEVEGDEEGLKTAWNFGKNIAFLVKKLK
CDSVI CQETP DDEALSACRS LGEALAA
EE GLIVVNGMPVGETKQQCVDFGKKFAE
LE GMRVRF CP TQE DLAAAAVQFGRDFAKAVR

GE G I I T QETPD D D A LVVKCKELLGK TLA AV
E E GVI A NETPD DAA L EECR A A GK E L
E LGPSSE DKEVCK S LGE TLAR
PDEDGLVRCREFGKSFAE
 NDGVMANNAPGDAELDECKELGAALA
REDILLADKT $\square R E D D L R K C R E L G E A M A$
$\square S$ D E A A Q D R A S $\square$ LG K R VA R L I K R PEA $\square L A E K A \square P E D Q L E R C R E L G Q A L$

CESVICNEMPDDEGDQSCKALGENL

EA
$R$ R G G T PRASSGELD LS LARA LGRRLA

P TEDELEKCYNMGKRLADKVKEMK N Y K E Y F N $\square$ Y GKRFA QKAVE IGN
ED GVE T A QAYGKE IAAEM
LE P FMVK FK P S E E ELQQKAFELGRELA R
1 E DCII NNTPDDEGLQQKCKELGETLAAK
AD P L R AVVF T P T A D LLLE QCK A L G A A V S E EVV K


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UniRef90_C9XWL8 UniRef90_W6NI00 UniRef90-F7XP89 UniRef90_R7JTE4
UniRef90_C7HOV3 UniRef90-W1U8B8 UniRef90-B9M4E5 UniRef90-F7JYT9
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UniRef90-U2DR81
UniRef90-R5N048
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UniRef90-W6N5Z1
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UniRef90_E4SIL3
UniRef90-R2P0J8
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UniRef90-R6LFP1
UniRef90-H7EPT4
UniRef90-X1TUT8
UniRef90_G9WKT4
UniRef90_UPIO0026258EB
UniRef90_UPI00026
UniRef90_F0H7V6
UniRef90_UPI00046FF43B
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UniRef90-K1ZPN1
UniRef90-U4KMC3
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UniRef90-E4L813
UniRef90-D1B8C0
Unirergo_DIB8CO
UniRef90_UP10003C7D15F
UniRef90_D7K2Y6
UniRef90_D7K2Y6

10
20
30
40 K TLAII NGSKGKNTAEMAEAEAQGVETELVELMDYETKEC KVTVVYDTMHYSTQKMAHEVAEGI MAEGYDVEMFFLHE K I Y V I F WT QGGNTQAMAEAVAEGIVEGGKEAEVTYVGS AKI AVIYWSGTGNTQAMAESIMEGL KAGGADASDFTVSE RITIVYDTMSGNTRDMADAI A QGUNEVDPRVAVKDFNVA
SKVAVIYWSNGGNVEVLADSISKGAKSAG KLAIVY LISTQGNTMLMAEGI AEGA $\quad \square$ R SKVAVVYWSGTGNTEMMAQKVAEGAKEAGAEVSVLTCADF AKVAVVYWSGTGNTEYMANSIVEGAKGAGAEVETFTAGD AN I AIVYWT GSGNTEAMANAIDEGAKAAGAETQLSFVTDD V FY SP HGNTQKMAASVVKGAAAAGVQVDCRHDNEL

 SKVAVVYWSGTGNTEAMANAVKSGAQATGAQVGFFKADEF KILIAYYSHSANTARMDEAMAKEGIETQLGGQKVYGCLAC KIS 1 YWSNGGNVEVIAANAIAESAQR
KVTIVYDTMHYSTQKMAHAFAEGDMSEG DDVVMYFDHY LLVVYHSMTGGTEQMARALVAGAATESGVTTRLLH KVLVAYFSHSGNTRTVAQAI ATGADDFEDIPQQDYPTDY $K V I V I C C S M T G N T E E M A E E I V A G D R$ HAGVEPAVR
KVKVI YWSQTGNTAAMAQAVAEGIKKEG
SKI AVVYWSGTGNTEAMAAAVLEGAKERGADAE $\square$ FTPSEF QV T:I I Y D SMMWNSTRRMAEAI GE G DK SA
 N ILI AYVSAYENTSLMAEKIAEGDRPACNFNVEVCDDEA I 1 Y WS GT GNTEEMANLI AKKGIEKGG
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AKTLVVYYSETGNTRRDAEQI QKGAD DAEDVPVVPYSNDY K GII YWS GTGNTELMAQNVKKGVENAGGEADIFSVSSF Y $\mathrm{Y} V \mathrm{AYWSGTGNTEAMANAVSEGVQNAG}$ RI TI FYDSMSNNTRMMADAI A Q GI HDV


SKSLLDYFSDTGNTKRVAQQMARGADLYQUDVENPYTSKD

$K I L I L F G S T N G S T A K L T G A F M K G \square R K S D D V E I V H \square F S L Q$
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            IKVVVFWS QT GNTEAMM EADVA E GVVKA A G
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    K
    RVLI V FFFS RT GTT T R RLLA T A LLA G GLLLS A DVVE E I C D Y T E R R
    SNI AV I VGS KNGNTE|LAAKAFVDGAKKNNNNVEEIIDSVAD Y T
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A KVAIVVYWT GSGNTEAMA HAV E E GAAQNA GAE VALDNF VS D
    VIVYYGSMM GNT K K M T D A I A R S LT E S G D
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S KILVVA Y F S A T GN T QA\VA ER| VE GT DVY R\R A S\VP Y A S N P
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FS P
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DELVYGLSKTETQNKVCPP $\square K P K D P A Y Y$
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N $\square C F E T K N R R C A \square V D D Y V N G C I E K M L E A D G \| P F G T P T Y F A$ RODRKKARLIEASAADAVEIASEHAFALGCPSMG RQD TRVKПYNSGKNSENDDAT EMFRSEGFLLGSSTDNN FAPGTAERYTKПAF
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MRRWE ERCASTGANI
$R T \square Q E E \square S G A \quad G F E \square A E T F E V N Y \frac{V}{V}$
MRDWA

ASHFKEW
 GAAVD LIDAK $\square$ QERGCTV

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D R $\square \mathrm{H}$ T R L T
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SEPV $\square$ ANDSPDDAA $\square$ AS CK A $\square G E A \square A K$ VAGLKSKWRPDGKAMR $\square$ CRAHGQQVAK

EPGFNCKWTPQQAE $\square E A A E K Y G \quad Y D F A L K \square K$
MDGLKVTFVPSEEDLKKAFAYGKEFAE GMVKQMTGRPNQEDVDNAKAFVSRL

C D S VT C M A E P D A D A LE S C A R LG S A L A Q

GEGVMANGAPDADAI SALEDLGRQLAQ
LIA WRKGDFEKDKEGI RTMRVLGENMA WLLRKDN
AEG पIANEAPDGEA】EACEKAGRELAEL
A LDDEDREKCVEFGREFAK
VAVTMAHEAPDKDAEAACKAMGAEDAR
EEGDIANEAPTSGDLDECYS DGKSVGER $\square K K M$
E EGII A NEAPEDDVLEELKAAGKELAE
GEGVIANNAPDDAAVSQCEDLGRMLAQ

A E G L K V V F S P S A E EKEQCKE LGRRL

F GREQGTVEKDEEGLT TAWNFGKNVALLVKKDK AEPVICNLTPDEEGLANCKALGEALAK

PDEKG】RECVEYGREFARATK KGEVRKDEEGMDTAWAFGKK $\square$ ALLVKK L R R
$M L A M K V K W K P D G K A \square L A C R E H G R Q V A K$
LENFDRA $\square H P D G E D L D Q A K E W A K R M V S L A$ VTGDDGNAP LSEGSLRGAARVG

PSVEERKQCREYGRTTGRKV
$\square G N S \square G E V S D D E E G M K T M E T L G K N I A W L L K K \rrbracket N$

P L M A NEAPSSDDEDACVSFGQRFSQ

UniRef90_B2UQU4 UniRef90- B5E980 UniRef90-M8K5A9 UniRef90-R7JHA6 UniRef90 V 1 CER UniRef90 D5E7L3 UniRef90-W4HET3 UniRef90-R6J8S7 UniRef90-UPI000465F4C UniRef90 A1V9W0
UniRef90-E1YAS8
UniRef90-E0E2G1
UniRef90 B2A792
UniRef90_UPIO0035EE57F
UniRef90-A6LZ28
UniRef90-Q6ANT6

1
 R\|AIIFY ${ }^{\text {FSPHGNTEQM }}$ KNLI TYFSLEGNTKFПAESTAEEDECDDMELIPSKKYST NTLVAYFSATGTTAKIAHRIAEEITPEQSYTKADLDWHD VIIPYVSAYGYTK ILAEEIEKGVKAAGDDEVRKFDLED KILGISGSKNGNSEQMDDRVLAMAEKRGFATDSVFLSEM RLLIVHHSSTGGTRQMADAAFARAREELHEDVRSLT KIPVIYWSGTGNTKLUMAEAVAEGMGTAAEDK SVSDDTPE KVLAINGSARGNTASMAEDEAAGI ETQLHGKDIRGCIAC RAVIVYDTMWHSTEKMASAIAEGLESVGVPTRIMWLKAN KKMAEC:AEGUKTEGMEVILKKVED KVGVFYWSGTGNTQAMAEA:GEGLAKA GVEYDVDNISN VVVVYGSMYGNTETMVDTI CRRLAEKGIKNDKVYNISK KIVAI IYWSQTGNTKLMAEQI LAGA KTAGAEVDLF SKVVIFRGSKNGYTARLLEQVAKGAKSKGAEVIEFDLNDS

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lupas }2
lupas_14
lupas_28
jnet
conf
sol25
sol5
sol0
jhmm
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 GVHVTLCHINHASVADI RDLMEECDGLIFGTPTINR GKIGKYFWSVMFKEKPELINAQLDISNYKNIITGTPVWCG QKSRSS LEMNDAKSRPALKGQKENMQDYDTVFIGYPIWWD ADHSLIASVAAEW

YWADGVLLGSPTILG EVKPClACGKCCPDDDDMEKDYPKDDEADA\|IVASPVYFG ADAAGPDDLLAADGYLFAGPENDA CSAMGAEVLEEYEFEPFFTALEEPFLQGKKVVIEGSYGWGG MKCWENKDGHCAVKKDMLNEIVDKMVAADGMLLGSPTYFA HHS AVMTELADCGAVLVGSPTHNN TV DEDMLNSDVIIFGCPTYFG DPGKSV THVSYI

TNDTWRYOS GGPSMGS GПRGCQGCMYCRTHDGCDEVASATALTYDVLALGCPA MG GपRGCQGCMYCRTHDGCAVNDYDA $\mathbb{K} E A D A$ VFGSPAYYY
lupas_21
lupas_14
lupas_28
jnet conf sol25
sol5 sol0
jhmm
jpsss

|  | UniRef90_B2UQU4 |
| :---: | :---: |
|  | UniRef90-B5E980 |
|  | UniRef90-M8K5A9 |
|  | UniRef90 R7JHA6 |
|  | UniRef90_V1CER4 |
|  | UniRef90-D5E7L3 |
|  | UniRef90-W4HET3 |
|  | UniRef90-R6J8S7 |
|  | UniRef90_UPI000465F4CF |
|  | UniRef90-A1V9W0 |
|  | UniRef90-E1YAS8 |
|  | UniRef90-E0E2G1 |
|  | UniRef90-B2A792 |
|  | UniRef90_UPI00035EE57F |
|  | UniRef90-A6LZ28 |
|  | UniRef90_Q6ANT6 |

$\qquad$ 90

100
110
$N \prod G G \| F G S F G W S G$
TYAPPFNTFGSNFE $\square K Y K N G A D F A C H G G G G A E K$
 SPTAQLKALFDRSVLLRRHNFKLSNKDGAGIADGRNGGQE A $\square A G V M K D F F D R S Y Y P V L G R \square E G R P Y A Q M G V C A G S D G E N A$ SYMSDWEQRIKAAG
$N V S T N D K S D I D R A G M V A D A N D A M D A R K D G A A V V A D R R G G A$ GILDPAVAAMLTYMKGLDRPQNRDGAAFGSFGWSGESV VMTA GLKE LMDKSVKYFGKDNGK D GGAFTSSGA $\mathbb{Z}$ G GNE EVLDEAEFEP K FFEEAEGSIGGKRVAAFGSYGWGDG RILFPP A EMDYLLCFLENKNLKNRLLGLEGSYTWSGG

$S M T A Q M K A F \square D R T V A H R R N G F L F R D K V G A A \square A V G R N G G Q E$


C F
$P N D I M R D G Q \square K M K \square Y G E$
KTIQVIQDWMH\|HGMVVVGDGGHFGG
ARQVAR $\square A Q G W R L R E V H D P L I V C T H A Q T$
$\square H V F N S T N H F Y F \square N Q M V V P \quad G S S Y W N \square G$
KSITEWLQSMGM
T T LSS IIQGFLIHGM $\quad \begin{aligned} & \text { LI QGFQKGN }\end{aligned}$ E WMRDWQSRVEAAGANLFDD

MQT WQQ
EVIDSNA】LYN $\mathrm{G} \square \mathrm{A}$

PAPFRAPFMPKAEALAECEALGRAVAEEVLK
GYRVKFKPSEEQLKSAFEFGKNFGK
PEA $\square$ QAPKT $\square$ S DSD $\square E R C G E L G Q A \square A$
RGLDPGEVESDEEGVLTMKNLGKNMAWVMQK LDN $H Y G P V S D G A P D E A V K E E C V R Y G K M \square G D \square S V K \square S$

GLIVNETPNEEGDA LCVE LGETFAR QEGLIVNESPDEQGTEQCQNLGAALA WGNHPGGYAEDNVGDATAEK $\square G E R V A H \square A L R \square S$
lupas_21
lupas_14
lupas_28
jnet conf sol25 sol5 sol0
solo
jhmm
jpssm


[^0]:    

[^1]:    L V S
    LN N
    VSTVCEATAPE $\square$ PNAGPPYVD
    AAII EGRFEHPELF
    WDLFEGRFDNDEL
    LATPDAGPW
    VNEVAGASA QLVA LDDDAAVP
    ПDANPAWDAHLAATADTPAGDPRQLIDHCDALI F
    TLSEEVLKKMYAVDKDHPLAKVEELPDYDGFMF IIESNPAWKAHAEATKDVPTATLADLEWADAVIFSVPTRYG AEGAQAALIEIDGEGNIPEAAWGQLDEAQSIIFGAPTYMG A AGAGAELVAGDADGNLPQGGWNLLLDAADAA: MGSPTYMG
    TDTA

    RTHVILKRVGKVT WAT

    VT D D
    DA WNKAWAEH $\square E A V Q D \square P E A A$
    DWQTLIDGCHA$I V$ V
    QHDRAGRFDNQR TAPEAVVNGQDA MMADLDECEALVLGSPTFMG IDGNPEWAAHVERTAGQF, APADMEWADGYI F
     TLPAEVLQKMHAGGSKYP\|IDPEELKE

    GVQEVEGVEVVIKHVDEAVPEDLLNFDGV AASVAGAAVEMIVVDALTEERWATLDAADAIVFGAPAYMG DESNPAWKKHHDATQD IPEVKPEDLEWADAII FSDPTRFG QP $\square E E \square R P E T V E D M E R R R S D \| L K Q I A K A D A L I V G A P A Y F G$ TSPSE

    N $\square$ D D A DHTDLD DCDGI AL AQGAGA LT $\square A \square D G E G Q \square P A Q G W E Q L E A F D A A D G S S G \| F G$ GAAQVAGAQVHLIPADEAEAKAALLADADAVVEGSPTYMG TEWTEAWSENAGADAEDPAATADDLDWADAILIGGPGRFG TAPPEAlATNPRWQAHDELATGADLEWADGLAIGSPTRFG LAPEEAIASNPSWKRNVPTATAADIEWADAII FSVPTRFG AK GA GATLIDADDSEGNUPENAWATLREAAVI L F QLVD G Q WH Q A DAMLARLAAADAI IFGAPAYQG ISTECEAVAPD【PANGALYATLDDLRHCAGLVLGSPTRFG TAPKEVIEGQDAWMSDTPEATLNSLTNYDGIIMGSPTYYG APSDVVWSAHLRATDHIEDATPEDLA WADGFVLGAPTRFG SDEQ WQGLDHADADVFGSPTYMG QADFSDFF EEAMADADAIVVGSPTYMG SYKTEYATEEGKEAASYK LLT RETLVEYDYYLFGDPTKFG D GNPE WA A HVERTA GQEIAEVVALEWADVILEGTP TARFG A S DVA R E S A MLV E Y D GY I F G S P T Y L G

[^2]:    

[^3]:    

[^4]:    

