**Supplementary file 1 Archaeal short C1A peptidases**

**Archaea-specific short C1A peptidases**

DAHWUS010000703, UCB59168, MCK4996027, MCK5636955, RLF37898, MCK4365330, MCD6513258, KAA0002332, MCI4345830, MCI4341662, MCI4334896, MBE3121439, HHF56427, MCD6216108, MCF7862147, PKP61290, NCN64603, MBU1246324, MCK5627663,MBL7168114, RLG75435, RLG02684, NLE04568, RLF09379, KAB3546236, RZN40145, RLG25020, MCK4459896, PXF57508, MCK5108675, MCE7699474, MCE7699050, MBS7626718, MBS7650961, HIH98053, KYC53855, MBS7646162, MBC7109069, HIH98781, MBS7622855, HIH29766, WP\_148687067, VVB58332, MCE7699047, RLI87757, MBQ6628014, RLF92273, VVB65043, MBP7069777, KXB08553, VVB93671, HEC72648, MBP1662758, MCI4337786, VVB62775, MCK5561106, MCK9567651, KYK35576, MCK4902719, MBS3749108, OYV09165, MBS3801904, MCI4363036, NTV76584, OYV14351,KYK28083, MCJ7697462, HIH28190, HIH00289, OYT28409, NYT01874, MBC7081689, MBU0496552, MBC7128408, KYK22496, RLF39497, DAC73334, MBN1861190, RLF51075, MBY8998716

**Horizontally acquired short C1A peptidases in Archaea**

MBD3407302, MCK5614944, MCJ7698565, MCK4415586, RLF27795, UCE36941, MBW2982642, MBN2335896, MCH8905524, TFH41208, MBM4250075, OIO22098, VVB93824, MCE8423104, VVB85898, OIO24549, VVC01043, MCK9586153, MBP7067802, NLJ21726, UEC41668, OPX81696, MCK9405279, WP\_013720700, NMB85868, OPX75105, MCK4347891, MBK7387220, WP\_209584139, WP\_071907541, OPY48778, WP\_209631153, WP\_219968434, PWR71151, WP\_012901135, RLG13091, OPY19415, WP\_174590212, MCG2737956, WP\_014406686, RMF28885, MBN1678530, OLD12351, NLV28195, CAD7778915, OPY18197, WP\_013825867, CAD7776905, MBP8624268, MCP8310751, WP\_069582411, NLH22408, WP\_048082145, MCJ7464255, MCE5215344, TMI41914, MRR14384, MCP8322871, NTV76414, KYK32179, MCJ7445856, OYV10600, TMI69218, TFH41693, OLE91984, OQB17203, OPY54508, MCK9597148, MCI4435550, MCP8304908, MPZ06446, QNO58023, TRZ67270, QQG48186, WP\_134482916, VFJ12905, MCK4734469, MBN1324555, WP\_248535176, MCK4971339, OPY55129, CAD7780064, MBU0762495, TRZ69458, WP\_048182473, HIH19026, HDL02487, RLG20759, RLG35358, WP\_095644254, WP\_048153359, HII92371, WP\_229395323, WP\_048117302, QNO57621, MCH8905524, RLI65907, MCK4266327, WP\_048180826, NLH20743, OYV14776, VVB88503, KYK28850,

**Supplementary file 2 Horizontally acquired C1A peptidases in eukaryotes and viruses**

Only the most representative sequences are listed. Directions of horizontal transfer:

***A) Bacteria to Eukaryota***

***A1) very recent HGT from Cyanobacteria to bdelloid rotifers (Bdelloidea, Rotifera)***

donor sequence: WP\_054465464

bdelloid rotifers: Rotaria (CAF3488612), Adineta (CAF1251741), Didymodactylos (CAF1112757)

***A2) Streptomycetes to Fungi***

donor sequence: WP\_073773949

Fungi: KAF2749223, KAI1849739, XP\_003656030, KAH6627468

***A3) Gammaproteobacteria to green algae and chytrid fungi***

donor sequence: WP\_242518642

green algae: KAI9000141, KAG2487069, PNH11230, XP\_042927188, XP\_002956830

chytrid fungi: KAI9024262

***A4) Deltaproteobacteria to Fungi (Ascomycetes) and diatoms - C1-terB sequences***

donor sequence: WP\_136935198

Fungi (Ascomycetes): TLD34137, KLU91290

diatoms: CAB9506488

***A5) Cyanobacteria to dinoflagellates and cryptophytes (Alveolata, SAR supergroup) - C1-EFh sequences***

donor sequence: WP\_171575278

dinoflagellates: CAE7556063, ICPI01040318, GICE01035329

cryptophytes: XP\_005833280

***A6) Actinobacteria to pelagophytes (SAR supergroup, Stramenopiles; Ochrophyta; Pelagophyceae) - pelagophytes causes harmful marine brown tide blooms***

donor sequence: TMM39349

pelagophytes: KAH8058674, KAJ1448925

***B) Bacteria to DNA viruses (Caudoviricetes)***

Donor sequence: WP\_249293808, PWM09368, WP\_230141817, MCI6929133

Caudoviricetes: DAJ83460, DAT91692, DAI08572, DAH93260, DAR43207, DAM15906

***C) plants to fungal plant pathogens – evidence from the fungal genome sequences***

Triticum aleurain: Pyricularia oryzae (MQQU01001077)

RD21A-like (*Juglans regia*): Xylaria sp. (JADKYC010001065)