

Supporting Information Figure S3: Full alignment of HetR proteins

Suppl. Fig. Y: Full alignment of HetR proteins. Name and coloring conventions are as in **Figure 5**. In brief, green columns are the most highly conserved, with conservative substitutions in cyan, hydrophobic to hydrophobic nonconservative substitutions in gray, and others in pink. The top line (H) indicates whether at least one mutant residue affects heterocyst differentiation negatively (red), positively (blue), or not at all (green). The second line (A) indicates whether at least one mutant residue affects an in vitro assay for DNA binding (red) or PatS binding (blue). The residue is green and in capital letters if the assay of the mutant HetR gives a similar result as wild-type HetR. The bottom line (S) indicates whether an analysis of the structure of a crystalized HetR protein indicates binding of the residue to DNA (red), to PatS (blue), or to another HetR subunit (gray) The letters refer to the source of the evidence, as given below:

- a. Buikema, W.J., Haselkorn, R. (1991b) Characterization of a gene controlling heterocyst differentiation in the cyanobacterium *Anabaena* 7120. *Genes Devel* **5**: 321-330.
- b. Dong, Y., Huang, X., Wu, X.-Y., Zhao, J. (2000) Identification of the active site of HetR protease and its requirement for heterocyst differentiation in the cyanobacterium *Anabaena* sp. strain PCC 7120. *J Bacteriol* **182**: 1575-1579.
- c. Huang X, Dong Y, Zhao J: (2004) HetR homodimer is a DNA-binding protein required for heterocyst differentiation, and the DNA-binding activity is inhibited by PatS. *Proc Natl Acad Sci U S A* **101**: 4848-4853.
- d. Khudyakov, I.Y., Golden, J.W. (2004) Different functions of HetR, a master regulator of heterocyst differentiation in *Anabaena* sp. PCC7120, can be separated by mutation. *Proc Natl Acad Sci USA* **101**: 16040-16045.
- f. Risser, D.D., Callahan, S.M. (2007) Mutagenesis of *hetR* reveals amino acids necessary for HetR function in the heterocystous cyanobacterium *Anabaena* sp. strain PCC7120. *J Bacteriol* **189**: 2460-2467.
- g. Feldmann, E.A., Ni, S., Sahu, I.D., Mishler, C.H., Risser, D.D., Murakami, J.L., *et al.* (2011) Evidence for direct binding between HetR from *Anabaena* sp. PCC 7120 and PatS-5. *Biochemistry* **50**: 9212-9224.
- h. Kim Y, Joachimiak G, Ye Z, Binkowski TA, Zhang R, Gornicki P, Callahan SM, Hess WR, Haselkorn R, Joachimiak A (2011). Structure of transcription factor HetR required for heterocyst differentiation in cyanobacteria. *Proc Natl Acad Sci USA* **108**, 10109–10114.
- i. Feldmann EA, Ni S, Sahu ID, Mishler CH, Levengood JD, Kushnir Y, McCarrick RM, Lorigan GA, Tolbert BS, Callahan SM, Kennedy MA (2012). Differential binding between PatS C-terminal peptide fragments and HetR from *Anabaena* sp. PCC 7120. *Biochemistry* **51**:2436–2442.
- j. Kim, Y., Joachimiak, G., Ye, Z., Binkowski, T.A., Zhang, R., Gornicki, P., *et al.* (2011) Structure of transcription factor HetR required for heterocyst differentiation in cyanobacteria. *Proc Natl Acad Sci USA* **108**: 10109-10114.
- k. Hu, H.-X., Jiang, Y.-L., Zhao, M.-X., Cai, K., Liu, S., Wen, B., *et al.* (2015) Structural insights into HetR-PatS interaction involved in cyanobacterial pattern formation. *Sci Reports* **5**: 16470.
- l. Both reference j and k
- m. Both reference h and j
- n. Both reference f and j
- o. References b and f disagree
- p. References c and f disagree
- q. Both references g and k

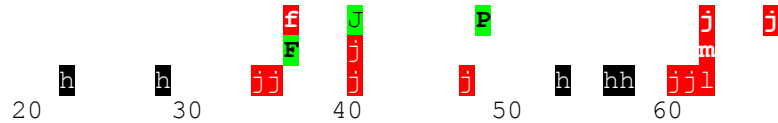
**H
A
S**

h h

| | | 1 | 10 |
|-----------|---|------------|----------------|
| Nos21 | 1 | MSNDI | DLIKQLGPSAMDQI |
| Nos7107 | 1 | MSNDI | DLIKRLGPSAMDQI |
| Nod9414 | 1 | MSNDI | DLIKRLSPSAMDQI |
| Nos7524 | 1 | MSNDI | DLIKRLGPSAMDQI |
| Nos3756 | 1 | MSNDI | DLIKRLGPSAMDQI |
| Ana29413 | 1 | MSNDI | DLIKRLGPSAMDQI |
| Ana7120 | 1 | MSNDI | DLIKRLGPSAMDQI |
| Nos29133 | 1 | MSNDI | DLIKRLDPSAMDQI |
| Ana310F | 1 | MTNDI | DLIKRLGPSAMDQI |
| Aph102 | 1 | MTNDI | DLIKRLGPSAMDQI |
| Ana102 | 1 | MTNDI | DLIKRLGPSAMDQI |
| Ana90 | 1 | MTNDI | DLIKRLGPSAMDQI |
| Ana7108 | 1 | MSNDI | DLIKRLGPSAMDQI |
| CylR505 | 1 | MNNDI | DLIKRLGPSAMDQI |
| RapD9 | 1 | MNNDI | DLIKRLGPSAMDQI |
| Ana7122 | 1 | MSNDI | DLIKRLGPSAMDQI |
| AnaAzo | 1 | MSNDI | DLIKRLGPSAMDQI |
| Cyl7417 | 1 | MNNDI | DLIKRLSPSAMDQI |
| Cal6303 | 1 | MSNDI | DLIKRLGPSAMDQI |
| Has12170 | 1 | MSNDI | DLIKRLGPSAMDQI |
| Tol9009 | 1 | MSNDI | DLIKRLGPSAMDQI |
| Tol7601 | 1 | MSNDI | DLIKRLGPSAMDQI |
| Cal7507 | 1 | MSNDI | DLIKRLGPSAMDQI |
| Mch7126 | 1 | MSNDI | DLIKRLGPSAMDQI |
| Scy7110 | 1 | MSNDV | DLIKRLGPSAMDQI |
| Tol521301 | 1 | MSNDV | DLIKRLGPSAMDQI |
| Scy61278 | 1 | MSNDV | DLIKRLGPSAMDQI |
| Mas10914 | 1 | MSNDV | DLIKRLGPSAMDQI |
| Tol511288 | 1 | MSNDV | DLIKRLGPSAMDQI |
| Cal3363 | 1 | MSNDI | DLIKRLGPSAMDQI |
| Chl6912 | 1 | MSNDV | DLIKRLGPSAMDQI |
| Chl9212 | 1 | MSNDV | DLIKRLGPSAMDQI |
| Fis3754 | 1 | MSNDV | DLIKRLGPSAMDQI |
| Fis7521 | 1 | MSNDV | DLIKRLGPSAMDQI |
| Hap220 | 1 | MSNDV | DLIKRLGPSAMDQI |
| Fis9339 | 1 | MSNDV | DLIKRLGPSAMDQI |
| RicHH01 | 1 | MSNDI | DLIKRLGPSAMDQI |
| Cal7103 | 1 | MSNDI | DLIKSLSPSAMDQI |
| Riv7116 | 1 | MHNDT | DLIKRLDPSAMDQI |
| Mas008 | 1 | MTNDV | DLIKRLDPSAMDQI |
| Lep7376 | 1 | MVMKTEL | DLLKDLNPSALDEI |
| Syn042902 | 1 | MAQPEL | ELLQALNPSAFDQV |
| Syn7003 | 1 | MAQPER | ELLQALNPSAFDQV |
| Syn73109 | 1 | MAQPEL | ELLQALNPSAFDQV |
| Syn7002 | 1 | MAQPEL | ELLQALNPSAFDQV |
| Syn7117 | 1 | MAQPEL | ELLQALNPSAFDQV |
| Syn8807 | 1 | MAQPEL | ELLQALNPSAFDQV |
| Spi9445 | 1 | MKSDL | DLIKTLSPSAMDQI |
| Spisub | 1 | MKSDL | DLIKTLSPSAMDQI |
| Mic7113 | 1 | MTAPKMMNQV | DLIKSLSPSAMDQI |
| Osc12 | 1 | MTNDL | DLIKRLGPSAMDQI |
| Osc10802 | 1 | MTNDL | DLIKRLSPSAMDQI |
| Osc6304 | 1 | MSNDL | DLIKSLSPSAMDQI |

| | | | |
|-------------|---|---------------------------------------|-----------------------|
| PhoOSCR | 1 | MLSLGVLNRNQIDPRDLIGPPILIDSGIV | MNKDT-DLIERLSPSAMDQI |
| Pho130791 | 1 | ----- | MNKDT-DLIERLSPSAMDQI |
| MicFGP2 | 1 | -----MPPNLAISGIV | MKNDSL DLVKSLSPSAMDQI |
| Osc7112 | 1 | -----MPPNLAISGIV | MKNDSL DLVKSLSPSAMDQI |
| Tri101 | 1 | ----- | MKTDT-DLINSLSPSAMDQI |
| Pla126_8 | 1 | ----- | MTKDT-DLIKSLSPSAMDQI |
| Pla406 | 1 | ----- | MTKDT-DLIKSLSPSAMDQI |
| Pla15 | 1 | ----- | MTKDT-DLIKSLSPSAMDQI |
| Pla407 | 1 | ----- | MTKDT-DLIKSLSPSAMDQI |
| Arth39 | 1 | ----- | MKKDT-DLIKSLSPSGMDQI |
| Arth328 | 1 | ----- | MKKDT-DLIKSLSPSAMDQI |
| Arth8005 | 1 | ----- | MKKDT-DLIKSLSPSAMDQI |
| LynBLJ | 1 | ----- | MRKDT-DLIKTLSPSSMDQI |
| Lyn8106 | 1 | ----- | MRKDT-DLIKTLSPSSMDQI |
| Gei7407 | 1 | ----- | MMTNDI-DLIKRLSPSAMDQI |
| Lep6306 | 1 | ----- | MTNDL-DLIKLLSPSAMDQI |
| Lep2104 | 1 | -----MFFVSAVALPD | MTNDL-DLIKLLSPSAMDQI |
| Lep3755 | 1 | ----- | MTNDL-DLIKLLSPSAMDQI |
| ProH9006_b | 1 | ----- | MQTDS-DLIKRLSPSAMDQI |
| Cri9333 | 1 | ----- | MSNDI-DLIKSLCPSAMDQI |
| Syn7335 | 1 | ----- | MTNNT-NLVKQLEPSAIDEI |
| LepHIJ | 1 | -----MTNVQSP | ITADT-DLIKRLSPSAIDQI |
| Lep7375 | 1 | ----- | MTADA-DLIKRLSPSAIDQI |
| Hal2206_a | 1 | -----MDNSVSKMTRDV | DLIRRLSPSAMDQI |
| LepK1_a | 1 | -----MVSTPLSPLAAEDE | ALIRRLSPSAIDQI |
| Nodnod_a | 1 | -----MPLSSLAVEDE | ELIRRLSPSAIDQI |
| Pho30_a | 1 | -----MSLSALAVEDE | ALIRRLSPSAIDQI |
| Lep6406_a | 1 | -----MLNAHSSVSNDM | DLVRQLSPSAMDQI |
| Lyn141951_a | 1 | -----MFNALESVSNDM | DLVRQLGPSAIDQI |
| ProH9006_a | 1 | -----MFVKNSSGNCLPTLDSLSDL | DLIEKLSPSALDQI |
| ProH9006_c | 1 | ----- | -----MNPSALDQI |
| LepK1_c | 1 | -----MVQIRVNHDKLAKALNVSDIDFF | |
| Lep6406_b | 1 | -----MTPPAEPPTNAPNTGGFDDILAHLEVSSADRV | |
| Lyn141951_b | 1 | -----MSLPVGDDEI IADLVKSSADRI | |
| Hal2206_b | 1 | -----MATTSDNQTELNKALNLEVGPADRI | |
| Pho30_b | 1 | -----MTHLSQVPPDLKNDLLRAVDSSPADWI | |
| Nodnod_b | 1 | -----MTYQSQVPPDLKQDLLRAVDNSPADWI | |
| LepK1_b | 1 | -----MTYQSQVPPDLKHDLLRAVDNSPADWI | |

H
A
S



| | | | | | | | | |
|-----------|----|---------------|---------|-----|------------|--------|--------|---------|
| Nos21 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Nos7107 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Nod9414 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Nos7524 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Nos3756 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Ana29413 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Ana7120 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Nos29133 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Ana310F | 20 | MLYLAFSAMRTG | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Aph102 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Ana102 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Ana90 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Ana7108 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| CylR505 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| RapD9 | 20 | MIYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Ana7122 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| AnaAzo | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Cyl7417 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Cal6303 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Has12170 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Tol19009 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Tol17601 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Cal7507 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Mch7126 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Scy7110 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Tol521301 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Scy61278 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Mas10914 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Tol511288 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Cal3363 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Chl6912 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Chl9212 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Fis3754 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Fis7521 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Hap220 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Fis9339 | 20 | MLYLAFSAMRTG | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| RicHH01 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Cal7103 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Riv7116 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGQNL | RMTGHLH |
| Mas008 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAI | YMTYLE | EQGENL | RMTGHLH |
| Lep7376 | 22 | LLYLAFCVLRGT | GYRHGAF | LDA | AATAAKCAVY | TTYQE | QDGNL | RMTGHLH |
| Syn042902 | 21 | LLSLAFFALRQSS | SYRHGAF | LDA | AATAAKCAVY | TTYVE | QGGNL | RMTGHLH |
| Syn7003 | 21 | LLSLAFFALRQSS | SYRHGAF | LGA | AATAAKCAVY | TTYVE | QGGNL | RMTGHLH |
| Syn73109 | 21 | LLSLAFFALRQSS | SYRHGAF | LDA | AATAAKCAVY | TTYVE | QGGNL | RMTGHLH |
| Syn7002 | 21 | LLSLAFFALRQSS | SYRHGAF | LDA | AATAAKCAVY | TTYVE | QGGNL | RMTGHLH |
| Syn7117 | 21 | LLSLAFFALRQSS | SYRHGAF | LDA | AATAAKCAVY | TTYVE | QGGNL | RMTGHLH |
| Syn8807 | 21 | LLSLAFFALRQSS | SYRHGAF | LDA | AATAAKCAVY | TTYVE | QGGNL | RMTGHLH |
| Spi9445 | 20 | MFYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAIY | TTYIE | QGENV | RMTGHLH |
| Spisub | 20 | MFYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAIY | TTYIE | QGENV | RMTGHLH |
| Mic7113 | 25 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAIY | TTYEQ | GENTR | RMTGHLH |
| Osc12 | 20 | MLYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAIY | MTYLE | QDQNL | RMTGHLH |
| Osc10802 | 20 | MFYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAIY | QTYLE | QDRNL | RMTGHLH |
| Osc6304 | 20 | MIYLAFSAMRTS | GHRHGAF | LDA | AATAAKCAIY | MTYLE | QDENL | RMTGHLH |

| | | |
|-------------|----|--|
| PhoOSCR | 50 | MLYLAFIAMRTSGHRHGAFLDAAATAAKCAIYLTYLEQGENLRMTGHLH |
| Pho130791 | 20 | MLYLAFIAMRTSGHRHGAFLDAAATAAKCAIYLTYLEQGENLRMTGHLH |
| MicFGP2 | 32 | MLYLAFSAMRTSGHRHGAFLDAAATAAKCAIYMTYMEQDNNLRMTGHLH |
| Osc7112 | 32 | MLYLAFSAMRTSGHRHGAFLDAAATAAKCAIYMTYIEEKNNLRMTGHLH |
| Tri101 | 20 | MLYLAFSAMRTSGHRHGAFLDAAATAAKCAIYMTYIEQGQNLRTGHLH |
| Pla126_8 | 20 | LLYLAFSAMRTSGHRHGAFLDAAATAAKCAIYMTYMEQGKNLRTGHLH |
| Pla406 | 20 | LLYLAFSAMRTSGHRHGAFLDAAATAAKCAIYMTYMEQGKNLRTGHLH |
| Pla15 | 20 | LLYLAFSAMRTSGHRHGAFLDAAATAAKCAIYMTYMEQGKNLRTGHLH |
| Pla407 | 20 | LLYLAFSAMRTSGHRHGAFLDAAATAAKCAIYMTYMEQGKNLRTGHLH |
| Arth39 | 20 | MLYLAFSAMRTSGHRHGAFLDAAATAAKCAIYTTYMEQGENLRMTGHLH |
| Arth328 | 32 | MLYLAFSAMRTSGHRHGAFLDAAATAAKCAIYTTYMEQGENLRMTGHLH |
| Arth8005 | 20 | MLYLAFSAMRTSGHRHGAFLDAAATAAKCAIYTTYMEQGENLRMTGHLH |
| LynBLJ | 20 | MLYLAFSAMRTSGHRHGAFLDAAATAAKCAIYMTYMEQDQNLRTGHLH |
| Lyn8106 | 20 | MLYLAFSAMRTSGHRHGAFLDAAATAAKCAIYMTYMEQDQNLRTGHLH |
| Gei7407 | 21 | MLYLAFSAMRTSGHRHGAFLDAAATAAKCAIYMTYLEQGQNLRTGHLH |
| Lep6306 | 20 | MLYLAFSAMRTSGHRHGAFLDAAATAAKCAIYMTYLEQDGNIRMTGHLH |
| Lep2104 | 31 | MLYLAFSAMRTSGHRHGAFLDAAATAAKCAIYMTYLEQDGNLRMTGHLH |
| Lep3755 | 20 | MLYLAFSAMRTSGHRHGAFLDAAATAAKCAIYMTYLEQDGNLRMTGHLH |
| ProH9006_b | 20 | MLYLAFSAMRTSGHRHGAFLDAAATAAKCAIYMTYMEQEQLNRMTGHLH |
| Cri9333 | 20 | LIYLAFSAMRTSGHRHGAFLDAAATAAKFAIYMTYMEQSHNIRMTGHLH |
| Syn7335 | 20 | MMHLAFSAMRTSGHRHGAFLDAAATAAKCAIYTTYLEQGNNLRMTGHLH |
| LepHIJ | 27 | MMYLAFSAMRTSGHRHGAFLDAAATAAKCAIYTTYMEQGQNLRTGHLH |
| Lep7375 | 20 | MMYLAFSAMRTSGHRHGAFLDAAATAAKCAIYTTYIEQGQNLRTGHLH |
| Hal2206_a | 27 | LFYLAFSAMRTSGHRHGAFLDAAATAAKCAIYMTYLEQGRNLRMTGHLH |
| LepK1_a | 29 | LLYIAFSAMRTSGHRHGAFLDAAATAAKCAIYMTYLEQGENLRMTGHLH |
| Nodnod_a | 26 | LLYIAFSAMRTSGHRHGAFLDAAATAAKCAIYMTYLEQGENLRMTGHLH |
| Pho30_a | 26 | LLYIAFSAMRTSGHRHGAFLDAAATAAKCAIYMTYLEQGENLRMTGHLH |
| Lep6406_a | 27 | MLYLAFSAMRTSGHRHGAFLDAAASAANKCAIYLTYLEQGENLRMTGHLH |
| Lyn141951_a | 27 | LLYLAFSAMRTSGHRHGAFLDAAATAAKCAIYMTYVEQGENLRMTGHLH |
| ProH9006_a | 35 | MIHLAFSAMRTSGHRHGAFLEAAATAAKCAVYSTYVEQGNNLRMTGHLH |
| ProH9006_c | 10 | LLYLAFSALRTSGHRHGAFLDAAATAAKCAVYSTYQEQGSNLRRTGQLH |
| LepK1_c | 24 | ILLVINLIKTFGHRYGKVIDAVSVAAKFAVYLYTYLEEGNNLRRTGFLH |
| Lep6406_b | 14 | LIYLAVSAMKLGGHRYGAFLEAATTAAKLAVYTSYLEQGKNNRRTSFLH |
| Lyn141951_b | 24 | LFYLAISVMKLGGHRYGSFLEAANTAAKLAIYSSYLEQGHNNRRTSFLH |
| Hal2206_b | 28 | LLYLAMGAMKMGGHRYGAFLEAATTAAKLAIYSTFIEQGNNIRRTGFLY |
| Pho30_b | 28 | LLNLALSTMKMGGHRYGAFLEAATTAAKLAIYSTFIEQGNNIRRTGFLY |
| Nodnod_b | 28 | LLNLALSTMKMGGHRYGAFLEAATTAAKLAIYSTFIEQGNNIRRTGFLY |
| LepK1_b | 28 | LLNLALSTMKMGGHRYGAFLEAATTAAKLAIYSTFIEQGNNIRRTGFLY |

H
A
S



| Accession | Position | Sequence |
|-----------|----------|--|
| Nos21 | 70 | HLEPKRVKIIVEEVRQALTEGKLLKMLGSQEPYLIQLPYVWMEKYPWQP |
| Nos7107 | 70 | HLEPKRVKIIVEEVRQALTEGKLLKMLGSQEPYLIQLPYVWMEKYPWQP |
| Nod9414 | 70 | HLEPKRVKIIVEEVRQALTEGKLLKMLGSQEPYLIQLPYVWMEKFPWQP |
| Nos7524 | 70 | HLEPKRVKIIVEEVRQALMEGKLLKMLGSQEPYLIQFPYVWMEKYPWQP |
| Nos3756 | 70 | HLEPKRVKIIVEEVRQALMEGKLLKMLGSQEPYLIQFPYVWLEKYPWMP |
| Ana29413 | 70 | HLEPKRVKIIVEEVRQALMEGKLLKMLGSQEPYLIQFPYVWMEQYPWIP |
| Ana7120 | 70 | HLEPKRVKIIVEEVRQALMEGKLLKMLGSQEPYLIQFPYVWMEQYPWIP |
| Nos29133 | 70 | HLEPKRVKIIVEEVRQALTEGKLLKMLGSQEPYLIQLPYVWLEKYPWQP |
| Ana310F | 70 | HLEPKRVKIIVEEVRQALTEGKLLKMLGSQEPYLIQLPYVWMEKYPWQP |
| Aph102 | 70 | HLEPKRVKIIVEEVRALALTEGKLLKMLGSQEPYLIQLPYVWIEKYPWQP |
| Ana102 | 70 | HLEPKRVKIIVEEVRALALTEGKLLKMLGSQEPYLIQLPYVWMEKYPWIP |
| Ana90 | 70 | HLEPKRVKIIVEEVRALALTEGKLLKMLGSQEPYLIQLPYVWMEKYPWIP |
| Ana7108 | 70 | HLEPKRVKIIVEEVRALALTEGKLLKMLGSQEPYLIQLPYVWMEKYPWLP |
| CylR505 | 70 | HLEPKRVKIIVEEIREALTEGKLLKMLGSQEPYLIQLPHVWMEKYSWQP |
| RapD9 | 70 | HLEPKRVKIIVEEIREALTEGKLLKMLGSQEPYLIQLPHVWMEKYSWQP |
| Ana7122 | 70 | HLEPKRVKIIVEEVRQALTEGKLLKMLGSQEPYLIQLPYVWMEKYPWQP |
| AnaAzo | 70 | HLEPKRVKIIVEEVRQALTEGKLLKMLGSQEPYLIQLPYLWMEKYPWHP |
| Cyl7417 | 70 | HLEPKRVKIIVEEVRALALTEGKLLKMLGSQEPYLIQLPYVWIEKYPWQP |
| Cal6303 | 70 | HLEPKRVKAIVEEVRQALTEGKLLKMLGSQEPYLIQLPYVWMEKYPWQP |
| Has12170 | 70 | HLEPKRVKIIVEEVRALALTEGKLLKMLGSQEPYLIQLPYVWMEKFPWRP |
| Tol9009 | 70 | HLEPKRVKIIVEEVRALALTEGKLLKMLGSQEPYLIQLPYVWMEKFPWRP |
| Tol7601 | 70 | HLEPKRVKIIVEEVRQALTEGKLLKMLGSQEPYLIQLPYVWMEKFPWRP |
| Cal7507 | 70 | HLEPKRVKIIVEEVRQALTEGKLLKMLGSQEPYLIQLPYVWMEKYPWRP |
| Mch7126 | 70 | HLEPKRVKIIVEEVRQALTEGKLLKMLGSQEPYLIQLPYVWIEKYPWRP |
| Scy7110 | 70 | HLEPKRVKIIVEEVRQALTEGKLLKMLGSQEPYLIQLPYVWMEKYPWRP |
| Tol521301 | 70 | HLEPKRVKIIVEEVRQALTEGKLLKMLGSQEPYLIQLPYVWMEKFPWRP |
| Scy61278 | 70 | HLEPKRVKIIVEEVRQALTEGKLLKMLGSQEPGYLIQLPYVWMEKHPWRP |
| Mas10914 | 70 | HLEPKRVKIIVEEVRQALTEGKLLKMLGSQEPYLIQLPYVWMEQYPWRP |
| Tol511288 | 70 | HLEPKRVKIIVEEVRQALTEGKLLKMLGSQEPYLIQLPYVWMEERYPWRP |
| Cal3363 | 70 | HLEPKRVKIIVEEVRQALTEGKLLKMLGSQEPYLIQFPYVWMEKYPWRP |
| Chl6912 | 70 | HLEPKRVKAIVEEVRQALTEGKLLKMLGSQEPYLIQFPYVWMEKYPWRP |
| Chl9212 | 70 | HLEPKRVKAIVEEVRQALTEGKLLKMLGSQEPYLIQFPYVWMEKYPWRP |
| Fis3754 | 70 | HLEPKRVKAIVEEVRQALTEGKLLKMLGSQEPYLIQFPYVWMEKYPWRP |
| Fis7521 | 70 | HLEPKRVKAIVEEVRQALTEGKLLKMLGSQEPYLIQFPYVWMEKYPWRP |
| Hap220 | 70 | HLEPKRVKAIVEEVRQALTEGKLLKMLGSQEPYLIQFPYVWMEKYPWRP |
| Fis9339 | 70 | HLEPKRVKAIVEEVRQALTEGKLLKMLGSQEPYLIQFPYVWMEKYPWRP |
| RicHH01 | 70 | HLEPKRVKAIVEEVRQALTEGRLLKMLGSQEPYLIQFPYVWLEKYPWVP |
| Cal7103 | 70 | HLEPKRVKAIVEEVRQALTEGKLLKMLGSQEPYLIQLPYVWMEKYPWQP |
| Riv7116 | 70 | HLEPKRVKAIVEEVRQALTEGRLLKMLGSQEPYLIQFPYVWMEKYPWQP |
| Mas008 | 70 | HLEPKRVKVIVEEVRQALTKGKLLKMLGSQEPYLIQLPYVWMEKYPWQP |
| Lep7376 | 72 | HIEPKRVKIVIREIESALREGQLLKMLGSQEPSYLIELPYVWLEHYPLKA |
| Syn042902 | 71 | HIEPKRVKAIVQIEEQGLQAGQRLQHGAFQEPYLTTELPOVWLGQYPWHR |
| Syn7003 | 71 | HIEPKRVKAIVQIEEQGLQAGQRLQHAAFQEPYLTTELPOVWLGQYPWHR |
| Syn73109 | 71 | HIEPKRVKAIVQIEEQGLQAGQRLQHAAFQEPYLTTELPOVWLGQYPWHR |
| Syn7002 | 71 | HIEPKRVKAIVQIEEQGLQAGQRLQHAAFQEPYLTTELPOVWLGQYPWHR |
| Syn7117 | 71 | HIEPKRVKAIVQIEEQGLQAGQRLQHAAFQEPYLTTELPOVWLGQYPWHR |
| Syn8807 | 71 | HIEPKRVKAIVQIEEQGLQAGQRLQHAAFQEPYLTTELPOVWLGQYPWHR |
| Spi9445 | 70 | HIEPKRVRVIVNEVRQALTEGKLLKMLGSQEPYLIQFPYVWLEKYPWQP |
| Spisub | 70 | HIEPKRVRVIVNEVRQALTEGKLLKMLGSQEPYLIQFPYVWLEKYPWQP |
| Mic7113 | 75 | HIEPKRVKVIVEEVRQALSEGKLLKMLGSQEPYLIQFPYVWMEHYPWQP |
| Osc12 | 70 | HIEPKRVKAIVEEVKEALTEGKLLKMLGSQEPYLIQFPYVWMEQFPWQP |
| Osc10802 | 70 | HIEPKRVKAIVEEVQEALTEGKLLKMLGSQEPYLIQFPYVWLEQYPWQP |
| Osc6304 | 70 | HIEPKRVKAIVEEVKEALTKGKLLKMLGSQEPYLIQFPYVWLEQYPWRP |

| | | |
|-------------|-----|--|
| PhoOSCR | 100 | HIEPRRVKVIVEEVRQALTEGKLLKMLGSQEPYLIQFPYVWLEQYPWQP |
| Pho130791 | 70 | HIEPRRVKVIVEEVRQALTEGKLLKMLGSQEPYLIQFPYVWLEQYPWRP |
| MicFGP2 | 82 | HIEPKRVKVIVEEVREALTQGKLLKMLGSQEPYLIQFPYVWLEQYGWMP |
| Osc7112 | 82 | HIEPKRVKVIVEEVQEALTQGKLLKMLGSQEPYLIQFPYVWLEQYPWLP |
| Tri101 | 70 | HIEPKRVKVIVQEVVEEALTKGKLLKMLGSQEPYLIQFPYVWLEQYPWTP |
| Pla126_8 | 70 | HIEPKRVKVIVEEVQQALTEGKLLKMLGSQEPYLIQFPYVWLENYPWQP |
| Pla406 | 70 | HIEPKRVKVIVEEVQQALTEGKLLKMLGSQEPYLIQFPYVWLENYPWQP |
| Pla15 | 70 | HIEPKRVKVIVEEVQQALTEGKLLKMLGSQEPYLIQFPYVWLENYPWQP |
| Pla407 | 70 | HIEPKRVKVIVEEVQQALTEGKLLKMLGSQEPYLIQFPYVWLENYPWQP |
| Arth39 | 70 | HIEPKRVKVIVEEVREALTEGKLLKMLGSTEPRYLIQFPYVWLEQYPWQP |
| Arth328 | 82 | HIEPKRVKVIVEEVREALTEGKLLKMLGSTEPRYLIQFPYVWLEQYPWQP |
| Arth8005 | 70 | HIEPKRVKVIVEEVREALTEGKLLKMLGSTEPRYLIQFPYVWLEQYPWQP |
| LynBLJ | 70 | HIEPKRVKVIVEEVRQAVTEGKLLKMLGSQEPYLIQFPYVWLEQYSWQP |
| Lyn8106 | 70 | HIEPKRVKVIVEEVRQAVTEGKLLKMLGSQEPYLIQFPYVWLEQYSWQP |
| Gei7407 | 71 | HIEPKRVKVIVEEVRQALTEGKLLKMLGSQEPYLIQFPYVWLEQYPWMP |
| Lep6306 | 70 | HIEPKRVKAIVEEVRQALTEGKLLKMLGSQEPYLIQLPYVWMEQYPWQP |
| Lep2104 | 81 | HIEPKRVKAIVEEVRQALTEGKLLKMLGSQEPYLIQLPYVWMEHYPWQP |
| Lep3755 | 70 | HIEPKRVKAIVEEVRQALTEGKLLKMLGSQEPYLIQLPYLWMEHYPWQP |
| ProH9006_b | 70 | HIEPKRVKVIVEEVREALTKGKILKMLGSQEPYLIQFPYVWLEKYPWDG |
| Cri9333 | 70 | HIEPKRVKVIVDEVQALTEGKLLKMLGSQEPSYLIQFPYVWLERYPWYT |
| Syn7335 | 70 | HIEPKRVKVIVEEMTAALTEGKLLKMLGSQEPYLIQLPHVWLQQYPWKP |
| LepHIJ | 77 | HIEPKRVKAIVEEVRQALSEGKLLKMLGAQEPYLIQFPYVWLEQYPWES |
| Lep7375 | 70 | HIEPKRVKAIVEEVRQALSEGKLLKMLGAQEPYLIQFPYVWLEKYPWEP |
| Hal2206_a | 77 | HIEPKRVKAIVEEIGEALTEGKLLKMLGSQEPYLIQFPYVWMEERFPWQP |
| LepK1_a | 79 | HIEPKRVKAIVEEMRQALTEGKLLKMLGSQEPYLIQFPYMWLRYPWQA |
| Nodnod_a | 76 | HIEPKRVKAIVEEMRQALTEGKLLKMLGSQEPYLIQFPYMWLRYPWQP |
| Pho30_a | 76 | HIEPKRVKAIVEEMRQALTEGKLLKMLGSQEPYLIQFPYMWLRYPWQP |
| Lep6406_a | 77 | HIEPKRVKAIVEEVRQALTEGRLLKMLGSQEPYLIQFPYVWLERHPWMP |
| Lyn141951_a | 77 | HIEPKRVKAIVGEIQEALTEGRLLKLLGSQEPYLIQFPYVWLEKYPWEP |
| ProH9006_a | 85 | HIEPKRVKAIVEEIQQSLTQGRLLKVLGSQEPYLIQLPYVWMEKYPQCE |
| ProH9006_c | 60 | HVEPKRVKEIVQEIQAALTEGKLLKMLGSQEPHYLIQLPHLWQORYPWTP |
| LepK1_c | 74 | HVEPRRVKEIVSEFDTLLENGGSLCLLGSVEPSYLIQFSYIWIIEKYSLKE |
| Lep6406_b | 64 | HVEPKRVRAIIEKEVEAVLVDRRALTTLSAQEPYYLSGLPYLWQSLYPWEP |
| Lyn141951_b | 74 | HVEPKRVRAIIVKEVEALKADGKSLTSLSDQEPYYLIGLPFLWQEKYPWEA |
| Hal2206_b | 78 | HVEPKRVKAIIVQEVQEAALNKGLSLKTLSSQEPYYLIGLPFLWQELHPWTP |
| Pho30_b | 78 | HVEPKRVKAIIVQEIQVALAEGQSLKVLNSKEPYYLIALPFLWQEHFPCAP |
| Nodnod_b | 78 | HVEPKRVKAIIVQEIQAALAEGQSLKVLNSKEPYYLIALPFLWQEHFPCNA |
| LepK1_b | 78 | HVEPKRVKAIIVQEIQAALAEGQSLKVLNSKEPYYLIALPFLWQEHFPCPA |

| | | |
|-------------|-----|--|
| PhoOSCR | 150 | GKPRIAGSSLSPDEKRQLERKLP-----KPLPDAQTINSFQFMELIEFL |
| Pho130791 | 120 | GKPRIAGSSLSPDEKRQLERKLP-----KPLPDAQTINSFQFMELIEFL |
| MicFGP2 | 132 | GRPRIPGNLTVDEKKYLESKIP-----PNPPDAQLINSFQFMELIEFL |
| Osc7112 | 132 | GRPRIPGNLTADEKKYLEGKIP-----PNPPDAQLINSFQFMELIEFL |
| Tri101 | 120 | SRSRLPGNNLTTEEKRYIEGKLP-----SNMPDARLINSFQFMELIEFL |
| Pla126_8 | 120 | GRSRISGSSLTQEEKRVIETKLP-----KYL PDAQLINSFQFMELIDFL |
| Pla406 | 120 | GRSRISGSSLTQEEKRVIETKLP-----KYL PDAQLINSFQFMELIDFL |
| Pla15 | 120 | GRSRISGSSLTQEEKRVIETKLP-----KYL PDAQLINSFQFMELIDFL |
| Pla407 | 120 | GRSRISGSSLTQEEKRVIETKLP-----KYL PDAQLINSFQFMELIDFL |
| Arth39 | 120 | GKARVPGSSLTQEEKRVIESRLP-----KYL PDAQLINSFQFMELIEFL |
| Arth328 | 132 | GKARVPGTSLTQDEKRVIESRLP-----KYL PDAQLINSFQFMELIEFL |
| Arth8005 | 120 | GKARVPGTSLTQDEKRVIESRLP-----KYL PDAQLINSFQFMELIEFL |
| LynBLJ | 120 | GKPRIPGNLTPPEEKRVIESKLP-----KLL PDAQLINSFQFMELIEFL |
| Lyn8106 | 120 | GKPRILGNLTPPEEKRVIESKLP-----KLL PDAQLINSFQFMELIEFL |
| Gei7407 | 121 | GRPRIPGTSLTSEEKQIEEKLP-----SLL PDAQLINSFQFLELIEFL |
| Lep6306 | 120 | GRSRVPGTSLTSEEKQIEQKLP-----NNL PDAQLINSFQFLELIEFL |
| Lep2104 | 131 | GRSRVPGSSLTSDKQIEQKLP-----PNL PDAQLINAFAFLELIEFL |
| Lep3755 | 120 | GRSRIPGTSLTSEEKQIEQKLP-----PNL PDAQLINAFAFLELIEFL |
| ProH9006_b | 120 | QESRIPGNLTSQEKQNQLKKLP-----DDL PNAQLINSFQFMDLVEFL |
| Cri9333 | 120 | GRSRISGTSLTSEEKRHIEAKLP-----ESLPDAQI ISSIQFLELIEFL |
| Syn7335 | 120 | GEYRVPSNSFTLDEKRQIEAKLEAANLLDTIPNAKLLNGFQFMELVEFL |
| LepHIJ | 127 | GRSRLVGTNLTSEEKAQIEQKLP-----PNL PEAQLITSFQFAELIEFL |
| Lep7375 | 120 | GRSRLVGTNLTSEEKAQIEQKLP-----SNL PEAQLITSFQFAELIEFL |
| Hal2206_a | 127 | GQTRVPDPRLTSSEERAQIEAKLPD----GPL PDAQVITSIQFLELMESL |
| LepK1_a | 129 | QOSRVSGTSLTSEEKAILESKLPT-----PCPDARIINSFQFLELIEIL |
| Nodnod_a | 126 | QOSRVSGTSLTSEEKTILENKLPN-----PCPDARIINSFQFLELIEIL |
| Pho30_a | 126 | QOSRVSGTSLTGDEKALLE SRLPN-----PCPDARIINSFQFLELIEIL |
| Lep6406_a | 127 | GRSRVPGTSLTPEEKRHIEAKLP-----SNL PDATLITSFHFMELIEFL |
| Lyn141951_a | 127 | GTFRLPSTSLTSDKRLLEKLP-----TDI PDAQIINSFQFMELIEFL |
| ProH9006_a | 135 | GRSRISGTSLMPSEKQIEGNLP-----ADL PPAQLINSFQFMELIEFL |
| ProH9006_c | 110 | QOSRLGGSNLTPSECQQIEARMP-----ADL PPAQLINL FQFMELIEVL |
| LepK1_c | 124 | GESVTRLFNLTESERIIIEAGFP-----ENT PKCLLLRECDVEALIKDL |
| Lep6406_b | 114 | GTLRLQRPELTPSEHQVVEAEP-----LHY PPTRLDLLLEFLDLIKLL |
| Lyn141951_b | 124 | GQCRLNNHYLSAKEHEALYEQLP-----ADL PSARFLDMLEFLDLIQLL |
| Hal2206_b | 128 | GNPRIHTQGLMASERQIEASLP-----DDL PPARLLDLFEFMDLIKVL |
| Pho30_b | 128 | GAARVRLQGLTPGERKTI EESLP-----SSAPKARILDQVEFAELMELL |
| Nodnod_b | 128 | SESCVRIQGLTPGERKAI EEDLP-----SGAPRARILDQVEFTELIELL |
| LepK1_b | 128 | NEARVRIQGLTPGERKRI EDSL P-----ASV PKARILDQVEFNELMELL |

H
A
S

170 180 190 200 210
JJ JJ
j j j h j

| | | | | |
|-----------|-----|------------------|--------------------------|-------------|
| Nos21 | 165 | HKRSQEVLPPEHQMP | LSEALAEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| Nos7107 | 165 | HKRSQEVLPPEHQMP | LSEALAEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| Nod9414 | 165 | HKRSQEVLPPEHQMP | LSEALAEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| Nos7524 | 165 | HKRSQEDLPPEHQMP | LSEALGEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| Nos3756 | 165 | HKRSQEELPPEHRMEL | LSEALAEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| Ana29413 | 165 | HKRSQEDLPPEHRMEL | LSEALAEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| Ana7120 | 165 | HKRSQEDLPPEHRMEL | LSEALAEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| Nos29133 | 165 | HRRSQEDLPTEHQMP | LSEALGEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| Ana310F | 165 | HKRSQEDLPPNHQMP | LSEALAEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| Aph102 | 165 | HKRSQEELPSNHQMP | LSEAFAEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| Ana102 | 165 | HKRSQEDLPPSHQMP | LSEALAEHIKRRLLYSGTVTRIDC | PWG-MPFYALT |
| Ana90 | 165 | HKRSQEELPANHQMP | LSEALAEHIKRRLLYSGTVTRIDC | PWG-MPFYALT |
| Ana7108 | 165 | HKRSQEELPPHHQMP | LSEALAEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| CylR505 | 165 | HKRSQEELPQQHQMP | LSEALAEHIKRRLIYSGTVTRIDS | PWG-MPFYVLT |
| RapD9 | 165 | HKRSQEELPHHHQMP | LSEALAEHIKRRLIYSGTVTRIDS | PWG-MPFYVLT |
| Ana7122 | 165 | HKRSQEELPPHHQMP | LSEALAEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| AnaAzo | 165 | HKRSQEELPPHHQMP | LSEALAEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| Cyl7417 | 165 | HKRSQEELPSHHQMP | LSEALAEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| Cal6303 | 165 | HKRSQEDLPPEHRMGL | LSEALAEHIKRRLLYAGTVTRVDS | PWG-MPFYALT |
| Has12170 | 165 | HKRSQEDLPPEHRMGL | LSEALAEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| Tol9009 | 165 | HKRSQEDLPPEHRMGL | LSEALAEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| Tol7601 | 165 | HKRSQEEMPPEHQMP | LSEALAEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| Cal7507 | 165 | HKRSQEDMPPEHQMP | LSEALAEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| Mch7126 | 165 | HKRSQEDMPLQHQMP | LSEALAEHIKRRLLYSGTVARIDS | PWG-MPFYALT |
| Scy7110 | 165 | HKRSQEDLPPEHRMEL | LSEALAEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| Tol521301 | 165 | HKRSQEDLPPEHRMEL | LSEALAEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| Scy61278 | 165 | HKRSQEDLPPEHRMEL | LSEALAEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| Mas10914 | 165 | HRRSQEDFPPENRMEL | LSEALAEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| Tol511288 | 165 | HKRSQEDLPPENRMEL | LSEALAEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| Cal3363 | 165 | HKRSQEDLPQEHQMP | LSEALAEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| Chl6912 | 165 | HKRSQEDLPKEHQMP | LSEALAEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| Chl9212 | 165 | HKRSQEDLPKEHQMP | LSEALAEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| Fis3754 | 165 | HKRSQEDLPKEHQMP | LSEALAEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| Fis7521 | 165 | HKRSQEDLPKEHQMP | LSEALAEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| Hap220 | 165 | HKRSQEDLPKEHQMP | LSEALAEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| Fis9339 | 165 | HKRSQEDLPKEHQMP | LSEALAEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| RicHH01 | 165 | HKRSQEDLPQEHQMP | LSEALVEHIKRRLLYSGTVLRVDS | PWG-MPFYALA |
| Cal7103 | 165 | HKRSQEDLPAQHQML | LSEALAEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| Riv7116 | 165 | HKRSQEDLPAHQMP | LSEALAEHIKRRLLYSTVTRVDS | PWG-MPFYALT |
| Mas008 | 165 | HNRSQEDFPPKNQMP | LSEALAEHIKRRLLYSGTVSRIDS | PWG-MPFYALT |
| Lep7376 | 167 | HQRSQEKFPSDRRMP | LSEALAEHIKRRLHAETVMRLDN | PWG-MPYYVLL |
| Syn042902 | 166 | HQQAQEKAPGDRPLP | LSEALAEHIKRRLHAETVMRLDN | PWG-MPYYILL |
| Syn7003 | 166 | HQQAQENSPGDRPLP | LSEALAEHIKRRLHAETVMRLDN | PWG-MPYYILL |
| Syn73109 | 166 | HQQAQAKAPGDRPLP | LSEALAEHIKRRLHAETVMRLDN | PWG-MPYYILL |
| Syn7002 | 166 | HQQAQAKTPGDRPLP | LSEALAEHIKRRLHAETVMRLDN | PWG-MPYYILL |
| Syn7117 | 166 | HQQAQAKIPGDRPLP | LSEALAEHIKRRLHAETVMRLDN | PWG-MPYYILL |
| Syn8807 | 166 | HQQAQAKTPGDHPLP | LSEALAEHIKRRLHAETVMRLDN | PWG-MPYYILL |
| Spi9445 | 165 | HLSRQEDLPEDRKMP | MSEALAEHIKRRLIYAGTVMRIDN | PWG-LPYYALT |
| Spisub | 165 | HLSRQEDLPEDRKMP | MSEALAEHIKRRLIYAGTVMRIDN | PWG-LPYYALT |
| Mic7113 | 170 | HSRSQEEFEKERRVPL | LSEAMAEHIKRRLLYSGTVTRIDC | PWG-LPYYALT |
| Osc12 | 166 | HTRSQEDFPPERRMP | LSEALAEHIKRRLLYSGTVTRIDS | PWG-MPFYALT |
| Osc10802 | 165 | HARSQEDLPPERRMP | LSEALAEHIKRRLIYAGTVARIDS | PWG-MPFYALT |
| Osc6304 | 165 | HARSQEDFSADRRMP | LSEALAEHIKRRLVYSGTVTRINS | PWG-MPFYALT |

| | | |
|-------------|-----|---|
| PhoOSCR | 195 | HSRSQEDLPPERRMPLSEALAEHIKRRLLIYSGTVTRIDSPWG-MPVYALT |
| Pho130791 | 165 | HSRSQEDLPPERRMPLSEALAEHIKRRLLIYSGTVTRIDSPWG-MPVYALT |
| MicFGP2 | 177 | HRRSQEDMSPERRMPLSEALAEHIKRRLLIYSGTVTRIDSPWG-MPFYALT |
| Osc7112 | 177 | HRRSQEDMSPERRMPLSEALAEHIKRRLLIYSGTVTRIDAPWG-MPFYALT |
| Tri101 | 165 | HRRSQEDFPPERRMPLSEALAEHIKRRLLIYSGTVTKIDSPWG-MPFYALT |
| Pla126_8 | 165 | HTRSQEDLEPNRRMPLSEALAEHIKRRLLTYSETVIKIESPWG-MPFYALN |
| Pla406 | 165 | HTRSQEDLEPNRRMPLSEALAEHIKRRLLTYSETVIKIESPWG-MPFYALN |
| Pla15 | 165 | HTRSQEDLEPNRRMPLSEALAEHIKRRLLTYSETVIKIESPWG-MPFYALN |
| Pla407 | 165 | HTRSQEDLEPNRRMPLSEALAEHIKRRLLTYSETVIKIESPWG-MPFYALN |
| Arth39 | 165 | HRRSQEDIEPSRRMPLSEALTEHIKRRLLIYSGTVTKIDSPWG-MPFYALT |
| Arth328 | 177 | HRRSQEDIEPSRRMPLSEALTEHIKRRLLIYSGTVTKIDSPWG-MPFYALT |
| Arth8005 | 165 | HRRSQEDIEPSRRMPLSEALTEHIKRRLLIYSGTVTKIDSPWG-MPFYALT |
| LynBLJ | 165 | HRRSQEDLDPSRRMALSEALAEHIKRRLLIYSGTVTKVDSPWG-MPFYALT |
| Lyn8106 | 165 | HRRSQEDLDPSRRMALSEALAEHIKRRLLIYSGTVTKVDSPWG-MPFYALT |
| Gei7407 | 166 | HARSQEDVPAERRLPLSEALAEHIKRRLLYSGTVTRIDSPWG-MPFYALT |
| Lep6306 | 165 | NTRSQEDLPPEQRMPLSEALAEHIKRRLLYSGTVTRIESPWG-MPFYALT |
| Lep2104 | 176 | HARSQEDLPEDQRMPLSEALAEHIKRRLLIYSGTVTRVESPWG-MPFYALT |
| Lep3755 | 165 | HGRSQEDLPEEQRMPLSEALAEHIKRRLLIYSGTVTRVESPWG-MPFYALT |
| ProH9006_b | 165 | HRRSQEDLPENQRGPLSEALAEHIRRLLYSGTVLRIDNSWS-MPFYALA |
| Cri9333 | 165 | HSRSQENLPLDQCLPLSEALAEHIKRRLLIYSGTVTRIDSPWG-LPFYALT |
| Syn7335 | 170 | HARSQEHLPEARRMALSDALAEHIRRLLIYAGTVARIDSPGTGMPFYALT |
| LepHIJ | 172 | HARSQESVPSGRQLPLSEALAEHIRRLLYSGTVARIDSPWG-MPFYALA |
| Lep7375 | 165 | HARSQESVPNGRQLPLSEALAEHIRRLLYSGTVTRIDSPWG-MPFYALA |
| Hal2206_a | 173 | HTRSQDDLPPERRLPMSEALAEHIRRLLIYAGTVSRIDAPWG-LPFYVLT |
| LepK1_a | 174 | HEKSQDDLPEHRVPLSEALAEHIRRLLIYSGTVARIDASWG-ASYGGLV |
| Nodnod_a | 171 | HEKSQDDWPTEHRVPLSEALAEHIRRLLIYSGTVARIDASWG-ASYGGLA |
| Pho30_a | 171 | HEKSQDDLVAHRVPLSEALAEHIRRLLIYSGTVARIDASWG-ASYGGLA |
| Lep6406_a | 172 | HERSQEDFPKDRQAPLSEALAEHIRRLLIYSGTVSRIDCPWG-MPFYALM |
| Lyn141951_a | 172 | HERSQEDFPVDRRSPLSEALAEHIRRLLMYSQTVQRLDSPWG-MSFYALM |
| ProH9006_a | 180 | HGRAQEDFPADRRMPLSEAFAEHIRRLLYSGTVISIDTSWG-PPLYALM |
| ProH9006_c | 155 | HGRSQEDLPCDRRMPLSESMAEHIRRLLIYSGTVLSVESSWG-TPFYALQ |
| LepK1_c | 169 | HDKAQSLLHESKRTAFSEALAEHAKYRLLAAETMQEIKITKD-TSAYLLL |
| Lep6406_b | 159 | HSKSQDDFPPTRRMVLSDALTEHIKFRLLHSGTVVQIEASPLSIPVFALA |
| Lyn141951_b | 169 | HEKSQAEYPPSRQMPLSDALTEHIKFRLLHSGTVTQVDIPFLSIPIFALT |
| Hal2206_b | 173 | HVKSQEHLSPDQRMPLSDALTEHIKFRLLYSDTVLQIDSPLLTMPLFALA |
| Pho30_b | 173 | HQMSQEELPSSQRMPLSDALMLHIKFRLLHSGTVIQIDSPLVDIPLYALA |
| Nodnod_b | 173 | HQMSQEELPKGQRMPLSDALMSHIKFRLLHSSTVIQIDSPLVDIPLYALA |
| LepK1_b | 173 | HHMSQEELPTGQRMPLSDALMSHIKFRLLHSGTVIQIDSPLVDIPLYALA |

H
A
S

d

j
j
j

h

h

J

ggGgggg
ikk k
k

220

230

240

250

| | | | |
|-----------|-----|--|---------|
| Nos21 | 214 | RPFYA-PADDQERTYIMLEDTARYFRMMRNWAEKR--PNSMRAL | EELDI |
| Nos7107 | 214 | RPFYA-PADDQERTYIMLEDTARYFRMMRNWAEKR--PNSMRAL | EELDI |
| Nod9414 | 214 | RPFYA-PADDQERTYIMVEDTARYFRMMKDWAEKR--PNTMRAL | EELDI |
| Nos7524 | 214 | RPFYA-PADDQERTYIMVEDTARYFRMMKDWAEKR--PNAMRAL | EELDI |
| Nos3756 | 214 | RPFYA-PADDQERTYIMVEDTARYFRMMKDWAEKR--PNAMRAL | EELDV |
| Ana29413 | 214 | RPFYA-PADDQERTYIMVEDTARYFRMMKDWAEKR--PNAMRAL | EELDV |
| Ana7120 | 214 | RPFYA-PADDQERTYIMVEDTARYFRMMKDWAEKR--PNAMRAL | EELDV |
| Nos29133 | 214 | RPFYA-PADDQERTYIMVEDTARYFRMMKNWAEKR--RNAMRL | LEELDI |
| Ana310F | 214 | RPFYS-PADDQERTYTMVEDTARYFRMMKYWADRK--PNTMRAV | EELDI |
| Aph102 | 214 | RPFYS-PADDQERTYTMIEDTARYFRMMKYWADRK--PNTMRAV | EELDI |
| Ana102 | 214 | RPFYA-PADDQERTYTMVEDTARYFRMMKYWAEKR--PNTMRAV | EELDI |
| Ana90 | 214 | RPFYA-PADDQERTYTMVEDTARYFRMMKYWAEKR--PNTMRAV | EELDI |
| Ana7108 | 214 | RPFYA-PADDQERTYTMVEDTARYFRMMKDWAEKR--ANAMRAV | EELDI |
| CylR505 | 214 | RHFYA-PADDQERTYTMIEDTARYFRMMKDWAEKR--SHAMRAV | EELDI |
| RapD9 | 214 | RQFYA-PADDQERTYTMIEDTARYFRMMKNWAEKR--SHAMRAV | EELDI |
| Ana7122 | 214 | RPFYA-PADDQERTYTMVEDTARYFRMMKDWAEKR--ANAMRAV | EELDI |
| AnaAzo | 214 | RPFYA-PADDQERTYTMVEDTARYFRMMKDWAEKR--ANSMRAV | EELDI |
| Cyl7417 | 214 | RPFYA-PADDQERTYIMVEDTARYFRIMKDWAEKR--PNAMRL | LEELDI |
| Cal6303 | 214 | RPFYA-PADEQERTYIMVEDTARYFRMMRDWAEKR--PKAMRI | LEELDI |
| Has12170 | 214 | RSFYA-PADDQERTYIMVEDTARYFRLMKDWAEKR--PNSMRV | LETMDV |
| Tol9009 | 214 | RSFYA-PADDQERTYIMVEDTARYFRLMKDWAEKR--PNSMRV | LETMDV |
| Tol7601 | 214 | RPFYA-PADDQERTYIMVEDTARYFRLMKDWAEKR--QNAMRAL | EELDI |
| Cal7507 | 214 | RPFYA-PADDQERTYIMVEDTARYFRMMKNWAEKR--PNTMRV | LEELDI |
| Mch7126 | 214 | RPFYA-PADDQERTYIMVEDTARYFRMMKDWAEKR--PNAMRV | LEELDI |
| Scy7110 | 214 | RPFYA-PADEQERTYIMVEDTARFFRMMRDWAEKR--PNTMRV | LEELDI |
| Tol521301 | 214 | RPFYA-PADEQERTYIMVEDTARFFRMMRDWAEKR--PNTMRV | LEELDI |
| Scy61278 | 214 | RPFYA-PVDEQERTYIMVEDTARYFRMMRDWAEKR--PNTMRV | LEELDI |
| Mas10914 | 214 | RPFYA-PADEQERTYIMVEDTARYFRMMKDWAEKR--PNTMRV | LEELDI |
| Tol511288 | 214 | RPFYA-PVDEQERTYIMVEDTARYFRMMKDWAEKR--PNTMRV | LEELDI |
| Cal3363 | 214 | RPFYA-PADDQERQYIMVEDTARYFRMMRDWAERL--ANTMRV | LEELDI |
| Chl6912 | 214 | RPFYA-PADDQERTYIIVEDTARYFRMMRDWAEKR--PNTMRV | LEELDI |
| Chl9212 | 214 | RPFYA-PADDQERTYIIVEDTARYFRMMRDWAEKR--PNTMRV | LEELDI |
| Fis3754 | 214 | RPFYA-PADDQERTYIMVEDTARFFRMMRDWAEKR--PNTMRV | LEELDI |
| Fis7521 | 214 | RPFYA-PADDQERTYIMVEDTARFFRMMRDWAEKR--PNTMRV | LEELDI |
| Hap220 | 214 | RPFYA-PADDQERTYIMVEDTARFFRMMRDWAEKR--PNTMRV | LEELDI |
| Fis9339 | 214 | RPFYA-PADDQERTYIMVEDTARFFRMMRDWAEKR--PNTMRV | LEELDI |
| RicHH01 | 214 | RPFYS-PVDEQERTYIMVEDTARYFRMMKDWAEKR--GRVMRV | LEEMDI |
| Cal7103 | 214 | RPFYA-PADDQERTYIMVEDTARYFRMMRDWAEKR--PNAMRV | LEELDI |
| Riv7116 | 214 | RPYYA-TASDEERTYIMVEDTARFFRMMREWSEKQ--RHTMRV | LEEMDI |
| Mas008 | 214 | RPYYA-TANDEERKYIMVEDTARFFRMMRDWSEKQ--PNVKRI | LETLNI |
| Lep7376 | 216 | RTTYE-PEGEAERLYTMVEDTARYFRLMREWSEKK--PNVMRI | FESLDI |
| Syn042902 | 215 | SSTYGGPDSPTKAPHSLLEDAAHFLRLSHAWTKQQ--HNVMRI | FESLDI |
| Syn7003 | 215 | SPTYGGPDSPTKAPHSLLEDAAHFLRLSHAWTKQQ--HNVMRI | FESLNI |
| Syn73109 | 215 | SSTYGGPDSPTKTPHSLLEDAAHFLRLSHAWTKQQ--HNVMRI | FESLDI |
| Syn7002 | 215 | SSTYGGPDSPTKAPHSLLEDAAHFLRLSHAWTKQQ--HNVMRI | FESLDI |
| Syn7117 | 215 | SSTYGGPDSPTKAPHSLLEDAAHFLRLSHAWTKQQ--HNVMRI | FESLDI |
| Syn8807 | 215 | SSTYGGPDSPTKAPHSLLEDAAHFLRLSHAWTKQQ--HNVMRI | FESLDI |
| Spi9445 | 214 | RPTYIS-PAEDEERTYVMVEDTARFFRMMRDWAEKR--PQVMRV | LEELDI |
| Spisub | 214 | RPTYIS-PAEDEERTYVMVEDTARFFRMMRDWAEKR--PQVMRV | LEELDI |
| Mic7113 | 219 | GASYS-PTDGKERTYTMVEDTARYFRLMRDWAEKQ--PKVMRV | LEELDI |
| Osc12 | 215 | RASYS-PAEEEERTYIMVEDTARYFRLMNDWANRH--PKAMRAL | LEELDI |
| Osc10802 | 214 | RPSYS-PSDEEERTYIMVEDTARYFRLMKDWADR--PGVMRV | LEELDI |
| Osc6304 | 214 | RASYS-PVDDQERTYVMVEDTARYFRLMKDWAEKQ--PKTMR | LLEELDI |

| | | |
|-------------|-----|--|
| PhoOSCR | 244 | RASYS-PINDEERNYIMVEDTARYFRMMDWTQRE--PKTMRLLLEELDI |
| Pho130791 | 214 | RASYS-PINDEERNYIMVEDTARYFRMMDWTQRE--PKTMRLLLEELDI |
| MicFGP2 | 226 | RATYS-PAEQEERTFTMVEDTARYFRLMKDWADKQ--PKVVRIMETLDI |
| Osc7112 | 226 | RATYS-PAEQEERTFTMVEDTARYFRLMKDWAEKQ--PKVVRIMETLDI |
| Tri101 | 214 | RSSYS-PEGQEERTYIMVEDTARYFRLMKDWAENNNNTNKVMRILEEFDI |
| Pla126_8 | 214 | RATYS-PEDQEERTFIMVEDTARYFRLMKDWAERQ--PRVIRVLEELDI |
| Pla406 | 214 | RATYS-PEDQEERTFIMVEDTARYFRLMKDWAERQ--PRVIRVLEELDI |
| Pla15 | 214 | RATYS-PEDQEERTFIMVEDTARYFRLMKDWAERQ--PRVIRVLEELDV |
| Pla407 | 214 | RATYS-PEDQEERTFIMVEDTARYFRLMKDWAERQ--PRVIRVLEELDV |
| Arth39 | 214 | RASYS-PEDQEERTYIMVEDTARYFRLMRDWAERQ--PKVMRVLEELDI |
| Arth328 | 226 | RASYS-PEDQEERTYIMVEDTARYFRLMKDWAERQ--PKVMRVLEELDI |
| Arth8005 | 214 | RASYS-PEDQEERTYIMVEDTARYFRLMKDWAERQ--PKVMRVLEELDI |
| LynBLJ | 214 | RASYS-PEDQEERTYVMVEDTARYFRLMRDWAERQ--PKVMRALEELDI |
| Lyn8106 | 214 | RASYS-PEDQEERTYVMVEDTARYFRLMRDWAERQ--PKVMRALEELDI |
| Gei7407 | 215 | RSSYS-PADEEERTFIMVEDTARYFRLMRADWADKE--DQVMRVLEELDV |
| Lep6306 | 214 | RASYS-PEDQEERAYVMIEDTARFFRLMQDWAKRE--DQVMRVLEELDI |
| Lep2104 | 225 | RASYS-PDDQEERAYVMIEDTARFFRLMQDWAQRQ--GQVMRILEELDI |
| Lep3755 | 214 | RASYS-PDDQEERAYVMIEDTARFFRIMQDWAKRQ--GQVMRVLEELDI |
| ProH9006_b | 214 | RSSYS-PADDEERAYIMIEDTARFFRLMRDWAESH--PHAMRVLEVLEI |
| Cri9333 | 214 | RISYS-PADSEERTYIMIEDTARYFRLMREWAARE--PQVIRLLEELDI |
| Syn7335 | 220 | RTSYS-PASEEERTYTMMEDTARYFRLMREWADSR--SGTRRILEELNI |
| LepHIJ | 221 | RASYI-PTDDAERTYTMIEDTARYFRIMREWVARK--DGTMRVLESLEI |
| Lep7375 | 214 | RASYI-PTDDAERTYTMIEDTARYFRIMREWVARK--DGTMRVLESLEI |
| Hal2206_a | 222 | RKSYS-PADQEERTYLMVEDTARYFRMMREWAERQ--TDTVRILEELDL |
| LepK1_a | 223 | RASYA-PVDSQERMYAMVDDTAQYFRMMREWANGI--PGTMRVLEELDI |
| Nodnod_a | 220 | RASYA-PVDDQERMYAMVDDTAQYFRMMREWANGI--PGTMRVLEELDI |
| Pho30_a | 220 | RSSYA-PVDDQERMYAMVEDTAQYFRMMREWANGI--PGTMRVLEELDI |
| Lep6406_a | 221 | RPSYS-PVAEEERTYIMVEDTARYFRMMREWAERQ--GKTIRILEELDI |
| Lyn141951_a | 221 | RPSYS-PADQEERTLIMLEDTARYFRMMREWSESK--ADTVRILEELDI |
| ProH9006_a | 229 | RSTYS-PVGEEERSYTTIVEDTARYFQLMRSWAEDQ--PQVLRVLEELDI |
| ProH9006_c | 204 | RPVYA-PAGEEERNYVVVEDTARYFHLMRWAEEKQ--PHTIRILEELNI |
| LepK1_c | 218 | KKDYS-PKGRQARMQTMIQDLTRSFRWMYSWVDGE--DGIMRGIETLEI |
| Lep6406_b | 209 | RTHYA-PKGERERVFTMIDDVARFFKLMQDWAAEQ--PGVLRALVFDV |
| Lyn141951_b | 219 | RTHYA-PKQQQERVFTMIDDLARFGKLMQDWVVEQ--PDVLRGLVFDV |
| Hal2206_b | 223 | RTAHS-PKGPREAFTMIEDVARFFSLMQAWVAKE--PYVMRALEVFDV |
| Pho30_b | 223 | SESYS-PKGEQERVFAMIDDVARFFSLMQAWVRED--EGVLRGVEVFDV |
| Nodnod_b | 223 | SESYS-PKGEQERVFAMIDDVARYFGLLQAWVREE--TGVMRGVEVFDV |
| LepK1_b | 223 | SESYS-PRGEQERVFAMIDDVARYFGLLQAWVREE--TGVLRGVEVFDV |

H
A
S

| | 260 | 270 | 280 | 290 |
|-----------|-----|------------------|-------------------|----------------------|
| Nos21 | 261 | PPEKWDQAMEELDEVI | RAWADKYHQSGG-- | IPMILQMVFGRKED----- |
| Nos7107 | 261 | PPEKWDQAMEELDEVI | RAWADKYHQSGG-- | IPMILQMVFGRKED----- |
| Nod9414 | 261 | PAEKWEQAMAELDEIV | REWADRYHQSGG-- | IPMILQMVFGRKED----- |
| Nos7524 | 261 | PPEKWEQAMEELDEIV | RAWADKYHQAGG-- | IPMILQMVFGRKED----- |
| Nos3756 | 261 | PPERWDEAMQELDEII | RTWADKYHQAGG-- | IPMILQMVFGRKED----- |
| Ana29413 | 261 | PPERWDEAMQELDEII | RTWADKYHQVGG-- | IPMILQMVFGRKED----- |
| Ana7120 | 261 | PPERWDEAMQELDEII | RTWADKYHQVGG-- | IPMILQMVFGRKED----- |
| Nos29133 | 261 | LPEKMEQAMEELDEII | RAWADKYHQDGG-- | IAVVLOTVFGEKED----- |
| Ana310F | 261 | PADQIEQAIDELDEVI | RSWGDKYHQEGG-- | VPMILQMVFGNKDDE----- |
| Aph102 | 261 | PSDWIDLAMEELDGI | IRSWGDKYHQEGG-- | VPMVLQMVVGSKDE----- |
| Ana102 | 261 | PPDWIEPAMEELDEII | RSWGDKYHKEGG-- | VPMILQMVVGNKDE----- |
| Ana90 | 261 | PPDWIEPAMEELDEII | RSWGDKYHQEGG-- | IPMILQMVVGNKDE----- |
| Ana7108 | 261 | PAERLDQAMEELDEII | RAWADKYHQDGG-- | MPMILQMVFGSQDE----- |
| CylR505 | 261 | APEKIQAAMDELDEII | RVWADRYHQEGG-- | KPVVLOMAFGQODD----- |
| RapD9 | 261 | APEKIQAAMDELDEII | RVWADRYHQEGG-- | KPVVLOMAFGEQDD----- |
| Ana7122 | 261 | PLEQMEQAMEELDEII | RAWADKYHQDGG-- | MPMILQMVFGNQDD----- |
| AnaAzo | 261 | PIEQMQQAMEELDEII | RAWADKYHQDGG-- | MPMVLQMVFANQDQ----- |
| Cyl7417 | 261 | PAERMDQAKEELDEII | RTWADKYHQDGG-- | IPMILQTVFGKKDD----- |
| Cal6303 | 261 | PPERLEQAQEELDEII | RAWADRYHQEGG-- | MTVVLOMVFGKKDD----- |
| Has12170 | 261 | PPERLEQALSELDEVI | RAWADKYHQEGG-- | VPMILQMVFGNKED----- |
| Tol9009 | 261 | PPDRLEQALSELDEVI | RAWADKYHQEGG-- | VPMILQMVFGNKED----- |
| Tol7601 | 261 | PPERLEQALEELDEVI | RAWADRYHQEGG-- | VPMILQMVFGKKED----- |
| Cal7507 | 261 | PPEKFEQAMEELDEVI | RAWADKYHQESG-- | IPMMLQMVFGKKEE----- |
| Mch7126 | 261 | PPERFEQAMAELDEVI | RAWADKYHQDDG-- | IPMLLQMVFGKKED----- |
| Scy7110 | 261 | PPEKYQAMDELDEVI | RAWADKYHQDGG-- | VPMILQMVFGKKDD----- |
| Tol521301 | 261 | PPEKYNQAMDELDEVI | RAWADKYHQDGG-- | VPMILQMVFGKKED----- |
| Scy61278 | 261 | PPERFEKAMEELDEII | RAWADKYHQDGG-- | VPMILQMVFGKKED----- |
| Mas10914 | 261 | PPDRFEKAMEELDEII | RAWADKYHEDGG-- | VPMILQMVFGKKED----- |
| Tol511288 | 261 | PPERFEKAMEELDEVI | RAWADKYHEDGG-- | VPMILQMVFGKKED----- |
| Cal3363 | 261 | PPDNISPALEELDEVI | RAWADKYHQDGG-- | IPMILQMVFGKKED----- |
| Chl6912 | 261 | PLEKVEQAMEELDEII | RAWADKYHKDGG-- | VPTILOMVVGGKKED----- |
| Chl9212 | 261 | PLEKVEQAMEELDEII | RAWADKYHKDGG-- | VPTILOMVVGGKKED----- |
| Fis3754 | 261 | LPEKMQQAKDELDEII | RAWADKYHQDDG-- | VPVVLQMVFGKKED----- |
| Fis7521 | 261 | LPEKMQQAKDELDEII | RAWADKYHQDDG-- | VPVVLQMVFGKKED----- |
| Hap220 | 261 | PPEKMQQAKDELDEII | RAWADKYHQDDG-- | IPVVLQMVFGKKED----- |
| Fis9339 | 261 | PPEKMEQAKDELDEII | RAWADKYHQDDG-- | IPVVLQMVFGKKED----- |
| RicHH01 | 261 | PSEEMEVAMSELDEII | RDWADKYHKEGG-- | THMILQMVFGKKDLS---- |
| Cal7103 | 261 | PPERIKQAIQELDEVI | RAWADKYHQENG-- | VPMVLQMVFGNKED----- |
| Riv7116 | 261 | PPERIDEALELDQII | RAWADKYHEVGG-- | APMALQMVFGKKED----- |
| Mas008 | 261 | PSGRFQEAYEELDEII | RAWADKYHQEGE-- | TSMVLQMVFGQEODE----- |
| Lep7376 | 263 | PDEDLPAAQAELEMM | RAWADKYHKRGE-- | QTMAVQMVFGQKDG----- |
| Syn042902 | 263 | APADLSEAQTELHELM | RHWAKKYHQRGK-- | PTMAIHMMFGPKDHLS--- |
| Syn7003 | 263 | APADLSQAQTELHELF | MRHWAGKYHQRGK-- | PTMAIHMMFGPKDHLS--- |
| Syn73109 | 263 | APADLSQAQTELHELM | RHWAKKYHQRGK-- | PTMAIHMMFGPKDHLS--- |
| Syn7002 | 263 | APADLSQAQTELHELM | RHWAKKYHQRGK-- | PTMAIHMMFGPKDHLS--- |
| Syn7117 | 263 | APADLSQAQTELHELM | RHWAKKYHQRGK-- | PTMAIHMMFGPKDHLS--- |
| Syn8807 | 263 | APADLSEAQTELHELM | RHWAKKYHQRGK-- | PTMAIHMMFGPKDHLS--- |
| Spi9445 | 261 | YPEDLEAAQAELELDQ | VI RAWADKYHKKGG-- | KPMILQMIFGDKED----- |
| Spisub | 261 | YPEDLEAAQAELELDQ | VI RAWADKYHKKGG-- | KPMILQMIFGDKED----- |
| Mic7113 | 266 | PPENLDQAMEELDEVI | RAWADRHHRADG-- | EPMVLQMVFGPKVD----- |
| Osc12 | 262 | PPEQIDAAMQELDEII | RAWADKYHQVGG-- | TPFILQAMGIREG----- |
| Osc10802 | 261 | PPDRLGQALEELDEVI | RAWADRYHQKGG-- | STMILQMVFGPKED----- |
| Osc6304 | 261 | PSHRMDQAMEELDEVI | RQWADRYHEEGG-- | EPMLLQMVFGPQEES----- |

| | | | |
|-------------|-----|--|-------------|
| PhoOSCR | 291 | PSDRLQDALTELDDELIRGWADKFKHQKGG--EPTVLQMVVGP | PRDDSFMA-- |
| Pho130791 | 261 | PSDRLQDALTELDDELIRGWADKFKHQKGG--EPTVLQMVVGP | PRDDSFMA-- |
| MicFGP2 | 273 | PPERLDQALEELDEIIRNWADRYHKRGE--PTMILQMVFGPQDDA----- | |
| Osc7112 | 273 | PPERLDQALEELDEIIRNWADRYHKRGE--PTMILQMVFGPQDDA----- | |
| Tri101 | 263 | SPDRFEQAKEDLDEIIRHWADRYHESGG--KQMVVQMVFG | LKDD----- |
| Pla126_8 | 261 | PPERIDRAIEELDEIIRQWADRYHQQGG--ETMVVQMVFG | PKKEED---- |
| Pla406 | 261 | PPERIDRAIEELDEIIRQWADRYHQAGG--ETMVVQMVFG | PKKEEQ---- |
| Pla15 | 261 | PPERIDRAIEELDEIIRQWADRYHQAGG--ETMVVQMVFG | PKKEEQ---- |
| Pla407 | 261 | PPERIDRAIEELDEIIRQWADRYHQAGG--ETMVVQMVFG | PKKEEQ---- |
| Arth39 | 261 | PSDRIESALEELDEIIRQWADRYHQGTGG--EAMVLQMVFG | PQETD----- |
| Arth328 | 273 | PSDRIESALEELDEIIRQWADRYHEIGG--EPMVLQMVFG | PQETD----- |
| Arth8005 | 261 | PSDRIESALEELDEIIRQWADRYHEIGG--EPMVLQMVFG | PQETD----- |
| LynBLJ | 261 | PSDRVDQALEELDEILRQWADRYHQGTGG--EPMVLQFVFG | PKEDE----- |
| Lyn8106 | 261 | PPERIDQALEELDEILRQWADRYHQGTGG--EPMVLQFVFG | PKEDE----- |
| Gei7407 | 262 | PEERIDQALEELDEVIRAWADRYHQPGG--QPMVVQMVVGP | PDESLSAA |
| Lep6306 | 261 | PDDRVRDAIAELDEILRNWADRYHQEGG--KPFVVQMVFG | STET----- |
| Lep2104 | 272 | PSDRIESAIAELDEILRNWADRYHKEGG--KPFVVQMVFG | SAEL----- |
| Lep3755 | 261 | PNDRIDSIAIAELDEILRNWADRHHREGG--KPFVVQMVFG | SGEL----- |
| ProH9006_b | 261 | PEATIGQAFEELDQLLRWADRHHQDGT--QPFVLQMVVGS | DDR----- |
| Cri9333 | 261 | LPEQMDEAIAELDEIIRTWADKYHTSGG--QPMVLQMIFG | SKSD----- |
| Syn7335 | 267 | PLSDREAAFNELDSMISQWANRYHDDSG--QPTVVQAMGNS | SDSPQ---- |
| LepHIJ | 268 | PAENRQQALDELDLLLRKWADKYHQGTGG--EPMVLQMALGM | GDVDG---- |
| Lep7375 | 261 | PAENRQQALDELDLLLRKWADKYHQGTGG--EPMVLQMAVG | VGDIDG---- |
| Hal2206_a | 269 | PPSQRAQAFDELDTIIRAWADKYHQKGG--EPTILQMVVGD | NDDSTA--- |
| LepK1_a | 270 | PAADREAAFKELDEVIRTWADRYHKPGG--EPTLLQMVIG | HHWK----- |
| Nodnod_a | 267 | PAARREALQELDEVIRAWADKHHQPGG--EPTLLQMVIG | HHLK----- |
| Pho30_a | 267 | PAAARDTALQELDEVIRTWADKHHQPGG--EPTLLQMVIG | HHIK----- |
| Lep6406_a | 268 | PAEKLESIAIADLDETIIRAWADRYHQANG--IPMVLQMVLG | QQQPEED--- |
| Lyn141951_a | 268 | PPEKLPAAIAELDEILRAWADKYHETGG--RPMVLQAMAGH | QEEVVESSS |
| ProH9006_a | 276 | APDQVEEAFGELDVLLRVIWADRYHCHSG--QPVVVQMVAG | KVERDENLGV |
| ProH9006_c | 251 | PADRMEEALGELDVLLRQWADRYHDDTAT--QTVSVQMVAG | KATEIP---- |
| LepK1_c | 265 | AEEQKEEALQELDQMMRAWADKYHTESDGSKIVALQFLLG | PHQEMTI--- |
| Lep6406_b | 256 | DIDRRSEALEELDQLLRWADKYHQDGG--YPMLQLAAGT | REAREG--- |
| Lyn141951_b | 266 | APEQREKALAELDTMLKAWADKYHQEGG--HPMILQLAAGT | REPGDA--- |
| Hal2206_b | 270 | DPAKKDEALAELDKLLQDWADKYHQDDG--DPMVLQLAAGN | REFEV---- |
| Pho30_b | 270 | APQDRKVALEELDAMLRAWADKYHQDGG--LPMVLQFAAG | RRREHD----- |
| Nodnod_b | 270 | APQQRQQALQELDEMLRAWADKYHQDGG--LPMVLQFAAG | RRREYD----- |
| LepK1_b | 270 | APQQRQAALDELTLRRAWADKYHQDGG--MPMVLQFAAG | RRRDYD----- |

**H
A
S**

| | | |
|-----------|-----|-------|
| Nos21 | 303 | ----- |
| Nos7107 | 303 | ----- |
| Nod9414 | 303 | ----- |
| Nos7524 | 303 | ----- |
| Nos3756 | 303 | ----- |
| Ana29413 | 303 | ----- |
| Ana7120 | 303 | ----- |
| Nos29133 | 303 | ----- |
| Ana310F | 304 | ----- |
| Aph102 | 303 | ----- |
| Ana102 | 303 | ----- |
| Ana90 | 303 | ----- |
| Ana7108 | 303 | ----- |
| CylR505 | 303 | ----- |
| RapD9 | 303 | ----- |
| Ana7122 | 303 | ----- |
| AnaAzo | 303 | ----- |
| Cyl7417 | 303 | ----- |
| Cal6303 | 303 | ----- |
| Has12170 | 303 | ----- |
| Tol9009 | 303 | ----- |
| Tol7601 | 303 | ----- |
| Cal7507 | 303 | ----- |
| Mch7126 | 303 | ----- |
| Scy7110 | 303 | ----- |
| Tol521301 | 303 | ----- |
| Scy61278 | 303 | ----- |
| Mas10914 | 303 | ----- |
| Tol511288 | 303 | ----- |
| Cal3363 | 303 | ----- |
| Chl6912 | 303 | ----- |
| Chl9212 | 303 | ----- |
| Fis3754 | 303 | ----- |
| Fis7521 | 303 | ----- |
| Hap220 | 303 | ----- |
| Fis9339 | 303 | ----- |
| RicHH01 | 305 | ----- |
| Cal7103 | 303 | ----- |
| Riv7116 | 303 | ----- |
| Mas008 | 303 | ----- |
| Lep7376 | 305 | ----- |
| Syn042902 | 308 | ----- |
| Syn7003 | 308 | ----- |
| Syn73109 | 308 | ----- |
| Syn7002 | 308 | ----- |
| Syn7117 | 308 | ----- |
| Syn8807 | 308 | ----- |
| Spi9445 | 303 | ----- |
| Spisub | 303 | ----- |
| Mic7113 | 308 | ----- |
| Osc12 | 304 | ----- |
| Osc10802 | 303 | ----- |
| Osc6304 | 304 | ----- |

| | | |
|-------------|-----|-------------|
| PhoOSCR | 337 | ----- |
| Pho130791 | 307 | ----- |
| MicFGP2 | 316 | ----- |
| Osc7112 | 316 | ----- |
| Tri101 | 305 | ----- |
| Pla126_8 | 305 | ----- |
| Pla406 | 305 | ----- |
| Pla15 | 305 | ----- |
| Pla407 | 305 | ----- |
| Arth39 | 304 | ----- |
| Arth328 | 316 | ----- |
| Arth8005 | 304 | ----- |
| LynBLJ | 304 | ----- |
| Lyn8106 | 304 | ----- |
| Gei7407 | 310 | DF----- |
| Lep6306 | 303 | ----- |
| Lep2104 | 314 | ----- |
| Lep3755 | 303 | ----- |
| ProH9006_b | 303 | ----- |
| Cri9333 | 303 | ----- |
| Syn7335 | 311 | ----- |
| LepHIJ | 312 | ----- |
| Lep7375 | 305 | ----- |
| Hal2206_a | 314 | ----- |
| LepK1_a | 312 | ----- |
| Nodnod_a | 309 | ----- |
| Pho30_a | 309 | ----- |
| Lep6406_a | 313 | ----- |
| Lyn141951_a | 316 | DA----- |
| ProH9006_a | 324 | IAKSPDLPQTA |
| ProH9006_c | 296 | MADLTDPLG-- |
| LepK1_c | 312 | ----- |
| Lep6406_b | 301 | ----- |
| Lyn141951_b | 311 | ----- |
| Hal2206_b | 314 | ----- |
| Pho30_b | 313 | ----- |
| Nodnod_b | 313 | ----- |
| LepK1_b | 313 | ----- |