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|                |           |                |                |                                                                                   |    |
|----------------|-----------|----------------|----------------|-----------------------------------------------------------------------------------|----|
| NTDB id 1159   | ABDM36    | RS04765        | WP 001166105.1 | .....MEALIEKIKKEYKLIYICTGLGLLVGGFFLLKPAPQTPVKETNLQAE...VVAISKDLSVSEKEVSKKEEKSEEP  | 0  |
| NTDB id 1150   | A1552VC   | RS08580        | WP 001166105.1 | .....                                                                             | 0  |
| NTDB id 1395   | DSB67     | RS04445        | WP 010649155.1 | .....                                                                             | 0  |
| NTDB id 1362   | HI 1008   | AAC22669.1     |                | .....                                                                             | 0  |
| NTDB id 1382   | A4U84     | RS07375        | WP 062924234.1 | .....                                                                             | 0  |
| NTDB id 595    | KW2       | RS08725        | WP 021037687.1 | .....MEKILDKLKEYWKIM.LLVVCALIAGGIFYIFTNSPKPAETLSVEN....LSSS...STKSSVSKFNSSSSEK    | 65 |
| NTDB id 521    | SMSK321   | RS04960        | WP 000443804.1 | .....MESIIEKIKKEYKIIIV.ICTGLGLLVGGFFLLKPAPHTPVKETNLQAE...VVAISKDSSTEKDVKKEEKEEPV  | 69 |
| NTDB id 493    | SM12261   | RS04300        | WP 000387351.1 | .....MEAIIEKIKKEYKIIIV.ICTGLGLLVGGFFLLKPAPQTPVKETNLQAE...VVAISKDSVSEKEVKKEEKEEPL  | 69 |
| NTDB id 263    | KZH43     | RS04195        | WP 000387330.1 | .....MEAIIEKIKKEYKIIIV.ICTGLGLLVGGFFLLKPAPQTPVKETNLQAE...VVAISKDLVSEKEVNKKEEKEEPL | 69 |
| NTDB id 222    | SPD       | RS04535        | WP 000387330.1 | .....MEAIIEKIKKEYKIIIV.ICTGLGLLVGGFFLLKPAPQTPVKETNLQAE...VVAISKDLVSEKEVNKKEEKEEPL | 69 |
| NTDB id 188    | SPR       | RS04295        | WP 000387330.1 | .....MEAIIEKIKKEYKIIIV.ICTGLGLLVGGFFLLKPAPQTPVKETNLQAE...VVAISKDLVSEKEVNKKEEKEEPL | 69 |
| NTDB id 153    | SP        | RS04730        | WP 000387344.1 | .....MEAIIEKIKKEYKIIIV.ICTGLGLLVGGFFLLKPAPQTPVKETNLQAE...VVAISKDSSTEKEVKKEEKEEPL  | 69 |
| NTDB id 1069   | ABD1      | RS03060        | WP 043960841.1 | .....                                                                             | 0  |
| NTDB id 1041   | HON27     | RS14740        | WP 005124713.1 | .....                                                                             | 0  |
| NTDB id 36     | MW        | RS08230        | WP 001793467.1 | MVLLYQFLLRYKDFLTQWKLYIISAVVLMVVLIGFIFWRQDDYTSRNFENKDNALKQSTSENSSLSKVEDVQVKDGDNSK  | 80 |
| NTDB id 20     | SA        | RS08005        | WP 001802022.1 | MVLLYQFLLRYKDFLTQWKLYIISAVVLMVVLIGFIFWRQDDYTSRNFENKDTALKQSTSENSSLSKLEDVQVKDGDNSK  | 80 |
| NTDB id 105    | BSU 25590 | NP 390437.1    |                | .....MNWLNQHKKAIILAASAAVFTAIMIFLATG...KNKE...PVKQAVPTE...TENTVVVKQEANNDE          | 57 |
| NTDB id 1014   | ACIAD     | RS13855        | WP 004924483.1 | .....                                                                             | 0  |
| NTDB id 1127   | NGFG      | RS10560        | WP 003703428.1 | .....MSRGG                                                                        | 5  |
| NTDB id 1126   | NGFG      | RS09375        | WP 003703428.1 | .....MSRGG                                                                        | 5  |
| NTDB id 1125   | NGFG      | RS07215        | WP 003703428.1 | .....MSRGG                                                                        | 5  |
| NTDB id 1108   | NGFG      | RS06525        | WP 003703428.1 | .....MSRGG                                                                        | 5  |
| NTDB id 138640 | RC07      | RS08535        | WP 002855574.1 | .....                                                                             | 0  |
| NTDB id 1242   | Cj0011c   | YP 002343483.1 |                | .....                                                                             | 0  |
| consensus      |           |                |                |                                                                                   |    |

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| NTDB id 1159   | ABDM36    | RS04765        | WP 001166105.1 | .....EQDLITVDYKGAVKSPGYYLDTYSKRYNDKLYLFCMLF.....AKGLLEQADSKSLNLAQKVSDEALVYVPKGEESA | 33  |
| NTDB id 1150   | A1552VC   | RS08580        | WP 001166105.1 | .....MQIKT.KIVTFLFLSLCLPTLPLLANAEETAPAAQ.....                                      | 33  |
| NTDB id 1395   | DSB67     | RS04445        | WP 010649155.1 | .....MKWMLTLCLLILAPMSWAE.TKTKAD.....                                               | 25  |
| NTDB id 1362   | HI 1008   | AAC22669.1     |                | .....MKT.L.FTSVVLGALVSSSFEEKATXQTAQSVV.....TTQA.....                               | 38  |
| NTDB id 1382   | A4U84     | RS07375        | WP 062924234.1 | .....MKK.LSRYTFSLLFG.LFSATTFAEEKVTTSTEHTPV.....VMQQ.....                           | 39  |
| NTDB id 595    | KW2       | RS08725        | WP 021037687.1 | NKNEIMVDLKGAVAKPNVYQISSDERLVDLI.....RQAGGFTDQADQKSINLSAKLKDEEVIYVPKVGESS           | 133 |
| NTDB id 521    | SMSK321   | RS04960        | WP 000443804.1 | EQDLITVDVKGAVKSPGIYDLVSGSRVNDV.....QKAGGLTEQADSKSLNLAQKVSDEALVYVPTKGEESA           | 137 |
| NTDB id 493    | SM12261   | RS04300        | WP 000387351.1 | EQDLITVDVKGAVKSPGIYDLVSGSRVNDV.....QKAGGLTEQADSKSLNLAQKVSDEALVYVPTKGEESA           | 137 |
| NTDB id 263    | KZH43     | RS04195        | WP 000387330.1 | EQDLITVDVKGAVKSPGIYDLVSGSRVNDV.....QKAGGLTEQADSKSLNLAQKVSDEALVYVPTKGEESA           | 137 |
| NTDB id 222    | SPD       | RS04535        | WP 000387330.1 | EQDLITVDVKGAVKSPGIYDLVSGSRVNDV.....QKAGGLTEQADSKSLNLAQKVSDEALVYVPTKGEESA           | 137 |
| NTDB id 188    | SPR       | RS04295        | WP 000387330.1 | EQDLITVDVKGAVKSPGIYDLVSGSRVNDV.....QKAGGLTEQADSKSLNLAQKVSDEALVYVPTKGEESA           | 137 |
| NTDB id 153    | SP        | RS04730        | WP 000387344.1 | EQDLITVDVKGAVKSPGIYDLVSGSRVNDV.....QKAGGLTEQADSKSLNLAQKVSDEALVYVPTKGEESA           | 137 |
| NTDB id 1069   | ABD1      | RS03060        | WP 043960841.1 | .....MQYSMRFWKN...K.YFVLIMLCGLVISPSVCAQSFQDNFQEWKVKQQM..YDQK.....                  | 49  |
| NTDB id 1041   | HON27     | RS14740        | WP 005124713.1 | .....MQYSMRFWKN...K.YFLLIMLCGLVISPSVCAQSFQDNFQEWKAKQQM..YDQK.....                  | 49  |
| NTDB id 36     | MW        | RS08230        | WP 001793467.1 | NKGPVYVDVKGAVKHPNVYKMTSKDRVVD.LL.....DKAQLLEDADVSRINLSEKLTQDKMIFIPHKGQKNV          | 147 |
| NTDB id 20     | SA        | RS08005        | WP 001802022.1 | NKGPVYVDVKGAVKHPNVYKMTSKDRVVD.LL.....DKAQLLEDADVSRINLSEKLTQDKMIFIPHKGQKNV          | 147 |
| NTDB id 105    | BSU 25590 | NP 390437.1    |                | SNETIVIDIKGAVQHPGVYEM.RTGDRVS.....QAI...EKAGGTSEQADEAQVNLAELIQDGTVVYIPKKGEETA      | 125 |
| NTDB id 1014   | ACIAD     | RS13855        | WP 004924483.1 | .....MSIRHFFT...FFWAT.....LLTLFSMQI...VFAQGGFDQYDQAW.....KTQQKAHDTR                | 45  |
| NTDB id 1127   | NGFG      | RS10560        | WP 003703428.1 | ATPYRFLIRHIVARCGLLFATLKGKTMKKMFVLFCLMF.....                                        | 44  |
| NTDB id 1126   | NGFG      | RS09375        | WP 003703428.1 | ATPYRFLIRHIVARCGLLFATLKGKTMKKMFVLFCLMF.....                                        | 44  |
| NTDB id 1125   | NGFG      | RS07215        | WP 003703428.1 | ATPYRFLIRHIVARCGLLFATLKGKTMKKMFVLFCLMF.....                                        | 44  |
| NTDB id 1108   | NGFG      | RS06525        | WP 003703428.1 | ATPYRFLIRHIVARCGLLFATLKGKTMKKMFVLFCLMF.....                                        | 44  |
| NTDB id 138640 | RC07      | RS08535        | WP 002855574.1 | .....MKKLLFLF..FA.....                                                             | 10  |
| NTDB id 1242   | Cj0011c   | YP 002343483.1 |                | .....MKKLLFLF..FA.....                                                             | 10  |
| consensus      |           |                |                |                                                                                    |     |

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|----------------|-----------|----------------|----------------------------------|-----------------------------------------------------|----------|------------|------------|-------------|--------------|----------|--------------|--------------|-------|-----|
| NTDB id 1159   | ABDM36    | RS04765        | WP 001166105.1                   | .....VEEGIVITVNINTASAEELATLLKGI                     | GLKKAQAI | VDYREANGP  | FTH        | IDDLTNVKGIG | EATVR        | 95       |              |              |       |     |
| NTDB id 1150   | A1552VC   | RS08580        | WP 001166105.1                   | .....VEEGIVITVNINTASAEELATLLKGI                     | GLKKAQAI | VDYREANGP  | FTH        | IDDLTNVKGIG | EATVR        | 95       |              |              |       |     |
| NTDB id 1395   | DSB67     | RS04445        | WP 010649155.1                   | .....KYEGIEITVNVNSATAQEIATLLIGI                     | GEKKAQD  | IVEYRNEHG  | PFKTAADL   | TKVKGIG     | EATVR        | 87       |              |              |       |     |
| NTDB id 1362   | HI 1008   | AAC22669.1     | .....EAQVAPAVVSDKLNINTATASEIQKSL | TGIGAKKA                                            | EAI      | VQYREKHG   | NFXNAE     | QLELVQG     | GIGKATLE     | 104      |              |              |       |     |
| NTDB id 1382   | A4U84     | RS07375        | WP 062924234.1                   | .....VAATQKVNANVNVINTATASEIQDKL                     | VGIGAKKA | QAI        | IVEYREKNG  | KFLNVEQL    | TEVSGIGKATLE | 104      |              |              |       |     |
| NTDB id 595    | KW2       | RS08725        | WP 021037687.1                   | SESTDSPTG...SSVSNQISTTSGPKVNINKA                    | DITELQK  | LTGIGQKKAQ | DI         | DFRMKNGD    | FKSIEDL      | GLKVS    | GFGDKTLE     | 209          |       |     |
| NTDB id 521    | SMSK321   | RS04960        | WP 000443804.1                   | SQHTGSGAP.....SSTS                                  | SKDKK    | INLNKAS    | LEELKQ     | VKGLGGKRAQ  | DI           | IDHREANG | KFKSVDEL     | KKVSGIGAKTIE | 207   |     |
| NTDB id 493    | SM12261   | RS04300        | WP 000387351.1                   | SQQAGPGTA.....SSTS                                  | KEKK     | VNLNKAS    | LEELKQ     | VKGLGGKRAQ  | DI           | IDHREANG | KFKSVDEL     | KKVSGIGAKTIE | 207   |     |
| NTDB id 263    | KZH43     | RS04195        | WP 000387330.1                   | SQQTGLGTA.....SSISKEKK                              | VNLNKAS  | LEELKQ     | VKGLGGKRAQ | DI          | IDHREANG     | KFKSVDEL | KKVSGIGGKTIE | 207          |       |     |
| NTDB id 222    | SPD       | RS04535        | WP 000387330.1                   | SQQTGLGTA.....SSISKEKK                              | VNLNKAS  | LEELKQ     | VKGLGGKRAQ | DI          | IDHREANG     | KFKSVDEL | KKVSGIGGKTIE | 207          |       |     |
| NTDB id 188    | SPR       | RS04295        | WP 000387330.1                   | SQQTGLGTA.....SSISKEKK                              | VNLNKAS  | LEELKQ     | VKGLGGKRAQ | DI          | IDHREANG     | KFKSVDEL | KKVSGIGGKTIE | 207          |       |     |
| NTDB id 153    | SP        | RS04730        | WP 000387344.1                   | SQQTGSGTA.....SSTS                                  | KEKK     | VNLNKAS    | LEELKQ     | VKGLGGKRAQ  | DI           | IDHREANG | KFKSVDEL     | KKVSGIGGKTIE | 207   |     |
| NTDB id 1069   | ABD1      | RS03060        | WP 043960841.1                   | LNISKSSHSNSSKISQTKNFNDSTGQ                          | IHLNQANV | NEFQQ      | LKGIGEKKAQ | AIVEYRQK    | NGSFKN       | IDEI     | KNVKGIG      | PAIFE        | 128   |     |
| NTDB id 1041   | HON27     | RS14740        | WP 005124713.1                   | LNITKSSHSNGSKISQTKNFNDSTGQ                          | IHLNQANV | NEFQQ      | LKGIGEKKAQ | AIVEYRQK    | NGSFKN       | IDEI     | KNVKGIG      | PAIFE        | 128   |     |
| NTDB id 36     | MW        | RS08230        | WP 001793467.1                   | EP....QIGVNS..VHVKNGNTNNTK                          | VNLNTAS  | VSELMS     | VPGVGQAKA  | NAIVEYRN    | QQGAFQE      | IDDL     | KKVKG        | FGSKTFD      | 220   |     |
| NTDB id 20     | SA        | RS08005        | WP 001802022.1                   | EP....QIEVNS..VHVKNGNTNNTK                          | VNLNTAS  | VSELMS     | VPGVGQAKA  | NAIVEYRN    | QQGAFQE      | IDDL     | KKVKG        | FGSKTFD      | 220   |     |
| NTDB id 105    | BSU 25590 | NP 390437.1    |                                  | V....QQGGGGS..V..QSDGGKGALVNINT                     | ATLEELQ  | ISGVGPSKA  | EAI        | IAYREENG    | RFTIED       | ITKV     | SGIGEK       | SFE          | 196   |     |
| NTDB id 1014   | ACIAD     | RS13855        | WP 004924483.1                   | LNSSASHHSLSK..P..TQQSGTG                            | VKNINS   | ATAKELQ    | LHGVGEKK   | KALAI       | IVEYRQ       | QYGFAS   | VDDL         | QKVKGIG      | PKFIE | 120 |
| NTDB id 1127   | NGFG      | RS10560        | WP 003703428.1                   | .....SCAFSLAAVNINAASQ                               | QLEA     | LPGIGPAK   | AKAIAEYRA  | QNGAFK      | SVDDL        | IKVKGIG  | PAVLA        | 105          |       |     |
| NTDB id 1126   | NGFG      | RS09375        | WP 003703428.1                   | .....SCAFSLAAVNINAASQ                               | QLEA     | LPGIGPAK   | AKAIAEYRA  | QNGAFK      | SVDDL        | IKVKGIG  | PAVLA        | 105          |       |     |
| NTDB id 1125   | NGFG      | RS07215        | WP 003703428.1                   | .....SCAFSLAAVNINAASQ                               | QLEA     | LPGIGPAK   | AKAIAEYRA  | QNGAFK      | SVDDL        | IKVKGIG  | PAVLA        | 105          |       |     |
| NTDB id 1108   | NGFG      | RS06525        | WP 003703428.1                   | .....SCAFSLAAVNINAASQ                               | QLEA     | LPGIGPAK   | AKAIAEYRA  | QNGAFK      | SVDDL        | IKVKGIG  | PAVLA        | 105          |       |     |
| NTDB id 138640 | RC07      | RS08535        | WP 002855574.1                   | .....LTAFLFGA                                       | VNINTATL | KELKS      | LNGIGEAK   | AKAILEYRKE  | ANFTS        | IDDL     | KKVKGIG      | DKLFE        | 70    |     |
| NTDB id 1242   | Cj0011c   | YP 002343483.1 |                                  | .....LTAFLFGA                                       | VNINTATL | KELKS      | LNGIGEAK   | AKAILEYRKE  | ANFTS        | IDDL     | KKVKGIG      | DKLFE        | 70    |     |
| consensus      |           |                |                                  | ***! !** !* * !*! ***!!*!!*! * * !***** *!***! **** |          |            |            |             |              |          |              |              |       |     |

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| NTDB id 1159   | ABDM36    | RS04765        | WP 001166105.1 | NNAARILL         | 103     |       |     |
| NTDB id 1150   | A1552VC   | RS08580        | WP 001166105.1 | NNAARILL         | 103     |       |     |
| NTDB id 1395   | DSB67     | RS04445        | WP 010649155.1 | KNEDRILL         | 95      |       |     |
| NTDB id 1362   | HI 1008   | AAC22669.1     |                | KNRDRIIF         | 112     |       |     |
| NTDB id 1382   | A4U84     | RS07375        | WP 062924234.1 | KNRDCIVIE        | 113     |       |     |
| NTDB id 595    | KW2       | RS08725        | WP 021037687.1 | KLKDEISID        | 218     |       |     |
| NTDB id 521    | SMSK321   | RS04960        | WP 000443804.1 | KLKDYVTVD        | 216     |       |     |
| NTDB id 493    | SM12261   | RS04300        | WP 000387351.1 | KLKDYVTVD        | 216     |       |     |
| NTDB id 263    | KZH43     | RS04195        | WP 000387330.1 | KLKDYVTVD        | 216     |       |     |
| NTDB id 222    | SPD       | RS04535        | WP 000387330.1 | KLKDYVTVD        | 216     |       |     |
| NTDB id 188    | SPR       | RS04295        | WP 000387330.1 | KLKDYVTVD        | 216     |       |     |
| NTDB id 153    | SP        | RS04730        | WP 000387344.1 | KLKDYVTVD        | 216     |       |     |
| NTDB id 1069   | ABD1      | RS03060        | WP 043960841.1 | KNKSRLAL         | 136     |       |     |
| NTDB id 1041   | HON27     | RS14740        | WP 005124713.1 | KNKSRLAL         | 136     |       |     |
| NTDB id 36     | MW        | RS08230        | WP 001793467.1 | KLKSYFTI         | 228     |       |     |
| NTDB id 20     | SA        | RS08005        | WP 001802022.1 | KLKSYFTI         | 228     |       |     |
| NTDB id 105    | BSU 25590 | NP 390437.1    |                | KIKSSIIVK        | 205     |       |     |
| NTDB id 1014   | ACIAD     | RS13855        | WP 004924483.1 | KNRDRLAI         | 128     |       |     |
| NTDB id 1127   | NGFG      | RS10560        | WP 003703428.1 | KLKDQASVGAPAPKGP | PAKPVLP | PAVKK | 131 |
| NTDB id 1126   | NGFG      | RS09375        | WP 003703428.1 | KLKDQASVGAPAPKGP | PAKPVLP | PAVKK | 131 |
| NTDB id 1125   | NGFG      | RS07215        | WP 003703428.1 | KLKDQASVGAPAPKGP | PAKPVLP | PAVKK | 131 |
| NTDB id 1108   | NGFG      | RS06525        | WP 003703428.1 | KLKDQASVGAPAPKGP | PAKPVLP | PAVKK | 131 |
| NTDB id 138640 | RC07      | RS08535        | WP 002855574.1 | KIKNDITVE        | 79      |       |     |
| NTDB id 1242   | Cj0011c   | YP 002343483.1 |                | KIKNDITIE        | 79      |       |     |
| consensus      |           |                |                | *****            | ****    |       |     |

 non conserved  
 similar  
  $\geq 50\%$  conserved