

SUPPLEMENTARY ONLINE DATA

The basic building blocks and evolution of CRISPR–Cas systems

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Table S1 | Gene neighbourhoods used for assignments of Cas1 proteins to the CRISPR–Cas subtypes

Cas1 GI number	Organism	Automatically assigned CRISPR–Cas system (CAS) subtype	CRISPR–Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
384117649	<i>Acetobacter_pasteurianus</i> _IFO_3283_01_42C_uid158377	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
258513018	<i>Acetobacter_pasteurianus</i> _IFO_3283_01_uid59279	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
384049465	<i>Acetobacter_pasteurianus</i> _IFO_3283_03_uid158373	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
384055396	<i>Acetobacter_pasteurianus</i> _IFO_3283_07_uid158381	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
384043999	<i>Acetobacter_pasteurianus</i> _IFO_3283_12_uid158379	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
384055813	<i>Acetobacter_pasteurianus</i> _IFO_3283_22_uid158383	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
384061324	<i>Acetobacter_pasteurianus</i> _IFO_3283_26_uid158531	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
384061684	<i>Acetobacter_pasteurianus</i> _IFO_3283_32_uid158375	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
379012740	<i>Acetobacterium_woodii</i> _DSM_1030_uid88073	CAS-I-B	2-1-4-3-5-7-8-6
302391602	<i>Acetohalobium_arabaticum</i> _DSM_5501_uid51423	CAS-I-D	10d-csc2g7-csc1g5-3-4-1-2-6
284048125	<i>Acidaminococcus_fermentans</i> _DSM_20731_uid43471	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
352684362	<i>Acidaminococcus_intestini</i> _RyC_MR95_uid74445	CAS-II-A	9-1-2-csn2
332796067	<i>Acidianus_hospitalis</i> _W1_uid66875	CAS-III-A	csm3g7-csm3g7-x-x-4-x-x-x-x-2-1-6
332797424	<i>Acidianus_hospitalis</i> _W1_uid66875	CAS-I-A	6-csaXg8-3HD-3-5-7-csa5SS-R-4-1-2-4-R
302347808	<i>Acidilobus_saccharovorans</i> _345_15_uid51395	CAS-III-B	6-x-4-2-1-4-cmr3g5-10-cmr6g7-csm3g7-cmr5SS-cmr4g7-csm6-x-csm6
256371771	<i>Acidimicrobium_ferrooxidans</i> _DSM_10331_uid59215	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3 + 3HD
148243835	<i>Acidiphilium_cryptum</i> _JF_5_uid58447	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1
148260802	<i>Acidiphilium_cryptum</i> _JF_5_uid58447	CAS-I-E	1-6e-5-7-cse2SS-8e-3
225872438	<i>Acidobacterium_capsulatum</i> _ATCC_51196_uid59127	CAS-I-C	2-1-4-7-8c-5-x-3 + 3HD
117929157	<i>Acidotherrmus_cellulolyticus</i> _11B_uid58501	CAS-II	2-1-9
121592920	<i>Acidovorax_JS42</i> _uid58427	CAS-I-F	6f-7f-5f-8f-3f-1
326315086	<i>Acidovorax_avenae</i> _ATCC_19860_uid42497	CAS-II	9-1-2
326318659	<i>Acidovorax_avenae</i> _ATCC_19860_uid42497	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
222109284	<i>Acidovorax_ebreus</i> _TPSY_uid59233	CAS-II	2-1-9
432329386	<i>Aciduliprofundum_MAR08_339</i> _uid184407	CAS-I-B	2-1-4-3 + 3HD-5-7-x-6
289596068	<i>Aciduliprofundum_boonei</i> _T469_uid43333	Unknown	1

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Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
289596694	Aciduliprofundum_boonei_T469_uid43333	CAS-III-A	2-1-4-6-csx1-csx1-csm5g7-csm4g5-csm3g7-csm2SS-10
50085564	Acinetobacter_ADP1_uid61597	CAS-I-F	3f-x-8f-5f-7f-6f-1
213158189	Acinetobacter_baumannii_AB0057_uid59083	CAS-I-F	6f-7f-5f-8f-3f-1
215482695	Acinetobacter_baumannii_AB307_0294_uid59271	CAS-I-F	1-3f-8f-5f-7f-6f
169795149	Acinetobacter_baumannii_AYE_uid61637	CAS-I-F	1-3f-8f-5f-7f-6f
165975670	Actinobacillus_pleuropneumoniae_serovar_3_JL03_uid58891	CAS-I-F	3f-1-6f-7f-5f-8f
126207702	Actinobacillus_pleuropneumoniae_serovar_5b_L20_uid58789	CAS-I-F	3f-1-6f-7f-5f-8f
190149485	Actinobacillus_pleuropneumoniae_serovar_7_AP76_uid59231	CAS-I-F	3f-1-6f-7f-5f-8f
152978061	Actinobacillus_succinogenes_130Z_uid58247	CAS-II	9-1-2
152978958	Actinobacillus_succinogenes_130Z_uid58247	CAS-I-C	3-5-8c-7-4-x-x-x-1-2
407692092	Actinobacillus_suis_H91_0380_uid176363	CAS-II	9-1-2
118431380	Aeropyrum_pernix_K1_uid57757	CAS-I-A	6-8a2-3HD-3-5-7-csa5SS-R-4-2-1-4
365967615	Aggregatibacter_actinomycetemcomitans_ANH9381_uid80743	CAS-I-C	3-7-4 + x-1-2
261867834	Aggregatibacter_actinomycetemcomitans_D11S_1_uid41333	CAS-I-C	3-4-x-1-2
387120005	Aggregatibacter_actinomycetemcomitans_D7S_1_uid46989	CAS-I-C	2-1-x-4-7-8c-5-3
387120332	Aggregatibacter_actinomycetemcomitans_D7S_1_uid46989	CAS-I-F	8f-5f-7f-6f-3f-1
251792131	Aggregatibacter_aphrophilus_NJ8700_uid59407	CAS-I-C	3 + 3HD-x-5-8c-7-4-x-1-2
187736488	Akkermansia_muciniphila_ATCC_BAA_835_uid58985	CAS-II	2-1-9
319760941	Alicyclophilus_denitrificans_BC_uid49953	CAS-II	9-1-2
330822846	Alicyclophilus_denitrificans_K601_uid66307	CAS-II	9-1-2
258512610	Alicyclobacillus_acidocaldarius_DSM_446_uid59199	CAS-I-U	csb2-7-8x1-3-2-1-4
384136648	Alicyclobacillus_acidocaldarius_Tc_4_1_uid158681	CAS-I-U	csb2-7-8x1-3-2-1-4
114320110	Alkalilimnicola_ehrlichii_MLHE_1_uid58467	CAS-I-E	2-1-5-7-cse2SS-8e-3 + 3HD
150389454	Alkaliphilus_metalliredigens_QYMF_uid58171	CAS-I-C	3-5-8c-7-4-1-2
150389964	Alkaliphilus_metalliredigens_QYMF_uid58171	CAS-I-B	6-8 + 8a1-7-5-3-4-1-2
288940388	Allochrotaium_vinosum_DSM_180_uid46083	CAS-I-E	2-1-x-6e-5-7-cse2SS-x-8e-x-3 + 3HD
288947693	Allochrotaium_vinosum_DSM_180_uid46083	CAS-III-U	csx1-x-csx16-x-2-2-1
332142270	Alteromonas_macleodii_Deep_ecotype_uid58251	CAS-I-E	2-1-x-6e-5-7-cse2SS-8e-3
294101137	Aminobacterium_colombiense_DSM_12261_uid47083	CAS-I	2-1 + 4-5-7-x-3 + 3HD-6
260892568	Ammonifex_degensii_KC4_uid41053	CAS-I-B	1-2
260893609	Ammonifex_degensii_KC4_uid41053	CAS-I-D	4-4-2-1-x-x-x-x-csc2g7-x-x-3HD-3
414079085	Anabaena_90_uid179383	CAS-I-D	2-1-4-x-6-x-csc1g5-csc2g7-10d
440681127	Anabaena_cylindrica_PCC_7122_uid183339	CAS-I-D	2-1-4-6-x-csc1g5-csc2g7-10d-x-x-x-3
440685092	Anabaena_cylindrica_PCC_7122_uid183339	CAS-III-A	5g10-csm3g7-x-csm3g7-x-x-7-x-6-4-1-2
440685177	Anabaena_cylindrica_PCC_7122_uid183339	CAS-III-B	1 + x-1-x-2-x-x-x-x-10-cmr3g5-cmr4g7
440685178	Anabaena_cylindrica_PCC_7122_uid183339	CAS-III-B	1 + x-1-x-2-x-x-x-x-10-cmr3g5-cmr4g7
440685228	Anabaena_cylindrica_PCC_7122_uid183339	CAS-III-B	cmr1g7 + cmr6g7-x-cmr4g7-cmr3g5-10-x-2-1
75910374	Anabaena_variabilis_ATCC_29413_uid58043	CAS-I-D	10d-csc2g7-csc1g5-20G-6-4-1-2
392407912	Anaerobaculum_mobile_DSM_13181_uid168323	CAS-I-B	1-4-3 + x-5-x-x-8a1-6
320160633	Anaerolinea_thermophila_UNI_1_uid62245	CAS-I-C	2-1-4-7-8c-5-3 + 3HD
320161859	Anaerolinea_thermophila_UNI_1_uid62245	CAS-III-A	csx1-10-csm2SS-csm3g7-csm4g5-csm5g7-csx1-csx1-csx15-6-1-2

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
320162242	Anaerolinea_thermophila_UNI_1_uid62245	CAS-III-B	4-2-1-6-3 + 3HD-5-7-8a1-csx15-csx1 + x-cmr6g7-cmr5SS-cmr4g7
197121198	Anaeromyxobacter_K_uid58953	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
220915900	Anaeromyxobacter_dehalogenans_2CP_1_uid58989	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
212638614	Anoxybacillus_flavithermus_WK1_uid59135	CAS-I-B	6-8a1-7-5-3 + 3HD-4-1-2
15605875	Aquifex_aeolicus_VF5_uid57765	CAS-I	DinG-x-x-x-x-x-x-x-1-4-3-8a1-5-7-x-csx3-csm6-cmr6g7-cmr4g7
297572289	Arcanobacterium_haemolyticum_DSM_20595_uid49489	CAS-I-E	5-7-cse2SS-8e-6e-3 + 3HD-1-2
11499462	Archaeoglobus_fulgidus_DSM_4304_uid57717	CAS-I-A	cmr1g7-csa3-csa5SS-7-5-csa8a2-3-3HD-2-4-1-4
11500011	Archaeoglobus_fulgidus_DSM_4304_uid57717	CAS-I-B	2-1-4
327400671	Archaeoglobus_veneficus_SNP6_uid65269	CAS-I-A	3-5-7-8a1-6-2-1-4
384172708	Arcobacter_L_uid158135	CAS-I	2-1-4-3-5-7-8a1-x-6
296274322	Arcobacter_nitrofigilis_DSM_7299_uid49001	CAS-I-B	6-x-7-5-3 + 3HD-x-4-1-2
56477284	Aromatoleum_aromaticum_EbN1_uid58231	CAS-I-C	1-4-x-7-8c-5-3
288957740	Azospirillum_B510_uid46085	CAS-II	2-1-9
288957883	Azospirillum_B510_uid46085	CAS-III-A	csm3g7-csm3g7-csm3g7-6-2-1 + RT
288959585	Azospirillum_B510_uid46085	CAS-I-U	csb1-csb2-3-x-x-x-1 + 4-2
374998939	Azospirillum_lipoferum_4B_uid82343	CAS-III-B	2-1 + RT-x-csm3g7-x-x-x-cmr1g7-10-cmr3g5-cmr4g7-cmr5SS
374292449	Azospirillum_lipoferum_4B_uid82343	CAS-I-U	3-8x1-7-5b6-1 + 4-2
226945223	Azotobacter_vinelandii_DJ_uid57597	CAS-I-C	2-1-4-7-8c-5-3
56965354	Bacillus_clausii_KSM_K16_uid58237	CAS-I-C	2-1-4-7-8c-5-3
336115128	Bacillus_coagulans_2_6_uid68053	CAS-I-B	1-4-3 + 3HD-5-x-x-6
347752339	Bacillus_coagulans_36D1_uid54335	CAS-I-B	6-x-x-5-3 + 3HD-4-1-x-1-2
15612904	Bacillus_halodurans_C_125_uid57791	CAS-I-C	cmr5SS-cmr6g7-x-x-x-3-5-8c-7-4-1-2
375360192	Bacteroides_fragilis_638R_uid84217	CAS-II	1-9
60683388	Bacteroides_fragilis_NCTC_9343_uid57639	CAS-II	2-1-9
53713835	Bacteroides_fragilis_YCH46_uid58195	CAS-I-B	2-1-4-7-x-3 + 3HD-x-6
319902868	Bacteroides_helcogenes_P_36_108_uid62135	CAS-I-C	2-1-4-7-8c-5-3 + 3HD
390944705	Belliella_baltica_DSM_15883_uid168182	CAS-II	6-2-1-x-9
119026198	Bifidobacterium_adolescentis_ATCC_15703_uid58559	CAS-I-C	2-1-4-7-8c-8c-5-3 + 3HD
386867543	Bifidobacterium_animalis_ATCC_25527_uid162513	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3 + 3HD
219683006	Bifidobacterium_animalis_lactis_AD011_uid58911	CAS-I-U	3-csb1-1 + 4
387821196	Bifidobacterium_animalis_lactis_B420_uid163691	CAS-I-U	csb3-3-5b6-csb1-2-1 + 4
384189957	Bifidobacterium_animalis_lactis_BB_12_uid158871	CAS-I-U	csb3-3-5b6-csb1-x-1 + 4
384194324	Bifidobacterium_animalis_lactis_BLC1_uid158867	CAS-I-U	csb3-3-5b6-csb1-2-1 + 4
387822880	Bifidobacterium_animalis_lactis_Bi_07_uid163693	CAS-I-U	csb3-3-5b6-csb1-2-1 + 4
241191326	Bifidobacterium_animalis_lactis_Bl_04_uid59359	CAS-I-U	csb3-3-5b6-csb1-2-1 + 4
384192748	Bifidobacterium_animalis_lactis_CNCM_I_2494_uid158869	CAS-I-U	csb3-3-5b6-csb1-x-1 + 4
241196732	Bifidobacterium_animalis_lactis_DSM_10140_uid59357	CAS-I-U	csb3-3-5b6-csb1-2-1 + 4
384195888	Bifidobacterium_animalis_lactis_V9_uid158865	CAS-I-U	csb3-3-5b6-csb1-2-1 + 4
408501645	Bifidobacterium_asteroides_PRL2011_uid176921	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3 + 3HD
310286727	Bifidobacterium_bifidum_S17_uid59545	CAS-II-A	csn2-1-9
384197500	Bifidobacterium_breve_ACS_071_V_Sch8b_uid158863	CAS-I-C	2-1-4-7-8c-3 + 3HD
283456134	Bifidobacterium_dentium_Bd1_uid43091	CAS-II	2-1-9

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
283456492	<i>Bifidobacterium_dentium_Bd1_uid43091</i>	CAS-I-C	1-8c-5-3 + 3HD
312134081	<i>Bifidobacterium_longum_BBMN68_uid60163</i>	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1
384200945	<i>Bifidobacterium_longum_KACC_91563_uid158861</i>	CAS-II	9-1
296126271	<i>Brachyspira_murdochii_DSM_12563_uid48819</i>	CAS-I-B	6-8a1-7-5-3 + 3HD-4-1-2
377813512	<i>Burkholderia_YI23_uid81081</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
222528176	<i>Caldicellulosiruptor_bescii_DSM_6725_uid59201</i>	CAS-III-A	6-6-8a1-7-5-3 + 3HD-4-1-2-x-x-x-csx1-10-csm3g7-csm3g7-x-csm3g7
222530612	<i>Caldicellulosiruptor_bescii_DSM_6725_uid59201</i>	CAS-I-B	2-1-4-3 + 3HD-5-x-8a1
312128678	<i>Caldicellulosiruptor_hydrothermalis_108_uid60157</i>	CAS-I-B	2-1-4-3 + 3HD-5-7-8a1-6
312128727	<i>Caldicellulosiruptor_hydrothermalis_108_uid60157</i>	CAS-I-B	2-1-4-3 + 3HD-5-x-8a1-x-x-x-csm6
312794543	<i>Caldicellulosiruptor_kristjanssonii_177R1B_uid60393</i>	CAS-I-B	2-1-4-3 + 3HD-5-7-8a1-x-x-6
312794650	<i>Caldicellulosiruptor_kristjanssonii_177R1B_uid60393</i>	CAS-I-B	2-1-4-3 + 3HD-5-x-8
312794692	<i>Caldicellulosiruptor_kristjanssonii_177R1B_uid60393</i>	CAS-I-B	4-1-2-8a1-x-5-3-csx1
312623456	<i>Caldicellulosiruptor_kronotskyensis_2002_uid60491</i>	CAS-III-B	10-cmr3g5-cmr1g7-cmr4g7-cmr5SS-cmr6g7-1-4-3-5-7-x-8a1-6
312623502	<i>Caldicellulosiruptor_kronotskyensis_2002_uid60491</i>	CAS-I-B	2-1-4-3 + 3HD-5-x-8a1
344996859	<i>Caldicellulosiruptor_lactoaceticus_6A_uid60575</i>	CAS-I-D	2-1-4-6-3-csc1g5-csc2g7-10d
344997553	<i>Caldicellulosiruptor_lactoaceticus_6A_uid60575</i>	CAS-I-B	2-1-4-3 + 3HD-5-x-8-csm6
344997601	<i>Caldicellulosiruptor_lactoaceticus_6A_uid60575</i>	CAS-I-B	4-1-2-8a1-x-5-3-x-x-csm6-x-csm3g7
302870841	<i>Caldicellulosiruptor_obsidiansis_OB47_uid51501</i>	CAS-III-B	6-8a1-7-5-3 + 3HD-4-1-2-cmr6g7-cmr5SS-cmr4g7-cmr1g7-cmr3g5-10-csx1
302872861	<i>Caldicellulosiruptor_obsidiansis_OB47_uid51501</i>	CAS-III-A	csx1-x-csm5g7-csm4g5-csm3g7-csm2SS-10-x-x-4-1-2-8a1-x-5-3-x-x-x-csx1
312134146	<i>Caldicellulosiruptor_owensensis_OL_uid60165</i>	CAS-I-B	6-8a1-x-7-5-3-4-1-2-x-csx1
146295140	<i>Caldicellulosiruptor_saccharolyticus_DSM_8903_uid58289</i>	CAS-I	8a1-x-5-3HD-x-x-x-4-1-2-x-x-x-x-x-10-csm2SS-csm3g7
146295386	<i>Caldicellulosiruptor_saccharolyticus_DSM_8903_uid58289</i>	CAS-I-B	6-8a1-x-7-5-3-x-4-1
146297392	<i>Caldicellulosiruptor_saccharolyticus_DSM_8903_uid58289</i>	CAS-I-B	1-4-3-5-7-8a1-6
383762167	<i>Caldilinea_aerophila_DSM_14535__NBRC_104270_uid158165</i>	CAS-III-A	2-1-6-csx15-x-csx1-csm5g7-csm4g5-csm3g7-csm2SS-10-csx1
383762541	<i>Caldilinea_aerophila_DSM_14535__NBRC_104270_uid158165</i>	CAS-I-A	8a1-7-5-3 + 3HD-6-1-4
383787935	<i>Caldisericum_exile_AZM16c01_uid158173</i>	CAS-I-B	6-6-8a1-7-5-3-4-1-2
313673559	<i>Calditerrivibrio_nitroreducens_DSM_19672_uid60821</i>	CAS-III-A	2-Prim2-1-x-x-x-x-x-x-x-csx20-csm5g7
313673874	<i>Calditerrivibrio_nitroreducens_DSM_19672_uid60821</i>	CAS-I-B	6-x-7-5-3 + 3HD-x-1-2
428297029	<i>Calothrix_PCC_6303_uid183109</i>	CAS-III-B	1 + x-1-2-x-x-x-x-x-x-10-cmr4g7
428297030	<i>Calothrix_PCC_6303_uid183109</i>	CAS-III-B	1 + x-1-2-x-x-x-x-x-x-10-cmr4g7
428298414	<i>Calothrix_PCC_6303_uid183109</i>	CAS-I-D	3-x-x-x-10d-csc2g7-csc1g5-6-4-1-2
427716239	<i>Calothrix_PCC_7507_uid182930</i>	Unknown	1
427716556	<i>Calothrix_PCC_7507_uid182930</i>	CAS-I-D	2-1-4-6-csc1g5-csc2g7-10d-3
427717963	<i>Calothrix_PCC_7507_uid182930</i>	CAS-III-A	csm3g7-x-csm3g7-x-x-6-x-x-2-1-x-x-1

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
427717966	Calothrix_PCC_7507_uid182930	CAS-III-A	csm3g7-x-csm3g7-x-x-6-x-x-x-2-1-x-x-1
427718222	Calothrix_PCC_7507_uid182930	CAS-I-D	2-1-4-6-x-3-csc1g5-csc2g7-10d
157164052	Campylobacter_concisus_13826_uid58667	CAS-I-B	6-8-x-5-3-4-2-1
154174048	Campylobacter_curvus_525_92_uid58669	CAS-I-B	1-2-4-3-5-7-8-6
118475338	Campylobacter_fetus_82_40_uid58545	CAS-I-B	6-x-x-5-3 + 3HD-4-1-2
157415743	Campylobacter_jejuni_81116_uid58771	CAS-II	2-1-9
384448745	Campylobacter_jejuni_IA3902_uid159531	CAS-II	2-1-9
384442101	Campylobacter_jejuni_M1_uid159535	CAS-II	2-1-9-9
403056242	Campylobacter_jejuni_NCTC_11168_BN148_uid174152	CAS-II	2-1-9
218563120	Campylobacter_jejuni_NCTC_11168__ATCC_700819_uid57587	CAS-II	2-1-9
407942867	Campylobacter_jejuni_PT14_uid176499	CAS-II	2-1-9
57238545	Campylobacter_jejuni_RM1221_uid57899	CAS-II	2-1
384443889	Campylobacter_jejuni_S3_uid159533	CAS-II	2-1
153952137	Campylobacter_jejuni_doylei_269_97_uid58671	CAS-II	2-1-9
257093773	Candidatus_Accumulibacter_phosphatis_clade_IIA_UW_1_uid59207	CAS-III-B	2-1-2-x-x-6-csx1-cmr6g7-cmr5SS-cmr4g7-cmr3g5-10
257093834	Candidatus_Accumulibacter_phosphatis_clade_IIA_UW_1_uid59207	CAS-I-E	3-8e-cse2SS-7-5-6e-1-2
342732369	Candidatus_Arthromitus_SFB_mouse_Japan_uid71379	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
384455776	Candidatus_Arthromitus_SFB_mouse_Yit_uid159517	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
347542431	Candidatus_Arthromitus_SFB_rat_Yit_uid73425	CAS-I-C	3 + x-5-8c-7-4-1-2
347756303	Candidatus_Chloracidobacterium_thermophilum_B_uid73587	CAS-I-C	6-3-8c-7-5-1 + 4-2
347756766	Candidatus_Chloracidobacterium_thermophilum_B_uid73587	CAS-I-U	7-csb2-3-x-1 + 4-2
218961167	Candidatus_Cloacamonas_acidaminovorans_uid62959	CAS-III-A	csm5g7-csa3-csx1 + x-x-x-x-x-x-Prim2-x-1-2
218961577	Candidatus_Cloacamonas_acidaminovorans_uid62959	CAS-I-B	4-2-1-3HD-5-7-8-6
169831450	Candidatus_Desulforudis_audaxviator_MP104C_uid59067	CAS-I	4-4-2-1-3 + 3HD-5-7-x-x-6
169831957	Candidatus_Desulforudis_audaxviator_MP104C_uid59067	CAS-III-B	csm3g7-x-5g10-csm3g7-x-csx1-x-x-x-2-1-4-3 + 3HD-5-7-x-6-cmr6g7 + x-cmr5SS-cmr4g7-cmr1g7
170290046	Candidatus_Korarchaeum_cryptofilum_OPF8_uid58601	CAS-I-A	1-4-2-4-R-csa5SS-7-5-csa8a2-x-3
392375776	Candidatus_Methylomirabilis_oxyfera_uid161981	CAS-I-U	2-1 + 4-csb2-7-8x1-3
407464693	Candidatus_Nitrosopumilus_AR2_uid176130	Unknown	1
407462288	Candidatus_Nitrosopumilus_koreensis_AR1_uid176129	Unknown	1
408403000	Candidatus_Nitrososphaera_gargensis_Ga9_2_uid176707	CAS-I	4-1-2-4-x-x-3-5-7-x-6
302036890	Candidatus_Nitrospira_defluvii_uid51175	CAS-I-E	3-8e-cse2SS-7-5-6e-1-2
294086112	Candidatus_Puniceispirillum_marinum_IMCC1322_uid47081	CAS-II	9-1-2
340622235	Capnocytophaga_canimorsus_Cc5_uid70727	CAS-II	2-1-9
78043644	Carboxydotherrmus_hydrogenoformans_Z_2901_uid57821	CAS-I-B	csm3g7-csm2SS-10-x-x-x-x-x-x-2-1-4-3-5-x-8-6
256393069	Catenulispora_acidiphila_DSM_44928_uid59077	CAS-I-E	2-1-6e-5-7-cse2SS-3 + 3HD + 8e
332669040	Cellulomonas_fimi_ATCC_484_uid66779	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
192359205	Cellvibrio_japonicus_Ueda107_uid59139	CAS-I-C	2-1-4-7-8c-5-3 + 3HD
434386050	Chamaesiphon_PCC_6605_uid183005	CAS-I-C	2-1-4-7-8c-5-3
78188972	Chlorobium_chlorochromatii_CaD3_uid58375	CAS-I-C	2-1-4-7-8c-5-3 + 3HD
189345988	Chlorobium_limicola_DSM_245_uid58127	CAS-I-A	6-x-x-8a1-7-5-3-1-2-4
189346458	Chlorobium_limicola_DSM_245_uid58127	CAS-III-B	1-2-1 + x-cmr1g7-csm3g7-10-cmr4g7

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
78187160	<i>Chlorobium_luteolum</i> _DSM_273_uid58175	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
189501080	<i>Chlorobium_phaeobacteroides</i> _BS1_uid58131	CAS-I-E	3HD-x-3-8e-cse2SS-6e-7-5-1-2
119357239	<i>Chlorobium_phaeobacteroides</i> _DSM_266_uid58133	CAS-I-C	2-1-4-x-8c-5-3 + 3HD-3HD
119357846	<i>Chlorobium_phaeobacteroides</i> _DSM_266_uid58133	CAS-III-A	6-csx1-csm5g7-csm4g5-csm3g7-csm2SS-10-x-csx15-csx1-1 + RT-2
119357853	<i>Chlorobium_phaeobacteroides</i> _DSM_266_uid58133	CAS-III	2-1-6
145220110	<i>Chlorobium_phaeovibrioides</i> _DSM_265_uid58129	CAS-I-C	3HD-3 + 3HD-5-8c-7-4-1-2
21673956	<i>Chlorobium_tepidum</i> _TLS_uid57897	CAS-I-C	2-1-4-7-8c-5-3 + 3HD
21674788	<i>Chlorobium_tepidum</i> _TLS_uid57897	CAS-I-E	3-8e-cse2SS-6e-7-5-1-2
222523888	<i>Chloroflexus_Y_400_fl_uid59085</i>	CAS-III-A	2-1-6-x-x-csx1-csm5g7-csm4g5-csm3g7-csm2SS-10
222526429	<i>Chloroflexus_Y_400_fl_uid59085</i>	CAS-I-A	8a1-7-5-3-6-1-2-4
222526872	<i>Chloroflexus_Y_400_fl_uid59085</i>	CAS-III	6-csx1-x-csx1-x-x-1-2
219847509	<i>Chloroflexus_aggregans</i> _DSM_9485_uid58621	CAS-I-A	4-2-1-6-3-5-7-8a1
219850296	<i>Chloroflexus_aggregans</i> _DSM_9485_uid58621	CAS-III-A	10-csm2SS-csm3g7-csm4g5-csm5g7 + x-csx1-x-6-1-2
163846146	<i>Chloroflexus_aurantiacus_J_10_fl_uid57657</i>	CAS-III-A	2-1-6-x-csx1-csm5g7-csm4g5-csm3g7-csm2SS-10
163848495	<i>Chloroflexus_aurantiacus_J_10_fl_uid57657</i>	CAS-I-A	8a1-7-5-3-6-1-2-4
163848915	<i>Chloroflexus_aurantiacus_J_10_fl_uid57657</i>	CAS-III	6-csx1-x-csx1-x-x-1-2
193216046	<i>Chloroherpeton_thalassium</i> _ATCC_35110_uid59187	CAS-I	4-2-1-6
34496684	<i>Chromobacterium_violaceum</i> _ATCC_12472_uid58001	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
34497211	<i>Chromobacterium_violaceum</i> _ATCC_12472_uid58001	CAS-I-F	6f-7f-5f-8f-3f-1
92112367	<i>Chromohalobacter_salexigens</i> _DSM_3043_uid62921	CAS-I-E	3 + 3HD-x-x-8e-cse2SS-7-5-6e-1-2
428208003	<i>Chroococciopsis_thermalis</i> _PCC_7203_uid183002	CAS-I	2-1-4-6-3
283786691	<i>Citrobacter_rodentium</i> _ICC168_uid43089	CAS-I-E	3-8e-cse2SS-7-5-6e-1-2
376260588	<i>Clostridium_BNL1100_uid84307</i>	CAS-I-C	3-5-8c-7-4-1-2
407473145	<i>Clostridium_acidurici_9a_uid176126</i>	CAS-I-B	6-8a1-7-5-3-4-1-2
220928906	<i>Clostridium_cellulolyticum_H10_uid58709</i>	CAS-I-C	3 + 3HD-5-x-x-4-1-2
220930481	<i>Clostridium_cellulolyticum_H10_uid58709</i>	CAS-II	2-1-9
374296492	<i>Clostridium_clariflavum</i> _DSM_19732_uid82345	CAS-III-A	4-2-1-csx1-csx1-csm3g7-x-csm3g7-5g10-csm3g7-10-x-3 + 3HD
126700597	<i>Clostridium_difficile_630_uid57679</i>	CAS-I-B	2-1-4-3-5-7-8a1 + x-6
384362144	<i>Clostridium_difficile_B11_uid158363</i>	CAS-I-B	2-1-4-3-5-7-8a1 + x-6
260684497	<i>Clostridium_difficile_CD196_uid41017</i>	CAS-I-B	2-1-4-3-5-7-8a1 + x-6
260688155	<i>Clostridium_difficile_R20291_uid40921</i>	CAS-I-B	2-1-4-3-5-7-8a1 + x-6
153955370	<i>Clostridium_kluyveri</i> _DSM_555_uid58885	CAS-I-B	2-1-4-3 + 3HD-5-x-8b-6
219855788	<i>Clostridium_kluyveri</i> _NBRC_12016_uid59369	CAS-I-B	2-1-4-3 + 3HD-5-x-8b-6
118443013	<i>Clostridium_novyi_NT_uid58643</i>	CAS-I-B	2-1-4-3 + 3HD-5-x-8b-6
442805096	<i>Clostridium_stercorarium</i> _DSM_8532_uid186819	CAS-I-B	2-1-4-3 + 3HD-5-7-8a1-6
28210841	<i>Clostridium_tetani_E88_uid57683</i>	CAS-I-B	6-8-7-5-3-4-1
28211139	<i>Clostridium_tetani_E88_uid57683</i>	CAS-I-B	1-4-3-5-7-8b-6
125974782	<i>Clostridium_thermocellum</i> _ATCC_27405_uid57917	CAS-I-B	2-1-4-3 + 3HD-5-7-x-6
125975696	<i>Clostridium_thermocellum</i> _ATCC_27405_uid57917	CAS-III-A	csm3g7-5g10-csm3g7-x-x-csx1-x-csx1-1-2-4
385780234	<i>Clostridium_thermocellum</i> _DSM_1313_uid161989	CAS-I-B	2-1-4-3 + 3HD-5-7-x-6
328955026	<i>Coriobacterium_glomerans</i> _PW2_uid65787	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
328956316	<i>Coriobacterium glomerans</i> _PW2_uid65787	CAS-II-A	9-1-2-csn2
227832732	<i>Corynebacterium aurimucosum</i> _ATCC_700975_uid59409	CAS-I-E	3 + 3HD-8e-7-5-6e-1-2
375289764	<i>Corynebacterium diphtheriae</i> _241_uid83607	CAS-II	9-1-2
375291817	<i>Corynebacterium diphtheriae</i> _241_uid83607	CAS-I-E	5-7-cse2SS-8e-6e-3 + 3HD-1-2
376283540	<i>Corynebacterium diphtheriae</i> _31A_uid84309	CAS-II	9-1-2
376286567	<i>Corynebacterium diphtheriae</i> _BH8_uid84311	CAS-II	9-1-2
376289244	<i>Corynebacterium diphtheriae</i> _C7__beta__uid84313	CAS-II	9-1-2
376241738	<i>Corynebacterium diphtheriae</i> _CDCE_8392_uid84295	CAS-I-E	3 + 3HD + x-8e-cse2SS-7-5-6e-1-2
376244597	<i>Corynebacterium diphtheriae</i> _HC01_uid84297	CAS-II	9-1-2
376246654	<i>Corynebacterium diphtheriae</i> _HC01_uid84297	CAS-I-E	5-7-cse2SS-8e-6e-3 + 3HD-1-2
376292155	<i>Corynebacterium diphtheriae</i> _HC02_uid84317	CAS-II	9-1-2
376250212	<i>Corynebacterium diphtheriae</i> _HC03_uid84299	CAS-I-E	3 + 3HD + x-8e-cse2SS-7-5-6e-1-2
376247407	<i>Corynebacterium diphtheriae</i> _HC04_uid84301	CAS-I-E	3 + 3HD + x-8e-cse2SS-7-5-6e-1-2
375292015	<i>Corynebacterium diphtheriae</i> _INCA_402_uid83605	CAS-I-E	3 + 3HD + x-8e-cse2SS-7-5-6e-1-2
38232679	<i>Corynebacterium diphtheriae</i> _NCTC_13129_uid57691	CAS-II	9-1-2
38234755	<i>Corynebacterium diphtheriae</i> _NCTC_13129_uid57691	CAS-I-E	5-7-cse2SS-8e-6e-3-1-2
376253164	<i>Corynebacterium diphtheriae</i> _PW8_uid84303	CAS-I-E	3 + 3HD + x-8e-cse2SS-7-5-6e-1-2
376256052	<i>Corynebacterium diphtheriae</i> _VA01_uid84305	CAS-II	9-1-2
68535718	<i>Corynebacterium jeikeium</i> _K411_uid58399	CAS-I-E	1-6e-5-7-cse2SS-8e-3
389851004	<i>Corynebacterium pseudotuberculosis</i> _258_uid167260	CAS-I-E	DinG-x-x-x-6e-3 + 3HD + x-1-2
379715956	<i>Corynebacterium pseudotuberculosis</i> _316_uid89381	CAS-I-E	DinG-x-x-1-2
392401162	<i>Corynebacterium pseudotuberculosis</i> _Cp162_uid168258	CAS-I-E	DinG-x-x-1-2
336326623	<i>Corynebacterium resistens</i> _DSM_45100_uid50555	CAS-I-E	1-6e-5-7-cse2SS-8e-3 + 3HD
397652782	<i>Corynebacterium ulcerans</i> _0102_uid169879	CAS-I-E	2-1-3 + 3HD-6e-8e-cse2SS-7-5
397652857	<i>Corynebacterium ulcerans</i> _0102_uid169879	CAS-I-U	2-1 + 4-csb3-3-x-csb1
384514575	<i>Corynebacterium ulcerans</i> _809_uid159659	CAS-I-E	2-1-3-6e-8e-cse2SS-7-5
384514652	<i>Corynebacterium ulcerans</i> _809_uid159659	CAS-I-U	2-1 + 4-csb3-3-x-csb1
337289649	<i>Corynebacterium ulcerans</i> _BR_AD22_uid68291	CAS-I-E	2-1-3 + 3HD-6e-8e-cse2SS-7-5
337289723	<i>Corynebacterium ulcerans</i> _BR_AD22_uid68291	CAS-I-U	2-1 + 4-csb3-3-x-csb1
172041644	<i>Corynebacterium urealyticum</i> _DSM_7109_uid61639	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
212213313	<i>Coxiella burnetii</i> _CbuG_Q212_uid58893	CAS-I-F	1-5f-7f-6f
154707248	<i>Coxiella burnetii</i> _Dugway_SJ108_111_uid58629	CAS-I-F	1-8f-5f-7f-6f
209364215	<i>Coxiella burnetii</i> _Dugway_SJ108_111_uid58629	CAS-I-F	1-8f-5f-7f-6f
428304235	<i>Crinalium epipsammum</i> _PCC_9333_uid183113	Unknown	1-2
156934981	<i>Cronobacter sakazakii</i> _ATCC_BAA_894_uid58145	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
389841918	<i>Cronobacter sakazakii</i> _ES15_uid167045	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
260596842	<i>Cronobacter turicensis</i> _z3032_uid40821	CAS-I-E	3-8e-cse2SS-7-5-6e-1-2
428769331	<i>Cyanobacterium</i> _PCC_10605_uid183340	Unknown	2-1
428770999	<i>Cyanobacterium</i> _PCC_10605_uid183340	CAS-I	3-6-x-4-x-1-2
428771810	<i>Cyanobacterium</i> _PCC_10605_uid183340	CAS-III-B	cmr4g7-x-x-x-cmr6g7-csm6-x-x-x-x-1-2
428772907	<i>Cyanobacterium stanieri</i> _PCC_7202_uid183337	CAS-III-B	2-1-x-x-x-x-10-cmr3g5-cmr4g7
428774573	<i>Cyanobacterium stanieri</i> _PCC_7202_uid183337	CAS-I-C	2-1 + 4-x-x-6-3 + 3HD-x-7-5
172035264	<i>Cyanothece</i> _ATCC_51142_uid59013	CAS-III-B	2-1-x-x-10-x-cmr3g5-csm6-cmr4g7-x-cmr6g7
172036113	<i>Cyanothece</i> _ATCC_51142_uid59013	CAS-I-C	6-3-8c + 8c2-7-5-1 + 4-2
218438692	<i>Cyanothece</i> _PCC_7424_uid59025	CAS-I-D	3-10d-csc2g7-csc1g5-6-4-1-2
218439403	<i>Cyanothece</i> _PCC_7424_uid59025	CAS-I-E	DinG + x-x-3 + 3HD-8e-cse2SS-7-5-6e-1-2

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
218442585	Cyanothece_PCC_7424_uid59025	CAS-I-C	2-1 + 4-x-5-7-8c + 8c2-3 + 3HD-6
218442809	Cyanothece_PCC_7424_uid59025	CAS-III-A	csm6-x-x-RT-1-2
219883136	Cyanothece_PCC_7425_uid59435	CAS-III-B	10-cmr3g5-cmr4g7-x-cmr6g7-x-x-x-x-1-2
220907870	Cyanothece_PCC_7425_uid59435	CAS-I-D	3-10d-csc2g7-csc1g5-6-4-1-2
220909452	Cyanothece_PCC_7425_uid59435	CAS-I-E	2-1-6e-5-7-cse2S5-8e-x-3 + 3HD
220910738	Cyanothece_PCC_7425_uid59435	CAS-III-A	2-1-x-x-x-x-x-csm3g7-x-x-6
307591969	Cyanothece_PCC_7822_uid52547	CAS-I-D	cmr4g7-x-cmr6g7-x-x-x-2-1-4-6-csc1g5-csc2g7-10d-3
307592260	Cyanothece_PCC_7822_uid52547	Unknown	2-1
307592471	Cyanothece_PCC_7822_uid52547	CAS-III-B	cmr1g7 + cmr6g7-x-cmr4g7-cmr3g5-10-x-x-x-x-2-1
307591462	Cyanothece_PCC_7822_uid52547	CAS-III-B	1 + x-2-x-x-x-x-x-10-cmr3g5-cmr4g7
218245380	Cyanothece_PCC_8801_uid59027	CAS-I-D	2-1-4-6-csc1g5-csc2g7-10d-3
257058416	Cyanothece_PCC_8802_uid59143	CAS-I-D	2-1-4-6-csc1g5-csc2g7-10d-3
434407100	Cylindrospermum_stagnale_PCC_7417_uid183111	CAS-I-D	10d-csc2g7-csc1g5-x-6-4-1-x-2
291278961	Deferribacter_desulfuricans_SSM1_uid46653	CAS-I	3-x-x-5-x-x-8a1-6-2-1-4
73749217	Dehalococcoides_CBDB1_uid58413	CAS-I-E	1-6e-5-7-cse2S5-8e-3 + 3HD-x-x-x-4
289433192	Dehalococcoides_GT_uid42115	CAS-I-E	2-1-6e-5-7-cse2S5-8e-3 + 3HD-x-x-x-4
94972104	Deinococcus_geothermalis_DSM_11300_uid58275	CAS-I-E	2-1-x-6e-5-7-cse2S5-8e-3 + 3HD
94984342	Deinococcus_geothermalis_DSM_11300_uid58275	CAS-I-C	2-1-4-7-8c-5-3 + 3HD
386854797	Deinococcus_gobiensis_I_0_uid162509	CAS-I-A	4-2-1-5-7-8a2-3-6
386855142	Deinococcus_gobiensis_I_0_uid162509	CAS-I-E	2-1-6e-5-7-cse2S5-8e-x-x-x-3 + 3HD
325284857	Deinococcus_proteolyticus_MRP_uid63399	CAS-I-E	3 + 3HD-8e-x-x-cse2S5-x-5-6e-1-2
333916900	Delftia_Cs1_4_uid67319	CAS-I-F	6f-7f-5f-8f-x-x-3f-1
160896657	Delftia_acidovorans_SPH_1_uid58703	CAS-I-F	1-x-x-8f-5f-7f-6f
302343095	Desulfarculus_baarsii_DSM_2075_uid51371	CAS-I-C	3-5-8c-7-4-1-2
302343124	Desulfarculus_baarsii_DSM_2075_uid51371	CAS-III-A	csm3g7-csm3g7-csm3g7-10-1 + RT-2-6
218782762	Desulfatibacillum_alkenivorans_AK_01_uid58913	CAS-I-E	3 + 3HD-8e-cse2S5-6e-7-5-1-2
219668223	Desulfotobacterium_hafniense_DCB_2_uid57749	CAS-I-C	5-x-x-3-4-1-2
219669947	Desulfotobacterium_hafniense_DCB_2_uid57749	CAS-I-B	2-1-4-3 + 3HD-x-x-5-x-x-x-x-6
89895510	Desulfotobacterium_hafniense_Y51_uid58605	CAS-I-B	2-1-4-3 + 3HD-x-x-x-5
328951839	Desulfobacca_acetoxidans_DSM_11109_uid65785	CAS-I-A	4-x-5-7-csa5S5-3HD-3-2-1
328953000	Desulfobacca_acetoxidans_DSM_11109_uid65785	CAS-III	6-x-x-x-x-RT-x-x-1-2
328953422	Desulfobacca_acetoxidans_DSM_11109_uid65785	CAS-III-A	csm5g7-csm6-x-csx20-csx1-x-x-x-Prim2 + x-x-1-2
328954440	Desulfobacca_acetoxidans_DSM_11109_uid65785	CAS-III-A	1 + RT-x-x-csm3g7-x-csm6-csm3g7-x-csm3g7-csm3g7
224367660	Desulfobacterium_autotrophicum_HRM2_uid59061	CAS-I-B	1-2-x-8-x-7-5-3 + 3HD-4
408418420	Desulfobacula_toluolica_Tol2_uid175777	CAS-I-B	3-x-7-6-4-1-2
408420400	Desulfobacula_toluolica_Tol2_uid175777	CAS-I-B	1-2-x-8-x-5-3 + 3HD-4
320353599	Desulfobulbus_propionicus_DSM_2032_uid62265	CAS-I-C	3 + 3HD-5-8c-7-x-4-1-2
158522999	Desulfococcus_oleovorans_Hxd3_uid58777	CAS-I-E	3-8e-cse2S5-7-5-6e-1-2
392409180	Desulfomonile_tiedjei_DSM_6799_uid168320	CAS-I-C	3 + 3HD-5-8c-7-4-1-2

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
392412844	Desulfomonile_tiedjei_DSM_6799_uid168320	CAS-I-E	3-8e-cse2SS-7-5-6e-1-2
392424830	Desulfosporosinus_acidiphilus_SJ4_uid156759	CAS-I-C	3 + 3HD-5-8c-7-1-2
374994461	Desulfosporosinus_orientis_DSM_765_uid82939	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
258514214	Desulfotomaculum_acetoxidans_DSM_771_uid59109	CAS-I-B	6-8a1-7-5-3-4-1-2
258516129	Desulfotomaculum_acetoxidans_DSM_771_uid59109	CAS-III-B	csx1-6-2-1 + 4-cmr6g7-cmr5SS-cmr4g7-cmr3g5-10-cmr1g7 + x-csx1
258516154	Desulfotomaculum_acetoxidans_DSM_771_uid59109	CAS-I-B	2-1-4-3 + 3HD-5-x-x-6
258516757	Desulfotomaculum_acetoxidans_DSM_771_uid59109	CAS-I-C	2-1-4-7-8c-5-3 + 3HD
258517354	Desulfotomaculum_acetoxidans_DSM_771_uid59109	CAS-I-B	2-1-4-3-5-x-8-6
333922763	Desulfotomaculum_carboxydivorans_CO_1_SRB_uid67317	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
333922948	Desulfotomaculum_carboxydivorans_CO_1_SRB_uid67317	CAS-I-A	6-8a1-7-5-3 + 3HD-1-2-4-4
333977937	Desulfotomaculum_kuznetsovii_DSM_6115_uid67357	CAS-III-B	cmr1g7-cmr4g7-cmr5SS-cmr6g7-6-8a1-x-5-3-4-1-2
333978075	Desulfotomaculum_kuznetsovii_DSM_6115_uid67357	CAS-I-B	6-8a1-7-5-3 + 3HD-4-1-2
333980328	Desulfotomaculum_kuznetsovii_DSM_6115_uid67357	CAS-I	4-4-2-1-x-x-7-x-3 + 3HD-x-6
134298414	Desulfotomaculum_reducens_MI_1_uid58277	CAS-I-B	6-8-x-5-3 + 3HD-4-1-2
134298871	Desulfotomaculum_reducens_MI_1_uid58277	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
134299482	Desulfotomaculum_reducens_MI_1_uid58277	CAS-III-A	1 + 4-2-10-csm2SS-csm3g7-csm4g5-csx1-6
334339986	Desulfotomaculum_ruminis_DSM_2154_uid67507	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
334341514	Desulfotomaculum_ruminis_DSM_2154_uid67507	CAS-I-B	2-1-4-3 + 3HD-5-x-8-6
220904201	Desulfovibrio_desulfuricans_ATCC_27774_uid59213	CAS-I-E	3 + 3HD-8e-cse2SS-6e-7-5-1-2
376297899	Desulfovibrio_desulfuricans_ND132_uid63159	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
436839745	Desulfovibrio_hydrothermalis_AM13_DSM_14728_uid184831	CAS-III-B	1 + RT-2-x-x-cmr6g7-cmr5SS-cmr4g7-cmr3g5-10-cmr1g7
436842170	Desulfovibrio_hydrothermalis_AM13_DSM_14728_uid184831	CAS-I-F	6f-7f-5f-8f-3f-1
239906078	Desulfovibrio_magneticus_RS_1_uid59309	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
239908820	Desulfovibrio_magneticus_RS_1_uid59309	CAS-I-F	6f-7f-5f-8f-x-3f-1
120586827	Desulfovibrio_vulgaris_DP4_uid58679	CAS-I-C	2-1-4-7-8c-5-3 + 3HD
46562259	Desulfovibrio_vulgaris_Hildenborough_uid57645	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
387134024	Desulfovibrio_vulgaris_RCH1_uid161961	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
218887066	Desulfovibrio_vulgaris_Miyazaki_F_uid59089	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
317051111	Desulfurispirillum_indicum_S5_uid45897	CAS-I-F	6f-7f-5f-x-x-8f-x-x-1
317051217	Desulfurispirillum_indicum_S5_uid45897	CAS-III-A	10-csm2SS-csm3g7-csm4g5-csm5g7-x-x-csx1-csx20-x-1-2-x-2
297569499	Desulfurivibrio_alkaliphilus_AHT2_uid49487	CAS-I-F	6f-7f-5f-8f-3f-1
390938732	Desulfurococcus_fermentans_DSM_16532_uid75119	CAS-I-A	R-4-1-2-4-R-x-7-5-x-3-x-6
218884093	Desulfurococcus_kamchatkensis_1221n_uid59133	CAS-I-A	6-3HD-3-csaXg8-5-7-csa5SS-R-4-2-1-4-R-x-cmr3g5-10-cmr6g7-cmr1g7-cmr5SS-cmr4g7-csm6
320101181	Desulfurococcus_mucosus_DSM_2162_uid62227	CAS-I-A	1-4-2-4-x-7-5-8a2-3-x-R
307130364	Dickeya_dadantii_3937_uid52537	CAS-I-C	2-1-4-7-8c-5-3
307132487	Dickeya_dadantii_3937_uid52537	CAS-I-F	6f-7f-5f-8f-3f-1
271498931	Dickeya_dadantii_Ech586_uid42519	CAS-I-E	3-x-8e-cse2SS-7-5-6e-1-2
271501957	Dickeya_dadantii_Ech586_uid42519	CAS-I-F	6f-7f-5f-8f-3f-1
242238186	Dickeya_dadantii_Ech703_uid59363	CAS-I-F	6f-7f-5f-8f-3f-1
242240984	Dickeya_dadantii_Ech703_uid59363	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
251788335	<i>Dickeya_zeae_Ech1591_uid59297</i>	CAS-I-F	1-3f-8f-5f-7f-6f
251788543	<i>Dickeya_zeae_Ech1591_uid59297</i>	CAS-I-E	2-1-5-7-6e-cse2SS-8e-3 + 3HD
206900365	<i>Dictyoglomus_thermophilum_H_6_12_uid59439</i>	CAS-I-B	2-1-4-3 + 3HD-5-7-8a1-6
206900175	<i>Dictyoglomus_thermophilum_H_6_12_uid59439</i>	CAS-I	6-8a1-x-5-3 + 3HD-4-1-2
217967015	<i>Dictyoglomus_turgidum_DSM_6724_uid59177</i>	CAS-I	csm4g5-csm3g7-csm2SS-10-csx3-x-x-x-x-2-1-4-3-5-x-8-6
159042957	<i>Dinoroseobacter_shibae_DFL_12_uid58707</i>	CAS-II	9-1-2
159045760	<i>Dinoroseobacter_shibae_DFL_12_uid58707</i>	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
339445982	<i>Eggerthella_YY7918_uid68707</i>	CAS-II-A	csn2-2-1-9
257791721	<i>Eggerthella_lenta_DSM_2243_uid59079</i>	CAS-I-C	2-1-4-7-8c-5-3 + 3HD
187250661	<i>Elusimicrobium_minutum_Pei191_uid58949</i>	CAS-II	9-1-2
146311059	<i>Enterobacter_638_uid58727</i>	CAS-I-F	1-3f-8f-5f-7f-6f
397699067	<i>Enterococcus_faecalis_D32_uid171261</i>	CAS-II-A	9-1-2-csn2
384512369	<i>Enterococcus_faecalis_OG1RF_uid54927</i>	CAS-II-A	9-1-2-csn2
392988475	<i>Enterococcus_hirae_ATCC_9790_uid70619</i>	CAS-II-A	9-1-2-csn2
385785743	<i>Erwinia_Ejp617_uid159955</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3 + 3HD
292898489	<i>Erwinia_amylovora_ATCC_49946_uid46943</i>	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
292489282	<i>Erwinia_amylovora_CFBP1430_uid46839</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3 + 3HD
387870239	<i>Erwinia_pyrifoliae_DSM_12163_uid159693</i>	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
387870253	<i>Erwinia_pyrifoliae_DSM_12163_uid159693</i>	CAS-I-F	1-3f-x-x-x-8f-5f-7f-6f
259907486	<i>Erwinia_pyrifoliae_Ep1_96_uid40659</i>	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
259907498	<i>Erwinia_pyrifoliae_Ep1_96_uid40659</i>	CAS-I-F	1-3f-x-x-8f-5f-7f-6f
188532985	<i>Erwinia_tasmaniensis_Et1_99_uid59029</i>	CAS-I-F	1-3f-x-x-8f-5f-7f-6f
387890346	<i>Escherichia_blattae_DSM_4481_uid165043</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-x-x-3
387608391	<i>Escherichia_coli_042_uid161985</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
218696353	<i>Escherichia_coli_55989_uid59383</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
117623062	<i>Escherichia_coli_APEC_O1_uid58623</i>	CAS-I-F	1-3f-8f-5f-7f-6f
443618784	<i>Escherichia_coli_APEC_O78_uid187277</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3-3HD
170018999	<i>Escherichia_coli_ATCC_8739_uid58783</i>	CAS-I-E	3-8e-cse2SS-7-5-6e-1-2
238901892	<i>Escherichia_coli_BW2952_uid59391</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
386594505	<i>Escherichia_coli_DH1_uid161951</i>	CAS-I-E	3-8e-cse2SS-7-5-6e-1-2
387622438	<i>Escherichia_coli_DH1_uid162051</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
157155405	<i>Escherichia_coli_E24377A_uid58395</i>	CAS-I-E	1-6e-5-7-cse2SS-8e-3
218688665	<i>Escherichia_coli_ED1a_uid59379</i>	CAS-I-F	1-3f-8f-5f-7f-6f
387613378	<i>Escherichia_coli_ETEC_H10407_uid161993</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e
157162204	<i>Escherichia_coli_HS_uid58393</i>	CAS-I-E	1-6e-5-7-cse2SS-8e-x-3
218555302	<i>Escherichia_coli_IAI1_uid59377</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
386598616	<i>Escherichia_coli_IHE3034_uid162007</i>	CAS-I-F	1-3f-8f-7f-6f
386700332	<i>Escherichia_coli_KO11FL_uid162099</i>	CAS-I-E	3-8e-cse2SS-7-5-6e-1-2
378711820	<i>Escherichia_coli_KO11FL_uid52593</i>	CAS-I-E	3-8e-cse2SS-7-5-6e-1-2
170082330	<i>Escherichia_coli_K_12_substr_DH10B_uid58979</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
16130662	<i>Escherichia_coli_K_12_substr_MG1655_uid57779</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
388478772	<i>Escherichia_coli_K_12_substr_W3110_uid161931</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
222155607	<i>Escherichia_coli_LF82_uid161965</i>	CAS-I-F	1-3f-8f-5f-7f-6f
260845402	<i>Escherichia_coli_O103_H2_12009_uid41013</i>	CAS-I-E	2-1-6e-5-cse2SS-8e-3
410481280	<i>Escherichia_coli_O104_H4_2009EL_2050_uid175905</i>	CAS-I-E	3-8e-cse2SS-7-5-6e-1-2
407470625	<i>Escherichia_coli_O104_H4_2009EL_2071_uid176128</i>	CAS-I-E	3-8e-cse2SS-7-5-6e-1-2
407480714	<i>Escherichia_coli_O104_H4_2011C_3493_uid176127</i>	CAS-I-E	3-8e-cse2SS-7-5-6e-1-2
260869434	<i>Escherichia_coli_O111_H_11128_uid41023</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
209397933	<i>Escherichia_coli_O157_H7_EC4115_uid59091</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
15803272	<i>Escherichia_coli_O157_H7_EDL933_uid57831</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
15832863	<i>Escherichia_coli_O157_H7_Sakai_uid57781</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
254794695	<i>Escherichia_coli_O157_H7_TW14359_uid59235</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
260856866	<i>Escherichia_coli_O26_H11_11368_uid41021</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e
291284082	<i>Escherichia_coli_O55_H7_CB9615_uid46655</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
387508107	<i>Escherichia_coli_O55_H7_RM12579_uid162153</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
387616140	<i>Escherichia_coli_O83_H1_NRG_857C_uid161987</i>	CAS-I-F	1-3f-8f-5f-7f-6f
218557787	<i>Escherichia_coli_S88_uid62979</i>	CAS-I-F	1-3f-8f-7f-6f
209920201	<i>Escherichia_coli_SE11_uid59425</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
170681830	<i>Escherichia_coli_SMS_3_5_uid58919</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
386605207	<i>Escherichia_coli_UM146_uid162043</i>	CAS-I-F	6f-7f-8f-3f-1
386615473	<i>Escherichia_coli_UMNK88_uid161991</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-x-3
91209921	<i>Escherichia_coli_UTI89_uid58541</i>	CAS-I-F	1-3f-8f-5f-5f-7f-6f
386610119	<i>Escherichia_coli_W_uid162011</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
386710611	<i>Escherichia_coli_W_uid162101</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
387883934	<i>Escherichia_coli_Xuzhou21_uid163995</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
218547725	<i>Escherichia_fergusonii_ATCC_35469_uid59375</i>	CAS-I-E	3-8e-cse2SS-7-5-6e-1-2
317131634	<i>Ethanoligenens_harbinense_YUAN_3_uid46255</i>	CAS-I-C	2-1-4-7-8c-5-3 + 3HD
310825770	<i>Eubacterium_limosum_KIST612_uid59777</i>	CAS-I-B	6-8b-x-5-3 + 3HD-4-1-2
238924076	<i>Eubacterium_rectale_ATCC_33656_uid59169</i>	CAS-II	9-1-2
238924839	<i>Eubacterium_rectale_ATCC_33656_uid59169</i>	CAS-I-C	2-1-4-7-8c-5-x-x-3
172056196	<i>Exiguobacterium_sibiricum_255_15_uid58053</i>	CAS-I-C	3-5-8c-7-4-1-2
288932203	<i>Ferroglobus_placidus_DSM_10642_uid40863</i>	CAS-III-B	1-4-2-x-x-cmr4g7-10-x-x-cmr4g7-cmr1g7
385805115	<i>Fervidococcus_fontis_Kam940_uid162201</i>	CAS-I-A	6-R-3HD-3-8a2-5-7-x-x-4-1-2-4-R-R-x-x-csm6-cmr6g7-cmr1g7-cmr5SS
154249624	<i>Fervidobacterium_nodosum_Rt17_B1_uid58625</i>	CAS-I-B	6-8a1-x-5-3-4-1-2
154250065	<i>Fervidobacterium_nodosum_Rt17_B1_uid58625</i>	CAS-III-A	csx1-x-1-10-csm2SS-csm3g7-csm4g5-csm5g7-x-6-x-2-2
154250301	<i>Fervidobacterium_nodosum_Rt17_B1_uid58625</i>	Unknown	1
383787172	<i>Fervidobacterium_pennivorans_DSM_9078_uid78143</i>	CAS-III-A	2-2-x-6-x-csm5g7-csm4g5-csm3g7-csm2SS-10-1
385789536	<i>Fibrobacter_succinogenes_S85_uid161919</i>	CAS-II	9-1-2
385790829	<i>Fibrobacter_succinogenes_S85_uid161919</i>	CAS-III-A	1-2-x-csx1-10-csm3g7-csm3g7-x-csm3g7
261414554	<i>Fibrobacter_succinogenes_S85_uid41169</i>	CAS-II	9-1-2
261415948	<i>Fibrobacter_succinogenes_S85_uid41169</i>	CAS-III-A	1-2-x-x-csx1-10-csm3g7-x-csm3g7-csx20
374307349	<i>Filifactor_alocis_ATCC_35896_uid46625</i>	CAS-I-C	3-5-8c-7-4-1-2
374307737	<i>Filifactor_alocis_ATCC_35896_uid46625</i>	CAS-II-A	csn2-2-1-9
169823756	<i>Fingoldia_magna_ATCC_29328_uid58867</i>	CAS-II-A	csa3-x-x-x-x-9-1-2-csn2-PDEDXK
365959405	<i>Flavobacterium_columnare_ATCC_49512_uid80731</i>	CAS-II	9-x-x-x-1
150025576	<i>Flavobacterium_psychrophilum_JIP02_86_uid61627</i>	CAS-II	9-1-2
392395717	<i>Flexibacter_litoralis_DSM_6794_uid168257</i>	Unknown	2-x-1
336323211	<i>Flexistipes_sinusarabici_DSM_4947_uid68147</i>	CAS-I-B	2-1-4-3 + 3HD-5-7-8a1-6
336323599	<i>Flexistipes_sinusarabici_DSM_4947_uid68147</i>	CAS-III-A	csm5g7-csm4g5-csm3g7-csm2SS-x-csx1-6-x-2-1-Prim2

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
336323857	<i>Flexistipes_sinusarabici_DSM_4947_uid68147</i>	CAS-III-B	cmr6g7-cmr5SS-cmr4g7-cmr3g5-10-cmr1g7-csx1-6-x-2-1-Prim2
327405118	<i>Fluviicola_taffensis_DSM_16823_uid65271</i>	CAS-II	2-1-x-x-9
385793361	<i>Francisella_cf__novicida_Fx1_uid162105</i>	Unknown	20G-x-x-x-x-csa3-2-1-4
118497353	<i>Francisella_novicida_U112_uid58499</i>	CAS-II-B	9-1-2-4
118497969	<i>Francisella_novicida_U112_uid58499</i>	Unknown	20G-x-x-x-x-csa3-2-1-4
167627880	<i>Francisella_philomiragia_ATCC_25017_uid59105</i>	Unknown	4-1-2
86738746	<i>Frankia_Ccl3_uid58397</i>	CAS-I-E	3-8e-cse2SS-7-5-6e-1-2
86742032	<i>Frankia_Ccl3_uid58397</i>	CAS-I-C	3-5-8c-7-4-1-2
111219951	<i>Frankia_alni_ACN14a_uid58695</i>	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
111224947	<i>Frankia_alni_ACN14a_uid58695</i>	CAS-I-B	6-x-7-3 + 5-4-1-2
19704512	<i>Fusobacterium_nucleatum_ATCC_25586_uid57885</i>	CAS-I-B	2-1-4-3-x-7-8-6
332290352	<i>Gallibacterium_anatis_UMN179_uid66567</i>	CAS-III-A	csm3g7-csm4g5-x-x-csm3g7-6-csx16-csx1-csx1-2-1-2
283783235	<i>Gardnerella_vaginalis_409_05_uid43211</i>	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
311114560	<i>Gardnerella_vaginalis_ATCC_14019_uid55487</i>	CAS-I-E	3 + 3HD-x-8e-cse2SS-7-5-6e-1-2
297529736	<i>Geobacillus_C56_T3_uid49467</i>	CAS-I-B	6-8a1-7-5-3 + 3HD-4-1-2
239825879	<i>Geobacillus_WCH70_uid59045</i>	CAS-III-B	8-x-5-3-4-1-2-6-csm6-csx1-cmr1g7-10-cmr3g5-cmr4g7-cmr5SS-cmr6g7
319765457	<i>Geobacillus_Y412MC52_uid55381</i>	CAS-III-B	8-x-5-3 + 3HD-4-1-2-6-csm6-csx1-cmr1g7-10-cmr3g5-cmr4g7-cmr5SS-cmr6g7
261418641	<i>Geobacillus_Y412MC61_uid41171</i>	CAS-III-B	8-x-5-3 + 3HD-4-1-2-6-csm6-csx1-cmr1g7-10-cmr3g5-cmr4g7-cmr5SS-cmr6g7
312110562	<i>Geobacillus_Y4_1MC1_uid55779</i>	CAS-I-B	csm6-x-6-8a1-7-5-3-4-1-2
312112401	<i>Geobacillus_Y4_1MC1_uid55779</i>	CAS-I-B	6-2-1-4-3 + 3HD-5-x-8
336235012	<i>Geobacillus_thermoglucosidasius_C56_YS93_uid48129</i>	CAS-I-B	6-8a1 + x-7-5-3-4-1-2
336236852	<i>Geobacillus_thermoglucosidasius_C56_YS93_uid48129</i>	CAS-I-B	6-2-1-4-3 + 3HD-5-x-8
222056492	<i>Geobacter_FRC_32_uid58543</i>	CAS-I-C	2-1-4-x-7-8c-5-3
189425531	<i>Geobacter_lovleyi_SZ_uid58713</i>	CAS-I-E	2-x-1-6e-5-7-cse2SS-8e-3
404495934	<i>Geobacter_metallireducens_GS_15_uid57731</i>	CAS-I-C	3-5-8c-7-x-x-4-x-1-2
409911919	<i>Geobacter_sulfurreducens_KN400_uid161977</i>	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-x-x-1-2
39995168	<i>Geobacter_sulfurreducens_PCA_uid57743</i>	CAS-I-U	3-8-csb1-csb2-x-x-1 + 4-2
39996494	<i>Geobacter_sulfurreducens_PCA_uid57743</i>	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-x-x-1-2
148262910	<i>Geobacter_uraniireducens_Rf4_uid58475</i>	CAS-I-E	3-8e-cse2SS-6e-7-5-x-x-x-1-x-2
434393783	<i>Gloeocapsa_PCC_7428_uid183112</i>	CAS-I	6-3 + 3HD-x-7-5-1 + 4-2
434395286	<i>Gloeocapsa_PCC_7428_uid183112</i>	CAS-I-D	3-10d-csc2g7-csc1g5-20G-6-4-1-2
209542526	<i>Gluconacetobacter_diazotrophicus_PAI_5_uid59075</i>	CAS-II	9-x-1-2
209542604	<i>Gluconacetobacter_diazotrophicus_PAI_5_uid59075</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3 + 3HD
209543797	<i>Gluconacetobacter_diazotrophicus_PAI_5_uid59075</i>	CAS-I-C	3-x-x-5-8c-7-4-1-2
162145897	<i>Gluconacetobacter_diazotrophicus_PAI_5_uid61587</i>	CAS-I-C	2-1-4-7-8c-5-x-x-3
162147908	<i>Gluconacetobacter_diazotrophicus_PAI_5_uid61587</i>	CAS-II	9-1-2
162147988	<i>Gluconacetobacter_diazotrophicus_PAI_5_uid61587</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3 + 3HD
347759998	<i>Gluconacetobacter_xylinus_NBRC_3288_uid46523</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3 + 3HD
414341117	<i>Gluconobacter_oxydans_H24_uid179202</i>	CAS-I-E	3 + 3HD-x-8e-cse2SS-7-5-6e-1-2
378719041	<i>Gordonia_polyisoprenivorans_VH2_uid86651</i>	CAS-I-U	2-1 + 4-csb2-csb1-8-3
114328039	<i>Granulibacter_bethesdensis_CGDNIH1_uid58661</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3 + 3HD

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
114328362	<i>Granulibacter_bethesdensis_CGDNIH1_uid58661</i>	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
345430423	<i>Haemophilus_parainfluenzae_T3T1_uid72801</i>	CAS-II	9-1-2
83645586	<i>Hahella_chejuensis_KCTC_2396_uid58483</i>	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
312143828	<i>Halanaerobium_hydrogeniformans_uid60191</i>	CAS-I-B	4-2-1-3 + 3HD-5-x-8
262198025	<i>Haliangium_ochraceum_DSM_14365_uid41425</i>	CAS-I-U	csb1-csb2-3-x-1 + 4-2
332662474	<i>Haliscomenobacter_hydrossis_DSM_1100_uid66777</i>	CAS-I	6-8a1-7-5-3 + 3HD-4-1-2
332668016	<i>Haliscomenobacter_hydrossis_DSM_1100_uid66777</i>	Unknown	RT-1-PDEDXK-2
332661941	<i>Haliscomenobacter_hydrossis_DSM_1100_uid66777</i>	CAS-III-B	2-1-x-RT-cmr6g7-x-cmr4g7-cmr3g5-10
344209644	<i>Haloarcula_hispanica_ATCC_33960_uid72475</i>	CAS-I-B	2-1-4-3 + 3HD-5-7-8b-6
55376278	<i>Haloarcula_marismortui_ATCC_43049_uid57719</i>	CAS-I-B	6-8-7-5-3-4-1-2
435853686	<i>Halobacteroides_halobius_DSM_5150_uid184862</i>	CAS-I	1-2-4-4-x-x-3 + 3HD-x-7-x-6
389849193	<i>Haloferax_mediterranei_ATCC_33500_uid167315</i>	CAS-I-B	6-8b-7-5-3 + 3HD-4-1-2
292653771	<i>Haloferax_volcanii_DS2_uid46845</i>	CAS-I-B	6-8b-7-5-3 + 3HD-4-1-2
257388877	<i>Halomicrobium_mukohataei_DSM_12286_uid59107</i>	CAS-I-B	6-8b-7-5-3 + 3HD-4-1-2
307543692	<i>Halomonas_elongata_DSM_2581_uid52781</i>	CAS-I-F	1-3f-8f-5f-7f
385802707	<i>Haloquadratum_walsbyi_C23_uid162019</i>	CAS-I-D	R-6-10d-csc2g7-csc1g5-3-4-1-2
385803535	<i>Haloquadratum_walsbyi_C23_uid162019</i>	CAS-I-B	6-8b-7-5-3 + 3HD-4-1-2
257052525	<i>Halorhabdus_utahensis_DSM_12940_uid59189</i>	CAS-I-B	2-1-4-3 + 3HD-5-7-8b-6
121997419	<i>Halorhodospira_halophila_SL1_uid58473</i>	CAS-III-B	1-2-1-2-csx1-csx16-csx1-cmr1g7-10-cmr3g5-cmr4g7-cmr5SS-cmr6g7
222481209	<i>Halorubrum_lacusprofundi_ATCC_49239_uid58807</i>	CAS-I-B	2-1-4-3 + 3HD-5-7-8b-6
222481446	<i>Halorubrum_lacusprofundi_ATCC_49239_uid58807</i>	CAS-I-D	6-10d-csc2g7-csc1g5-3-4-1-2
428775339	<i>Halothece_PCC_7418_uid183338</i>	CAS-I-D	csm6-csm3g7-x-csm3g7-x-csm3g7-x-6-4-1-2-csc1g5-csc2g7-10d-x-x-x-3
428775953	<i>Halothece_PCC_7418_uid183338</i>	CAS-III-B	1-2-x-x-10-cmr3g5-cmr4g7-x-cmr1g7 + cmr6g7-csm6-csx1
220932357	<i>Halothermothrix_oreni_H_168_uid58585</i>	CAS-III-B	csm6-cmr6g7 + x-cmr5SS-cmr4g7-cmr3g5-10-cmr1g7-x-4-2-1-3-5-x-8
261855429	<i>Halothiobacillus_neapolitanus_c2_uid41317</i>	CAS-I-C	2-1-x-x-4-7-8c-5-3
386750121	<i>Helicobacter_cetorum_MIT_00_7128_uid162217</i>	CAS-III	csm5g7-csx1-x-x-x-x-x-x-2-1
386762034	<i>Helicobacter_cinaedi_PAGU611_uid162219</i>	CAS-II	2-1-9
291276264	<i>Helicobacter_mustelae_12198_uid46647</i>	CAS-II	2-1-9
167628642	<i>Heliobacterium_modesticaldum_ice1_uid58279</i>	CAS-I-A	4-4-2-1-x-6-5-7-x-3
167628317	<i>Heliobacterium_modesticaldum_ice1_uid58279</i>	CAS-I-E	1-5-7-cse2SS-8e-3
159898755	<i>Herpetosiphon_aurantiacus_DSM_785_uid58599</i>	CAS-I-D	10d-csc2g7-csc1g5-3-6-4-1-2
159898907	<i>Herpetosiphon_aurantiacus_DSM_785_uid58599</i>	Unknown	RT-1-2
159899002	<i>Herpetosiphon_aurantiacus_DSM_785_uid58599</i>	CAS-III-A	10-csm2SS-csm3g7-csm4g5-csm5g7-csx1-x-6-1-2
159901591	<i>Herpetosiphon_aurantiacus_DSM_785_uid58599</i>	CAS-I-A	8a1-7-5-3 + 3HD-6-1-2-4
384129305	<i>Hydrogenobacter_thermophilus_TK_6_uid159875</i>	CAS-I-B	2-1-4-3 + x-5-x-8-6
288818552	<i>Hydrogenobacter_thermophilus_TK_6_uid45927</i>	CAS-I-B	2-1-4-3 + x-5-x-8-6
124027534	<i>Hyperthermus_butylicus_DSM_5456_uid57755</i>	CAS-I-A	csaXg8-5-7-csa5SS-R-x-x-4-2-4-1-x-x-x-R
385809790	<i>Ignavibacterium_album_JCM_16511_uid162097</i>	CAS-III-U	csm5g7-x-csx1-csx20-csx1-csx1-x-x-x-1-2

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
385811610	<i>Ignavibacterium_album_JCM_16511_uid162097</i>	CAS-II	9-1-2
156937861	<i>Ignicoccus_hospitalis_KIN4_I_uid58365</i>	CAS-III	6-x-x-1
156937921	<i>Ignicoccus_hospitalis_KIN4_I_uid58365</i>	CAS-I-A	4-1-2-4-3HD-3-x-5-7-csa5SS-R
305663330	<i>Ignisphaera_aggregans_DSM_17230_uid51875</i>	CAS-I-A	R-x-7-5-3-3HD-x-6-4-2-1-4
310780383	<i>Ilyobacter_polytropus_DSM_2926_uid59769</i>	CAS-II	2-1-9
320102061	<i>Isosphaera_pallida_ATCC_43644_uid62207</i>	CAS-I-U	1 + 4-2-csb2
310816367	<i>Ketogulonicigenium_vulgare_Y25_uid59581</i>	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
357387505	<i>Kitasatospora_setae_KM_6054_uid77027</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3 + 3HD
357393350	<i>Kitasatospora_setae_KM_6054_uid77027</i>	CAS-I-E	cse2SS-7-5-6e-1-2
397659651	<i>Klebsiella_oxytoca_E718_uid170256</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
375259960	<i>Klebsiella_oxytoca_KCTC_1686_uid83159</i>	CAS-I-F	1-3f-8f-5f-7f-6f
402780419	<i>Klebsiella_pneumoniae_1084_uid174151</i>	CAS-I-E	3 + 3HD-8e-cse2SS-6e-7-5-1-2
238895125	<i>Klebsiella_pneumoniae_NTUH_K2044_uid59073</i>	CAS-I-E	2-1-5-7-6e-cse2SS-8e-3 + 3HD
288933828	<i>Klebsiella_variicola_At_22_uid42113</i>	CAS-I-E	3-8e-cse2SS-7-5-6e-1-2
239617067	<i>Kosmotoga_olearia_TBF_19_5_1_uid59205</i>	Unknown	2-csm3g7-x-cmr4g7-10-cmr6g7-cmr1g7-2-1-4-3-5-x-8-6
295697238	<i>Kyrpidia_tusciae_DSM_2912_uid48361</i>	CAS-I-U	2-1-csb2-7-8x1-3
295697278	<i>Kyrpidia_tusciae_DSM_2912_uid48361</i>	CAS-I-B	3-5-x-8-x-x-csx1-x-2-1-4-3 + 3HD-5-x-x-6
385817592	<i>Lactobacillus_amylovorus_GRL1118_uid160233</i>	CAS-I-E	3-8e-cse2SS-7-5-6e-1-2
331702227	<i>Lactobacillus_buchneri_NRR1_B_30929_uid66205</i>	CAS-II	2-1-9
406025970	<i>Lactobacillus_buchneri_uid73657</i>	CAS-I-E	3-8e-cse2SS-7-5-6e-1-2
406027702	<i>Lactobacillus_buchneri_uid73657</i>	CAS-II	2-1-9
116493922	<i>Lactobacillus_casei_ATCC_334_uid57985</i>	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
385824064	<i>Lactobacillus_casei_BD_II_uid162119</i>	CAS-II	2-1-9
191639136	<i>Lactobacillus_casei_BL23_uid59237</i>	CAS-II	2-1-9
385820879	<i>Lactobacillus_casei_LC2W_uid162121</i>	CAS-II	2-1-9
409997998	<i>Lactobacillus_casei_W56_uid178736</i>	CAS-II	2-1-9
301067198	<i>Lactobacillus_casei_Zhang_uid50673</i>	CAS-II	2-1-9
295693070	<i>Lactobacillus_crispatus_ST1_uid48359</i>	CAS-I-E	2 + x-1-6e-5-7-cse2SS-8e-3 + 3HD
104773928	<i>Lactobacillus_delbrueckii_bulgaricus_ATCC_11842_uid58647</i>	CAS-I-E	3-8e-cse2SS-7-5-6e-1-2
116513937	<i>Lactobacillus_delbrueckii_bulgaricus_ATCC_BAA_365_uid57987</i>	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
313123566	<i>Lactobacillus_delbrueckii_bulgaricus_ND02_uid60621</i>	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
385812192	<i>Lactobacillus_fermentum_CECT_5716_uid162003</i>	CAS-I-E	3 + 3HD-x-8e-7-1
385812491	<i>Lactobacillus_fermentum_CECT_5716_uid162003</i>	CAS-I-C	1-7-8c-5-x-3
184155173	<i>Lactobacillus_fermentum_IFO_3956_uid58865</i>	CAS-I-E	3 + 3HD-x-8e-cse2SS-7-5-6e-1
184155685	<i>Lactobacillus_fermentum_IFO_3956_uid58865</i>	CAS-I-C	2-1-4-7-8c-5-x-3
161507871	<i>Lactobacillus_helveticus_DPC_4571_uid58761</i>	CAS-I-C	1-4-7-8c-5-3
385813367	<i>Lactobacillus_helveticus_H10_uid162017</i>	CAS-I-C	3-5-8c-7-4-1-2
403514602	<i>Lactobacillus_helveticus_R0052_uid174439</i>	CAS-I-C	3-5-8c-7-4-1-2
385826040	<i>Lactobacillus_johnsonii_DPC_6026_uid162057</i>	CAS-II	1-9
385828838	<i>Lactobacillus_rhamnosus_GG_uid161983</i>	CAS-II	2-1-9
258509198	<i>Lactobacillus_rhamnosus_GG_uid59313</i>	CAS-II	2-1-9
347525458	<i>Lactobacillus_ruminis_ATCC_27782_uid73417</i>	CAS-III-A	2-1-csm5g7-csm4g5-csm3g7-csm2SS-10-6
347525482	<i>Lactobacillus_ruminis_ATCC_27782_uid73417</i>	CAS-I-B	1-4-3-5-7-8a1-6
385839901	<i>Lactobacillus_salivarius_CECT_5713_uid162005</i>	CAS-II-A	9-9-x-1-csn2
90961086	<i>Lactobacillus_salivarius_UCC118_uid58233</i>	CAS-II-A	9-x-x-1-2-csn2
347534531	<i>Lactobacillus_sanfranciscensis_TMW_1_1304_uid72937</i>	CAS-II	2-1-9

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective cas genes)
296106563	Legionella_pneumophila_2300_99_Alcoy_uid48801	CAS-I-F	20G-x-x-x-x-1-3 + 3f-x-x-6f
54292958	Legionella_pneumophila_Lens_uid58209	CAS-I-F	6f-7f-5f-8f-3f-1
54295747	Legionella_pneumophila_Lens_uid58209	CAS-I-F	1-3f-8f-5f-7f-6f
54296139	Legionella_pneumophila_Paris_uid58211	CAS-II-B	9-1-2-4
116331946	Leptospira_borgpetersenii_serovar_Hardjo_bovis_JB197_uid58509	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-x-1-2
116327441	Leptospira_borgpetersenii_serovar_Hardjo_bovis_L550_uid58507	CAS-I-E	2-1-x-6e-5-7-cse2SS-8e-3 + 3HD
45656830	Leptospira_interrogans_serovar_Copenhageni_Fiocruz_L1_130_uid58065	CAS-I-C	5-7-8c + 8c2-3 + 3HD-6-x-2-1-4
294828260	Leptospira_interrogans_serovar_Lai_56601_uid57881	CAS-I-C	1 + 4-2-x-x-6-3-8c-7-5
386075004	Leptospira_interrogans_serovar_Lai_IPAV_uid161957	CAS-I-C	1 + 4-2-x-x-6-3 + 3HD-8c + 8c2-7-5
171057839	Leptothrix_cholodnii_SP_6_uid58971	CAS-I-C	2-1-4-x-x-7-8c-5-3 + 3HD
257125579	Leptotrichia_buccalis_C_1013_b_uid59211	CAS-I-B	2-1-4-3 + 3HD-5-7-8a1-6
257125862	Leptotrichia_buccalis_C_1013_b_uid59211	CAS-III	csm3g7-6-x-x-x-x-x-4-2-1-x-x-csx1-csx20
406600270	Leuconostoc_gelidum_JB7_uid175682	CAS-II-A	csn2-2-1-9
347547913	Listeria_ivanovii_PAM_55_uid73473	CAS-I	6-8a1-7-5-3-4-1-2
386044901	Listeria_monocytogenes_10403S_uid54461	CAS-II-A	csn2-2-1-9
386052779	Listeria_monocytogenes_Finland_1998_uid54443	CAS-I-B	6-8 + 8a1-7-5-3-4-1-2
386048323	Listeria_monocytogenes_J0161_uid54459	CAS-II-A	csn2-2-1-9
405756713	Listeria_monocytogenes_SLCC2540_uid175106	CAS-II-A	csn2-2-1-9
404282158	Listeria_monocytogenes_SLCC2755_uid52455	CAS-II-A	csn2-2-1-9
404411843	Listeria_monocytogenes_SLCC5850_uid175110	CAS-II-A	csn2-2-1-9
404287972	Listeria_monocytogenes_serotype_7_SLCC2482_uid174871	CAS-II-A	csn2-2-1-9
289433792	Listeria_seeligeri_serovar_1_2b_SLCC3954_uid46215	CAS-I-B	6-8 + 8a1-7-5-3-4-1-2
117926798	Magnetococcus_MC_1_uid57833	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
332982754	Mahella_australiensis_50_1_BON_uid66917	CAS-I-B	2-1-4-3-5-x-8-6
52425036	Mannheimia_succiniciproducens_MBEL55E_uid58197	CAS-I-C	2-1-x-x-x-4-7-8c-5-x-x-3 + 3HD
52425690	Mannheimia_succiniciproducens_MBEL55E_uid58197	CAS-III-U	2-1-2-x-csx1-csx1-csx16-x-6
328949815	Marinithermus_hydrothermalis_DSM_14884_uid65783	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
328950501	Marinithermus_hydrothermalis_DSM_14884_uid65783	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
328951570	Marinithermus_hydrothermalis_DSM_14884_uid65783	CAS-I	6-8a1-x-3 + 3HD-4-1-2
374339292	Marinitoga_piezophila_KA3_uid81629	CAS-I	6-8a1-7-5-3-4-1-2
374339409	Marinitoga_piezophila_KA3_uid81629	CAS-III-B	Prim2 + x-1-2-x-csx1 + x-csm6-6-cmr6g7-cmr5SS-cmr4g7-cmr3g5-10
152997544	Marinomonas_MWYL1_uid58715	CAS-I-E	2-1-x-6e-5-7-cse2SS-8e-3
326793969	Marinomonas_mediterranea_MMB_1_uid64753	CAS-III-B	2-6-x-x-cmr6g7-cmr5SS-cmr4g7-cmr3g5-10-cmr1g7
326796560	Marinomonas_mediterranea_MMB_1_uid64753	CAS-I-F	6f-7f-5f-8f-x-3f-1
348026605	Megasphaera_elsdenii_DSM_20460_uid71135	CAS-III-A	1-2-10-csm2SS-csm3g7-csm4g5-csm5g7-6-csm6
348026839	Megasphaera_elsdenii_DSM_20460_uid71135	CAS-I-C	4-1-2
348027012	Megasphaera_elsdenii_DSM_20460_uid71135	CAS-I-F	3f-1-6f-7f-5f-8f
291294626	Meiothermus_ruber_DSM_1279_uid46661	CAS-III-A	10-csm2SS-csm3g7-csm4g5-csm5g7-x-x-6-csx1-1-2-x-csx1

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
291295861	<i>Meiothermus_ruber</i> _DSM_1279_uid46661	CAS-III-B	2-1-4-csm6-cmr6g7-cmr5SS-cmr4g7-cmr3g5-10-cmr1g7-7-8c
291297379	<i>Meiothermus_ruber</i> _DSM_1279_uid46661	CAS-I-E	2-1-6e-5-7-x-cse2SS-8e-3
297565159	<i>Meiothermus_silvanus</i> _DSM_9946_uid49485	CAS-III-A	10-csm2SS-csm3g7-csm4g5-csm5g7-x-x-6-csx1-1-2-csx1
297565669	<i>Meiothermus_silvanus</i> _DSM_9946_uid49485	CAS-I-E	3 + 3HD-x-8e-cse2SS-x-7-5-6e-1-2
297567720	<i>Meiothermus_silvanus</i> _DSM_9946_uid49485	CAS-III-B	DinG + x-x-x-x-x-x-x-2-1-4-csm6-x-csx1-cmr6g7-cmr5SS-cmr4g7-cmr3g5-10-cmr1g7
297567845	<i>Meiothermus_silvanus</i> _DSM_9946_uid49485	CAS-I	2-1-4-x-3 + 3HD-x-7-x-6
397689809	<i>Melioribacter_roseus</i> _P3M_uid170941	CAS-I-B	2-1-x-4-3 + 3HD-5-7-x-8a1-6
397690169	<i>Melioribacter_roseus</i> _P3M_uid170941	CAS-II	2-1
332687143	<i>Melissococcus_plutonium</i> _ATCC_35311_uid66803	CAS-I-C	2-1-4-4-7-8c-5-x-3-3HD
379726963	<i>Melissococcus_plutonium</i> _DAT561_uid89371	CAS-I-C	3 + x-5-8c-7-4-1-2
389844445	<i>Mesotoga_prima</i> _MesG1_Ag_4_2_uid52599	CAS-III-B	cmr6g7-cmr5SS-cmr4g7-cmr3g5-10-cmr1g7-csm6-2-x-x-1-4-3-5-7
389845095	<i>Mesotoga_prima</i> _MesG1_Ag_4_2_uid52599	CAS-III	csm3g7-x-cmr4g7-10 + x-cmr6g7-cmr1g7-2-1-4-3-5-x-8-6
330834963	<i>Metallosphaera_cuprina</i> _Ar_4_uid66329	CAS-I	1-2-x-4-4-x-csx1
146303916	<i>Metallosphaera_sedula</i> _DSM_5348_uid58717	CAS-I-A	6-x-csaXg8-x-3-5-7-csa5SS-R-4-1-x-2-4-R-6-csx1-csx1
333987620	<i>Methanobacterium_SWAN</i> _1_uid67359	CAS-I-A	2-1-4-6-3-5-7-8a1
288560055	<i>Methanobrevibacter_ruminantium</i> _M1_uid45857	CAS-I	6-8a1-x-5-3 + 3HD-4-1-2
288560430	<i>Methanobrevibacter_ruminantium</i> _M1_uid45857	CAS-III-A	1-x-2-6-csx1-csm5g7-csm4g5-csm3g7-csm2SS-10
148642083	<i>Methanobrevibacter_smithii</i> _ATCC_35061_uid58827	Unknown	1-2
148642224	<i>Methanobrevibacter_smithii</i> _ATCC_35061_uid58827	CAS-I-A	2-1-4-3-5-7-8a1-6
289192644	<i>Methanocaldococcus_FS406_22</i> _uid42499	CAS-I-A	6-x-7-5-3-4-1-csa5SS-7-5-8a2-3-x-R-2
256811373	<i>Methanocaldococcus_fervens</i> _AG86_uid59347	CAS-I-A	2-R-x-3-8a2-5-7-csa5SS-1-4-3-5-7-x-6
296109603	<i>Methanocaldococcus_infernus</i> _ME_uid48803	CAS-I	8a1-7-5-3-1-2
296109866	<i>Methanocaldococcus_infernus</i> _ME_uid48803	CAS-I-B	3 + 3HD-5-x-8-1-2-4
15668554	<i>Methanocaldococcus_jannaschii</i> _DSM_2661_uid57713	CAS-I-A	6-3-4-1-R-x-7-5-3-3HD-8a2-2
261402133	<i>Methanocaldococcus_vulcanius</i> _M7_uid41131	CAS-I-D	2-1-4-3-csc1g5-csc2g7-10d-R-6
147920423	<i>Methanocella_arvoryzae</i> _MRE50_uid61623	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3 + 3HD
147921327	<i>Methanocella_arvoryzae</i> _MRE50_uid61623	Unknown	1
383319612	<i>Methanocella_conradii</i> _HZ254_uid157911	CAS-I-A	4-1-4-2-csa3-x-x-x-x-x-7
91772593	<i>Methanococcoides_burtonii</i> _DSM_6242_uid58023	Unknown	1
91772605	<i>Methanococcoides_burtonii</i> _DSM_6242_uid58023	Unknown	1
91772613	<i>Methanococcoides_burtonii</i> _DSM_6242_uid58023	Unknown	1
91772628	<i>Methanococcoides_burtonii</i> _DSM_6242_uid58023	CAS-I-E	3-8e-cse2SS-7-5-6e-1-2
91773111	<i>Methanococcoides_burtonii</i> _DSM_6242_uid58023	CAS-I-B	6-x-x-5-3 + 3HD-4-1-2
150401497	<i>Methanococcus_aeolicus</i> _Nankai_3_uid58823	CAS-III-A	6-3-5-7-8-1-2-4-x-csx1-csm5g7-csm4g5-csm3g7-csm2SS-10
134045811	<i>Methanococcus_maripaludis</i> _C5_uid58741	CAS-I-B	3-5-x-8-1-2-4
340624264	<i>Methanococcus_maripaludis</i> _X1_uid70729	CAS-I-B	3 + 3HD-5-7-8-1-2-4

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
150398872	Methanococcus_vannielii_SB_uid58767	CAS-III-B	10-cmr3g5-cmr4g7-cmr5SS-cmr6g7-x-x-6-1-2
150398983	Methanococcus_vannielii_SB_uid58767	CAS-I-B	4-2-1-8-7-5-3 + 3HD
297619051	Methanococcus_voltae_A3_uid49529	CAS-III-B	4-2-1-8-7-5-3 + 3HD-x-x-cmr6g7-cmr5SS-cmr4g7-cmr3g5
297619085	Methanococcus_voltae_A3_uid49529	CAS-III-B	cmr6g7-cmr5SS-cmr4g7-x-cmr3g5-10-cmr1g7-2-1-4-3-5-7-x-8b-6
124485266	Methanocorpusculum_labreanum_Z_uid58785	Unknown	1
124485674	Methanocorpusculum_labreanum_Z_uid58785	CAS-I-C	7-8c-5-3 + 3HD-4-1-2
397780289	Methanoculleus_bourgensis_MS2_uid171377	Unknown	1
397781631	Methanoculleus_bourgensis_MS2_uid171377	CAS-I-U	3-8x1-7-csb2-1 + 4
126178701	Methanoculleus_marisnigri_JR1_uid58561	Unknown	1
294495965	Methanohalophilus_mahii_DSM_5219_uid47313	Unknown	1
410669380	Methanobolus_psychrophilus_R15_uid177925	Unknown	1
410669394	Methanobolus_psychrophilus_R15_uid177925	Unknown	1
435851317	Methanomethylovorans_hollandica_DSM_15978_uid184864	CAS-III-B	1-2-4-x-x-x-cmr1g7-csm3g7-10-cmr4g7
307352568	Methanoplanus_petrolearius_DSM_11571_uid52695	Unknown	1
20094748	Methanopyrus_kandleri_AV19_uid57883	CAS-III-A	2-x-1-x-10-csm2SS-csm3g7-csm4g5-csx1-csm5g7
154150254	Methanoregula_boonei_6A8_uid58815	Unknown	1
432331395	Methanoregula_formicicum_SMSP_uid184406	Unknown	1
432331519	Methanoregula_formicicum_SMSP_uid184406	CAS-I-B	4-2-1-x-3-5-x-8-x-x-DinG
432331857	Methanoregula_formicicum_SMSP_uid184406	Unknown	1
432332081	Methanoregula_formicicum_SMSP_uid184406	CAS-I-C	2-1-4-7-8c-5-3 + 3HD
330508932	Methanosaeta_concilii_GP6_uid66207	CAS-I-B	3 + 3HD-5-x-8-4-2-1
330509017	Methanosaeta_concilii_GP6_uid66207	CAS-I-A	4-4-2-1-3-x-x-x-x-5
386002385	Methanosaeta_harundinacea_6Ac_uid81199	CAS-III-B	1 + 4-2-x-csx3-x-cmr6g7-cmr5SS-cmr4g7-cmr3g5-10-cmr1g7
116754851	Methanosaeta_thermophila_PT_uid58469	CAS-I-D	csc2g7-csc1g5-3-4-1-2-R-6
336477473	Methanosalsum_zhilinae_DSM_4017_uid68249	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
20092470	Methanosarcina_acetivorans_C2A_uid57879	CAS-I-A	3-5-7-8a1-2-1-4-6
73667852	Methanosarcina_barkeri_Fusaro_uid57715	CAS-I-A	6-4-1-2-x-8a1-7-5-3
73670571	Methanosarcina_barkeri_Fusaro_uid57715	CAS-I-U	2-1 + 4-csb2-csb1-8x1-3 + 3HD
21226661	Methanosarcina_mazei_Go1_uid57893	CAS-I-B	4-2-1-6-3-5-7-8-csa3
21229351	Methanosarcina_mazei_Go1_uid57893	Unknown	1
84489236	Methanosphaera_stadtmanae_DSM_3091_uid58407	CAS-I-B	6-8-7-5-3-4-1-2
84489745	Methanosphaera_stadtmanae_DSM_3091_uid58407	CAS-I	8a1-x-5-3 + 3HD-6-4-1-2
219852205	Methanosphaerula_palustris_E1_9c_uid59193	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
219852754	Methanosphaerula_palustris_E1_9c_uid59193	Unknown	1
88602029	Methanospirillum_hungatei_JF_1_uid58181	CAS-III-A	csx1-x-x-x-csx1-csx1-x-x-2-1-x-x-csm3g7-csm3g7-x-x-csm3g7-csm3g7-10
88602656	Methanospirillum_hungatei_JF_1_uid58181	CAS-I-E	2-1-6e-5-7-cse2SS-8e
88603116	Methanospirillum_hungatei_JF_1_uid58181	CAS-I-D	2-1-4-x-3-csc1g5-csc2g7-10d-6-R
15679095	Methanothermobacter_thermautotrophicus_Delta_H_uid57877	CAS-III-A	csx1-csm5g7-csm5g7-csm4g5-csm3g7-csm2SS-10-2-1-4-3-5-7-x-x-6
336121113	Methanothermococcus_okinawensis_IH1_uid51535	CAS-I-D	6-2-1-4-3-csc1g5-csc2g7-10d

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
333910103	<i>Methanoterris_igneus_Kol_5_uid67321</i>	CAS-I-D	R-10d-csc2g7-csc1g5-3-4-1-2
91774961	<i>Methylobacillus_flagellatus_KT_uid58049</i>	CAS-I-C	3 + x-5-8c-7-4-1-2
220925254	<i>Methylobacterium_nodulans_OR5_2060_uid59023</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3 + 3HD
53804988	<i>Methylococcus_capsulatus_Bath_uid57607</i>	CAS-I-C	2-1-4-x-7-8c-5-3 + 3HD
53804737	<i>Methylococcus_capsulatus_Bath_uid57607</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
357404710	<i>Methylomicrobium_alcaliphilum_uid77119</i>	CAS-I-C	3-5-8c-7-4-1-2
357405511	<i>Methylomicrobium_alcaliphilum_uid77119</i>	CAS-I-C	2-1-4-7-8c-5-3 + 3HD
357407021	<i>Methylomicrobium_alcaliphilum_uid77119</i>	CAS-I-E	2-1-x-x-x-x-x-x-x-6e-5-7
333983108	<i>Methylomonas_methanica_MC09_uid67363</i>	CAS-I-F	1-3f-8f-5f-7f-6f
333984705	<i>Methylomonas_methanica_MC09_uid67363</i>	CAS-I-C	3 + x-x-5-8c-7-x-4-1-2
387128443	<i>Methylophaga_JAM1_uid162947</i>	CAS-I-F	6f-x-x-3 + 3f-1
387130001	<i>Methylophaga_JAM7_uid162949</i>	CAS-I-F	6f-7f-5f-8f-3f-1
428311522	<i>Microcoleus_PCC_7113_uid183114</i>	CAS-I-D	2-1-4-6-x-3-csc1g5-csc2g7
428314604	<i>Microcoleus_PCC_7113_uid183114</i>	CAS-III-A	1 + x-1-2-x-x-x-csx1-6 + x-x-csm3g7-x-csm3g7
428314605	<i>Microcoleus_PCC_7113_uid183114</i>	CAS-III-A	1 + x-1-2-x-x-x-csx1-6 + x-x-csm3g7-x-csm3g7
428314640	<i>Microcoleus_PCC_7113_uid183114</i>	Unknown	6-x-x-4-1 + 2
166365827	<i>Microcystis_aeruginosa_NIES_843_uid59101</i>	CAS-I	5-3-x-x-x-x-6-4-1-2
336116789	<i>Microlunatus_phosphovorius_NM_1_uid68055</i>	CAS-III-A	10-csm3g7-cmr3g5-csm3g7-x-x-x-6-1 + RT-2-x-10-csm3g7-cmr3g5-csm3g7
298345382	<i>Mobiluncus_curtisii_ATCC_43063_uid49695</i>	CAS-I-E	2-1-6e-5-3HD + 7
83589357	<i>Moorella_thermoacetica_ATCC_39073_uid58051</i>	CAS-I-C	2-1-4-7-8c-5-3 + 3HD
83590562	<i>Moorella_thermoacetica_ATCC_39073_uid58051</i>	CAS-I-B	2-1-4-3-5-7-8a1-6
296112254	<i>Moraxella_catarrhalis_RH4_uid48809</i>	CAS-I-F	1-3f-8f-5f-7f-6f
339632828	<i>Mycobacterium_africanum_GM041182_uid68839</i>	CAS-III-A	2-1-csm5g7-csm3g7-csm2SS-10-6
31793993	<i>Mycobacterium_bovis_AF2122_97_uid57695</i>	CAS-III-A	2-1-csm6-csm5g7-csm4g5-csm3g7-csm2SS-10-6
378772551	<i>Mycobacterium_bovis_BCG_Mexico_uid86889</i>	CAS-III-A	2-1-csm6-csm5g7-csm4g5-csm3g7-csm2SS-10-6
121638696	<i>Mycobacterium_bovis_BCG_Pasteur_1173P2_uid58781</i>	CAS-III-A	2-1-csm6-csm5g7-csm4g5-csm3g7-csm2SS-10-6
224991188	<i>Mycobacterium_bovis_BCG_Tokyo_172_uid59281</i>	CAS-III-A	2-1-csm6-csm5g7-csm4g5-csm3g7-csm2SS-10-6
340627813	<i>Mycobacterium_canettii_CIPT_140010059_uid70731</i>	CAS-III-A	2-1-csm6-csm5g7-csm4g5-csm3g7-csm2SS-10
433627935	<i>Mycobacterium_canettii_CIPT_140060008_uid184829</i>	CAS-III-A	2-1-csm6-csm5g7-csm4g5-csm3g7-csm2SS-10-6
433643006	<i>Mycobacterium_canettii_CIPT_140070008_uid184832</i>	CAS-I-U	2-1 + 4-csb2-7-8x1-3
433631663	<i>Mycobacterium_canettii_CIPT_140070010_uid184828</i>	CAS-I-C	2-1-4-7-8c-5-3
433631914	<i>Mycobacterium_canettii_CIPT_140070010_uid184828</i>	CAS-I-U	2-1 + 4-csb2-csb1-8x1-3
433635878	<i>Mycobacterium_canettii_CIPT_140070017_uid184830</i>	CAS-I-U	2-1 + 4-csb2-7-8x1-3 + 3HD
15842358	<i>Mycobacterium_tuberculosis_CDC1551_uid57775</i>	CAS-III-A	2-1-csm6-csm5g7-csm4g5-csm3g7-csm2SS-10-6
385999602	<i>Mycobacterium_tuberculosis_CTRL_2_uid161997</i>	CAS-III-A	2-1-csm6-csm5g7-csm4g5-csm3g7-csm2SS-10-6
148824006	<i>Mycobacterium_tuberculosis_F11_uid58417</i>	CAS-III-A	2-1-csm6-csm5g7-csm4g5-csm3g7-csm2SS-10-6

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
148662659	<i>Mycobacterium_tuberculosis_H37Ra_uid58853</i>	CAS-III-A	2-1-csm6-csm5g7-csm4g5-csm3g7-csm2S5-10-6
397674731	<i>Mycobacterium_tuberculosis_H37Rv_uid170532</i>	CAS-III-A	2-1-csm6-csm5g7-csm4g5-csm3g7-csm2S5-10-6
15609954	<i>Mycobacterium_tuberculosis_H37Rv_uid57777</i>	CAS-III-A	2-1-csm6-csm5g7-csm4g5-csm3g7-csm2S5-10-6
253798098	<i>Mycobacterium_tuberculosis_KZN_1435_uid59069</i>	CAS-III-A	6-10-csm2S5-csm3g7-csm4g5-csm5g7-csm6-1-2
375295366	<i>Mycobacterium_tuberculosis_KZN_4207_uid83619</i>	CAS-III-A	6-10-csm2S5-csm3g7-csm4g5-csm5g7-csm6-1-2
392431574	<i>Mycobacterium_tuberculosis_KZN_605_uid54947</i>	CAS-III-A	6-10-csm2S5-csm3g7-csm4g5-csm5g7-csm6-1-2
383308570	<i>Mycobacterium_tuberculosis_RGTB327_uid157907</i>	CAS-III-A	2-1-csm6-csm5g7-csm4g5-csm3g7-csm2S5-10-6
386005689	<i>Mycobacterium_tuberculosis_RGTB423_uid162179</i>	CAS-III-A	2-1-csm6-csm5g7-csm3g7-csm2S5-10-6
392387446	<i>Mycobacterium_tuberculosis_UT205_uid162183</i>	CAS-III-A	2-1-csm6-csm5g7-csm4g5-csm3g7-csm2S5-10-6
193216853	<i>Mycoplasma_arthritis_158L3_1_uid58005</i>	CAS-II	1-2
433625053	<i>Mycoplasma_cynos_C142_uid184824</i>	CAS-II	2-1-9
401771108	<i>Mycoplasma_gallisepticum_CA06_2006_052_5_2P_uid172630</i>	CAS-II	9-1-2
385326555	<i>Mycoplasma_gallisepticum_F_uid162001</i>	CAS-II	9-1-2
401767319	<i>Mycoplasma_gallisepticum_NC95_13295_2_2P_uid172625</i>	CAS-II	9-1-2
401768091	<i>Mycoplasma_gallisepticum_NC96_1596_4_2P_uid172626</i>	CAS-II	9-1-2
401768852	<i>Mycoplasma_gallisepticum_NY01_2001_047_5_1P_uid172627</i>	CAS-II	9-1-2
385325799	<i>Mycoplasma_gallisepticum_R_high_uid161999</i>	CAS-II	9-1-2
294660601	<i>Mycoplasma_gallisepticum_R_low_uid57993</i>	CAS-II	9-1-2
401766564	<i>Mycoplasma_gallisepticum_VA94_7994_1_7P_uid172624</i>	CAS-II	1-2
401769599	<i>Mycoplasma_gallisepticum_WI01_2001_043_13_2P_uid172628</i>	CAS-II	9-1-2
47458867	<i>Mycoplasma_mobile_163K_uid58077</i>	CAS-II	1-9
71894593	<i>Mycoplasma_synoviae_53_uid58061</i>	CAS-II-A	9-1-2-csn2-1
338531918	<i>Myxococcus_fulvus_HW_1_uid68443</i>	CAS-I-C	3-5-8c-7-x-4-1-2
442324547	<i>Myxococcus_stipitatus_DSM_14675_uid186549</i>	CAS-I-C	2-1-4-7-8c-5-3
442324860	<i>Myxococcus_stipitatus_DSM_14675_uid186549</i>	CAS-III-B	2-1 + 4-5-7-x-3 + 3HD-6-cmr6g7-cmr5S5-cmr4g7-cmr3g5-10
108763792	<i>Myxococcus_xanthus_DK_1622_uid58003</i>	CAS-I-C	2-1-4-7-8c-5-3HD
108761389	<i>Myxococcus_xanthus_DK_1622_uid58003</i>	CAS-I-C	2-1 + 4-5-7-8c + 8c2-3 + 3HD-6
258653218	<i>Nakamurella_multipartita_DSM_44233_uid59221</i>	CAS-I-E	2-1-6e-5-7-cse2S5-8e-3 + 3HD
41614813	<i>Nanoarchaeum_equitans_Kin4_M_uid58009</i>	CAS-I-B	2-1-x-7-5-3-4
397772707	<i>Natrinema_J7_uid171337</i>	CAS-I-B	6-8b-7-5-3-4-1-2
429193351	<i>Natronobacterium_gregoryi_SP2_uid74439</i>	CAS-I-B	6-8b-7-5-3 + 3HD-4-1-2
76802276	<i>Natronomonas_pharaonis_DSM_2160_uid58435</i>	CAS-I-D	R-6-10d-csc2g7-csc1g5-3-4-1-2
313668836	<i>Neisseria_lactamica_020_06_uid60851</i>	CAS-I-C	2-1
313669045	<i>Neisseria_lactamica_020_06_uid60851</i>	CAS-II	9-1-2
385324781	<i>Neisseria_meningitidis_8013_uid161967</i>	CAS-II	9-1-2
385855844	<i>Neisseria_meningitidis_M01_240355_uid162075</i>	CAS-II	1-2
385337434	<i>Neisseria_meningitidis_WUE_2594_uid162093</i>	CAS-II	2-1-9
218767587	<i>Neisseria_meningitidis_Z2491_uid57819</i>	CAS-II	2-1-9
254804355	<i>Neisseria_meningitidis_alpha14_uid61649</i>	CAS-II	2-1-9

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
319956800	Nitratifactor_salsuginis_DSM_16511_uid62183	CAS-I-B	8-x-5-3 + 3HD-x-x-4-2-1
319957207	Nitratifactor_salsuginis_DSM_16511_uid62183	CAS-II	9-1-2
75676127	Nitrobacter_winogradskyi_Nb_255_uid58295	CAS-I-C	2-1-4-7-8c-5-3 + 3HD
292491305	Nitrosococcus_halophilus_Nc4_uid46803	CAS-I-F	3f-1-x-5f-7f-6f
292492002	Nitrosococcus_halophilus_Nc4_uid46803	CAS-I-C	3-5-8c-7-4-1-2
292492856	Nitrosococcus_halophilus_Nc4_uid46803	CAS-III	csm4g5-csm5g7-x-csx1-x-x-csx1-csx1-x-2-1-x-2
292492938	Nitrosococcus_halophilus_Nc4_uid46803	CAS-I-D	6-10d-csc2g7-x-3-4-1-2
77166205	Nitrosococcus_oceani_ATCC_19707_uid58403	CAS-I-F	3f-1-8f-5f-7f-6f
300114059	Nitrosococcus_watsonii_C_113_uid50331	CAS-I-E	2-1-6e-5-7-cse2SS
300115372	Nitrosococcus_watsonii_C_113_uid50331	CAS-I-F	1-8f-5f-7f-6f
325980970	Nitrosomonas_AL212_uid55727	Unknown	1
325982105	Nitrosomonas_AL212_uid55727	CAS-I-C	2-1-4-x-7-8c-5-3
30248142	Nitrosomonas_europaea_ATCC_19718_uid57647	CAS-III	2-1-2-csx1-x-csx1-csx16-6-x-csm5g7-csm4g5-csm3g7
114331015	Nitrosomonas_eutropha_C91_uid58363	CAS-I-C	2-1-4-7-8c
114332190	Nitrosomonas_eutropha_C91_uid58363	CAS-III-A	csm4g5-csm5g7-6-csx16-csx1-x-csx1-x-x-2-1-2
54026395	Nocardia_farcinica_IFM_10152_uid58203	CAS-I-E	1-6e-5-7-cse2SS-8e-3 + 3HD
297560256	Nocardiosis_dassonvillei_DSM_43111_uid49483	CAS-I-E	8e-cse2SS-7-5-6e-1-2
427706868	Nostoc_PCC_7107_uid182932	CAS-I-D	2-1-4-6-20G-3 + x-csc1g5-csc2g7-10d
427708213	Nostoc_PCC_7107_uid182932	CAS-III	csx19-csm3g7-x-x-x-6-x-x-x-2-1-x-x-1 + RT
427708216	Nostoc_PCC_7107_uid182932	CAS-III	csx19-csm3g7-x-x-x-6-x-x-x-2-1-x-x-1 + RT
17227877	Nostoc_PCC_7120_uid57803	CAS-III-B	csx18-1-2
17228961	Nostoc_PCC_7120_uid57803	CAS-III-A	1 + RT-x-x-x-csm3g7-csx19-csm3g7-csm3g7-x-csm3g7-csm3g7
17229060	Nostoc_PCC_7120_uid57803	CAS-I-D	10d-csc2g7-csc1g5-3-20G-6-4-1-x-2
427726427	Nostoc_PCC_7524_uid182933	CAS-III-B	1-2-10-cmr3g5-cmr4g7-x-cmr1g7 + cmr6g7
427728185	Nostoc_PCC_7524_uid182933	CAS-I-D	2-1-4-x-6-20G-x-csc1g5-csc2g7-10d
186682976	Nostoc_punctiforme_PCC_73102_uid57767	CAS-I-D	2-1-4-6-20G-3-csc1g5-csc2g7-10d
325279973	Odoribacter_splanchnicus_DSM_20712_uid63397	CAS-I-B	2-1-4-3 + 3HD-5-x-x-6
302336019	Olsenella_uli_DSM_7084_uid51367	CAS-II-A	csn2-2-1-9
392391492	Ornithobacterium_rhinotracheale_DSM_15997_uid168256	CAS-II	2-1-9
428320277	Oscillatoria_PCC_7112_uid183110	CAS-I-D	csc2g7-csc1g5-3-6-4-1-2
428216097	Oscillatoria_acuminata_PCC_6304_uid183003	CAS-I-D	csc2g7-csc1g5-3-x-6-4-1-2
374323589	Paenibacillus_terrae_HPL_003_uid82371	CAS-III-B	3-5-8c-7-4-1-2-x-x-x-cmr1g7-10-cmr3g5-cmr4g7-cmr5SS-cmr6g7
150007825	Parabacteroides_distasonis_ATCC_8503_uid58301	CAS-I-C	3-5-8c-7-4-1-2
154250554	Parvibaculum_lavamentivorans_DS_1_uid58739	CAS-II	2-1-9
304321090	Parvularcula_bermudensis_HTCC2503_uid51641	CAS-I-C	2-1-4-x-8c-5-3 + 3HD
386834577	Pasteurella_multocida_3480_uid161955	CAS-I-F	3f-1-6f-7f-5f-8f
378774028	Pasteurella_multocida_36950_uid86887	CAS-I-F	8f-5f-7f-6f-1-3f

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
383309947	<i>Pasteurella_multocida</i> _HN06_uid156881	CAS-I-F	8f-5f-7f-6f-1-3f
15602176	<i>Pasteurella_multocida</i> _Pm70_uid57627	CAS-I-F	8f-5f-7f-6f-x-x-1-3f
15602991	<i>Pasteurella_multocida</i> _Pm70_uid57627	CAS-II	2-1-9
50122600	<i>Pectobacterium_atrosepticum</i> _SCRI1043_uid57957	CAS-I-F	1-3f-8f-5f-7f-6f
403056816	<i>Pectobacterium_carotovorum</i> _PCC21_uid174335	CAS-I-E	3 + 3HD-x-x-8e-cse2SS-7-5-6e-1-2
403059938	<i>Pectobacterium_carotovorum</i> _PCC21_uid174335	CAS-I-F	1-3f-8f-5f-7f-6f
261819747	<i>Pectobacterium_wasabiae</i> _WPP163_uid41297	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
261822895	<i>Pectobacterium_wasabiae</i> _WPP163_uid41297	CAS-I-F	6f-7f-5f-8f-3f-1
404492576	<i>Pelobacter_carbinolicus</i> _DSM_2380_uid58241	CAS-I-E	3-8e-cse2SS-7-5-6e-x-x-1-2
118580752	<i>Pelobacter_propionicus</i> _DSM_2379_uid58255	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3 + 3HD
194336722	<i>Pelodictyon_phaeoclathratiforme</i> _BU_1_uid58173	CAS-I-C	3HD-3-5-8c-x-4-1-2
194337466	<i>Pelodictyon_phaeoclathratiforme</i> _BU_1_uid58173	CAS-III-A	6-csx1-csm5g7-csm4g5-csm3g7-csm2SS-10-x-csx15-2-1
147678249	<i>Pelotomaculum_thermopropionicum</i> _SI_uid58877	CAS-I	2-1-4-3 + 3HD-5-x-x-x-6-6-cmr6g7-cmr5SS
147678325	<i>Pelotomaculum_thermopropionicum</i> _SI_uid58877	CAS-I-C	2-1 + 4-7-8c-5-3 + 3HD
225850878	<i>Persephonella_marina</i> _EX_H1_uid58119	CAS-I-B	6-8a1-7-x-5-3-x-4-x-x-1-2
160903306	<i>Petrotoga_mobilis</i> _SJ95_uid58747	CAS-I-B	2-1-4-3 + 3HD-5-x-x-8-6
47104059	<i>Photobacterium_profundum</i> _SS9_uid62923	CAS-I-E	2-1-8e-5-7-cse2SS-6e-3 + 3HD
54303647	<i>Photobacterium_profundum</i> _SS9_uid62923	CAS-I-F	6f-x-x-3 + 3f-1
253990199	<i>Photorhabdus_asymbiotica</i> _uid59243	CAS-I-F	6f-7f-5f-8f-1
383765764	<i>Phycisphaera_mikurensis</i> _NBRC_102666_uid157331	CAS-I-C	2-1-4-7-8c-5-3 + 3HD
48477075	<i>Picrophilus_torridus</i> _DSM_9790_uid58041	CAS-I-D	2-1-4-3-csc1g5-csc2g7-10d-6
48477121	<i>Picrophilus_torridus</i> _DSM_9790_uid58041	CAS-III-A	2-1-csm5g7-csm4g5-csm3g7-10-6-x-csx1-csx1-csx1
283778924	<i>Pirellula_staleyii</i> _DSM_6068_uid43209	CAS-III-A	1 + RT-2-x-10-csm3g7-csm3g7
325110400	<i>Planctomyces_brasiliensis</i> _DSM_5305_uid60583	CAS-I-C	2-1-x-4-7-8c-5-3 + 3HD
325110641	<i>Planctomyces_brasiliensis</i> _DSM_5305_uid60583	CAS-I-C	2-1-x-4-7-8c-5-3 + 3HD
296121696	<i>Planctomyces_limnophilus</i> _DSM_3776_uid48643	Unknown	2-1 + 4
428202534	<i>Pleurocapsa_PCC_7327</i> _uid183006	CAS-III-B	csm6-cmr1g7 + cmr6g7-x-cmr4g7-cmr3g5-x-10-x-x-1-2
428203734	<i>Pleurocapsa_PCC_7327</i> _uid183006	CAS-I-D	csc2g7-csc1g5-3-6-4-1-2
328544463	<i>Polymorphum_gilvum</i> _SL003B_26A1_uid65447	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
332300108	<i>Porphyromonas_asaccharolytica</i> _DSM_20707_uid66603	CAS-I-C	3-5-8c-7-4-1-2
188995823	<i>Porphyromonas_gingivalis</i> _ATCC_33277_uid58879	CAS-I-B	2-1-4-7-x-3 + 3HD-x-6
334146064	<i>Porphyromonas_gingivalis</i> _TDC60_uid67407	CAS-III-B	2-1 + x-cmr6g7-x-cmr4g7-cmr3g5-10
334146098	<i>Porphyromonas_gingivalis</i> _TDC60_uid67407	CAS-I	2-1-4-3 + 3HD-7-8c-5-6
34541577	<i>Porphyromonas_gingivalis</i> _W83_uid57641	CAS-III-B	2-1 + RT-cmr6g7-x-cmr4g7-cmr3g5-10
34541603	<i>Porphyromonas_gingivalis</i> _W83_uid57641	CAS-I	2-1-4-3 + 3HD-7-8c-5-6
327314603	<i>Prevotella_denticola</i> _F0289_uid65091	CAS-III	10-cmr6g7-5g10-csm3g7-x-csm3g7-csx1-csx1-1-Prim-2
387132278	<i>Prevotella_intermedia</i> _17_uid163151	CAS-II	9-1-2
410867500	<i>Propionibacterium_acidipropionici</i> _ATCC_4875_uid179069	CAS-I-E	3-8e-7-5-6e-1-2
386070350	<i>Propionibacterium_acnes</i> _ATCC_11828_uid162177	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
297625585	<i>Propionibacterium_freudenreichii_shermanii</i> _CIRM_BIA1_uid49535	CAS-I-U	2-1 + 4-csb3-3-5b6-csb1
397669411	<i>Propionibacterium_propionicum</i> _F0230a_uid170533	CAS-I-U	2-1 + 4-x-csb1
397671369	<i>Propionibacterium_propionicum</i> _F0230a_uid170533	CAS-I	2-1 + 4-8x1-3 + 3HD

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
194334221	<i>Prosthecochloris_aestuarii</i> _DSM_271_uid58151	CAS-I-E	2-1-5-7-6e-cse2SS-8e-3 + 3HD
386744974	<i>Providencia_stuartii</i> _MRSN_2154_uid162193	CAS-I-F	1-3f-8f-5f-7f-6f
428217990	<i>Pseudanabaena_PCC_7367</i> _uid183004	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
347538517	<i>Pseudogulbenkiania_NH8B</i> _uid73423	CAS-I-E	3 + 3HD-x-8e-cse2SS-7-5-6e-1-2
392984024	<i>Pseudomonas_aeruginosa_DK2</i> _uid168996	CAS-I-F	6f-7f-5f-8f-3f-1
386058681	<i>Pseudomonas_aeruginosa_M18</i> _uid162089	CAS-I-F	6f-7f-5f-8f-3f-1
116050364	<i>Pseudomonas_aeruginosa_UCBPP_PA14</i> _uid57977	CAS-I-F	6f-7f-5f-8f-3f-1
146308770	<i>Pseudomonas_mendocina_ympp</i> _uid58723	CAS-I-E	2-1-6e-5-7-cse2SS-8e-x-x-3 + 3HD
146284062	<i>Pseudomonas_stutzeri_A1501</i> _uid58641	CAS-I-C	3-5-8c-7-4-1-2
357418717	<i>Pseudoxanthomonas_spadix_BD_a59</i> _uid75113	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
408489715	<i>Psychroflexus_torquis_ATCC_700755</i> _uid54205	CAS-II	9-x-1-2
119945309	<i>Psychromonas_ingrahamii_37</i> _uid58521	CAS-I-E	3 + 3HD-6e-cse2SS-7-5-8e-1-2
374326393	<i>Pyrobaculum_1860</i> _uid82379	CAS-I	4-1-2-4
374326449	<i>Pyrobaculum_1860</i> _uid82379	CAS-I-A	4-2-1-4-R-x-7-5-x-3
18311699	<i>Pyrobaculum_aerophilum_IM2</i> _uid57727	CAS-I-A	3HD-3-x-x-x-6-csa3-x-4-2-1-4
18311772	<i>Pyrobaculum_aerophilum_IM2</i> _uid57727	CAS-I-A	6-4-2-1-4-csa3-x-8a2-3HD-3-5-7-csa5SS-6
145591351	<i>Pyrobaculum_arsenaticum_DSM_13514</i> _uid58409	CAS-III-B	cmr6g7-cmr1g7-cmr5SS-cmr4g7-10-cmr3g5-csx1-4-2-1-4-R-x-7-5-x-3-3HD-x-6
126459887	<i>Pyrobaculum_calidifontis_JCM_11548</i> _uid58787	CAS-III-B	3HD-3-x-5-7-x-R-4-1-2-4-6-x-csx1-csm6-x-cmr3g5-10-cmr4g7
171185047	<i>Pyrobaculum_neutrophilum_V24Sta</i> _uid58421	CAS-I	csx1-x-x-x-4-2-1-4
171185597	<i>Pyrobaculum_neutrophilum_V24Sta</i> _uid58421	CAS-I	8a2-x-3-5-7-x-R-4-1-2-4-x-csm6-x-x-x-csm3g7-csm4g5
379004063	<i>Pyrobaculum_oguniense_TE7</i> _uid84411	Unknown	4-1-2-x-x-x-6
379004113	<i>Pyrobaculum_oguniense_TE7</i> _uid84411	CAS-III-B	8a2-x-3-5-7-x-R-4-1-2-4-csx1-cmr3g5-10-cmr4g7-cmr5SS-cmr1g7-cmr6g7
332159453	<i>Pyrococcus_NA2</i> _uid66551	CAS-I-A	2-1-4-x-8a2-x-3-5-7-x-R
389851559	<i>Pyrococcus_ST04</i> _uid167261	CAS-III-A	csm5g7-csm4g5-csm3g7-csm2SS-10-6-x-3-4-2-1
397651620	<i>Pyrococcus_furiosus_COM1</i> _uid169620	CAS-III-B	2-1-4-3-5-7-8a1-cmr6g7-cmr5SS-cmr4g7-csx1-cmr3g5
18977490	<i>Pyrococcus_furiosus_DSM_3638</i> _uid57873	CAS-III-B	2-1-4-3-5-7-8b-cmr6g7-cmr5SS-cmr4g7-csm6-cmr3g5
14590110	<i>Pyrococcus_horikoshii_OT3</i> _uid57753	CAS-III-A	10-csm2SS-csm3g7-csm4g5-csm5g7-csm6-8b-7-5-x-1-2-4-3-csx1
14591064	<i>Pyrococcus_horikoshii_OT3</i> _uid57753	CAS-I-A	2-1-4-4-3-5-7-8a1-6
337284443	<i>Pyrococcus_yayanosii_CH1</i> _uid68281	CAS-I-A	6-8a1-7-5-3 + 3HD-4-1-csa5SS-7-5-8a2-3-3HD-R-6-2
337284924	<i>Pyrococcus_yayanosii_CH1</i> _uid68281	CAS-III-A	csm3g7-csm4g5-csm5g7-csx1-x-7-5-x-x-1-2-4-3
347523053	<i>Pyrolobus_fumariorum_1A</i> _uid73415	CAS-I-A	4-x-x-x-x-2-1-4-R-x-x-3HD-3-8a2-5-7-csa5SS
383189738	<i>Rahnella_aquatilis_CIP_78_65</i> _ATCC_33071_uid86855	CAS-I-F	1-3f-8f-5f-7f-6f
300703390	<i>Ralstonia_solanacearum_CFBP2957</i> _uid50545	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
386332757	<i>Ralstonia_solanacearum_Po82</i> _uid162133	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
337281134	Ramlibacter_tataouinensis_TTB310_uid68279	CAS-I-C	3-5-8c-7-4-1-2
294676823	Rhodobacter_capsulatus_SB_1003_uid47509	CAS-III-A	RT-x-x-x-x-x-10-csm3g7-csm3g7-2-1 + RT-RT-6
294676849	Rhodobacter_capsulatus_SB_1003_uid47509	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
221640061	Rhodobacter_sphaeroides_KD131_uid59277	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
89885834	Rhodoferax_ferrireducens_T118_uid58353	CAS-I-E	1-6e-csf3g5-csf2g7-x-csf1g8-DinG
89902666	Rhodoferax_ferrireducens_T118_uid58353	CAS-I-C	3-5-8c-7-x-4-1-2
312113992	Rhodomicrobium_vannielii_ATCC_17100_uid43247	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
312114617	Rhodomicrobium_vannielii_ATCC_17100_uid43247	CAS-III-A	RT-2-1-csm3g7-csx19-csm3g7-csm3g7-10-x-csm6-csx1-x-csx16
90425960	Rhodopseudomonas_palustris_BisB18_uid58443	CAS-II	2-1-9
91975510	Rhodopseudomonas_palustris_BisB5_uid58441	CAS-II	9-1
316934446	Rhodopseudomonas_palustris_DX_1_uid43327	CAS-I-C	3 + 3HD-x-8c-7-4-1-2
209966592	Rhodospirillum_centenum_SW_uid58805	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
209966743	Rhodospirillum_centenum_SW_uid58805	CAS-III-B	10-cmr3g5-cmr4g7-cmr5SS-cmr1g7 + cmr6g7-csx1-1-2
384261706	Rhodospirillum_photometricum_uid159003	CAS-I-E	6e-5-7-cse2SS-8e-3 + 3HD-2-1
384262419	Rhodospirillum_photometricum_uid159003	CAS-I-E	2-1-6e-5-7-8e-3 + 3HD
83591509	Rhodospirillum_rubrum_ATCC_11170_uid57655	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3-x-x-2-1 + 4-csb2-x-x-csm3g7-csm3g7-csm3g7-10
83591519	Rhodospirillum_rubrum_ATCC_11170_uid57655	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3-x-x-2-1 + 4-csb2-x-x-csm3g7-csm3g7-csm3g7-10
83591687	Rhodospirillum_rubrum_ATCC_11170_uid57655	CAS-I-E	3 + 3HD-8e-x-cse2SS-7-5-6e-1-2
83592169	Rhodospirillum_rubrum_ATCC_11170_uid57655	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
83592490	Rhodospirillum_rubrum_ATCC_11170_uid57655	CAS-III-A	csm3g7-csm3g7-csm3g7-10-6-2-1
386348188	Rhodospirillum_rubrum_F11_uid162149	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3 + 3HD-x-x-2-1 + 4-x-x-csm3g7 + x-csm3g7-csm3g7
386348198	Rhodospirillum_rubrum_F11_uid162149	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3 + 3HD-x-x-2-1 + 4-x-x-csm3g7 + x-csm3g7-csm3g7
386348372	Rhodospirillum_rubrum_F11_uid162149	CAS-I-E	3 + 3HD-x-8e-x-cse2SS-7-5-6e-1-2
386348878	Rhodospirillum_rubrum_F11_uid162149	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
386349209	Rhodospirillum_rubrum_F11_uid162149	CAS-III-A	csm3g7-cmr3g5 + csm3g7-10-6-2-1
268316057	Rhodothermus_marinus_DSM_4252_uid41729	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
268317185	Rhodothermus_marinus_DSM_4252_uid41729	CAS-III-A	2-1-x-csx1-csm5g7-csm4g5-csm3g7-csm2SS-10-4-3-5
268318378	Rhodothermus_marinus_DSM_4252_uid41729	CAS-III-U	csx1-csx20-x-x-csx1-csx1-6-x-2-1 + 4
268318441	Rhodothermus_marinus_DSM_4252_uid41729	Unknown	2-1 + 4
345303027	Rhodothermus_marinus_SG0_5JP17_172_uid72767	CAS-III-A	5g10-x-csm3g7-csm3g7-x-csm3g7-x-csx1-csx1-x-1-2-10-csm2SS-csm3g7-csm4g5-csm5g7 + x-csx1
345301858	Rhodothermus_marinus_SG0_5JP17_172_uid72767	Unknown	csx1-x-x-x-csx1-csx1-6-x-2-1 + 4-x-x-x-x-x-x-csx1

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective cas genes)
383485593	Riemerella_anatipestifer_ATCC_11845__DSM_15868_uid159857	CAS-II	2-1-9
313206287	Riemerella_anatipestifer_ATCC_11845__DSM_15868_uid60727	CAS-II	2-1
407451860	Riemerella_anatipestifer_RA_CH_1_uid175469	CAS-II	9-1-2
442314524	Riemerella_anatipestifer_RA_CH_2_uid186548	CAS-II	9-1-2
386321728	Riemerella_anatipestifer_RA_GD_uid162013	CAS-II	9-1-2
427738347	Rivularia_PCC_7116_uid182929	Unknown	1-2
347532818	Roseburia_hominis_A2_183_uid73419	CAS-I-C	2-1-4-7-8c-5-3 + 3HD
148654810	Roseiflexus_RS_1_uid58523	CAS-I-E	1-6e-5-7-cse2SS-8e-3 + 3HD
148656004	Roseiflexus_RS_1_uid58523	CAS-III-U	csm3g7-10-csx1-csx1-csx3-8b-7-5-3-6-1-2-4
148657121	Roseiflexus_RS_1_uid58523	CAS-III-U	2-x-1-RT-x-x-x-csx15-csx1-x-csx1
148658413	Roseiflexus_RS_1_uid58523	CAS-I-C	2-1-4-7-8c-5-3 + 3HD
156741961	Roseiflexus_castenholzii_DSM_13941_uid58287	CAS-III-A	10-csm2SS-csm3g7-csm4g5-csm5g7-csx1-6-1-2
156742636	Roseiflexus_castenholzii_DSM_13941_uid58287	Unknown	2-x-1-x-x-x-csx15-csx1-x-csx1
156743243	Roseiflexus_castenholzii_DSM_13941_uid58287	CAS-I	5g10 + csm3g7-10-csx1-csx1 + x-csx3 + x-8a1-7-5-3-6-1-2-4
283458258	Rothia_mucilaginoso_uid43093	CAS-I-U	csb3-3-5b6-x-csb1-2-1 + 4
383756542	Rubrivivax_gelatinosus_IL144_uid158163	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3 + 3HD
108803109	Rubrobacter_xylanophilus_DSM_9941_uid58057	CAS-III-B	2-1-csm6-cmr6g7-cmr5SS-cmr4g7-cmr3g5-10-cmr1g7-csx1-4-3 + 3HD
317055826	Ruminococcus_albus_7_uid51721	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
338214362	Runella_slithiformis_DSM_19594_uid68317	CAS-I	6-6-x-3 + 3HD-x-x-7-x-x-4-1-2
257055744	Saccharomonospora_viridis_DSM_43017_uid59055	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
257055753	Saccharomonospora_viridis_DSM_43017_uid59055	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3 + 3HD
134101617	Saccharopolyspora_erythraea_NRRL_2338_uid62947	CAS-III-A	1 + 4-2-x-x-x-csm3g7-cmr3g5-csm3g7-10
433603791	Saccharothrix_espanaensis_DSM_44229_uid184826	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3 + 3HD
159037600	Salinispora_arenicola_CNS_205_uid58659	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
159038158	Salinispora_arenicola_CNS_205_uid58659	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
145593555	Salinispora_tropica_CNB_440_uid58565	CAS-III-A	2-1-4-3 + 3HD-5-7-x-6-csm3g7-csm3g7-5g10 + csm3g7-10
340000487	Salmonella_bongori_NCTC_12419_uid70155	CAS-I-E	2-1-6e-7-cse2SS-8e-3
197248534	Salmonella_enterica_serovar_Agona_SL483_uid59431	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
62181440	Salmonella_enterica_serovar_Choleraesuis_SC_B67_uid58017	CAS-I-E	2-1-6e-5-7-cse2SS
198243044	Salmonella_enterica_serovar_Dublin_CT_02021853_uid58917	CAS-I-E	2-1-6e-5-7-cse2SS-8e
207858198	Salmonella_enterica_serovar_Enteritidis_P125109_uid59247	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
205353879	Salmonella_enterica_serovar_Gallinarum_287_91_uid59249	CAS-I-E	2-1-6e-5-7-cse2SS-8e
378956558	Salmonella_enterica_serovar_Gallinarum_pullorum_RKS5078_uid87035	CAS-I-E	1-6e-5-7-cse2SS-8e-3
386592622	Salmonella_enterica_serovar_Heidelberg_B182_uid162195	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
194448225	Salmonella_enterica_serovar_Heidelberg_SL476_uid58973	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
194444085	Salmonella_enterica_serovar_Newport_SL254_uid58831	CAS-I-E	2-1-6e-5-7-cse2SS-8e
197363813	Salmonella_enterica_serovar_Paratyphi_A_AKU_12601_uid59269	CAS-I-E	2-1-6e-5-7-cse2SS
56414885	Salmonella_enterica_serovar_Paratyphi_A_ATCC_9150_uid58201	CAS-I-E	2-1-6e-5-7-cse2SS
224584717	Salmonella_enterica_serovar_Paratyphi_C_RKS4594_uid59063	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
194734989	Salmonella_enterica_serovar_Schwarzengrund_CVM19633_uid58915	CAS-I-E	2-1-6e-5-7-cse2SS-8e
16761710	Salmonella_enterica_serovar_Typhi_CT18_uid57793	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
378961003	<i>Salmonella_enterica_serovar_Typhi_P_stx_12_uid87001</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
29143194	<i>Salmonella_enterica_serovar_Typhi_Ty2_uid57973</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
378451691	<i>Salmonella_enterica_serovar_Typhimurium_140285_uid86059</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
383497609	<i>Salmonella_enterica_serovar_Typhimurium_798_uid158047</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
16766244	<i>Salmonella_enterica_serovar_Typhimurium_LT2_uid57799</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
378700849	<i>Salmonella_enterica_serovar_Typhimurium_SL1344_uid86645</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
379702192	<i>Salmonella_enterica_serovar_Typhimurium_ST4_74_uid84393</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
378985528	<i>Salmonella_enterica_serovar_Typhimurium_T000240_uid84397</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
378990262	<i>Salmonella_enterica_serovar_Typhimurium_UK_1_uid87049</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
378446294	<i>Salmonella_enterica_serovar_Typhimurium_uid86061</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
379728404	<i>Saprosira_grandis_Lewin_uid89375</i>	Unknown	2-x-1
383753766	<i>Selenomonas_ruminantium_lactilytica_TAM6421_uid157247</i>	CAS-I-F	1-3f-8f-5f-7f-6f
330839805	<i>Selenomonas_sputigena_ATCC_35185_uid55329</i>	CAS-I-C	2-1-4-7-8c-5-3 + 3HD
440229170	<i>Serratia_marcescens_FGI94_uid185180</i>	CAS-I-F	1-3f-8f-5f-7f-6f
120598999	<i>Shewanella_W3_18_1_uid58341</i>	CAS-I-F	DinG-6f-7f-5f-8f-3f-1
153001750	<i>Shewanella_baltica_OS185_uid58743</i>	CAS-I-F	6f-7f-5f-8f-3f-1
160876483	<i>Shewanella_baltica_OS195_uid58261</i>	CAS-I-F	6f-7f-5f-8f-3f-1
378709684	<i>Shewanella_baltica_OS678_uid50553</i>	CAS-I-F	6f-7f-5f-8f-3f-1
386313929	<i>Shewanella_putrefaciens_200_uid161927</i>	CAS-I-F	DinG-6f-x-x-3 + 3f-1
146292917	<i>Shewanella_putrefaciens_CN_32_uid58267</i>	CAS-I-F	1-3 + 3f-x-x-6f-DinG
82545172	<i>Shigella_boydii_Sb227_uid58215</i>	CAS-I-E	3-8e-cse2SS-7-5-6e-1-2
430741373	<i>Singulisphaera_acidiphila_DSM_18658_uid81777</i>	CAS-I-C	2-1 + 4-5-7-8c + 8c2-3 + 3HD-6
162457462	<i>Sorangium_cellulosum_So_ce_56_uid61629</i>	CAS-I-C	6-3-8c-7-5-1-2
269929332	<i>Sphaerobacter_thermophilus_DSM_20745_uid41997</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3 + 3HD
374317550	<i>Sphaerochaeta_pleomorpha_Grapes_uid82365</i>	CAS-I-C	3-5-8c-7-4-1-2
347528128	<i>Sphingobium_SYK_6_uid73353</i>	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
325972002	<i>Spirochaeta_Buddy_uid63633</i>	CAS-II	2-1-9
383789641	<i>Spirochaeta_africana_DSM_8902_uid81779</i>	CAS-I-F	1-3f-8f-5f-7f-6f
339500527	<i>Spirochaeta_caldaria_DSM_7334_uid68753</i>	CAS-I-C	2-1-4-7-8c-5-3 + 3HD
330837093	<i>Spirochaeta_coccoides_DSM_17374_uid66331</i>	CAS-I-E	3-8e-cse2SS-6e-7-5-1-2
330837112	<i>Spirochaeta_coccoides_DSM_17374_uid66331</i>	CAS-I-F	6f-7f-5f-8f-3f-1
302337595	<i>Spirochaeta_smaragdinae_DSM_11293_uid51369</i>	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
307718095	<i>Spirochaeta_thermophila_DSM_6192_uid53037</i>	CAS-I-C	3-5-x-7-4-1-2
386346101	<i>Spirochaeta_thermophila_DSM_6578_uid162041</i>	CAS-I-C	1-2
386346444	<i>Spirochaeta_thermophila_DSM_6578_uid162041</i>	CAS-I-D	3 + x-3HD-x-x-csc2g7-x-4-2-1-x-x-x-6
284040851	<i>Spirosoma_linguale_DSM_74_uid43413</i>	CAS-I-B	8-7-5-3-6-1-2-4
434397028	<i>Stanieria_cyanosphaera_PCC_7437_uid183115</i>	CAS-III-B	1-x-cmr1g7 + cmr6g7-x-cmr4g7-cmr3g5-2
434399186	<i>Stanieria_cyanosphaera_PCC_7437_uid183115</i>	CAS-I-C	2-1 + 4-5-7-8c + 8c2-3 + 3HD-6
434408292	<i>Stanieria_cyanosphaera_PCC_7437_uid183115</i>	CAS-I-D	2-1-4-6-csc1g5-csc2g7-10d-x-3
404477384	<i>Staphylococcus_aureus_08BA02176_uid175257</i>	CAS-III-A	1-2-10-csm2SS-csm3g7-csm4g5-csm5g7-csm6-6
379794576	<i>Staphylococcus_aureus_MSHR1132_uid89393</i>	CAS-III-A	1-2-10-csm2SS-csm3g7-csm4g5-csm5g7-csm6-6
57865886	<i>Staphylococcus_epidermidis_RP62A_uid57663</i>	CAS-III-A	6-csm6-csm5g7-csm4g5-csm3g7-csm2SS-10-2-1
289549397	<i>Staphylococcus_lugdunensis_HKU09_01_uid46233</i>	CAS-III-A	1-2-10-csm2SS-csm3g7-csm4g5-csm5g7-csm6-csm6-6

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
385783005	<i>Staphylococcus lugdunensis</i> _N920143_uid162143	CAS-III-A	1-2-10-csm25S-csm3g7-csm4g5-csm5g7-6
386318631	<i>Staphylococcus pseudintermedius</i> _ED99_uid162109	CAS-II	9-1-2
126465226	<i>Staphylothermus marinus</i> _F1_uid58719	CAS-I-A	csm3g7-csm4g5-csm5g7-10-x-x-1-4-2-4-6-R-csa55S-7-5-csa8a2-3
269123825	<i>Streptobacillus moniliformis</i> _DSM_12112_uid41863	CAS-II	2-1-9
22537058	<i>Streptococcus agalactiae</i> _2603V_R_uid57943	CAS-II-A	9-1-2-csn2
76786845	<i>Streptococcus agalactiae</i> _A909_uid57935	CAS-II-A	9-1-2-csn2
406709384	<i>Streptococcus agalactiae</i> _GD201008_001_uid175780	CAS-II-A	9-1-2-csn2
25010966	<i>Streptococcus agalactiae</i> _NEM316_uid61585	CAS-II-A	9-1-2-csn2
410594451	<i>Streptococcus agalactiae</i> _SA20_06_uid178722	CAS-II-A	9-1-2-csn2
410494912	<i>Streptococcus dysgalactiae equisimilis</i> _AC_2713_uid178644	CAS-II-A	csn2-2-1-9
410495372	<i>Streptococcus dysgalactiae equisimilis</i> _AC_2713_uid178644	CAS-I-C	2-1-4-7-8c-5-3
386317165	<i>Streptococcus dysgalactiae equisimilis</i> _ATCC_12394_uid161979	CAS-II-A	csn2-2-1-9
386317483	<i>Streptococcus dysgalactiae equisimilis</i> _ATCC_12394_uid161979	CAS-I-C	2-1-4-7-8c-5-3
251782636	<i>Streptococcus dysgalactiae equisimilis</i> _GG5_124_uid59103	CAS-II-A	csn2-2-1-9
408401786	<i>Streptococcus dysgalactiae equisimilis</i> _RE378_uid176684	CAS-II-A	csn2-2-1-9
408402093	<i>Streptococcus dysgalactiae equisimilis</i> _RE378_uid176684	CAS-I-C	2-1-4-7-8c-5-3
414563500	<i>Streptococcus equi zooepidemicus</i> _ATCC_35246_uid162155	CAS-I-C	3 + x-x-5-8c-7-4-1-2
195977694	<i>Streptococcus equi zooepidemicus</i> _MGCS10565_uid59263	CAS-I-C	3-5-8c-7-4-1-2
195978434	<i>Streptococcus equi zooepidemicus</i> _MGCS10565_uid59263	CAS-II-A	csn2-2-1-9
225869002	<i>Streptococcus equi zooepidemicus</i> _uid59261	CAS-I-C	2-1-4-7-8c-5-3
386338080	<i>Streptococcus gallolyticus</i> _ATCC_43143_uid162103	CAS-II	2-1-9
386338090	<i>Streptococcus gallolyticus</i> _ATCC_43143_uid162103	CAS-II-A	csn2-2-1-9
325978668	<i>Streptococcus gallolyticus</i> _ATCC_BAA_2069_uid63617	CAS-II-A	csn2-2-1-9
288905631	<i>Streptococcus gallolyticus</i> _UCN34_uid46061	CAS-II-A	2-1-9-x-x-x-csn2-2-1-9
288905638	<i>Streptococcus gallolyticus</i> _UCN34_uid46061	CAS-II-A	2-1-9-x-x-x-csn2-2-1-9
157149930	<i>Streptococcus gordonii</i> _Challis_substr_CH1_uid57667	CAS-II	2-1-9
379705579	<i>Streptococcus infantarius</i> _CJ18_uid87033	CAS-II-A	csn2-2-1-9
374338349	<i>Streptococcus macedonicus</i> _ACA_DC_198_uid81631	CAS-II	2-1-9
397650021	<i>Streptococcus mutans</i> _GS_5_uid169223	CAS-II-A	csn2-2-1-9
397650106	<i>Streptococcus mutans</i> _GS_5_uid169223	CAS-I-E	2 + x-1-6e-5-7-cse25S-3 + 3HD
387785565	<i>Streptococcus mutans</i> _LJ23_uid162197	CAS-I-C	3-5-8c-7-4-1-2
387785883	<i>Streptococcus mutans</i> _LJ23_uid162197	CAS-II-A	9-1-2-csn2
290580135	<i>Streptococcus mutans</i> _NN2025_uid46353	CAS-I-E	3 + 3HD-8e-cse25S-7-5-6e-1-2
290580221	<i>Streptococcus mutans</i> _NN2025_uid46353	CAS-II-A	9-1-2-csn2
24379808	<i>Streptococcus mutans</i> _UA159_uid57947	CAS-II-A	csn2-2-1-9
337281888	<i>Streptococcus parasanguinis</i> _ATCC_15912_uid49313	CAS-I-C	3-5-8c-7-4-1-2
336064610	<i>Streptococcus pasteurianus</i> _ATCC_43144_uid68019	CAS-II	2-1-9
410680444	<i>Streptococcus pyogenes</i> _A20_uid178106	CAS-II-A	9-1-2-csn2
410680951	<i>Streptococcus pyogenes</i> _A20_uid178106	CAS-I-C	2-1-4-7-8c-5-3
15675042	<i>Streptococcus pyogenes</i> _M1_GAS_uid57845	CAS-II-A	9-1-2-csn2
15675454	<i>Streptococcus pyogenes</i> _M1_GAS_uid57845	CAS-I-C	2-1-4-7-8c-5-3
94990396	<i>Streptococcus pyogenes</i> _MGAS10270_uid58571	CAS-II-A	9-1-2-csn2
94994318	<i>Streptococcus pyogenes</i> _MGAS10750_uid58575	CAS-II-A	9-1-2-csn2
94994789	<i>Streptococcus pyogenes</i> _MGAS10750_uid58575	CAS-I-C	2-1-4-7-8c-5-x-3
383479947	<i>Streptococcus pyogenes</i> _MGAS15252_uid158037	CAS-II-A	9-1-2-csn2
383493862	<i>Streptococcus pyogenes</i> _MGAS1882_uid158061	CAS-II-A	9-1-2-csn2
94992341	<i>Streptococcus pyogenes</i> _MGAS2096_uid58573	CAS-II-A	9-1-2-csn2

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
94992802	<i>Streptococcus pyogenes</i> _MGAS2096_uid58573	CAS-I-C	2-1-4-7-8c-5-3
21910214	<i>Streptococcus pyogenes</i> _MGAS315_uid57911	CAS-II-A	9-1-2-csn2
71910583	<i>Streptococcus pyogenes</i> _MGAS5005_uid58337	CAS-II-A	9-1-2-csn2
71911099	<i>Streptococcus pyogenes</i> _MGAS5005_uid58337	CAS-I-C	2-1-4-7-8c-5-3
71903414	<i>Streptococcus pyogenes</i> _MGAS6180_uid58335	CAS-II-A	9-1-2-csn2
71903952	<i>Streptococcus pyogenes</i> _MGAS6180_uid58335	CAS-I-C	2-1-4-7-8c-5-3
94988517	<i>Streptococcus pyogenes</i> _MGAS9429_uid58569	CAS-II-A	9-1-2-csn2
94988910	<i>Streptococcus pyogenes</i> _MGAS9429_uid58569	CAS-I-C	2-1-4-7-8c-5-3
209559357	<i>Streptococcus pyogenes</i> _NZ131_uid59035	CAS-II-A	9-1-2-csn2
209559719	<i>Streptococcus pyogenes</i> _NZ131_uid59035	CAS-I-C	2-1-4-7-8c-5-3
28896087	<i>Streptococcus pyogenes</i> _SSI_1_uid57895	CAS-II-A	csn2-2-1-9
387761326	<i>Streptococcus salivarius</i> _57_I_uid162151	CAS-I-E	2 + x-1-6e-5-7-cse2SS-8e-3 + 3HD
340398858	<i>Streptococcus salivarius</i> _CCHSS3_uid70481	CAS-I-E	2 + x-1-6e-5-7-cse2SS-8e-3 + 3HD
387783793	<i>Streptococcus salivarius</i> _JIM8777_uid162145	CAS-II	9-1-2
386584495	<i>Streptococcus suis</i> _D9_uid162125	CAS-II	2-1-9
389856935	<i>Streptococcus suis</i> _ST1_uid167482	CAS-II-A	csn2-2-1-9
330833103	<i>Streptococcus suis</i> _ST3_uid66327	CAS-II	2-1-9
55822628	<i>Streptococcus thermophilus</i> _CNRZ1066_uid58221	CAS-II	9-1-2
386344354	<i>Streptococcus thermophilus</i> _JIM_8232_uid162157	CAS-II	9-1-2
386344649	<i>Streptococcus thermophilus</i> _JIM_8232_uid162157	CAS-III-A	1-2-6-10-csm2SS-csm3g7-csm4g5-csm5g7-csm6-csm6
116627543	<i>Streptococcus thermophilus</i> _LMD_9_uid58327	CAS-II	9-1-2
116627764	<i>Streptococcus thermophilus</i> _LMD_9_uid58327	CAS-III-A	1-2-6-csm2SS-csm3g7-csm4g5-csm5g7-x-csm6
116628212	<i>Streptococcus thermophilus</i> _LMD_9_uid58327	CAS-II-A	csn2-2-1-9
55820736	<i>Streptococcus thermophilus</i> _LMG_18311_uid58219	CAS-II	9-1-2
387909442	<i>Streptococcus thermophilus</i> _MN_ZLW_002_uid166827	CAS-II	9-1-2
387909738	<i>Streptococcus thermophilus</i> _MN_ZLW_002_uid166827	CAS-III-A	csm6-csm5g7-csm4g5-csm3g7-csm2SS-10-6-2-1
387910219	<i>Streptococcus thermophilus</i> _MN_ZLW_002_uid166827	CAS-II-A	csn2-2-1-9
386086349	<i>Streptococcus thermophilus</i> _ND03_uid162015	CAS-II	9-1-2
386086605	<i>Streptococcus thermophilus</i> _ND03_uid162015	CAS-III-A	1-2-6-10-csm2SS-csm3g7-csm4g5-csm5g7-x-csm6
386087119	<i>Streptococcus thermophilus</i> _ND03_uid162015	CAS-II-A	csn2-2-1-9
29834079	<i>Streptomyces avermitilis</i> _MA_4680_uid57739	CAS-I-E	1-6e-5-7-cse2SS-8e-3
357409215	<i>Streptomyces flavogriseus</i> _ATCC_33331_uid40839	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
182437340	<i>Streptomyces griseus</i> _NBRC_13350_uid58983	CAS-I-E	3 + 3HD + 8e-cse2SS-7-5-6e-1-2
386835890	<i>Streptomyces hygrosopicus</i> _jinggangensis_5008_uid89409	CAS-I-E	1-6e-5-7-cse2SS-8e-3 + 3HD
379008964	<i>Sulfobacillus acidophilus</i> _DSM_10332_uid88061	CAS-I-B	2-1-4-3 + 3HD-5-x-x-6
339628806	<i>Sulfobacillus acidophilus</i> _TPY_uid68841	CAS-I-B	2-1-4-3 + 3HD-5-x-x-6
70607609	<i>Sulfolobus acidocaldarius</i> _DSM_639_uid58379	CAS-I-D	3-csc1g5-csc2g7-10d-R-6-x-2-4-1-x-x-x-x-x-x-x-csm3g7
70607733	<i>Sulfolobus acidocaldarius</i> _DSM_639_uid58379	Unknown	6-x-2-1-4
385772426	<i>Sulfolobus islandicus</i> _HVE10_4_uid162067	CAS-I-A	6-csaXg8-3HD-3-5-7-csa5SS-R-4-1-2-4-R
385772765	<i>Sulfolobus islandicus</i> _HVE10_4_uid162067	CAS-I-D	3-csc1g5-csc2g7-x-R-6-1-x-x-x-x-x-x-x-4
284997246	<i>Sulfolobus islandicus</i> _L_D_8_5_uid43679	CAS-I-A	cmr4g7-csx1-x-x-x-x-x-4-1-2-4-R-R-csa5SS-7-5-3-3HD-csaXg8

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
284997293	<i>Sulfolobus_islandicus_L_D_8_5_uid43679</i>	CAS-I-D	3-csc1g5-csc2g7-x-x-R-6-x-1
227829656	<i>Sulfolobus_islandicus_L_S_2_15_uid58871</i>	CAS-I-A	csm3g7-10-csm3g7-x-csm3g7-x-x-2-csx1-4-1-2-4-R-R-csa55S-7-5-3-3HD-csaXg8
227827183	<i>Sulfolobus_islandicus_M_14_25_uid58849</i>	CAS-I	7-5-x-3-3HD-2-1-6-x-csx1-x-4-4-csm3g7-x-csm3g7-10
227827211	<i>Sulfolobus_islandicus_M_14_25_uid58849</i>	CAS-I-A	csm6-x-x-x-R-4-2-1-4-R-csa55S-7-5-3-3HD-csaXg8-6
229584404	<i>Sulfolobus_islandicus_M_16_27_uid58851</i>	CAS-III-A	7-5-x-3-3HD-2-1-6-x-csx1-4-4-csm3g7-x-csm3g7-10-csm3g7
229584430	<i>Sulfolobus_islandicus_M_16_27_uid58851</i>	CAS-I-A	csm6-x-x-x-x-4-1-2-4-R-R-csa55S-7-5-3-3HD-csaXg8
238619345	<i>Sulfolobus_islandicus_M_16_4_uid58841</i>	CAS-I-A	cmr4g7-csx1-x-x-csm6-x-x-x-4-1-2-4-R
385775488	<i>Sulfolobus_islandicus_REY15A_uid162071</i>	CAS-I-A	4-1-2-4-R-R-csa55S-7-5-3-3HD-csaXg8
229578570	<i>Sulfolobus_islandicus_Y_G_57_14_uid58923</i>	CAS-I-A	cmr3g5-x-x-x-R-4-2-x-x-1-4-R-csa55S-7-5-3-3HD-csaXg8-6
229582665	<i>Sulfolobus_islandicus_Y_N_15_51_uid58825</i>	CAS-I-A	csaXg8-3HD-3-5-7-csa55S-R-R-4-2-1-4-x-x-x-x-csx1
384434706	<i>Sulfolobus_solfataricus_98_2_uid167998</i>	CAS-I-A	csx1-x-7-5-x-3-3HD-2-1-6-x-x-x-x-4-2-1-4
15898245	<i>Sulfolobus_solfataricus_P2_uid57721</i>	CAS-I-A	csx1-csa55S-7-5-csaXg8-3-3HD-2-1-6
15898286	<i>Sulfolobus_solfataricus_P2_uid57721</i>	CAS-I-A	csaXg8-3HD-3-5-7-csa55S-R-R-x-4-1-4
15920199	<i>Sulfolobus_tokodaii_7_uid57807</i>	CAS-I-A	csx1-x-x-x-4-csx1-x-x-2-1-4-x-7-5-x-3-x-6
15922975	<i>Sulfolobus_tokodaii_7_uid57807</i>	CAS-I-A	R-4-1-2-4-x-x-csa55S-7-5-3-3HD-csaXg8
188996612	<i>Sulfurihydrogenibium_YO3AOP1_uid58855</i>	CAS-I-B	6-x-8a1-7-5-3 + 3HD-4-1-2
225848645	<i>Sulfurihydrogenibium_azorense_Az_Fu1_uid58121</i>	CAS-I-B	6-8a1-7-5-3 + 3HD-4-1-2
390940098	<i>Sulfurospirillum_barnesii_SES_3_uid168117</i>	CAS-I-B	6-x-x-5-3-4-1-2
268679538	<i>Sulfurospirillum_deleyianum_DSM_6946_uid41861</i>	CAS-I-B	6-x-7-5-3 + 3HD-4-1-2
51891801	<i>Symbiobacterium_thermophilum_IAM_14863_uid58165</i>	CAS-I-E	1-3-8e-cse2SS-7-5-6e
86608317	<i>Synechococcus_JA_2_3B_a_2_13_uid58537</i>	CAS-III-B	2-1-x-cmr1g7 + csm3g7-x-x-cmr4g7-cmr3g5-10-csx1
86605441	<i>Synechococcus_JA_3_3Ab_uid58535</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3 + 3HD
427712290	<i>Synechococcus_PCC_6312_uid182934</i>	CAS-I-C	2-1 + 4-x-x-5-7-8c + 8c2-3 + 3HD-x-x-6
427713845	<i>Synechococcus_PCC_6312_uid182934</i>	CAS-III-B	2-1-x-x-x-cmr1g7 + cmr6g7-x-cmr4g7-cmr3g5-10
170078384	<i>Synechococcus_PCC_7002_uid59137</i>	CAS-I-C	6-3 + 3HD-8c + 8c2-7-x-x-5-1 + 4-2
170079501	<i>Synechococcus_PCC_7002_uid59137</i>	CAS-I-D	2-1-4-6-csc1g5-csc2g7-10d-3
170079607	<i>Synechococcus_PCC_7002_uid59137</i>	CAS-III-B	cmr1g7 + cmr6g7-x-cmr4g7-cmr3g5-10-x-x-x-x-1
428222741	<i>Synechococcus_PCC_7502_uid183008</i>	CAS-III-B	2-1-x-x-csm6-x-cmr1g7 + cmr6g7-x-x-cmr4g7-cmr3g5-10

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
38505684	<i>Synechocystis_PCC_6803_uid57659</i>	CAS-I-D	3-10d-csc2g7-csc1g5-6-4-1-2
38505739	<i>Synechocystis_PCC_6803_uid57659</i>	CAS-III-A	csx1-csm6-csm3g7-x-csm3g7-5g10 + csm3g7-10-6-x-x-1-2
38505760	<i>Synechocystis_PCC_6803_uid57659</i>	CAS-III-B	cmr6g7-cmr5S5-cmr4g7-x-cmr3g5-10-csx18-1-2
116748794	<i>Syntrophobacter_fumaroxidans_MPOB_uid58177</i>	CAS-III-A	csm5g7-csm4g5-csm3g7-csm2S5-10-6-csx20-csx1-x-Prim2-1-2
116750256	<i>Syntrophobacter_fumaroxidans_MPOB_uid58177</i>	CAS-I-E	3 + 3HD-8e-cse2S5-7-5-6e-1-2
325289071	<i>Syntrophobotulus_glycolicus_DSM_8271_uid63343</i>	CAS-I-C	3-5-8c-7-4-1-2
325289514	<i>Syntrophobotulus_glycolicus_DSM_8271_uid63343</i>	CAS-I-B	6-8a1-7-5-3-4-1-2
114566032	<i>Syntrophomonas_wolfei_Goettingen_uid58179</i>	CAS-I-C	3-5-8c-7-4-1-2
114567264	<i>Syntrophomonas_wolfei_Goettingen_uid58179</i>	CAS-III-A	csm6-x-2-1-x-6-csm5g7-csm4g5-csm3g7-csm2S5-10
114567318	<i>Syntrophomonas_wolfei_Goettingen_uid58179</i>	CAS-I-B	2-1-4-3 + 3HD-5-x-x-6
114568021	<i>Syntrophomonas_wolfei_Goettingen_uid58179</i>	CAS-I-B	6-2-1-4-3 + 3HD-5-x-8-8-x-csm3g7-x-csm3g7
297617513	<i>Syntrophothermus_lipocalidus_DSM_12680_uid49527</i>	CAS-III-B	6-x-2-1-4-3 + 3HD-5-7-8a1-x-x-cmr6g7-cmr5S5-cmr4g7
297617712	<i>Syntrophothermus_lipocalidus_DSM_12680_uid49527</i>	CAS-I-C	2-1-4-x-8c-5-3 + 3HD
85858452	<i>Syntrophus_aciditrophicus_SB_uid58539</i>	CAS-III-B	cmr5S5-cmr6g7-csm6-csx1-x-x-x-x-x-1-2-2
85860584	<i>Syntrophus_aciditrophicus_SB_uid58539</i>	CAS-I-C	2-1-4-7-8c-5-3
375256010	<i>Tannerella_forsythia_ATCC_43037_uid83157</i>	CAS-III-A	3-x-x-4-10-csm2S5-csm3g7-csm4g5-csm5g7-csx1-1-2
348589565	<i>Taylorella_asinigenitalis_MCE3_uid73771</i>	CAS-I-F	1-3f
397661233	<i>Taylorella_equigenitalis_ATCC_35865_uid170255</i>	CAS-I-C	3-2-1-4-7-8c-5
254787056	<i>Teredinibacter_turnerae_T7901_uid59267</i>	CAS-I-C	2-1-4-7-8c-5-3
217970636	<i>Thauera_MZ1T_uid58987</i>	CAS-I-E	3 + 3HD-8e-cse2S5-7-5-6e-1-2
410668222	<i>Thermacetogenium_phaeum_DSM_12270_uid177811</i>	CAS-I-D	4-4-2-1-x-x-csc2g7-x-x-3HD-3-x-6
410668744	<i>Thermacetogenium_phaeum_DSM_12270_uid177811</i>	CAS-I-B	6-2-1-4-3 + 3HD-5-x-8-8-csx1-6-x-csm3g7
296133388	<i>Thermincola_potens_JR_uid48823</i>	CAS-I-C	2-1-4-7-8c-5-3 + 3HD
296133514	<i>Thermincola_potens_JR_uid48823</i>	CAS-III-A	2-1-csm6-6-csm5g7-csm4g5-csm3g7-csm2S5-10
296133980	<i>Thermincola_potens_JR_uid48823</i>	CAS-I-B	5g10 + csm3g7-10-csx1-x-x-x-x-x-x-2-1-4-3 + 3HD-5-x-8-8-x-6
307725454	<i>Thermoanaerobacter_X513_uid53065</i>	CAS-I-B	2-1-4-x-x-x-3 + 3HD-5-x-8-6
167040929	<i>Thermoanaerobacter_X514_uid58589</i>	CAS-I-B	2-1-4-x-x-x-3 + 3HD-5-x-8-6
320114993	<i>Thermoanaerobacter_brockii_finnii_Ako_1_uid55639</i>	CAS-I-B	8-x-5-3-x-x-x-x-x-4-1-2
289579423	<i>Thermoanaerobacter_italicus_Ab9_uid46241</i>	CAS-I-B	2-1-4-x-x-x-3-5-x-8
297543518	<i>Thermoanaerobacter_mathranii_A3_uid49481</i>	CAS-I-B	2-1-4-3 + 3HD-5-7-8a1-6
297545564	<i>Thermoanaerobacter_mathranii_A3_uid49481</i>	CAS-I-B	2-1-4-x-x-x-x-x-3 + 3HD-5-x-8
167036565	<i>Thermoanaerobacter_pseudethanolicus_ATCC_33223_uid58339</i>	CAS-I-B	5-3-x-x-x-x-x-x-x-4-1-2
20809002	<i>Thermoanaerobacter_tengcongensis_MB4_uid57813</i>	CAS-I	2-1-4-3 + 3HD-5-7-8a1-6-csx15-csx1 + x-6
345018873	<i>Thermoanaerobacter_wiegellii_Rt8_B1_uid52581</i>	CAS-I-B	2-1-4-x-x-3 + 3HD-5-x-8-x-6
390933511	<i>Thermoanaerobacterium_saccharolyticum_JW_SL_YS485_uid167781</i>	CAS-I-B	2-1-4-x-3 + 3HD-5-x-8-6
304318003	<i>Thermoanaerobacterium_thermosaccharolyticum_DSM_571_uid51639</i>	CAS-I-B	csx1-2-1-4-x-x-x-x-x-3 + 3HD-5-x-8

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
304318086	<i>Thermoanaerobacterium_thermosaccharolyticum_DSM_571_uid51639</i>	CAS-I	6-2-1-4-x-7-x-3 + 3HD
433656210	<i>Thermoanaerobacterium_thermosaccharolyticum_M0795_uid184821</i>	CAS-I-B	2-1-4-x-x-3 + 3HD-5-x-8-6-x-csm3g7
333898074	<i>Thermoanaerobacterium_xylanolyticum_LX_11_uid63163</i>	CAS-I-B	2-1-4-x-3 + 3HD-5-x-8-6-x-csm3g7-csm3g7
333898147	<i>Thermoanaerobacterium_xylanolyticum_LX_11_uid63163</i>	CAS-I-A	6-2-1-4-3-5-7-8a1
430751276	<i>Thermobacillus_composti_KWC4_uid74021</i>	CAS-I-B	5g10 + csm3g7-x-csx1-x-x-x-x-x-2-1-4-3 + 3HD-5-x-x-6
269838937	<i>Thermobaculum_terrenum_ATCC_BAA_798_uid42011</i>	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
269839455	<i>Thermobaculum_terrenum_ATCC_BAA_798_uid42011</i>	CAS-I-B	8a1-x-5-3 + 3HD-4-1-2
72161989	<i>Thermobifida_fusca_YX_uid57703</i>	CAS-I-E	10-cmr3g5-cmr4g7-cmr5SS-cmr6g7-cmr1g7-1-6e-5-7-cse2SS-8e-3 + 3HD-6e-5-7-cse2SS
296269507	<i>Thermobispora_bispora_DSM_43833_uid48999</i>	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
341581203	<i>Thermococcus_4557_uid70841</i>	CAS-I-B	3-4-2-1-5-7-x-6
341581817	<i>Thermococcus_4557_uid70841</i>	CAS-I	6-3 + 3HD-x-x-7-x-4-1-4-2
223476990	<i>Thermococcus_AM4_uid54735</i>	CAS-I-B	2-4-1-4-3-5-7-x-x-6
390960552	<i>Thermococcus_CL1_uid168259</i>	CAS-I-A	6-8a1-7-5-3 + 3HD-4-1-4-2
390961970	<i>Thermococcus_CL1_uid168259</i>	CAS-I-B	3-4-2-1-5-7-x-6
390962116	<i>Thermococcus_CL1_uid168259</i>	CAS-III-A	6-10-csm2SS-csm3g7-csm4g5-csm5g7-R2-csx3-2-1
315230242	<i>Thermococcus_barophilus_MP_uid54733</i>	CAS-I	6-3 + 3HD-x-x-7-5-4-1-2
57640390	<i>Thermococcus_kodakarensis_KOD1_uid58225</i>	CAS-I-A	2-4-6-R-3HD-3-8a2-5-7-csa5SS-1-x-x-4-x-3-5-7-8a1-6
242399467	<i>Thermococcus_sibiricus_MM_739_uid59399</i>	CAS-I-B	6-x-7-5-3 + 3HD-4-1-4-2
337285608	<i>Thermodesulfatator_indicus_DSM_15286_uid68285</i>	CAS-I	cmr4g7 + csm3g7-x-x-x-x-7-5-3 + 3HD-x-4-1-2
337286709	<i>Thermodesulfatator_indicus_DSM_15286_uid68285</i>	CAS-III-B	cmr5SS-cmr4g7-x-x-cmr3g5-10-cmr1g7-x-2-x-1-2-6
337288662	<i>Thermodesulfobacterium_OPB45_uid68283</i>	CAS-III-A	10-csm2SS-csm3g7-csm4g5-csm5g7-6-csx1-x-2-1-2
337288767	<i>Thermodesulfobacterium_OPB45_uid68283</i>	CAS-I-B	6-5-3-4-1-2
332295661	<i>Thermodesulfobium_narugense_DSM_14796_uid66601</i>	CAS-III-A	6-8-x-5-3-4-1-2-x-csx1-10-5g10 + csm3g7 + x-csm3g7-x-csm3g7
332296542	<i>Thermodesulfobium_narugense_DSM_14796_uid66601</i>	CAS-III-A	4-x-2-1-Prim2-csm5g7-csm4g5-csm3g7-csm2SS-10-csx1-csx1-6
206890539	<i>Thermodesulfobivrio_yellowstonii_DSM_11347_uid59257</i>	CAS-III-A	csm2SS-csm3g7-csm4g5-csm5g7-6-x-x-x-x-2-1-1-2
206889641	<i>Thermodesulfobivrio_yellowstonii_DSM_11347_uid59257</i>	CAS-III-B	cmr6g7-10-cmr4g7-x-x-csa5SS-x-7-5-4-1
206889560	<i>Thermodesulfobivrio_yellowstonii_DSM_11347_uid59257</i>	CAS-I-B	2-x-1-4-x-3-5-7-8a1-6
119720226	<i>Thermofilum_pendens_Hrk_5_uid58563</i>	CAS-III-B	cmr3g5-10-cmr6g7-cmr1g7-cmr5SS-cmr4g7-1-2-3-csc1g5-csc2g7-x-10d
389861365	<i>Thermogladius_1633_uid167488</i>	CAS-I-A	6-x-x-4-1-4-R
221632058	<i>Thermomicrobium_roseum_DSM_5159_uid59341</i>	CAS-I-B	6-8b-7-5-3 + 3HD-4-1-2

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
269125191	<i>Thermomonospora_curvata</i> _DSM_43183_uid41885	CAS-I-E	6-x-7-3 + 3HD + 5-4-1-2-x-x-3 + 3HD-8e + cse2SS-7-5-6e-1-2
269125200	<i>Thermomonospora_curvata</i> _DSM_43183_uid41885	CAS-I-E	6-x-7-3 + 3HD + 5-4-1-2-x-x-3 + 3HD-8e + cse2SS-7-5-6e-1-2
269126905	<i>Thermomonospora_curvata</i> _DSM_43183_uid41885	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
13540937	<i>Thermoplasma_volcanium</i> _GSS1_uid57751	CAS-III-A	2-1-csx1-csm5g7-csm4g5-csm3g7-csm2SS-10-6-csm6
302388669	<i>Thermosediminibacter_oceani</i> _DSM_16646_uid51421	CAS-I-B	6-x-5-3 + 3HD-4-1-2-x-x-6
217076447	<i>Thermosiphon_africanus</i> _TCF52B_uid59095	CAS-III-B	cmr3g5-10-cmr1g7-6-csx1-x-x-x-x-2-1-2
217077321	<i>Thermosiphon_africanus</i> _TCF52B_uid59095	CAS-I-B	2-1-4-x-x-3-5-x-8-6
217078000	<i>Thermosiphon_africanus</i> _TCF52B_uid59095	CAS-I-B	2-1-4-3 + 3HD-5-x-8b-6
150020249	<i>Thermosiphon_melanesiensis</i> _BI429_uid58683	CAS-I-B	2-1-4-x-3-5-x-8b-6
150021526	<i>Thermosiphon_melanesiensis</i> _BI429_uid58683	CAS-III-B	2-1-2-x-x-x-csm6-cmr1g7-10-cmr3g5-cmr4g7-cmr5SS
296242547	<i>Thermosphaera_aggregans</i> _DSM_11486_uid48993	CAS-I-A	3HD-3-x-5-7-x-R-R-4-2-1-4
170288818	<i>Thermotoga_RQ2</i> _uid58935	CAS-III-B	csm5g7-x-x-x-x-8a1-7-5-3-4-1-2-cmr1g7-10-cmr3g5-cmr4g7-cmr5SS-cmr6g7
157363075	<i>Thermotoga_lettingae</i> _TMO_uid58419	CAS-I-B	3 + 3HD-5-7-8-2-1-4-6
15644541	<i>Thermotoga_maritima</i> _MSB8_uid57723	CAS-III-B	cmr6g7-cmr4g7-cmr3g5-10-cmr1g7-2-1-4-3-5-7-8a1-x-x-x-x-csm5g7
222099688	<i>Thermotoga_neapolitana</i> _DSM_4359_uid59065	CAS-I-B	6-8a1-7-5-3-4-1-2
148270212	<i>Thermotoga_petrophila</i> _RKU_1_uid58655	CAS-I-B	2-1-4-3 + 3HD-5-7-8a1-6
338730939	<i>Thermotoga_thermarum</i> _DSM_5069_uid68449	CAS-III-B	csx1 + x-csm6-6-x-7-5-3 + 3HD-4-1-2-x-x-x-cmr1g7 + x-x-cmr1g7-10-cmr3g5-csm6
338731442	<i>Thermotoga_thermarum</i> _DSM_5069_uid68449	CAS-I-B	6-4-1-2-8-7-5-3 + 3HD
319790504	<i>Thermovibrio_ammonificans</i> _HB_1_uid62095	Unknown	2-2-2-1
357419113	<i>Thermovirga_lienii</i> _DSM_17291_uid77129	CAS-I-B	6-8a1-8b-x-5-3 + 3HD-4-1-2
384438634	<i>Thermus_CCB_US3_UF1</i> _uid81197	CAS-III-B	cmr6g7-cmr5SS-cmr4g7-cmr1g7-cmr3g5-10-csx1-1-4-4-3 + 3HD-6-8a1-x-x-2
384439730	<i>Thermus_CCB_US3_UF1</i> _uid81197	CAS-III-A	6-10-csm2SS-csm3g7-csm4g5-csm5g7-csx1-2-x-1-csx1
410732171	<i>Thermus_oshimai</i> _JL_2_uid178948	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
320450318	<i>Thermus_scotoductus</i> _SA_01_uid62273	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3 + 3HD
46255267	<i>Thermus_thermophilus</i> _HB27_uid58033	CAS-I-A	2-1-4-x-8a-7-5-6
55978328	<i>Thermus_thermophilus</i> _HB8_uid58223	CAS-III-A	csx1-1-x-10-csm2SS-csm3g7-csm4g5-csm5g7-csx1-x-x-csx1
55978376	<i>Thermus_thermophilus</i> _HB8_uid58223	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
55978407	<i>Thermus_thermophilus</i> _HB8_uid58223	CAS-I	2-1-4-x-x-x-x-3 + x-6
386361489	<i>Thermus_thermophilus</i> _JL_18_uid162129	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
386361517	<i>Thermus_thermophilus</i> _JL_18_uid162129	CAS-I	2-1-4-x-x-x-x-3 + x-6
384432243	<i>Thermus_thermophilus</i> _SG0_5JP17_16_uid159537	CAS-I	2-1-4-x-x-x-x-3 + x-6
384432300	<i>Thermus_thermophilus</i> _SG0_5JP17_16_uid159537	CAS-I-C	3-5-8c-x-4-1-2
289209607	<i>Thioalkalivibrio_K90mix</i> _uid46181	CAS-I-F	1-3f-8f-5f-7f-6f

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
430760780	<i>Thioalkalivibrio_nitratireducens</i> _DSM_14787_uid184011	CAS-III-B	cmr4g7-cmr5SS-cmr6g7-csx1-x-csx1-x-x-6-2-1-1-2
430761718	<i>Thioalkalivibrio_nitratireducens</i> _DSM_14787_uid184011	CAS-I-F	6f-7f-5f-8f-3f-1
220934970	<i>Thioalkalivibrio_sulfidophilus</i> _HL_EbGr7_uid59179	CAS-III-B	cmr1g7-10-cmr3g5-cmr4g7-cmr5SS-cmr6g7-csx1-x-csx1-x-1-2-x-csx1
220935599	<i>Thioalkalivibrio_sulfidophilus</i> _HL_EbGr7_uid59179	CAS-I-U	2-1 + 4-x-x-x-x-csb2-7-8x1-3
390948892	<i>Thiocystis_violascens</i> _DSM_198_uid74025	CAS-I-E	3-8e-cse2SS-7-5-6e-x-x-1-2
390949470	<i>Thiocystis_violascens</i> _DSM_198_uid74025	CAS-I-E	2-1-6e-5-7-x-8e-3 + 3HD
390952676	<i>Thiocystis_violascens</i> _DSM_198_uid74025	CAS-III-B	4-2-1-x-x-x-cmr3g5-10-cmr1g7-csx1
431929780	<i>Thioflavicoccus_mobilis</i> _8321_uid184343	CAS-III-B	cmr4g7-cmr3g5-10-cmr1g7-csx1-x-x-x-2-2-1-RT
431930657	<i>Thioflavicoccus_mobilis</i> _8321_uid184343	CAS-I-U	2-1 + 4-x-3-csb2-csb1
389875622	<i>Tistrella_mobilis</i> _KA081020_065_uid167486	CAS-III-A	10-cmr4g7-csm3g7-csm3g7-6-x-1 + RT-2
389874620	<i>Tistrella_mobilis</i> _KA081020_065_uid167486	CAS-I-C	2-1-4-7-8c-5-3 + 3HD
389874753	<i>Tistrella_mobilis</i> _KA081020_065_uid167486	CAS-II	2-1-9
237808119	<i>Tolomonas_auensis</i> _DSM_9187_uid59395	CAS-I-F	1-3f-8f-5f-7f-6f
333996012	<i>Treponema_azotonutricium</i> _ZAS_9_uid67365	CAS-III-B	csx20-csx1-cmr6g7-cmr5SS-cmr4g7-cmr3g5-10-cmr1g7-6-x-1-2-x-csx1
332298797	<i>Treponema_brennaborensis</i> _DSM_12168_uid66607	CAS-I-C	2-1-4-7-8c-5-3
42525844	<i>Treponema_denticola</i> _ATCC_35405_uid57583	CAS-II-A	9-1-2-csn2
328949009	<i>Treponema_succinifaciens</i> _DSM_2489_uid65781	CAS-III-A	csx1-x-x-2-2-1-x-x-csx20-csx1-x-csm5g7-csm4g5-csm3g7-csm2SS
297622675	<i>Trueperia_radiovictrix</i> _DSM_17093_uid49533	CAS-III-U	2-1-csx1-csx1-6
297623899	<i>Trueperia_radiovictrix</i> _DSM_17093_uid49533	CAS-III-B	7-cmr1g7-10-cmr3g5-cmr4g7-cmr5SS-cmr6g7-csx1-csm6-4-1-2
297624524	<i>Trueperia_radiovictrix</i> _DSM_17093_uid49533	CAS-I-E	2-1-6e-5-7-cse2SS-8e-x-3 + 3HD
269798874	<i>Veillonella_parvula</i> _DSM_2008_uid41927	CAS-III-A	6-csm3g7-csx19-csm3g7-5g10-csm3g7-10-csx20-1-2-x-csx1-csx1
121608212	<i>Verminephrobacter_eiseniae</i> _EF01_2_uid58675	CAS-II	9-1-2
121608431	<i>Verminephrobacter_eiseniae</i> _EF01_2_uid58675	CAS-I-F	6f-7f-5f-8f-3f-1
330467207	<i>Verrucosipora_maris</i> _AB_18_032_uid66297	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
227116690	<i>Vibrio_cholerae</i> _O395_uid159869	CAS-I-E	3 + 3HD-8e-cse2SS-6e-7-5-1-2
147674033	<i>Vibrio_cholerae</i> _O395_uid58425	CAS-I-E	3 + 3HD-8e-cse2SS-6e-7-5-1-2
37677204	<i>Vibrio_vulnificus</i> _YJ016_uid58007	CAS-III	6-csm3g7-x-csm3g7-5g10-cmr4g7-10-x-x-1 + RT-2-2-csx1-csx16-csx16-csm6
307595807	<i>Vulcanisaeta_distributa</i> _DSM_14429_uid52827	CAS-I-A	3HD-3-x-5-7-x-R-x-4-2-1-4
325968915	<i>Vulcanisaeta_moutnovskia</i> _768_28_uid63631	CAS-I-A	6-3HD-3-x-5-7-x-x-4-2-1-4
325955458	<i>Weeksella_virosa</i> _DSM_16922_uid63627	CAS-II	2-1-9
34557789	<i>Wolinella_succinogenes</i> _DSM_1740_uid61591	CAS-II	2-1-9
34557933	<i>Wolinella_succinogenes</i> _DSM_1740_uid61591	CAS-II-B	9-1-2-4
285019651	<i>Xanthomonas_albilineans</i> _GPE_PC73_uid43163	CAS-I-C	3-x-5-8c-7-4-1-2

Table S1 | Continued

Cas1 GI number	Organism	Automatically assigned CRISPR-Cas system (CAS) subtype	CRISPR-Cas-related gene neighbours (1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are respective <i>cas</i> genes)
285019808	<i>Xanthomonas albilineans</i> _GPE_PC73_uid43163	CAS-I-F	1-3f-8f-5f-7f-6f
21244566	<i>Xanthomonas axonopodis</i> _citri_306_uid57889	CAS-I-C	3-5-8c-7-4-1-2
384429891	<i>Xanthomonas campestris</i> _raphani_756C_uid159539	CAS-I-F	1-3f-8f-5f-7f-6f
58580490	<i>Xanthomonas oryzae</i> _KACC_10331_uid58155	CAS-I-C	2-1-4-7-8c-5-3 + 3HD
84622450	<i>Xanthomonas oryzae</i> _MAFF_311018_uid5847	CAS-I-C	2-1-4-7-8c-5-3 + 3HD
188578573	<i>Xanthomonas oryzae</i> _PX099A_uid59131	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
290476726	<i>Xenorhabdus bovienii</i> _SS_2004_uid46345	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
300724526	<i>Xenorhabdus nematophila</i> _ATCC_19061_uid49133	CAS-I-E	3 + 3HD-8e-cse2SS-7-5-6e-1-2
384139707	<i>Yersinia pestis</i> _A1122_uid158119	CAS-I-F	1-3f-x-8f-5f-7f-6f
162418150	<i>Yersinia pestis</i> _Angola_uid58485	CAS-I-F	6f-7f-5f-8f-1
108807960	<i>Yersinia pestis</i> _Antiqua_uid58607	CAS-I-F	6f-7f-5f-8f-3f-1
218929557	<i>Yersinia pestis</i> _CO92_uid57621	CAS-I-F	6f-7f-5f-8f-x-3f-1
384122748	<i>Yersinia pestis</i> _D106004_uid158071	CAS-I-F	6f-7f-5f-8f-3f-1
384126682	<i>Yersinia pestis</i> _D182038_uid158073	CAS-I-F	1-3f-3f-8f-5f-7f-6f
22125615	<i>Yersinia pestis</i> _KIM_10_uid57875	CAS-I-F	1-x-3f-8f-5f-7f-6f
108812225	<i>Yersinia pestis</i> _Nepal516_uid58609	CAS-I-F	6f-7f-5f-8f-3f-1
145599164	<i>Yersinia pestis</i> _Pestoides_F_uid58619	CAS-I-F	6f-7f-5f-8f-3f-1
294504227	<i>Yersinia pestis</i> _Z176003_uid47317	CAS-I-F	6f-7f-5f-8f-3f-1
384414198	<i>Yersinia pestis</i> _biovar_Medievalis_Harbin_35_uid158537	CAS-I-F	1-3f-8f-5f-7f-6f
45442077	<i>Yersinia pestis</i> _biovar_Microtus_91001_uid58037	CAS-I-F	6f-7f-5f-8f-x-3f-1
153949474	<i>Yersinia pseudotuberculosis</i> _JP_31758_uid58487	CAS-I-F	1-3f-8f-5f-7f-6f
51596831	<i>Yersinia pseudotuberculosis</i> _JP_32953_uid58157	CAS-I-F	6f-7f-5f-8f-3f-1
186895909	<i>Yersinia pseudotuberculosis</i> _PB1__uid59153	CAS-I-F	6f-7f-5f-8f-3f-1
170023885	<i>Yersinia pseudotuberculosis</i> _YPIII_uid59151	CAS-I-F	1-3f-8f-5f-7f-6f
295136245	<i>Zunongwangia profunda</i> _SM_A87_uid48073	CAS-II	9-1-x-2
384411531	<i>Zymomonas mobilis</i> _ATCC_10988_uid55403	CAS-I-F	7f-5f-8f-3f-1
397676481	<i>Zymomonas mobilis</i> _ATCC_29191_uid170612	CAS-I-F	6f-7f-5f-8f-3f-1
260752826	<i>Zymomonas mobilis</i> _NCIMB_11163_uid41019	CAS-I-F	6f-7f-5f-8f-3f-1
260738831	<i>Zymomonas mobilis</i> _NCIMB_11163_uid41019	CAS-I-C	3 + 3HD-5-8c-7-4-1-2
283856307	<i>Zymomonas mobilis</i> _ZM4_uid58095	CAS-I-F	1-3f-8f-5f-7f-6f
338707995	<i>Zymomonas mobilis</i> _pomaceae_ATCC_29192_uid68445	CAS-I-E	2-1-6e-5-7-cse2SS-8e-3
338708688	<i>Zymomonas mobilis</i> _pomaceae_ATCC_29192_uid68445	CAS-I-C	2-1-4-7-8c-5-3 + 3HD
304310409	<i>Gamma proteobacterium</i> _HdN1_uid51635	CAS-I-E	3-8e-cse2SS-7-5-6e-x-1-2
304313028	<i>Gamma proteobacterium</i> _HdN1_uid51635	CAS-II	1-9
345004201	<i>Halophilic archaeon</i> _DL31_uid72619	CAS-I-D	2-1-4-3-csc1g5-csc2g7-x-6-R
189485060	Uncultured_Termite_group_1_bacterium_phylotype_Rs_D17_uid59059	CAS-II	9-9-1-2
189485223	Uncultured_Termite_group_1_bacterium_phylotype_Rs_D17_uid59059	CAS-I-C	3-5-8c-7-4-1-2-9-1-2
189485226	Uncultured_Termite_group_1_bacterium_phylotype_Rs_D17_uid59059	CAS-I-C	3-5-8c-7-4-1-2-9-1-2

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