

SUPPORTING TABLES

Table S1. List of PCR primers used in this study.

Name	Primers sequences (5'-3')
Lmes_fwd	GATCGGATCCATGAGTTTTTTTAATAAAGG
Lmes_rev	GATCCTGCAGTTAAGCCTTGGTTTCTCCATAACC
KpneuF	GATCGGATCCATGAAGGTTGCGTTCAATAAAG
KpneuR	TGCACTGCAGCTATTCTTTCGATTTATACTC
AbaumF	GATCGGATCCATGAATATGTTACGTACAGG
AbaumR	TGCACTGCAGTTAGTCTTCTTTTTGTGCC
BanimF	GATCGGATCCATGGATGTGCTTTCCAAG
BanimR	TGCACTGCAGTTACGATTTACGATTTTTTC

Table S2. List of predicted BY-kinases in Bacteria

For each of predicted BY-kinase, columns represent: (1) GI, the GI number of BY-kinases; (2) Group, corresponding phylum/subphylum; (3) Loc, the localization of BY-kinase within chromosome (chr) or plasmid; (4) Organism, the name of corresponding organism; (5) Type, three BY-kinase types were defined: orphan CD (CD), CD with flanking TAD (TAD+CD), and TAD with CD encode by one gene (TAD-CD); (6) Order, corresponding order in taxonomy; (7) Family, corresponding family in taxonomy; (8) Genus, corresponding genus in taxonomy; (9) UGD, “+” means Ugd family proteins are present in corresponding organism; (10) PSN, corresponding subgroup in protein similarity network, “-“ means unclassified proteins; (11) Y-H, “+” means the Y-H pair is present in the kinase; (12) Y-R, “+” means the Y-R pair is present in the kinase; (13) YHR, “+” means both the Y-H and Y-R pairs are present in the kinase.

GI	Group	Location	Organism	Type	Order	Family	Genus	UGD	PSN	Y-H	Y-R	YHR
347754604	Acidobacteria	chr I	Candidatus Chloracidobacterium thermophilum B	TAD-CD	?	?	Candidatus Chloracidobacterium	+	-			
94967866	Acidobacteria	chr	Candidatus Koribacter versatilis Ellin345	TAD-CD	?	?	Candidatus Koribacter	+	-			
94970337	Acidobacteria	chr	Candidatus Koribacter versatilis Ellin345	TAD-CD	?	?	Candidatus Koribacter	+	-			
94970830	Acidobacteria	chr	Candidatus Koribacter versatilis Ellin345	TAD-CD	?	?	Candidatus Koribacter	+	-			
225872417	Acidobacteria	chr	Acidobacterium capsulatum ATCC 51196	TAD-CD	Acidobacteriales	Acidobacteriaceae	Acidobacterium	+	A3			
322434972	Acidobacteria	chr	Acidobacterium sp. MP5ACTX9	TAD-CD	Acidobacteriales	Acidobacteriaceae	Acidobacterium	+	-			
374310434	Acidobacteria	chr	Granulicella mallensis MP5ACTX8	TAD-CD	Acidobacteriales	Acidobacteriaceae	Granulicella	+	-			
374310813	Acidobacteria	chr	Granulicella mallensis MP5ACTX8	TAD-CD	Acidobacteriales	Acidobacteriaceae	Granulicella	+	-			
374311479	Acidobacteria	chr	Granulicella mallensis MP5ACTX8	TAD-CD	Acidobacteriales	Acidobacteriaceae	Granulicella	+	-			
374312440	Acidobacteria	chr	Granulicella mallensis MP5ACTX8	TAD+CD	Acidobacteriales	Acidobacteriaceae	Granulicella	+	-			
320107625	Acidobacteria	chr	Terriglobus saanensis SP1PR4	TAD-CD	Acidobacteriales	Acidobacteriaceae	Terriglobus	+	-			
116623727	Acidobacteria	chr	Candidatus Solibacter usitatus Ellin6076	TAD-CD	Solibacterales	Solibacteraceae	Candidatus Solibacter	+	-			
116623943	Acidobacteria	chr	Candidatus Solibacter usitatus Ellin6076	TAD-CD	Solibacterales	Solibacteraceae	Candidatus Solibacter	+	-			
229819500	Actinobacteria	chr	Beutenbergia cavernae DSM 12333	TAD-CD	Actinomycetales	Beutenbergiaceae	Beutenbergia	+	A1			
332669240	Actinobacteria	chr	Cellulomonas fimi ATCC 484	TAD-CD	Actinomycetales	Cellulomonadaceae	Cellulomonas	+	A1			
257067501	Actinobacteria	chr	Brachybacterium faecium DSM 4810	TAD-CD	Actinomycetales	Dermabacteraceae	Brachybacterium	+	-			
256826233	Actinobacteria	chr	Kytococcus sedentarius DSM 20547	TAD-CD	Actinomycetales	Dermacoccaceae	Kytococcus	+	A1			
378716659	Actinobacteria	chr	Gordonia polyisoprenivorans VH2	TAD-CD	Actinomycetales	Gordoniaceae	Gordonia	+	-			
317124315	Actinobacteria	chr	Intrasporangium calvum DSM 43043	TAD-CD	Actinomycetales	Intrasporangiaceae	Intrasporangium	+	A1			
317125749	Actinobacteria	chr	Intrasporangium calvum DSM 43043	TAD-CD	Actinomycetales	Intrasporangiaceae	Intrasporangium	+	-			
170782599	Actinobacteria	chr	Clavibacter michiganensis subsp. sepedonicus	TAD-CD	Actinomycetales	Microbacteriaceae	Clavibacter	+	A1			
170782726	Actinobacteria	chr	Clavibacter michiganensis subsp. sepedonicus	TAD-CD	Actinomycetales	Microbacteriaceae	Clavibacter	+	A1			
323357300	Actinobacteria	chr	Microbacterium testaceum StLB037	TAD-CD	Actinomycetales	Microbacteriaceae	Microbacterium	+	A1			
323357377	Actinobacteria	chr	Microbacterium testaceum StLB037	TAD-CD	Actinomycetales	Microbacteriaceae	Microbacterium	+	A1			
148271901	Actinobacteria	chr	Clavibacter michiganensis NCPPB 382	TAD-CD	Actinomycetales	Microbacteriaceae	Clavibacter	+	A1			
148272006	Actinobacteria	chr	Clavibacter michiganensis NCPPB 382	TAD-CD	Actinomycetales	Microbacteriaceae	Clavibacter	+	A1			
50955414	Actinobacteria	chr	Leifsonia xyli subsp. xyli str. CTCB07	CD	Actinomycetales	Microbacteriaceae	Leifsonia	+	A1			
283458593	Actinobacteria	chr	Rothia mucilaginosa	TAD-CD	Actinomycetales	Micrococcaceae	Rothia	-	A1			
311113103	Actinobacteria	chr	Rothia dentocariosa ATCC 17931	TAD-CD	Actinomycetales	Micrococcaceae	Rothia	-	A1			
116671764	Actinobacteria	chr I	Arthrobacter sp. FB24	TAD-CD	Actinomycetales	Micrococcaceae	Arthrobacter	+	A1			
220913689	Actinobacteria	chr	Arthrobacter chlorophenolicus A6	TAD-CD	Actinomycetales	Micrococcaceae	Arthrobacter	+	A1			
220913696	Actinobacteria	chr	Arthrobacter chlorophenolicus A6	TAD-CD	Actinomycetales	Micrococcaceae	Arthrobacter	+	A1			
119963655	Actinobacteria	chr	Arthrobacter aurescens TC1	TAD-CD	Actinomycetales	Micrococcaceae	Arthrobacter	+	A1			
239917119	Actinobacteria	chr	Micrococcus luteus NCTC 2665	TAD-CD	Actinomycetales	Micrococcaceae	Micrococcus	+	A1			
330468662	Actinobacteria	chr	Verrucospora maris AB-18-032	TAD-CD	Actinomycetales	Micromonosporaceae	Verrucospora	+	A1			
302867870	Actinobacteria	chr	Micromonospora aurantiaca ATCC 27029	TAD-CD	Actinomycetales	Micromonosporaceae	Micromonospora	+	A1			
315505728	Actinobacteria	chr	Micromonospora sp. L5	TAD-CD	Actinomycetales	Micromonosporaceae	Micromonospora	+	A1			
126433565	Actinobacteria	chr	Mycobacterium sp. JLS	TAD-CD	Actinomycetales	Mycobacteriaceae	Mycobacterium	+	A1			
119867016	Actinobacteria	chr	Mycobacterium sp. KMS	TAD-CD	Actinomycetales	Mycobacteriaceae	Mycobacterium	+	A1			
145225349	Actinobacteria	chr	Mycobacterium gilvum PYR-GCK	TAD-CD	Actinomycetales	Mycobacteriaceae	Mycobacterium	+	A1			
315445696	Actinobacteria	chr	Mycobacterium gilvum Spyr1	TAD-CD	Actinomycetales	Mycobacteriaceae	Mycobacterium	+	A1			
108797920	Actinobacteria	chr	Mycobacterium sp. MCS	TAD-CD	Actinomycetales	Mycobacteriaceae	Mycobacterium	+	A1			
271967770	Actinobacteria	chr	Streptosporangium roseum DSM 43021	TAD-CD	Actinomycetales	Streptosporangiaceae	Streptosporangium	+	A1			
322690557	Actinobacteria	chr	Bifidobacterium longum JCM 1217	TAD-CD	Bifidobacteriales	Bifidobacteriaceae	Bifidobacterium	-	C8			
23465796	Actinobacteria	chr	Bifidobacterium longum NCC2705	TAD-CD	Bifidobacteriales	Bifidobacteriaceae	Bifidobacterium	-	C8			

119026376	Actinobacteria	chr	<i>Bifidobacterium adolescentis</i> ATCC 15703	TAD-CD	Bifidobacteriales	Bifidobacteriaceae	<i>Bifidobacterium</i>	-	C8
219683098	Actinobacteria	chr	<i>Bifidobacterium animalis</i> subsp. <i>lactis</i> AD011	TAD-CD	Bifidobacteriales	Bifidobacteriaceae	<i>Bifidobacterium</i>	+	C8
241196833	Actinobacteria	chr	<i>Bifidobacterium animalis</i> subsp. <i>lactis</i> DSM 10140	TAD-CD	Bifidobacteriales	Bifidobacteriaceae	<i>Bifidobacterium</i>	+	C8
322688585	Actinobacteria	chr	<i>Bifidobacterium longum</i> subsp. <i>infantis</i> 157F	TAD-CD	Bifidobacteriales	Bifidobacteriaceae	<i>Bifidobacterium</i>	-	C8
283456697	Actinobacteria	chr	<i>Bifidobacterium dentium</i> Bd1	TAD-CD	Bifidobacteriales	Bifidobacteriaceae	<i>Bifidobacterium</i>	+	C8
283456702	Actinobacteria	chr	<i>Bifidobacterium dentium</i> Bd1	TAD-CD	Bifidobacteriales	Bifidobacteriaceae	<i>Bifidobacterium</i>	+	C8
213692938	Actinobacteria	chr	<i>Bifidobacterium longum</i> subsp. <i>infantis</i> ATCC 15697	TAD-CD	Bifidobacteriales	Bifidobacteriaceae	<i>Bifidobacterium</i>	+	C8
296453600	Actinobacteria	chr	<i>Bifidobacterium longum</i> JDM301	TAD-CD	Bifidobacteriales	Bifidobacteriaceae	<i>Bifidobacterium</i>	+	C8
312133273	Actinobacteria	chr	<i>Bifidobacterium longum</i> BBMN68	TAD-CD	Bifidobacteriales	Bifidobacteriaceae	<i>Bifidobacterium</i>	+	C8
241191427	Actinobacteria	chr	<i>Bifidobacterium animalis</i> subsp. <i>lactis</i> BI-04	TAD-CD	Bifidobacteriales	Bifidobacteriaceae	<i>Bifidobacterium</i>	+	C8
108803409	Actinobacteria	chr	<i>Rubrobacter xylanophilus</i> DSM 9941	TAD-CD	Rubrobacterales	Rubrobacteraceae	<i>Rubrobacter</i>	+	A3
108804765	Actinobacteria	chr	<i>Rubrobacter xylanophilus</i> DSM 9941	TAD+CD	Rubrobacterales	Rubrobacteraceae	<i>Rubrobacter</i>	+	A3
328544642	Alphaproteobacteria	chr	<i>Polymorphum gilvum</i> SL003B-26A1	TAD-CD	?	?	?	+	C2
315499193	Alphaproteobacteria	chr I	<i>Asticcacaulis excentricus</i> CB 48	TAD-CD	Caulobacterales	Caulobacteraceae	<i>Asticcacaulis</i>	+	C3
167648771	Alphaproteobacteria	chr	<i>Caulobacter</i> sp. K31	TAD-CD	Caulobacterales	Caulobacteraceae	<i>Caulobacter</i>	+	C3
295691335	Alphaproteobacteria	chr	<i>Caulobacter segnis</i> ATCC 21756	TAD-CD	Caulobacterales	Caulobacteraceae	<i>Caulobacter</i>	+	C3
221233102	Alphaproteobacteria	chr	<i>Caulobacter crescentus</i> NA1000	TAD-CD	Caulobacterales	Caulobacteraceae	<i>Caulobacter</i>	+	C3
16124419	Alphaproteobacteria	chr	<i>Caulobacter crescentus</i> CB15	TAD-CD	Caulobacterales	Caulobacteraceae	<i>Caulobacter</i>	+	C3
197104614	Alphaproteobacteria	chr	<i>Phenylobacterium zucineum</i> HLK1	TAD-CD	Caulobacterales	Caulobacteraceae	<i>Phenylobacterium</i>	+	C3
302382257	Alphaproteobacteria	chr	<i>Brevundimonas subvibrioides</i> ATCC 15264	TAD-CD	Caulobacterales	Caulobacteraceae	<i>Brevundimonas</i>	+	C3
304320844	Alphaproteobacteria	chr	<i>Parvularcula bermudensis</i> HTCC2503	TAD-CD	Parvularculales	Parvularculaceae	<i>Parvularcula</i>	+	-
304320930	Alphaproteobacteria	chr	<i>Parvularcula bermudensis</i> HTCC2503	TAD-CD	Parvularculales	Parvularculaceae	<i>Parvularcula</i>	+	-
304321818	Alphaproteobacteria	chr	<i>Parvularcula bermudensis</i> HTCC2503	TAD-CD	Parvularculales	Parvularculaceae	<i>Parvularcula</i>	+	-
217976555	Alphaproteobacteria	chr	<i>Methylocella silvestris</i> BL2	TAD-CD	Rhizobiales	Beijerinckiaceae	<i>Methylocella</i>	+	C2
182679568	Alphaproteobacteria	chr	<i>Beijerinckia indica</i> ATCC 9039	TAD-CD	Rhizobiales	Beijerinckiaceae	<i>Beijerinckia</i>	+	C2
182677830	Alphaproteobacteria	chr	<i>Beijerinckia indica</i> ATCC 9039	TAD-CD	Rhizobiales	Beijerinckiaceae	<i>Beijerinckia</i>	+	-
148252610	Alphaproteobacteria	chr	<i>Bradyrhizobium</i> sp. BTAi1	TAD-CD	Rhizobiales	Bradyrhizobiaceae	<i>Bradyrhizobium</i>	+	C2
92118533	Alphaproteobacteria	chr	<i>Nitrobacter hamburgensis</i> X14	TAD-CD	Rhizobiales	Bradyrhizobiaceae	<i>Nitrobacter</i>	+	C2
316933388	Alphaproteobacteria	chr	<i>Rhodopseudomonas palustris</i> DX-1	TAD-CD	Rhizobiales	Bradyrhizobiaceae	<i>Rhodopseudomonas</i>	+	C2
39936418	Alphaproteobacteria	chr	<i>Rhodopseudomonas palustris</i> CGA009	TAD-CD	Rhizobiales	Bradyrhizobiaceae	<i>Rhodopseudomonas</i>	+	C2
146339263	Alphaproteobacteria	chr	<i>Bradyrhizobium</i> sp. ORS 278	TAD-CD	Rhizobiales	Bradyrhizobiaceae	<i>Bradyrhizobium</i>	+	C2
146341707	Alphaproteobacteria	chr	<i>Bradyrhizobium</i> sp. ORS 278	TAD-CD	Rhizobiales	Bradyrhizobiaceae	<i>Bradyrhizobium</i>	+	C2
146343807	Alphaproteobacteria	chr	<i>Bradyrhizobium</i> sp. ORS 278	TAD-CD	Rhizobiales	Bradyrhizobiaceae	<i>Bradyrhizobium</i>	+	C2
192292146	Alphaproteobacteria	chr	<i>Rhodopseudomonas palustris</i> TIE-1	TAD-CD	Rhizobiales	Bradyrhizobiaceae	<i>Rhodopseudomonas</i>	+	C2
337741139	Alphaproteobacteria	chr	<i>Oligotropha carboxidovorans</i> OM5	TAD-CD	Rhizobiales	Bradyrhizobiaceae	<i>Oligotropha</i>	+	-
209885237	Alphaproteobacteria	chr	<i>Oligotropha carboxidovorans</i> OM5	TAD-CD	Rhizobiales	Bradyrhizobiaceae	<i>Oligotropha</i>	+	-
338739964	Alphaproteobacteria	chr	<i>Hyphomicrobium</i> sp.	TAD-CD	Rhizobiales	Hyphomicrobiaceae	<i>Hyphomicrobium</i>	+	C5
300021986	Alphaproteobacteria	chr	<i>Hyphomicrobium denitrificans</i> ATCC 51888	TAD-CD	Rhizobiales	Hyphomicrobiaceae	<i>Hyphomicrobium</i>	+	C5
312113178	Alphaproteobacteria	chr	<i>Rhodomicrobium vannielii</i> ATCC 17100	TAD-CD	Rhizobiales	Hyphomicrobiaceae	<i>Rhodomicrobium</i>	+	C5
312115476	Alphaproteobacteria	chr	<i>Rhodomicrobium vannielii</i> ATCC 17100	TAD-CD	Rhizobiales	Hyphomicrobiaceae	<i>Rhodomicrobium</i>	+	C5
357386147	Alphaproteobacteria	chr	<i>Pelagibacterium halotolerans</i> B2	TAD-CD	Rhizobiales	Hyphomicrobiaceae	<i>Pelagibacterium</i>	+	-
220925715	Alphaproteobacteria	chr	<i>Methylobacterium nodulans</i> ORS 2060	TAD-CD	Rhizobiales	Methylobacteriaceae	<i>Methylobacterium</i>	+	C2
319779973	Alphaproteobacteria	chr	<i>Mesorhizobium ciceri</i> biovar <i>biserrulae</i> WSM1271	TAD-CD	Rhizobiales	Phyllobacteriaceae	<i>Mesorhizobium</i>	+	C2
110633017	Alphaproteobacteria	chr	<i>Chelativorans</i> sp. BNC1	TAD-CD	Rhizobiales	Phyllobacteriaceae	<i>Chelativorans</i>	+	C2
13474401	Alphaproteobacteria	chr	<i>Mesorhizobium loti</i> MAFF303099	TAD-CD	Rhizobiales	Phyllobacteriaceae	<i>Mesorhizobium</i>	+	C2
337264763	Alphaproteobacteria	chr	<i>Mesorhizobium opportunistum</i> WSM2075	TAD-CD	Rhizobiales	Phyllobacteriaceae	<i>Mesorhizobium</i>	+	C2

154252354	Alphaproteobacteria	chr	Parvibaculum lavamentivorans DS-1	TAD-CD	Rhizobiales	Phyllobacteriaceae	Parvibaculum	+	C3
222082822	Alphaproteobacteria	chr II	Agrobacterium radiobacter K84	TAD-CD	Rhizobiales	Rhizobiaceae	Agrobacterium	+	C2
332716338	Alphaproteobacteria	chr linear	Agrobacterium sp. H13-3	TAD-CD	Rhizobiales	Rhizobiaceae	Agrobacterium	+	C2
332716770	Alphaproteobacteria	chr linear	Agrobacterium sp. H13-3	TAD-CD	Rhizobiales	Rhizobiaceae	Agrobacterium	+	C2
209550558	Alphaproteobacteria	chr	Rhizobium leguminosarum bv. trifolii WSM2304	TAD-CD	Rhizobiales	Rhizobiaceae	Rhizobium	+	C2
241205922	Alphaproteobacteria	chr	Rhizobium leguminosarum bv. trifolii WSM1325	TAD-CD	Rhizobiales	Rhizobiaceae	Rhizobium	+	C2
86358832	Alphaproteobacteria	chr	Rhizobium etli CFN 42	TAD-CD	Rhizobiales	Rhizobiaceae	Rhizobium	+	C2
222106882	Alphaproteobacteria	chr II	Agrobacterium vitis S4	TAD-CD	Rhizobiales	Rhizobiaceae	Agrobacterium	+	C2
116253403	Alphaproteobacteria	chr	Rhizobium leguminosarum bv. viciae 3841	TAD-CD	Rhizobiales	Rhizobiaceae	Rhizobium	+	C2
190893056	Alphaproteobacteria	chr	Rhizobium etli CIAT 652	TAD-CD	Rhizobiales	Rhizobiaceae	Rhizobium	+	C2
190895172	Alphaproteobacteria	plasmid	Rhizobium etli CIAT 652	TAD-CD	Rhizobiales	Rhizobiaceae	Rhizobium	+	C2
159185792	Alphaproteobacteria	chr linear	Agrobacterium tumefaciens str. C58	TAD-CD	Rhizobiales	Rhizobiaceae	Agrobacterium	+	C2
15890922	Alphaproteobacteria	chr linear	Agrobacterium tumefaciens str. C58	TAD-CD	Rhizobiales	Rhizobiaceae	Agrobacterium	+	C2
209552270	Alphaproteobacteria	plasmid	Rhizobium leguminosarum bv. trifolii WSM2304	TAD-CD	Rhizobiales	Rhizobiaceae	Rhizobium	+	-
190894615	Alphaproteobacteria	plasmid	Rhizobium etli CIAT 652	TAD-CD	Rhizobiales	Rhizobiaceae	Rhizobium	+	-
154247479	Alphaproteobacteria	chr	Xanthobacter autotrophicus Py2	TAD-CD	Rhizobiales	Xanthobacteraceae	Xanthobacter	+	C2
298293180	Alphaproteobacteria	chr	Starkeya novella DSM 506	TAD-CD	Rhizobiales	Xanthobacteraceae	Starkeya	+	C5
114799879	Alphaproteobacteria	chr	Hyphomonas neptunium ATCC 15444	TAD-CD	Rhodobacterales	Hyphomonadaceae	Hyphomonas	+	-
254294155	Alphaproteobacteria	chr	Hirschia baltica ATCC 49814	TAD-CD	Rhodobacterales	Hyphomonadaceae	Hirschia	+	-
254294468	Alphaproteobacteria	chr	Hirschia baltica ATCC 49814	TAD-CD	Rhodobacterales	Hyphomonadaceae	Hirschia	+	-
146277998	Alphaproteobacteria	chr	Rhodobacter sphaeroides ATCC 17025	TAD-CD	Rhodobacterales	Rhodobacteraceae	Rhodobacter	+	C2
77463116	Alphaproteobacteria	chr I	Rhodobacter sphaeroides 2.4.1	TAD-CD	Rhodobacterales	Rhodobacteraceae	Rhodobacter	+	C2
221638973	Alphaproteobacteria	chr I	Rhodobacter sphaeroides KD131	TAD-CD	Rhodobacterales	Rhodobacteraceae	Rhodobacter	+	C2
126461988	Alphaproteobacteria	chr I	Rhodobacter sphaeroides ATCC 17029	TAD-CD	Rhodobacterales	Rhodobacteraceae	Rhodobacter	+	C2
374329519	Alphaproteobacteria	chr	Pseudovibrio sp. FO-BEG1	TAD-CD	Rhodobacterales	Rhodobacteraceae	Pseudovibrio	+	-
374331279	Alphaproteobacteria	chr	Pseudovibrio sp. FO-BEG1	TAD-CD	Rhodobacterales	Rhodobacteraceae	Pseudovibrio	+	-
159045929	Alphaproteobacteria	chr	Dinoroseobacter shibae DFL 12	TAD+CD	Rhodobacterales	Rhodobacteraceae	Dinoroseobacter	+	-
162148276	Alphaproteobacteria	chr	Gluconacetobacter diazotrophicus PAI 5	TAD-CD	Rhodospirillales	Acetobacteraceae	Gluconacetobacter	+	-
347762004	Alphaproteobacteria	chr	Gluconacetobacter xylinus NBRC 3288	TAD-CD	Rhodospirillales	Acetobacteraceae	Gluconacetobacter	+	-
148260523	Alphaproteobacteria	chr	Acidiphilium cryptum JF-5	TAD-CD	Rhodospirillales	Acetobacteraceae	Acidiphilium	+	-
326403715	Alphaproteobacteria	chr	Acidiphilium multivorum	TAD-CD	Rhodospirillales	Acetobacteraceae	Acidiphilium	+	-
288962330	Alphaproteobacteria	plasmid	Azospirillum sp. B510	TAD-CD	Rhodospirillales	Rhodospirillaceae	Azospirillum	+	C3
83310549	Alphaproteobacteria	chr	Magnetospirillum magneticum AMB-1	TAD-CD	Rhodospirillales	Rhodospirillaceae	Magnetospirillum	+	C3
375006561	Alphaproteobacteria	plasmid	Azospirillum lipoferum 4B	TAD-CD	Rhodospirillales	Rhodospirillaceae	Azospirillum	+	C3
209965812	Alphaproteobacteria	chr	Rhodospirillum centenum SW	TAD-CD	Rhodospirillales	Rhodospirillaceae	Rhodospirillum	+	C3
288960403	Alphaproteobacteria	plasmid	Azospirillum sp. B510	TAD-CD	Rhodospirillales	Rhodospirillaceae	Azospirillum	+	-
374998479	Alphaproteobacteria	plasmid	Azospirillum lipoferum 4B	TAD-CD	Rhodospirillales	Rhodospirillaceae	Azospirillum	+	-
209967243	Alphaproteobacteria	chr	Rhodospirillum centenum SW	TAD-CD	Rhodospirillales	Rhodospirillaceae	Rhodospirillum	+	-
85375504	Alphaproteobacteria	chr	Erythrobacter litoralis HTCC2594	TAD-CD	Sphingomonadales	Erythrobacteraceae	Erythrobacter	+	C5
85375266	Alphaproteobacteria	chr	Erythrobacter litoralis HTCC2594	TAD-CD	Sphingomonadales	Erythrobacteraceae	Erythrobacter	+	-
148557422	Alphaproteobacteria	chr	Sphingomonas wittichii RW1	TAD-CD	Sphingomonadales	Sphingomonadaceae	Sphingomonas	+	C3
334140323	Alphaproteobacteria	chr	Novosphingobium sp. PP1Y	TAD-CD	Sphingomonadales	Sphingomonadaceae	Novosphingobium	+	C3
148557710	Alphaproteobacteria	chr	Sphingomonas wittichii RW1	TAD-CD	Sphingomonadales	Sphingomonadaceae	Sphingomonas	+	C5
103487068	Alphaproteobacteria	chr	Sphingopyxis alaskensis RB2256	TAD-CD	Sphingomonadales	Sphingomonadaceae	Sphingopyxis	+	C5
347528532	Alphaproteobacteria	chr	Sphingobium sp. SYK-6	TAD-CD	Sphingomonadales	Sphingomonadaceae	Sphingobium	+	C5
87201236	Alphaproteobacteria	chr	Novosphingobium aromaticivorans DSM 12444	TAD-CD	Sphingomonadales	Sphingomonadaceae	Novosphingobium	+	-

294012202	Alphaproteobacteria	chr I	Sphingobium japonicum UT26S	TAD-CD	Sphingomonadales	Sphingomonadaceae	Sphingobium	+	-
334344046	Alphaproteobacteria	chr I	Sphingobium chlorophenolicum L-1	TAD-CD	Sphingomonadales	Sphingomonadaceae	Sphingobium	+	-
334344129	Alphaproteobacteria	chr I	Sphingobium chlorophenolicum L-1	TAD-CD	Sphingomonadales	Sphingomonadaceae	Sphingobium	+	-
334140572	Alphaproteobacteria	chr	Novosphingobium sp. PP1Y	TAD-CD	Sphingomonadales	Sphingomonadaceae	Novosphingobium	+	-
345303537	Bacteroidetes/Chlorobi	chr	Rhodothermus marinus SG0.5JP17-172	TAD-CD	Bacteroidetes Order II. Ir	Rhodothermaceae	Rhodothermus	+	-
268316686	Bacteroidetes/Chlorobi	chr	Rhodothermus marinus DSM 4252	TAD-CD	Bacteroidetes Order II. Ir	Rhodothermaceae	Rhodothermus	+	-
29345471	Bacteroidetes/Chlorobi	chr	Bacteroides thetaiotaomicron VPI-5482	TAD-CD	Bacteroidales	Bacteroidaceae	Bacteroides	+	C7
29348271	Bacteroidetes/Chlorobi	chr	Bacteroides thetaiotaomicron VPI-5482	TAD-CD	Bacteroidales	Bacteroidaceae	Bacteroides	+	C7
325299829	Bacteroidetes/Chlorobi	chr	Bacteroides salanitronis DSM 18170	TAD-CD	Bacteroidales	Bacteroidaceae	Bacteroides	+	C7
150003286	Bacteroidetes/Chlorobi	chr	Bacteroides vulgatus ATCC 8482	TAD-CD	Bacteroidales	Bacteroidaceae	Bacteroides	+	C7
150004097	Bacteroidetes/Chlorobi	chr	Bacteroides vulgatus ATCC 8482	TAD-CD	Bacteroidales	Bacteroidaceae	Bacteroides	+	C7
150008833	Bacteroidetes/Chlorobi	chr	Parabacteroides distazonis ATCC 8503	TAD-CD	Bacteroidales	Porphyromonadaceae	Parabacteroides	+	C7
150009824	Bacteroidetes/Chlorobi	chr	Parabacteroides distazonis ATCC 8503	TAD-CD	Bacteroidales	Porphyromonadaceae	Parabacteroides	+	C7
332299980	Bacteroidetes/Chlorobi	chr	Porphyromonas asaccharolytica DSM 20707	TAD-CD	Bacteroidales	Porphyromonadaceae	Porphyromonas	+	C7
34540258	Bacteroidetes/Chlorobi	chr	Porphyromonas gingivalis W83	TAD-CD	Bacteroidales	Porphyromonadaceae	Porphyromonas	+	C7
188955388	Bacteroidetes/Chlorobi	chr	Porphyromonas gingivalis ATCC 33277	TAD-CD	Bacteroidales	Porphyromonadaceae	Porphyromonas	+	C7
334147343	Bacteroidetes/Chlorobi	chr	Porphyromonas gingivalis TDC60	TAD-CD	Bacteroidales	Porphyromonadaceae	Porphyromonas	+	C7
313202740	Bacteroidetes/Chlorobi	chr	Paludibacter propionigenes WB4	CD	Bacteroidales	Porphyromonadaceae	Paludibacter	+	-
255037117	Bacteroidetes/Chlorobi	chr	Dyadobacter fermentans DSM 18053	TAD-CD	Cytophagales	Cytophagaceae	Dyadobacter	+	-
313676767	Bacteroidetes/Chlorobi	chr	Marivirga tractuosa DSM 4126	TAD-CD	Cytophagales	Flammeovirgaceae	Marivirga	+	-
327404039	Bacteroidetes/Chlorobi	chr	Fluviicola taffensis DSM 16823	TAD-CD	Flavobacteriales	Cryomorphaceae	Fluviicola	+	-
375150293	Bacteroidetes/Chlorobi	chr	Niastella koreensis GR20-10	TAD-CD	Sphingobacteriales	?	Niastella	+	-
332667341	Bacteroidetes/Chlorobi	chr	Haliscomenobacter hydrossis DSM 1100	TAD-CD	Sphingobacteriales	Saprosiraceae	Haliscomenobacter	+	-
193216219	Bacteroidetes/Chlorobi	chr	Chloroherpeton thalassium ATCC 35110	TAD-CD	Chlorobiales	Chlorobiaceae	Chloroherpeton	+	A3
119358413	Bacteroidetes/Chlorobi	chr	Chlorobium phaeobacteroides DSM 266	TAD-CD	Chlorobiales	Chlorobiaceae	Chlorobium	+	C9
145219882	Bacteroidetes/Chlorobi	chr	Chlorobium phaeovibrioides DSM 265	TAD-CD	Chlorobiales	Chlorobiaceae	Chlorobium	+	C9
194334575	Bacteroidetes/Chlorobi	chr	Prosthecochloris aestuarii DSM 271	TAD-CD	Chlorobiales	Chlorobiaceae	Prosthecochloris	+	C9
189347388	Bacteroidetes/Chlorobi	chr	Chlorobium limicola DSM 245	TAD-CD	Chlorobiales	Chlorobiaceae	Chlorobium	+	C9
78186637	Bacteroidetes/Chlorobi	chr	Chlorobium luteolum DSM 273	TAD-CD	Chlorobiales	Chlorobiaceae	Pelodictyon	+	C9
189500899	Bacteroidetes/Chlorobi	chr	Chlorobium phaeobacteroides BS1	TAD-CD	Chlorobiales	Chlorobiaceae	Chlorobium	+	C9
194335666	Bacteroidetes/Chlorobi	chr	Pelodictyon phaeoclathratiforme BU-1	TAD-CD	Chlorobiales	Chlorobiaceae	Pelodictyon	+	C9
193215830	Bacteroidetes/Chlorobi	chr	Chloroherpeton thalassium ATCC 35110	TAD-CD	Chlorobiales	Chlorobiaceae	Chloroherpeton	+	-
257093549	Betaproteobacteria	chr	Candidatus Accumulibacter phosphatis UW-1	TAD-CD	?	?	Candidatus Accumulibacter	+	B1
311107658	Betaproteobacteria	chr	Achromobacter xylosoxidans A8	TAD-CD	Burkholderiales	Alcaligenaceae	Achromobacter	+	B2
332286473	Betaproteobacteria	chr	Pusillimonas sp. T7-7	TAD-CD	Burkholderiales	Alcaligenaceae	Pusillimonas	+	B2 +
91778382	Betaproteobacteria	chr II	Burkholderia xenovorans LB400	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B1
330816477	Betaproteobacteria	chr I	Burkholderia gladioli BSR3	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
330819895	Betaproteobacteria	chr II	Burkholderia gladioli BSR3	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
330821267	Betaproteobacteria	chr II	Burkholderia gladioli BSR3	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
330814592	Betaproteobacteria	plasmid	Burkholderia gladioli BSR3	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
238024992	Betaproteobacteria	chr II	Burkholderia glumae BGR1	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
188591870	Betaproteobacteria	chr II	Cupriavidus taiwanensis LMG 19424	TAD-CD	Burkholderiales	Burkholderiaceae	Cupriavidus	+	B2
194289743	Betaproteobacteria	chr I	Cupriavidus taiwanensis LMG 19424	TAD-CD	Burkholderiales	Burkholderiaceae	Cupriavidus	+	B2
170736082	Betaproteobacteria	chr II	Burkholderia cenocepacia MC0-3	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
170736622	Betaproteobacteria	chr II	Burkholderia cenocepacia MC0-3	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
126439124	Betaproteobacteria	chr I	Burkholderia pseudomallei 668	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2

126442327	Betaproteobacteria	chr II	Burkholderia pseudomallei 668	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
172065185	Betaproteobacteria	chr III	Burkholderia ambifaria MC40-6	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
172062726	Betaproteobacteria	chr II	Burkholderia ambifaria MC40-6	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
172062759	Betaproteobacteria	chr II	Burkholderia ambifaria MC40-6	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
172063127	Betaproteobacteria	chr II	Burkholderia ambifaria MC40-6	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
172060177	Betaproteobacteria	chr I	Burkholderia ambifaria MC40-6	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
312602278	Betaproteobacteria	plasmid	Burkholderia rhizoxinica HKI 454	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
161521451	Betaproteobacteria	chr II	Burkholderia multivorans ATCC 17616	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
187922824	Betaproteobacteria	chr I	Burkholderia phytofirmans PsJN	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
187922849	Betaproteobacteria	chr I	Burkholderia phytofirmans PsJN	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
187923949	Betaproteobacteria	chr I	Burkholderia phytofirmans PsJN	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
187918776	Betaproteobacteria	chr II	Burkholderia phytofirmans PsJN	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
187920691	Betaproteobacteria	chr II	Burkholderia phytofirmans PsJN	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
187920927	Betaproteobacteria	chr II	Burkholderia phytofirmans PsJN	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
189352380	Betaproteobacteria	chr II	Burkholderia multivorans ATCC 17616	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
73539190	Betaproteobacteria	chr II	Ralstonia eutropha JMP134	TAD-CD	Burkholderiales	Burkholderiaceae	Cupriavidus	+	B2
134291038	Betaproteobacteria	chr III	Burkholderia vietnamiensis G4	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
134291907	Betaproteobacteria	chr III	Burkholderia vietnamiensis G4	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
134292914	Betaproteobacteria	chr II	Burkholderia vietnamiensis G4	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
323524891	Betaproteobacteria	chr I	Burkholderia sp. CCGE1001	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
323525997	Betaproteobacteria	chr I	Burkholderia sp. CCGE1001	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
323526264	Betaproteobacteria	chr I	Burkholderia sp. CCGE1001	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
323529729	Betaproteobacteria	chr II	Burkholderia sp. CCGE1001	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
323530282	Betaproteobacteria	chr II	Burkholderia sp. CCGE1001	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
113867839	Betaproteobacteria	chr I	Ralstonia eutropha H16	TAD-CD	Burkholderiales	Burkholderiaceae	Cupriavidus	+	B2
116693982	Betaproteobacteria	chr II	Ralstonia eutropha H16	TAD-CD	Burkholderiales	Burkholderiaceae	Cupriavidus	+	B2
116693996	Betaproteobacteria	chr II	Ralstonia eutropha H16	TAD-CD	Burkholderiales	Burkholderiaceae	Cupriavidus	+	B2
17549239	Betaproteobacteria	plasmid	Ralstonia solanacearum GMI1000	TAD-CD	Burkholderiales	Burkholderiaceae	Ralstonia	+	B2 +
83716548	Betaproteobacteria	chr II	Burkholderia thailandensis E264	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
83721637	Betaproteobacteria	chr I	Burkholderia thailandensis E264	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
107026882	Betaproteobacteria	chr II	Burkholderia cenocepacia AU 1054	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
91777873	Betaproteobacteria	chr II	Burkholderia xenovorans LB400	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
91779582	Betaproteobacteria	chr II	Burkholderia xenovorans LB400	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
91781980	Betaproteobacteria	chr I	Burkholderia xenovorans LB400	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
91781994	Betaproteobacteria	chr I	Burkholderia xenovorans LB400	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
91783285	Betaproteobacteria	chr I	Burkholderia xenovorans LB400	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
91783573	Betaproteobacteria	chr I	Burkholderia xenovorans LB400	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
78062666	Betaproteobacteria	chr II	Burkholderia sp. 383	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
78063119	Betaproteobacteria	chr II	Burkholderia sp. 383	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
78063713	Betaproteobacteria	chr II	Burkholderia sp. 383	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
78060511	Betaproteobacteria	chr III	Burkholderia sp. 383	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
115360916	Betaproteobacteria	chr III	Burkholderia ambifaria AMMD	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
115361228	Betaproteobacteria	chr III	Burkholderia ambifaria AMMD	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
115358372	Betaproteobacteria	chr II	Burkholderia ambifaria AMMD	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
115359861	Betaproteobacteria	chr II	Burkholderia ambifaria AMMD	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
115360293	Betaproteobacteria	chr II	Burkholderia ambifaria AMMD	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2

339321343	Betaproteobacteria	chr II	Cupriavidus necator N-1	TAD-CD	Burkholderiales	Burkholderiaceae	Cupriavidus	+	B2
339322708	Betaproteobacteria	chr II	Cupriavidus necator N-1	TAD-CD	Burkholderiales	Burkholderiaceae	Cupriavidus	+	B2
307728619	Betaproteobacteria	chr I	Burkholderia sp. CCGE1003	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
307729464	Betaproteobacteria	chr I	Burkholderia sp. CCGE1003	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
307729708	Betaproteobacteria	chr I	Burkholderia sp. CCGE1003	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
307725617	Betaproteobacteria	chr II	Burkholderia sp. CCGE1003	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
307725990	Betaproteobacteria	chr II	Burkholderia sp. CCGE1003	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
126457439	Betaproteobacteria	chr II	Burkholderia pseudomallei 1106a	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
126453607	Betaproteobacteria	chr I	Burkholderia pseudomallei 1106a	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
76810347	Betaproteobacteria	chr I	Burkholderia pseudomallei 1710b	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
76819162	Betaproteobacteria	chr II	Burkholderia pseudomallei 1710b	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
295681365	Betaproteobacteria	chr III	Burkholderia sp. CCGE1002	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
295681374	Betaproteobacteria	chr III	Burkholderia sp. CCGE1002	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
295675650	Betaproteobacteria	chr I	Burkholderia sp. CCGE1002	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
295675677	Betaproteobacteria	chr I	Burkholderia sp. CCGE1002	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
295676566	Betaproteobacteria	chr I	Burkholderia sp. CCGE1002	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
295698972	Betaproteobacteria	chr II	Burkholderia sp. CCGE1002	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
53720387	Betaproteobacteria	chr I	Burkholderia pseudomallei K96243	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
53722849	Betaproteobacteria	chr II	Burkholderia pseudomallei K96243	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
206562077	Betaproteobacteria	chr II	Burkholderia cenocepacia J2315	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
206562715	Betaproteobacteria	chr II	Burkholderia cenocepacia J2315	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
377821490	Betaproteobacteria	chr I	Burkholderia sp. YI23	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
377813405	Betaproteobacteria	chr II	Burkholderia sp. YI23	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
94314768	Betaproteobacteria	plasmid	Cupriavidus metallidurans CH34	TAD-CD	Burkholderiales	Burkholderiaceae	Cupriavidus	+	B2
186475826	Betaproteobacteria	chr I	Burkholderia phymatum STM815	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
186476447	Betaproteobacteria	chr I	Burkholderia phymatum STM815	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
186477221	Betaproteobacteria	chr I	Burkholderia phymatum STM815	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
186471484	Betaproteobacteria	plasmid	Burkholderia phymatum STM815	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
116691921	Betaproteobacteria	chr II	Burkholderia cenocepacia HI2424	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	B2
91781096	Betaproteobacteria	chr III	Burkholderia xenovorans LB400	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	-
186472136	Betaproteobacteria	chr II	Burkholderia phymatum STM815	TAD-CD	Burkholderiales	Burkholderiaceae	Burkholderia	+	-
319791781	Betaproteobacteria	chr	Variovorax paradoxus EPS	TAD-CD	Burkholderiales	Comamonadaceae	Variovorax	+	B2
319793545	Betaproteobacteria	chr	Variovorax paradoxus EPS	TAD-CD	Burkholderiales	Comamonadaceae	Variovorax	+	B2
319795308	Betaproteobacteria	chr	Variovorax paradoxus EPS	TAD-CD	Burkholderiales	Comamonadaceae	Variovorax	+	B2
239814198	Betaproteobacteria	chr I	Variovorax paradoxus S110	TAD-CD	Burkholderiales	Comamonadaceae	Variovorax	+	B2
239814943	Betaproteobacteria	chr I	Variovorax paradoxus S110	TAD-CD	Burkholderiales	Comamonadaceae	Variovorax	+	B2
239816164	Betaproteobacteria	chr I	Variovorax paradoxus S110	TAD-CD	Burkholderiales	Comamonadaceae	Variovorax	+	B2
121606084	Betaproteobacteria	chr	Polaromonas naphthalenivorans CJ2	TAD-CD	Burkholderiales	Comamonadaceae	Polaromonas	+	B2
340787180	Betaproteobacteria	chr	Collimonas fungivorans Ter331	TAD-CD	Burkholderiales	Oxalobacteraceae	Collimonas	+	B2
114332085	Betaproteobacteria	chr	Nitrosomonas eutropha C91	TAD-CD	Nitrosomonadales	Nitrosomonadaceae	Nitrosomonas	+	B1
30250210	Betaproteobacteria	chr	Nitrosomonas europaea ATCC 19718	TAD-CD	Nitrosomonadales	Nitrosomonadaceae	Nitrosomonas	+	B1
217969536	Betaproteobacteria	chr	Thauera sp. MZ1T	TAD-CD	Rhodocyclales	Rhodocyclaceae	Thauera	+	B1
56479322	Betaproteobacteria	chr	Aromatoleum aromaticum EbN1	TAD-CD	Rhodocyclales	Rhodocyclaceae	Aromatoleum	+	C5
320161111	Chloroflexi	chr	Anaerolinea thermophila UNI-1	TAD-CD	Anaerolineales	Anaerolineaceae	Anaerolinea	+	A3
156743606	Chloroflexi	chr	Roseiflexus castenholzii DSM 13941	TAD+CD	Chloroflexales	Chloroflexaceae	Roseiflexus	+	A3
148658131	Chloroflexi	chr	Roseiflexus sp. RS-1	TAD+CD	Chloroflexales	Chloroflexaceae	Roseiflexus	+	A3

+

156741338	Chloroflexi	chr	Roseiflexus castenholzii DSM 13941	TAD-CD	Chloroflexales	Chloroflexaceae	Roseiflexus	+	-
148658358	Chloroflexi	chr	Roseiflexus sp. RS-1	TAD-CD	Chloroflexales	Chloroflexaceae	Roseiflexus	+	-
159896727	Chloroflexi	chr	Herpetosiphon aurantiacus DSM 785	TAD-CD	Herpetosiphonales	Herpetosiphonaceae	Herpetosiphon	+	-
269928667	Chloroflexi	chr II	Sphaerobacter thermophilus DSM 20745	TAD-CD	Sphaerobacterales	Sphaerobacteraceae	Sphaerobacter	+	-
269929355	Chloroflexi	chr II	Sphaerobacter thermophilus DSM 20745	TAD-CD	Sphaerobacterales	Sphaerobacteraceae	Sphaerobacter	+	-
158333590	Cyanobacteria	chr	Acaryochloris marina MBIC11017	CD	Chroococcales	?	Acaryochloris	+	A2
158333606	Cyanobacteria	chr	Acaryochloris marina MBIC11017	TAD-CD	Chroococcales	?	Acaryochloris	+	A2
220909165	Cyanobacteria	chr	Cyanothece sp. PCC 7425	TAD-CD	Chroococcales	?	Cyanothece	+	A2
158338813	Cyanobacteria	chr	Acaryochloris marina MBIC11017	TAD-CD	Chroococcales	?	Acaryochloris	+	-
113954055	Cyanobacteria	chr	Synechococcus sp. CC9311	TAD-CD	Chroococcales	?	Synechococcus	+	-
220910287	Cyanobacteria	chr	Cyanothece sp. PCC 7425	TAD-CD	Chroococcales	?	Cyanothece	+	-
220910517	Cyanobacteria	chr	Cyanothece sp. PCC 7425	TAD-CD	Chroococcales	?	Cyanothece	+	-
17230348	Cyanobacteria	chr	Nostoc sp. PCC 7120	TAD-CD	Nostocales	Nostocaceae	Nostoc	+	A2
17231924	Cyanobacteria	chr	Nostoc sp. PCC 7120	TAD-CD	Nostocales	Nostocaceae	Nostoc	+	A2
75907268	Cyanobacteria	chr	Anabaena variabilis ATCC 29413	TAD-CD	Nostocales	Nostocaceae	Anabaena	+	A2
75907609	Cyanobacteria	chr	Anabaena variabilis ATCC 29413	TAD-CD	Nostocales	Nostocaceae	Anabaena	+	A2
186685558	Cyanobacteria	chr	Nostoc punctiforme PCC 73102	TAD-CD	Nostocales	Nostocaceae	Nostoc	+	A2
17230551	Cyanobacteria	chr	Nostoc sp. PCC 7120	TAD-CD	Nostocales	Nostocaceae	Nostoc	+	-
75907075	Cyanobacteria	chr	Anabaena variabilis ATCC 29413	TAD-CD	Nostocales	Nostocaceae	Anabaena	+	-
37523879	Cyanobacteria	chr	Gloeobacter violaceus PCC 7421	TAD-CD	Gloeobacterales	?	Gloeobacter	+	A2
37520023	Cyanobacteria	chr	Gloeobacter violaceus PCC 7421	TAD-CD	Gloeobacterales	?	Gloeobacter	+	-
37521365	Cyanobacteria	chr	Gloeobacter violaceus PCC 7421	TAD-CD	Gloeobacterales	?	Gloeobacter	+	-
37523285	Cyanobacteria	chr	Gloeobacter violaceus PCC 7421	TAD-CD	Gloeobacterales	?	Gloeobacter	+	-
37523354	Cyanobacteria	chr	Gloeobacter violaceus PCC 7421	TAD-CD	Gloeobacterales	?	Gloeobacter	+	-
297625154	Deinococcus-Thermus	chr	Truepera radiovictrix DSM 17093	CD	Deinococcales	Trueperaceae	Truepera	+	-
313681038	Deinococcus-Thermus	chr	Oceanithermus profundus DSM 14977	TAD-CD	Thermales	Thermaceae	Oceanithermus	-	-
158521668	Deltaproteobacteria	chr	Desulfococcus oleovorans Hxd3	TAD-CD	Desulfobacterales	Desulfobacteraceae	Desulfococcus	+	-
224369069	Deltaproteobacteria	chr	Desulfobacterium autotrophicum HRM2	TAD+CD	Desulfobacterales	Desulfobacteraceae	Desulfobacterium	+	-
224369651	Deltaproteobacteria	chr	Desulfobacterium autotrophicum HRM2	TAD-CD	Desulfobacterales	Desulfobacteraceae	Desulfobacterium	+	-
320354729	Deltaproteobacteria	chr	Desulfobulbus propionicus DSM 2032	CD	Desulfobacterales	Desulfobulbaceae	Desulfobulbus	+	-
256829990	Deltaproteobacteria	chr	Desulfomicrobium baculatum DSM 4028	TAD+CD	Desulfovibrionales	Desulfomicrobiaceae	Desulfomicrobium	+	C1
256829474	Deltaproteobacteria	chr	Desulfomicrobium baculatum DSM 4028	TAD-CD	Desulfovibrionales	Desulfomicrobiaceae	Desulfomicrobium	+	-
376295990	Deltaproteobacteria	chr	Desulfovibrio desulfuricans ND132	TAD+CD	Desulfovibrionales	Desulfovibrionaceae	Desulfovibrio	+	C1
78355879	Deltaproteobacteria	chr	Desulfovibrio alaskensis G20	TAD+CD	Desulfovibrionales	Desulfovibrionaceae	Desulfovibrio	+	C1
148263732	Deltaproteobacteria	chr	Geobacter uraniireducens Rf4	TAD-CD	Desulfuromonadales	Geobacteraceae	Geobacter	+	A3
322419761	Deltaproteobacteria	chr	Geobacter sp. M18	TAD-CD	Desulfuromonadales	Geobacteraceae	Geobacter	+	A3
253701088	Deltaproteobacteria	chr	Geobacter sp. M21	TAD+CD	Desulfuromonadales	Geobacteraceae	Geobacter	+	C1
148264409	Deltaproteobacteria	chr	Geobacter uraniireducens Rf4	TAD+CD	Desulfuromonadales	Geobacteraceae	Geobacter	+	C1
148264624	Deltaproteobacteria	chr	Geobacter uraniireducens Rf4	TAD+CD	Desulfuromonadales	Geobacteraceae	Geobacter	+	C1
39997081	Deltaproteobacteria	chr	Geobacter sulfurreducens PCA	TAD+CD	Desulfuromonadales	Geobacteraceae	Geobacter	+	C1
222056061	Deltaproteobacteria	chr	Geobacter sp. FRC-32	TAD+CD	Desulfuromonadales	Geobacteraceae	Geobacter	+	C1
197118156	Deltaproteobacteria	chr	Geobacter bemidjensis Bem	TAD+CD	Desulfuromonadales	Geobacteraceae	Geobacter	+	C1
78223235	Deltaproteobacteria	chr	Geobacter metallireducens GS-15	TAD+CD	Desulfuromonadales	Geobacteraceae	Geobacter	+	C1
322419157	Deltaproteobacteria	chr	Geobacter sp. M18	TAD+CD	Desulfuromonadales	Geobacteraceae	Geobacter	+	C1
118580886	Deltaproteobacteria	chr	Pelobacter propionicus DSM 2379	TAD+CD	Desulfuromonadales	Pelobacteraceae	Pelobacter	+	C1
262193406	Deltaproteobacteria	chr	Haliangium ochraceum DSM 14365	TAD-CD	Myxococcales	Koferiaceae	Haliangium	+	-

108761758	Deltaproteobacteria	chr	Myxococcus xanthus DK 1622	TAD-CD	Myxococcales	Myxococcaceae	Myxococcus	+	A3
338530381	Deltaproteobacteria	chr	Myxococcus fulvus HW-1	TAD-CD	Myxococcales	Myxococcaceae	Myxococcus	+	A3
153007265	Deltaproteobacteria	chr	Anaeromyxobacter sp. Fw109-5	TAD-CD	Myxococcales	Myxococcaceae	Anaeromyxobacter	+	B1
86160690	Deltaproteobacteria	chr	Anaeromyxobacter dehalogenans 2CP-C	TAD-CD	Myxococcales	Myxococcaceae	Anaeromyxobacter	+	B2
197124789	Deltaproteobacteria	chr	Anaeromyxobacter sp. K	TAD-CD	Myxococcales	Myxococcaceae	Anaeromyxobacter	+	B2
220919508	Deltaproteobacteria	chr	Anaeromyxobacter dehalogenans 2CP-1	TAD-CD	Myxococcales	Myxococcaceae	Anaeromyxobacter	+	B2
153004118	Deltaproteobacteria	chr	Anaeromyxobacter sp. Fw109-5	TAD-CD	Myxococcales	Myxococcaceae	Anaeromyxobacter	+	B2
153005492	Deltaproteobacteria	chr	Anaeromyxobacter sp. Fw109-5	TAD-CD	Myxococcales	Myxococcaceae	Anaeromyxobacter	+	B2
162455600	Deltaproteobacteria	chr	Sorangium cellulosum 'So ce 56'	TAD-CD	Myxococcales	Polyangiaceae	Sorangium	+	-
328953453	Deltaproteobacteria	chr	Desulfobacca acetoxidans DSM 11109	TAD-CD	Syntrophobacterales	Syntrophaceae	Desulfobacca	+	A3
328951986	Deltaproteobacteria	chr	Desulfobacca acetoxidans DSM 11109	TAD+CD	Syntrophobacterales	Syntrophaceae	Desulfobacca	+	C1
328953868	Deltaproteobacteria	chr	Desulfobacca acetoxidans DSM 11109	TAD+CD	Syntrophobacterales	Syntrophaceae	Desulfobacca	+	C1
116749613	Deltaproteobacteria	chr	Syntrophobacter fumaroxidans MPOB	TAD-CD	Syntrophobacterales	Syntrophobacteraceae	Syntrophobacter	+	-
116750742	Deltaproteobacteria	chr	Syntrophobacter fumaroxidans MPOB	TAD-CD	Syntrophobacterales	Syntrophobacteraceae	Syntrophobacter	+	-
172058642	Firmicutes	chr	Exiguobacterium sibiricum 255-15	TAD+CD	Bacillales	?	Exiguobacterium	+	A3
350267668	Firmicutes	chr	Bacillus subtilis subsp. spizizenii TU-B-10	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
350267881	Firmicutes	chr	Bacillus subtilis subsp. spizizenii TU-B-10	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
118480319	Firmicutes	chr	Bacillus thuringiensis str. Al Hakam	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
347751316	Firmicutes	chr	Bacillus coagulans 36D1	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
217962764	Firmicutes	chr	Bacillus cereus AH187	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
297531529	Firmicutes	chr	Geobacillus sp. C56-T3	TAD+CD	Bacillales	Bacillaceae	Geobacillus	+	A3
42784443	Firmicutes	chr	Bacillus cereus ATCC 10987	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
321312986	Firmicutes	chr	Bacillus subtilis BSn5	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
321313169	Firmicutes	chr	Bacillus subtilis BSn5	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
375363883	Firmicutes	chr	Bacillus amyloliquefaciens	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
375364068	Firmicutes	chr	Bacillus amyloliquefaciens	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
294497897	Firmicutes	chr	Bacillus megaterium QM B1551	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
30023309	Firmicutes	chr	Bacillus cereus ATCC 14579	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
163942963	Firmicutes	chr	Bacillus weihenstephanensis KBAB4	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
239828556	Firmicutes	chr	Geobacillus sp. WCH70	TAD+CD	Bacillales	Bacillaceae	Geobacillus	+	A3
154687567	Firmicutes	chr	Bacillus amyloliquefaciens FZB42	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
154687746	Firmicutes	chr	Bacillus amyloliquefaciens FZB42	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
49478947	Firmicutes	chr	Bacillus thuringiensis serovar konkukian str. 97-27	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
52081990	Firmicutes	chr	Bacillus licheniformis ATCC 14580	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
138896899	Firmicutes	chr	Geobacillus thermodenitrificans NG80-2	TAD+CD	Bacillales	Bacillaceae	Geobacillus	+	A3
222098745	Firmicutes	chr	Bacillus cereus Q1	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
218900401	Firmicutes	chr	Bacillus cereus G9842	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
16080489	Firmicutes	chr	Bacillus subtilis 168	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
16080678	Firmicutes	chr	Bacillus subtilis 168	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
288554243	Firmicutes	chr	Bacillus pseudofirmus OF4	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
225867252	Firmicutes	chr	Bacillus cereus 03BB102	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
296505704	Firmicutes	chr	Bacillus thuringiensis BMB171	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
308175179	Firmicutes	chr	Bacillus amyloliquefaciens DSM 7	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
308175360	Firmicutes	chr	Bacillus amyloliquefaciens DSM 7	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
375010505	Firmicutes	chr	Geobacillus thermoleovorans CCB_US3_UF5	TAD+CD	Bacillales	Bacillaceae	Geobacillus	+	A3
23100355	Firmicutes	chr	Oceanobacillus iheyensis HTE831	TAD+CD	Bacillales	Bacillaceae	Oceanobacillus	+	A3

297585321	Firmicutes	chr	Bacillus selenitireducens MLS10	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
218233773	Firmicutes	chr	Bacillus cereus B4264	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
15616230	Firmicutes	chr	Bacillus halodurans C-125	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
375287297	Firmicutes	chr	Bacillus cereus NC7401	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
305676049	Firmicutes	chr	Bacillus subtilis subsp. spizizenii str. W23	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
305676239	Firmicutes	chr	Bacillus subtilis subsp. spizizenii str. W23	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
311069950	Firmicutes	chr	Bacillus atrophaeus 1942	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
311070137	Firmicutes	chr	Bacillus atrophaeus 1942	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
56421861	Firmicutes	chr	Geobacillus kaustophilus HTA426	TAD+CD	Bacillales	Bacillaceae	Geobacillus	+	A3
52787377	Firmicutes	chr	Bacillus licheniformis ATCC 14580	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
376269185	Firmicutes	chr	Bacillus cereus F837/76	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
169827204	Firmicutes	chr	Lysinibacillus sphaericus C3-41	TAD+CD	Bacillales	Bacillaceae	Lysinibacillus	+	A3
295703260	Firmicutes	chr	Bacillus megaterium DSM 319	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
56965573	Firmicutes	chr	Bacillus clausii KSM-K16	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
157693834	Firmicutes	chr	Bacillus pumilus SAFR-032	TAD+CD	Bacillales	Bacillaceae	Bacillus	+	A3
347550024	Firmicutes	chr	Listeria ivanovii	TAD+CD	Bacillales	Listeriaceae	Listeria	+	-
379724014	Firmicutes	chr	Paenibacillus mucilaginosus 3016	TAD+CD	Bacillales	Paenibacillaceae	Paenibacillus	+	A3
337750969	Firmicutes	chr	Paenibacillus mucilaginosus KNP414	TAD+CD	Bacillales	Paenibacillaceae	Paenibacillus	+	A3
226313842	Firmicutes	chr	Brevibacillus brevis NBRC 100599	TAD+CD	Bacillales	Paenibacillaceae	Brevibacillus	+	A3
251794388	Firmicutes	chr	Paenibacillus sp. JDR-2	TAD+CD	Bacillales	Paenibacillaceae	Paenibacillus	+	A3
251794436	Firmicutes	chr	Paenibacillus sp. JDR-2	TAD+CD	Bacillales	Paenibacillaceae	Paenibacillus	+	A3
251795257	Firmicutes	chr	Paenibacillus sp. JDR-2	TAD+CD	Bacillales	Paenibacillaceae	Paenibacillus	+	A3
251798960	Firmicutes	chr	Paenibacillus sp. JDR-2	CD	Bacillales	Paenibacillaceae	Paenibacillus	+	A3
161508418	Firmicutes	chr	Staphylococcus aureus USA300_TCH1516	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
161510869	Firmicutes	chr	Staphylococcus aureus USA300_TCH1516	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
269201802	Firmicutes	chr	Staphylococcus aureus ED98	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
269204302	Firmicutes	chr	Staphylococcus aureus ED98	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
379794648	Firmicutes	chr	Staphylococcus aureus MSHR1132	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
379796985	Firmicutes	chr	Staphylococcus aureus MSHR1132	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
379013469	Firmicutes	chr	Staphylococcus aureus VC40	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
379015780	Firmicutes	chr	Staphylococcus aureus VC40	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
148266576	Firmicutes	chr	Staphylococcus aureus JH9	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
148269096	Firmicutes	chr	Staphylococcus aureus JH9	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
289549695	Firmicutes	chr	Staphylococcus lugdunensis HKU09-01	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
156978480	Firmicutes	chr	Staphylococcus aureus Mu3	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
156980978	Firmicutes	chr	Staphylococcus aureus Mu3	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
88193928	Firmicutes	chr	Staphylococcus aureus NCTC 8325	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
88196618	Firmicutes	chr	Staphylococcus aureus NCTC 8325	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
87161167	Firmicutes	chr	Staphylococcus aureus USA300_FPR3757	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
87160161	Firmicutes	chr	Staphylococcus aureus USA300_FPR3757	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
82749863	Firmicutes	chr	Staphylococcus aureus RF122	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
82752241	Firmicutes	chr	Staphylococcus aureus RF122	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
150392615	Firmicutes	chr	Staphylococcus aureus JH1	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
150395178	Firmicutes	chr	Staphylococcus aureus JH1	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
57651154	Firmicutes	chr	Staphylococcus aureus COL	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
57652403	Firmicutes	chr	Staphylococcus aureus COL	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3

151220308	Firmicutes	chr	Staphylococcus aureus Newman	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
151222774	Firmicutes	chr	Staphylococcus aureus Newman	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
15928249	Firmicutes	chr	Staphylococcus aureus N315	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
70725390	Firmicutes	chr	Staphylococcus haemolyticus JCSC1435	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	-	A3
73661370	Firmicutes	chr	Staphylococcus saprophyticus ATCC 15305	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
15923140	Firmicutes	chr	Staphylococcus aureus Mu50	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
15925653	Firmicutes	chr	Staphylococcus aureus Mu50	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
49485026	Firmicutes	chr	Staphylococcus aureus MSSA476	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
49487442	Firmicutes	chr	Staphylococcus aureus MSSA476	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
21281854	Firmicutes	chr	Staphylococcus aureus MW2	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
21284312	Firmicutes	chr	Staphylococcus aureus MW2	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
379019946	Firmicutes	chr	Staphylococcus aureus M013	CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
379022349	Firmicutes	chr	Staphylococcus aureus M013	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
49482393	Firmicutes	chr	Staphylococcus aureus MRSA252	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
49484858	Firmicutes	chr	Staphylococcus aureus MRSA252	TAD+CD	Bacillales	Staphylococcaceae	Staphylococcus	+	A3
326803338	Firmicutes	chr	Aerococcus urinae ACS-120-V-Co110a	TAD+CD	Lactobacillales	Aerococcaceae	Aerococcus	+	A3
326803974	Firmicutes	chr	Aerococcus urinae ACS-120-V-Co110a	TAD+CD	Lactobacillales	Aerococcaceae	Aerococcus	+	A3
328957719	Firmicutes	chr	Carnobacterium sp. 17-4	TAD+CD	Lactobacillales	Carnobacteriaceae	Carnobacterium	+	A3
328957839	Firmicutes	chr	Carnobacterium sp. 17-4	TAD+CD	Lactobacillales	Carnobacteriaceae	Carnobacterium	+	A3
332686035	Firmicutes	chr	Melissococcus plutonius ATCC 35311	TAD+CD	Lactobacillales	Enterococcaceae	Melissococcus	-	A3
379727910	Firmicutes	chr I	Melissococcus plutonius	TAD+CD	Lactobacillales	Enterococcaceae	Melissococcus	-	A3
352516565	Firmicutes	chr	Tetragenococcus halophilus	TAD+CD	Lactobacillales	Enterococcaceae	Tetragenococcus	+	A3
161508006	Firmicutes	chr	Lactobacillus helveticus DPC 4571	TAD+CD	Lactobacillales	Lactobacillaceae	Lactobacillus	-	A3
104774666	Firmicutes	chr	Lactobacillus delbrueckii subsp. bulgaricus ATCC 11842	TAD+CD	Lactobacillales	Lactobacillaceae	Lactobacillus	-	A3
330818961	Firmicutes	plasmid	Lactobacillus buchneri NRRL B-30929	TAD+CD	Lactobacillales	Lactobacillaceae	Lactobacillus	-	A3
338202471	Firmicutes	chr	Lactobacillus reuteri SD2112	TAD+CD	Lactobacillales	Lactobacillaceae	Lactobacillus	-	A3
116492361	Firmicutes	chr	Pediococcus pentosaceus ATCC 25745	TAD+CD	Lactobacillales	Lactobacillaceae	Pediococcus	-	A3
315039078	Firmicutes	chr	Lactobacillus amylovorus GRL 1112	TAD+CD	Lactobacillales	Lactobacillaceae	Lactobacillus	-	A3
325957503	Firmicutes	chr	Lactobacillus acidophilus 30SC	TAD+CD	Lactobacillales	Lactobacillaceae	Lactobacillus	-	A3
308180146	Firmicutes	chr	Lactobacillus plantarum ST-III	TAD+CD	Lactobacillales	Lactobacillaceae	Lactobacillus	-	A3
308180921	Firmicutes	chr	Lactobacillus plantarum ST-III	TAD+CD	Lactobacillales	Lactobacillaceae	Lactobacillus	-	A3
81429124	Firmicutes	chr	Lactobacillus sakei 23K	TAD+CD	Lactobacillales	Lactobacillaceae	Lactobacillus	-	A3
347534901	Firmicutes	chr	Lactobacillus sanfranciscensis TMW 1.1304	TAD+CD	Lactobacillales	Lactobacillaceae	Lactobacillus	-	A3
58337993	Firmicutes	chr	Lactobacillus acidophilus NCFM	TAD+CD	Lactobacillales	Lactobacillaceae	Lactobacillus	-	A3
380032108	Firmicutes	chr	Lactobacillus plantarum WCFS1	TAD+CD	Lactobacillales	Lactobacillaceae	Lactobacillus	-	A3
380032866	Firmicutes	chr	Lactobacillus plantarum WCFS1	TAD+CD	Lactobacillales	Lactobacillaceae	Lactobacillus	-	A3
301067049	Firmicutes	chr	Lactobacillus casei str. Zhang	TAD+CD	Lactobacillales	Lactobacillaceae	Lactobacillus	-	A3
336054807	Firmicutes	chr	Lactobacillus kefiranofaciens ZW3	TAD+CD	Lactobacillales	Lactobacillaceae	Lactobacillus	-	A3
295693622	Firmicutes	chr	Lactobacillus crispatus ST1	TAD+CD	Lactobacillales	Lactobacillaceae	Lactobacillus	-	A3
254556932	Firmicutes	chr	Lactobacillus plantarum JDMI	TAD+CD	Lactobacillales	Lactobacillaceae	Lactobacillus	-	A3
184154562	Firmicutes	chr	Lactobacillus fermentum IFO 3956	TAD+CD	Lactobacillales	Lactobacillaceae	Lactobacillus	-	A3
313124585	Firmicutes	chr	Lactobacillus delbrueckii subsp. bulgaricus ND02	TAD+CD	Lactobacillales	Lactobacillaceae	Lactobacillus	-	A3
258509047	Firmicutes	chr	Lactobacillus rhamnosus GG	TAD+CD	Lactobacillales	Lactobacillaceae	Lactobacillus	-	A3
377809946	Firmicutes	chr	Pediococcus claussenii ATCC BAA-344	TAD+CD	Lactobacillales	Lactobacillaceae	Pediococcus	-	A3
90961971	Firmicutes	chr	Lactobacillus salivarius UCC118	TAD+CD	Lactobacillales	Lactobacillaceae	Lactobacillus	+	C6
381336903	Firmicutes	chr	Leuconostoc mesenteroides J18	TAD+CD	Lactobacillales	Leuconostocaceae	Leuconostoc	-	A3

116491485	Firmicutes	chr	Oenococcus oeni PSU-1	TAD+CD	Lactobacillales	Leuconostocaceae	Oenococcus	+	A3
116618529	Firmicutes	chr	Leuconostoc mesenteroides ATCC 8293	TAD+CD	Lactobacillales	Leuconostocaceae	Leuconostoc	-	A3
170017558	Firmicutes	chr	Leuconostoc citreum KM20	TAD+CD	Lactobacillales	Leuconostocaceae	Leuconostoc	-	A3
300173003	Firmicutes	chr	Leuconostoc gasicomitatum LMG 18811	TAD+CD	Lactobacillales	Leuconostocaceae	Leuconostoc	-	A3
281490627	Firmicutes	chr	Lactococcus lactis subsp. lactis KF147	TAD+CD	Lactobacillales	Streptococcaceae	Lactococcus	-	A3
225858206	Firmicutes	chr	Streptococcus pneumoniae 70585	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	+	C6
76788321	Firmicutes	chr	Streptococcus agalactiae A909	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	-	C6
325978122	Firmicutes	chr	Streptococcus gallolyticus ATCC BAA-2069	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	-	C6
340398894	Firmicutes	chr	Streptococcus salivarius JIM8780	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	-	C6
116517023	Firmicutes	chr	Streptococcus pneumoniae D39	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	+	C6
225853928	Firmicutes	chr	Streptococcus pneumoniae JJA	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	+	C6
330832555	Firmicutes	chr	Streptococcus suis ST3	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	-	C6
146318220	Firmicutes	chr	Streptococcus suis 05ZYH33	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	-	C6
333905152	Firmicutes	chr	Streptococcus parauberis KCTC 11537	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	+	C6
336064119	Firmicutes	chr	Streptococcus pasteurianus ATCC 43144	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	-	C6
225856091	Firmicutes	chr	Streptococcus pneumoniae P1031	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	+	C6
298502151	Firmicutes	chr	Streptococcus pneumoniae TCH8431/19A	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	-	C6
182683319	Firmicutes	chr	Streptococcus pneumoniae CGSP14	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	+	C6
221231225	Firmicutes	chr	Streptococcus pneumoniae ATCC 700669	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	+	C6
337282873	Firmicutes	chr	Streptococcus parasanguinis ATCC 15912	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	-	C6
307126564	Firmicutes	chr	Streptococcus pneumoniae 670-6B	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	-	C6
222153187	Firmicutes	chr	Streptococcus uberis 0140J	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	+	C6
253755868	Firmicutes	chr	Streptococcus suis BM407	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	-	C6
225860384	Firmicutes	chr	Streptococcus pneumoniae Taiwan19F-14	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	-	C6
169833689	Firmicutes	chr	Streptococcus pneumoniae Hungary19A-6	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	+	C6
25011294	Firmicutes	chr	Streptococcus agalactiae NEM316	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	-	C6
125719004	Firmicutes	chr	Streptococcus sanguinis SK36	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	-	C6
157151662	Firmicutes	chr	Streptococcus gordonii str. Challis substr. CH1	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	-	C6
146320417	Firmicutes	chr	Streptococcus suis 98HAH33	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	-	C6
22537330	Firmicutes	chr	Streptococcus agalactiae 2603V/R	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	-	C6
331267019	Firmicutes	chr	Streptococcus oralis Uo5	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	-	C6
307067006	Firmicutes	chr	Streptococcus pneumoniae AP200	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	+	C6
288905148	Firmicutes	chr	Streptococcus gallolyticus UCN34	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	-	C6
116627844	Firmicutes	chr	Streptococcus thermophilus LMD-9	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	+	C6
15900278	Firmicutes	chr	Streptococcus pneumoniae TIGR4	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	-	C6
253753300	Firmicutes	chr	Streptococcus suis P1/7	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	-	C6
194397438	Firmicutes	chr	Streptococcus pneumoniae G54	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	+	C6
253751400	Firmicutes	chr	Streptococcus suis SC84	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	-	C6
379705070	Firmicutes	chr	Streptococcus infantarius CJ18	TAD+CD	Lactobacillales	Streptococcaceae	Streptococcus	-	C6
226950098	Firmicutes	chr	Clostridium botulinum A2 str. Kyoto	CD	Clostridiales	Clostridiaceae	Clostridium	+	A3
337738247	Firmicutes	chr	Clostridium acetobutylicum DSM 1731	CD	Clostridiales	Clostridiaceae	Clostridium	+	A3
337738250	Firmicutes	chr	Clostridium acetobutylicum DSM 1731	TAD+CD	Clostridiales	Clostridiaceae	Clostridium	+	A3
337738267	Firmicutes	chr	Clostridium acetobutylicum DSM 1731	TAD+CD	Clostridiales	Clostridiaceae	Clostridium	+	A3
110803878	Firmicutes	chr	Clostridium perfringens SM101	TAD+CD	Clostridiales	Clostridiaceae	Clostridium	+	A3
110799248	Firmicutes	chr	Clostridium perfringens ATCC 13124	TAD+CD	Clostridiales	Clostridiaceae	Clostridium	+	A3
170758556	Firmicutes	chr	Clostridium botulinum A3 str. Loch Maree	CD	Clostridiales	Clostridiaceae	Clostridium	+	A3

15896291	Firmicutes	chr	<i>Clostridium acetobutylicum</i> ATCC 824	CD	Clostridiales	Clostridiaceae	<i>Clostridium</i>	+	A3
15896294	Firmicutes	chr	<i>Clostridium acetobutylicum</i> ATCC 824	TAD+CD	Clostridiales	Clostridiaceae	<i>Clostridium</i>	+	A3
15896311	Firmicutes	chr	<i>Clostridium acetobutylicum</i> ATCC 824	TAD+CD	Clostridiales	Clostridiaceae	<i>Clostridium</i>	+	A3
153940754	Firmicutes	chr	<i>Clostridium botulinum</i> F str. Langeland	CD	Clostridiales	Clostridiaceae	<i>Clostridium</i>	+	A3
153931560	Firmicutes	chr	<i>Clostridium botulinum</i> A str. ATCC 19397	CD	Clostridiales	Clostridiaceae	<i>Clostridium</i>	+	A3
331268891	Firmicutes	chr	<i>Clostridium botulinum</i> BK7015925	TAD+CD	Clostridiales	Clostridiaceae	<i>Clostridium</i>	+	A3
300853716	Firmicutes	chr	<i>Clostridium ljungdahlii</i> DSM 13528	CD	Clostridiales	Clostridiaceae	<i>Clostridium</i>	+	A3
125973878	Firmicutes	chr	<i>Clostridium thermocellum</i> ATCC 27405	TAD-CD	Clostridiales	Clostridiaceae	<i>Clostridium</i>	+	A3
153937000	Firmicutes	chr	<i>Clostridium botulinum</i> A str. Hall	CD	Clostridiales	Clostridiaceae	<i>Clostridium</i>	+	A3
188590478	Firmicutes	chr	<i>Clostridium botulinum</i> E3 str. Alaska E43	TAD+CD	Clostridiales	Clostridiaceae	<i>Clostridium</i>	+	A3
150019551	Firmicutes	chr	<i>Clostridium beijerinckii</i> NCIMB 8052	TAD+CD	Clostridiales	Clostridiaceae	<i>Clostridium</i>	+	A3
148380645	Firmicutes	chr	<i>Clostridium botulinum</i> A str. ATCC 3502	CD	Clostridiales	Clostridiaceae	<i>Clostridium</i>	+	A3
18309444	Firmicutes	chr	<i>Clostridium perfringens</i> str. 13	TAD+CD	Clostridiales	Clostridiaceae	<i>Clostridium</i>	+	A3
18309474	Firmicutes	chr	<i>Clostridium perfringens</i> str. 13	TAD+CD	Clostridiales	Clostridiaceae	<i>Clostridium</i>	+	A3
374297115	Firmicutes	chr	<i>Clostridium clariflavum</i> DSM 19732	TAD-CD	Clostridiales	Clostridiaceae	<i>Clostridium</i>	+	A3
237796125	Firmicutes	chr	<i>Clostridium botulinum</i> Ba4 str. 657	CD	Clostridiales	Clostridiaceae	<i>Clostridium</i>	+	A3
170757290	Firmicutes	chr	<i>Clostridium botulinum</i> B1 str. Okra	CD	Clostridiales	Clostridiaceae	<i>Clostridium</i>	+	A3
118444157	Firmicutes	chr	<i>Clostridium novyi</i> NT	TAD+CD	Clostridiales	Clostridiaceae	<i>Clostridium</i>	+	A3
302873460	Firmicutes	chr	<i>Clostridium cellulovorans</i> 743B	TAD+CD	Clostridiales	Clostridiaceae	<i>Clostridium</i>	+	A3
302873791	Firmicutes	chr	<i>Clostridium cellulovorans</i> 743B	TAD+CD	Clostridiales	Clostridiaceae	<i>Clostridium</i>	+	A3
302874182	Firmicutes	chr	<i>Clostridium cellulovorans</i> 743B	TAD+CD	Clostridiales	Clostridiaceae	<i>Clostridium</i>	+	A3
160879362	Firmicutes	chr	<i>Clostridium phytofermentans</i> ISDg	TAD-CD	Clostridiales	Clostridiaceae	<i>Clostridium</i>	+	C6
339443617	Firmicutes	chr	<i>Clostridium</i> sp. SY8519	TAD+CD	Clostridiales	Clostridiaceae	<i>Clostridium</i>	-	-
257066052	Firmicutes	chr	<i>Anaerococcus prevotii</i> DSM 20548	TAD+CD	Clostridiales	Clostridiales	<i>Anaerococcus</i>	-	-
310828653	Firmicutes	chr	<i>Eubacterium limosum</i> KIST612	TAD+CD	Clostridiales	Eubacteriaceae	<i>Eubacterium</i>	+	A3
238922084	Firmicutes	plasmid	<i>Eubacterium eligens</i> ATCC 27750	TAD+CD	Clostridiales	Eubacteriaceae	<i>Eubacterium</i>	-	C6
238925469	Firmicutes	chr	<i>Eubacterium rectale</i> ATCC 33656	TAD+CD	Clostridiales	Eubacteriaceae	<i>Eubacterium</i>	-	C6
379011937	Firmicutes	chr	<i>Acetobacterium woodii</i> DSM 1030	TAD+CD	Clostridiales	Eubacteriaceae	<i>Acetobacterium</i>	+	-
302671751	Firmicutes	chr I	<i>Butyrivibrio proteoclasticus</i> B316	TAD+CD	Clostridiales	Lachnospiraceae	<i>Butyrivibrio</i>	+	C6
333979506	Firmicutes	chr	<i>Desulfotomaculum kuznetsovii</i> DSM 6115	TAD+CD	Clostridiales	Peptococcaceae	<i>Desulfotomaculum</i>	+	A3
258516403	Firmicutes	chr	<i>Desulfotomaculum acetoxidans</i> DSM 771	TAD+CD	Clostridiales	Peptococcaceae	<i>Desulfotomaculum</i>	+	A3
258517178	Firmicutes	chr	<i>Desulfotomaculum acetoxidans</i> DSM 771	TAD+CD	Clostridiales	Peptococcaceae	<i>Desulfotomaculum</i>	+	A3
374997554	Firmicutes	chr	<i>Desulfosporosinus orientis</i> DSM 765	TAD+CD	Clostridiales	Peptococcaceae	<i>Desulfosporosinus</i>	+	A3
374997597	Firmicutes	chr	<i>Desulfosporosinus orientis</i> DSM 765	TAD+CD	Clostridiales	Peptococcaceae	<i>Desulfosporosinus</i>	+	A3
134300832	Firmicutes	chr	<i>Desulfotomaculum reducens</i> MI-1	TAD+CD	Clostridiales	Peptococcaceae	<i>Desulfotomaculum</i>	+	A3
325289625	Firmicutes	chr	<i>Syntrophobotulus glycolicus</i> DSM 8271	TAD+CD	Clostridiales	Peptococcaceae	<i>Syntrophobotulus</i>	+	-
317057438	Firmicutes	chr	<i>Ruminococcus albus</i> 7	TAD+CD	Clostridiales	Ruminococcaceae	<i>Ruminococcus</i>	+	A3
317133574	Firmicutes	chr	<i>Ethanoligenens harbinense</i> YUAN-3	TAD+CD	Clostridiales	Ruminococcaceae	<i>Ethanoligenens</i>	+	-
220933055	Firmicutes	chr	<i>Halothermothrix orenii</i> H 168	TAD+CD	Halanaerobiales	Halanaerobiaceae	<i>Halothermothrix</i>	+	-
302392871	Firmicutes	chr	<i>Acetohalobium arabaticum</i> DSM 5501	TAD+CD	Halanaerobiales	Halobacteroidaceae	<i>Acetohalobium</i>	+	A3
320116374	Firmicutes	chr	<i>Thermoanaerobacter brockii</i> subsp. finnii Ako-1	TAD+CD	Thermoanaerobacterales	Thermoanaerobacteraceae	<i>Thermoanaerobacter</i>	-	A3
167037957	Firmicutes	chr	<i>Thermoanaerobacter pseudethanolicus</i> ATCC 33223	TAD+CD	Thermoanaerobacterales	Thermoanaerobacteraceae	<i>Thermoanaerobacter</i>	-	A3
345017223	Firmicutes	chr	<i>Thermoanaerobacter wiegelsii</i> Rt8.B1	TAD+CD	Thermoanaerobacterales	Thermoanaerobacteraceae	<i>Thermoanaerobacter</i>	+	A3
307723873	Firmicutes	chr	<i>Thermoanaerobacter</i> sp. X513	TAD+CD	Thermoanaerobacterales	Thermoanaerobacteraceae	<i>Thermoanaerobacter</i>	+	A3
167040855	Firmicutes	chr	<i>Thermoanaerobacter</i> sp. X514	TAD+CD	Thermoanaerobacterales	Thermoanaerobacteraceae	<i>Thermoanaerobacter</i>	+	A3
20807221	Firmicutes	chr	<i>Thermoanaerobacter tengcongensis</i> MB4	TAD+CD	Thermoanaerobacterales	Thermoanaerobacteraceae	<i>Caldanaerobacter</i>	+	A3

+

312135956	Firmicutes	chr	Caldicellulosiruptor owensensis OL	TAD+CD	Thermoanaerobacterales	Thermoanaerobacterales	Caldicellulosiruptor	+	A3				
312621467	Firmicutes	chr	Caldicellulosiruptor kronotskyensis 2002	TAD+CD	Thermoanaerobacterales	Thermoanaerobacterales	Caldicellulosiruptor	+	A3				
333897534	Firmicutes	chr	Thermoanaerobacterium xylanolyticum LX-11	TAD+CD	Thermoanaerobacterales	Thermoanaerobacterales	Thermoanaerobacterium	+	A3				
312794576	Firmicutes	chr	Caldicellulosiruptor kristjanssonii 177R1B	TAD+CD	Thermoanaerobacterales	Thermoanaerobacterales	Caldicellulosiruptor	+	A3				
302389078	Firmicutes	chr	Thermosediminibacter oceani DSM 16646	TAD+CD	Thermoanaerobacterales	Thermoanaerobacterales	Thermosediminibacter	+	A3				
284047940	Firmicutes	chr	Acidaminococcus fermentans DSM 20731	TAD+CD	Selenomonadales	Acidaminococcaceae	Acidaminococcus	+	A3				
348026056	Firmicutes	chr	Megasphaera elsdenii	TAD+CD	Selenomonadales	Veillonellaceae	Megasphaera	+	A3				
162447873	Firmicutes	chr	Acholeplasma laidlawii PG-8A	TAD+CD	Acholeplasmatales	Acholeplasmataceae	Acholeplasma	-	-				
310778182	Fusobacteria	chr	Ilyobacter polytropus DSM 2926	TAD+CD	Fusobacteriales	Fusobacteriaceae	Ilyobacter	+	-				
310778622	Fusobacteria	chr	Ilyobacter polytropus DSM 2926	TAD+CD	Fusobacteriales	Fusobacteriaceae	Ilyobacter	+	-				
304311075	Gammaproteobacteria	chr	gamma proteobacterium HdN1	TAD-CD	?	?	?	+	C4				
218666322	Gammaproteobacteria	chr	Acidithiobacillus ferrooxidans ATCC 23270	TAD-CD	Acidithiobacillales	Acidithiobacillaceae	Acidithiobacillus	+	-				
344199339	Gammaproteobacteria	chr	Acidithiobacillus ferrivorans SS3	TAD-CD	Acidithiobacillales	Acidithiobacillaceae	Acidithiobacillus	+	-				
117620956	Gammaproteobacteria	chr	Aeromonas hydrophila subsp. hydrophila ATCC 7966	TAD-CD	Aeromonadales	Aeromonadaceae	Aeromonas	+	B1			+	
237809604	Gammaproteobacteria	chr	Tolumonas auensis DSM 9187	TAD-CD	Aeromonadales	Aeromonadaceae	Tolumonas	+	B1				
332141024	Gammaproteobacteria	chr	Alteromonas macleodii str. 'Deep ecotype'	TAD-CD	Alteromonadales	Alteromonadaceae	Alteromonas	+	C4				
333893581	Gammaproteobacteria	chr	Alteromonas sp. SN2	TAD-CD	Alteromonadales	Alteromonadaceae	Alteromonas	+	C4				
333893714	Gammaproteobacteria	chr	Alteromonas sp. SN2	TAD-CD	Alteromonadales	Alteromonadaceae	Alteromonas	+	C4				
332307685	Gammaproteobacteria	chr	Glaciecola agarilytica 4H-3-7+YE-5	TAD-CD	Alteromonadales	Alteromonadaceae	Glaciecola	+	C4				
71281329	Gammaproteobacteria	chr	Colwellia psychrerythraea 34H	TAD-CD	Alteromonadales	Colwelliaceae	Colwellia	+	B1			+	
308047989	Gammaproteobacteria	chr	Ferrimonas balearica DSM 9799	TAD-CD	Alteromonadales	Ferrimonadaceae	Ferrimonas	+	C4				
77360720	Gammaproteobacteria	chr I	Pseudoalteromonas haloplanktis TAC125	TAD-CD	Alteromonadales	Pseudoalteromonadaceae	Pseudoalteromonas	-	C4				
109897398	Gammaproteobacteria	chr	Pseudoalteromonas atlantica T6c	TAD-CD	Alteromonadales	Pseudoalteromonadaceae	Pseudoalteromonas	+	C4				
315126370	Gammaproteobacteria	chr I	Pseudoalteromonas sp. SM9913	TAD-CD	Alteromonadales	Pseudoalteromonadaceae	Pseudoalteromonas	+	C4				
212634419	Gammaproteobacteria	chr	Shewanella piezotolerans WP3	TAD-CD	Alteromonadales	Shewanellaceae	Shewanella	+	B1			+	
114562562	Gammaproteobacteria	chr	Shewanella frigidimarina NCIMB 400	TAD-CD	Alteromonadales	Shewanellaceae	Shewanella	+	C4				
77164988	Gammaproteobacteria	chr	Nitrosococcus oceani ATCC 19707	TAD-CD	Chromatiales	Chromatiaceae	Nitrosococcus	+	C5				
292491415	Gammaproteobacteria	chr	Nitrosococcus halophilus Nc4	TAD-CD	Chromatiales	Chromatiaceae	Nitrosococcus	+	C5				
289207806	Gammaproteobacteria	chr	Thioalkalivibrio sp. K90mix	TAD-CD	Chromatiales	Ecotiothiorhodospiraceae	Thioalkalivibrio	+	B1				
114319961	Gammaproteobacteria	chr	Alkalilimnicola ehrlichii MLHE-1	TAD-CD	Chromatiales	Ecotiothiorhodospiraceae	Alkalilimnicola	+	-				
37527605	Gammaproteobacteria	chr	Photorhabdus luminescens subsp. laumondii TTO1	TAD-CD	Enterobacteriales	Enterobacteriaceae	Photorhabdus	+	B1				
291281980	Gammaproteobacteria	chr	Escherichia coli O55:H7 str. CB9615	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+	+
291283300	Gammaproteobacteria	chr	Escherichia coli O55:H7 str. CB9615	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+	+
378712526	Gammaproteobacteria	chr	Escherichia coli KO11FL	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+	+
378713613	Gammaproteobacteria	chr	Escherichia coli KO11FL	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+	+
224583396	Gammaproteobacteria	chr	Salmonella enterica serovar Paratyphi C strain RKS4594	TAD-CD	Enterobacteriales	Enterobacteriaceae	Salmonella	+	B1	+	+	+	+
218553568	Gammaproteobacteria	chr	Escherichia coli IAI1	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+	+
218554628	Gammaproteobacteria	chr	Escherichia coli IAI1	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+	+
345299981	Gammaproteobacteria	chr	Enterobacter asburiae LF7a	TAD-CD	Enterobacteriales	Enterobacteriaceae	Enterobacter	+	B1	+	+	+	+
345300027	Gammaproteobacteria	chr	Enterobacter asburiae LF7a	TAD-CD	Enterobacteriales	Enterobacteriaceae	Enterobacter	+	B1	+			
378450793	Gammaproteobacteria	chr	Salmonella enterica serovar Typhi str. 14028S	TAD-CD	Enterobacteriales	Enterobacteriaceae	Salmonella	+	B1	+	+	+	+
308187482	Gammaproteobacteria	chr	Pantoea vagans C9-1	TAD-CD	Enterobacteriales	Enterobacteriaceae	Pantoea	+	B1	+	+	+	+
378958908	Gammaproteobacteria	chr	Salmonella enterica serovar Typhi str. P-stx-12	TAD-CD	Enterobacteriales	Enterobacteriaceae	Salmonella	+	B1	+	+	+	+
194451550	Gammaproteobacteria	chr	Salmonella enterica serovar Heidelberg str. SL476	TAD-CD	Enterobacteriales	Enterobacteriaceae	Salmonella	+	B1	+	+	+	+
16761045	Gammaproteobacteria	chr	Salmonella enterica serovar Typhi str. CT18	TAD-CD	Enterobacteriales	Enterobacteriaceae	Salmonella	+	B1	+	+	+	+
378989504	Gammaproteobacteria	chr	Salmonella enterica serovar Typhi str. UK-1	TAD-CD	Enterobacteriales	Enterobacteriaceae	Salmonella	+	B1	+	+	+	+

74311538	Gammaproteobacteria	chr	Shigella sonnei Ss046	TAD-CD	Enterobacteriales	Enterobacteriaceae	Shigella	+	B1	+	+	+
161986511	Gammaproteobacteria	chr	Shigella sonnei Ss046	TAD-CD	Enterobacteriales	Enterobacteriaceae	Shigella	+	B1	+	+	+
187731566	Gammaproteobacteria	chr	Shigella boydii CDC 3083-94	TAD-CD	Enterobacteriales	Enterobacteriaceae	Shigella	+	B1	+	+	+
187730183	Gammaproteobacteria	chr	Shigella boydii CDC 3083-94	TAD-CD	Enterobacteriales	Enterobacteriaceae	Shigella	+	B1	+	+	+
197361912	Gammaproteobacteria	chr	Salmonella enterica serovar Paratyphi A str. AKU_12601	TAD-CD	Enterobacteriales	Enterobacteriaceae	Salmonella	+	B1	+	+	+
288934431	Gammaproteobacteria	chr	Klebsiella varicola At-22	TAD-CD	Enterobacteriales	Enterobacteriaceae	Klebsiella	+	B1	+	+	+
117624256	Gammaproteobacteria	chr	Escherichia coli APEC O1	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
339999887	Gammaproteobacteria	chr	Salmonella bongori NCTC 12419	TAD-CD	Enterobacteriales	Enterobacteriaceae	Salmonella	+	B1	+	+	+
85058958	Gammaproteobacteria	chr	Sodalis glossinidius str. 'morsitans'	TAD-CD	Enterobacteriales	Enterobacteriaceae	Sodalis	+	B1	+	+	+
253773008	Gammaproteobacteria	chr	Escherichia coli 'BL21-Gold(DE3)pLysS AG'	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
253773989	Gammaproteobacteria	chr	Escherichia coli 'BL21-Gold(DE3)pLysS AG'	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
261822280	Gammaproteobacteria	chr	Pectobacterium wasabiae WPP163	TAD-CD	Enterobacteriales	Enterobacteriaceae	Pectobacterium	+	B1	+	+	+
378979727	Gammaproteobacteria	chr	Klebsiella pneumoniae HS11286	TAD-CD	Enterobacteriales	Enterobacteriaceae	Klebsiella	+	B1			
162138415	Gammaproteobacteria	chr	Escherichia coli UTI89	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
300717516	Gammaproteobacteria	chr	Erwinia billingiae Eb661	TAD-CD	Enterobacteriales	Enterobacteriaceae	Erwinia	+	B1	+	+	+
215486098	Gammaproteobacteria	chr	Escherichia coli O127:H6 str. E2348/69	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
215487283	Gammaproteobacteria	chr	Escherichia coli O127:H6 str. E2348/69	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
206580442	Gammaproteobacteria	chr	Klebsiella pneumoniae 342	TAD-CD	Enterobacteriales	Enterobacteriaceae	Klebsiella	+	B1	+	+	+
375261821	Gammaproteobacteria	chr	Klebsiella oxytoca KCTC 1686	TAD-CD	Enterobacteriales	Enterobacteriaceae	Klebsiella	+	B1	+	+	+
157154890	Gammaproteobacteria	chr	Escherichia coli E24377A	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
157155608	Gammaproteobacteria	chr	Escherichia coli E24377A	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
271499801	Gammaproteobacteria	chr	Dickeya dadantii Ech586	TAD-CD	Enterobacteriales	Enterobacteriaceae	Dickeya	+	B1	+	+	+
218549475	Gammaproteobacteria	chr	Escherichia fergusonii ATCC 35469	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
260867190	Gammaproteobacteria	chr	Escherichia coli O111:H- str. 11128	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
260868771	Gammaproteobacteria	chr	Escherichia coli O111:H- str. 11128	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
156933345	Gammaproteobacteria	chr	Cronobacter sakazakii ATCC BAA-894	TAD-CD	Enterobacteriales	Enterobacteriaceae	Cronobacter	+	B1	+	+	+
317053707	Gammaproteobacteria	plasmid	Pantoea sp. At-9b	TAD-CD	Enterobacteriales	Enterobacteriaceae	Pantoea	+	B1			
317046572	Gammaproteobacteria	chr	Pantoea sp. At-9b	TAD-CD	Enterobacteriales	Enterobacteriaceae	Pantoea	+	B1			
317046574	Gammaproteobacteria	chr	Pantoea sp. At-9b	TAD-CD	Enterobacteriales	Enterobacteriaceae	Pantoea	+	B1	+	+	+
317048801	Gammaproteobacteria	chr	Pantoea sp. At-9b	TAD-CD	Enterobacteriales	Enterobacteriaceae	Pantoea	+	B1	+	+	+
161486469	Gammaproteobacteria	chr	Shigella flexneri 2a str. 2457T	TAD-CD	Enterobacteriales	Enterobacteriaceae	Shigella	+	B1	+	+	+
260843229	Gammaproteobacteria	chr	Escherichia coli O103:H2 str. 12009	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
260844671	Gammaproteobacteria	chr	Escherichia coli O103:H2 str. 12009	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
15800902	Gammaproteobacteria	chr	Escherichia coli O157:H7 str. EDL933	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
161367581	Gammaproteobacteria	chr	Escherichia coli O157:H7 str. EDL933	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
16128947	Gammaproteobacteria	chr	Escherichia coli str. K-12 substr. MG1655	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
90111377	Gammaproteobacteria	chr	Escherichia coli str. K-12 substr. MG1655	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
253988556	Gammaproteobacteria	chr	Photorhabdus asymbiotica	TAD-CD	Enterobacteriales	Enterobacteriaceae	Photorhabdus	+	B1			
292899877	Gammaproteobacteria	chr	Erwinia amylovora ATCC 49946	TAD-CD	Enterobacteriales	Enterobacteriaceae	Erwinia	+	B1	+	+	+
365971272	Gammaproteobacteria	chr	Enterobacter cloacae EcWSU1	TAD-CD	Enterobacteriales	Enterobacteriaceae	Enterobacter	+	B1	+	+	+
365971316	Gammaproteobacteria	chr	Enterobacter cloacae EcWSU1	TAD-CD	Enterobacteriales	Enterobacteriaceae	Enterobacter	+	B1	+		
62180687	Gammaproteobacteria	chr	Salmonella enterica serovar Choleraesuis str. SC-B67	TAD-CD	Enterobacteriales	Enterobacteriaceae	Salmonella	+	B1	+	+	+
259908048	Gammaproteobacteria	chr	Erwinia pyrifoliae Ep1/96	TAD-CD	Enterobacteriales	Enterobacteriaceae	Erwinia	+	B1	+	+	+
170681107	Gammaproteobacteria	chr	Escherichia coli SMS-3-5	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
333926423	Gammaproteobacteria	chr	Serratia sp. AS12	TAD-CD	Enterobacteriales	Enterobacteriaceae	Serratia	+	B1	+	+	+
333927823	Gammaproteobacteria	chr	Serratia sp. AS12	TAD-CD	Enterobacteriales	Enterobacteriaceae	Serratia	+	B1			

378700029	Gammaproteobacteria	chr	Salmonella enterica serovar Typhimurium str. SL1344	TAD-CD	Enterobacteriales	Enterobacteriaceae	Salmonella	+	B1	+	+	+
110804995	Gammaproteobacteria	chr	Shigella flexneri 5 str. 8401	TAD-CD	Enterobacteriales	Enterobacteriaceae	Shigella	+	B1	+	+	+
110806029	Gammaproteobacteria	chr	Shigella flexneri 5 str. 8401	TAD-CD	Enterobacteriales	Enterobacteriaceae	Shigella	+	B1	+	+	+
218690118	Gammaproteobacteria	chr	Escherichia coli ED1a	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
198243583	Gammaproteobacteria	chr	Salmonella enterica serovar Dublin str. CT_02021853	TAD-CD	Enterobacteriales	Enterobacteriaceae	Salmonella	+	B1	+	+	+
307130150	Gammaproteobacteria	chr	Dickeya dadantii 3937	TAD-CD	Enterobacteriales	Enterobacteriaceae	Dickeya	+	B1	+	+	+
24112394	Gammaproteobacteria	chr	Shigella flexneri 2a str. 301	TAD-CD	Enterobacteriales	Enterobacteriaceae	Shigella	+	B1	+	+	+
344915286	Gammaproteobacteria	chr	Shigella flexneri 2a str. 301	TAD-CD	Enterobacteriales	Enterobacteriaceae	Shigella	+	B1	+	+	+
238900239	Gammaproteobacteria	chr	Escherichia coli BW2952	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
238901250	Gammaproteobacteria	chr	Escherichia coli BW2952	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
292488721	Gammaproteobacteria	chr	Erwinia amylovora CFBP1430	TAD-CD	Enterobacteriales	Enterobacteriaceae	Erwinia	+	B1	+	+	+
260598549	Gammaproteobacteria	chr	Cronobacter turicensis z3032	TAD-CD	Enterobacteriales	Enterobacteriaceae	Cronobacter	+	B1	+	+	+
218699348	Gammaproteobacteria	chr	Escherichia coli IA139	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
238895629	Gammaproteobacteria	chr	Klebsiella pneumoniae subsp. pneumoniae NTUH-K2044	TAD-CD	Enterobacteriales	Enterobacteriaceae	Klebsiella	+	B1	+	+	+
157160501	Gammaproteobacteria	chr	Escherichia coli HS	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
260854685	Gammaproteobacteria	chr	Escherichia coli O26:H11 str. 11368	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
260856043	Gammaproteobacteria	chr	Escherichia coli O26:H11 str. 11368	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
378984679	Gammaproteobacteria	chr	Salmonella enterica serovar Typhi str. T000240	TAD-CD	Enterobacteriales	Enterobacteriaceae	Salmonella	+	B1	+	+	+
194736839	Gammaproteobacteria	chr	Salmonella enterica serovar Schwarzengrund str. CVM19633	TAD-CD	Enterobacteriales	Enterobacteriaceae	Salmonella	+	B1	+	+	+
29141258	Gammaproteobacteria	chr	Salmonella enterica serovar Typhi str. Ty2	TAD-CD	Enterobacteriales	Enterobacteriaceae	Salmonella	+	B1	+	+	+
291618056	Gammaproteobacteria	chr	Pantoea ananatis LMG 20103	TAD-CD	Enterobacteriales	Enterobacteriaceae	Pantoea	+	B1	+	+	+
333931376	Gammaproteobacteria	chr	Serratia plymuthica AS9	TAD-CD	Enterobacteriales	Enterobacteriaceae	Serratia	+	B1	+	+	+
333932777	Gammaproteobacteria	chr	Serratia plymuthica AS9	TAD-CD	Enterobacteriales	Enterobacteriaceae	Serratia	+	B1			
50120358	Gammaproteobacteria	chr	Pectobacterium atrosepticum SCRI1043	TAD-CD	Enterobacteriales	Enterobacteriaceae	Pectobacterium	+	B1	+	+	+
161486189	Gammaproteobacteria	chr	Escherichia coli CFT073	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
161502732	Gammaproteobacteria	chr	Salmonella enterica str. RSK2980	TAD-CD	Enterobacteriales	Enterobacteriaceae	Salmonella	+	B1	+	+	+
170019613	Gammaproteobacteria	chr	Escherichia coli ATCC 8739	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
170020619	Gammaproteobacteria	chr	Escherichia coli ATCC 8739	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
207857552	Gammaproteobacteria	chr	Salmonella enterica serovar Enteritidis str. P125109	TAD-CD	Enterobacteriales	Enterobacteriaceae	Salmonella	+	B1	+	+	+
209918234	Gammaproteobacteria	chr	Escherichia coli SE11	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
209919525	Gammaproteobacteria	chr	Escherichia coli SE11	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
254161094	Gammaproteobacteria	chr	Escherichia coli B str. REL606	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
254162052	Gammaproteobacteria	chr	Escherichia coli B str. REL606	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
194445793	Gammaproteobacteria	chr	Salmonella enterica serovar Newport str. SL254	TAD-CD	Enterobacteriales	Enterobacteriaceae	Salmonella	+	B1	+	+	+
15830391	Gammaproteobacteria	chr	Escherichia coli O157:H7 str. Sakai	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
38704045	Gammaproteobacteria	chr	Escherichia coli O157:H7 str. Sakai	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
254792238	Gammaproteobacteria	chr	Escherichia coli O157:H7 str. TW14359	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
254793844	Gammaproteobacteria	chr	Escherichia coli O157:H7 str. TW14359	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
209400850	Gammaproteobacteria	chr	Escherichia coli O157:H7 str. EC4115	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
209396474	Gammaproteobacteria	chr	Escherichia coli O157:H7 str. EC4115	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
283785880	Gammaproteobacteria	chr	Citrobacter rodentium ICC168	TAD-CD	Enterobacteriales	Enterobacteriaceae	Citrobacter	+	B1	+	+	+
378766550	Gammaproteobacteria	chr	Pantoea ananatis	TAD-CD	Enterobacteriales	Enterobacteriaceae	Pantoea	+	B1	+	+	+
251790445	Gammaproteobacteria	chr	Dickeya zeae Ech1591	TAD-CD	Enterobacteriales	Enterobacteriaceae	Dickeya	+	B1	+	+	+
170080638	Gammaproteobacteria	chr	Escherichia coli str. K-12 substr. DH10B	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
170081690	Gammaproteobacteria	chr	Escherichia coli str. K-12 substr. DH10B	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
296101388	Gammaproteobacteria	chr	Enterobacter cloacae ATCC 13047	TAD-CD	Enterobacteriales	Enterobacteriaceae	Enterobacter	+	B1	+	+	+

296103720	Gammaproteobacteria	chr	Enterobacter cloacae ATCC 13047	TAD-CD	Enterobacteriales	Enterobacteriaceae	Enterobacter	+	B1	+	+	+
296103764	Gammaproteobacteria	chr	Enterobacter cloacae ATCC 13047	TAD-CD	Enterobacteriales	Enterobacteriaceae	Enterobacter	+	B1	+		
82544695	Gammaproteobacteria	chr	Shigella boydii Sb227	TAD-CD	Enterobacteriales	Enterobacteriaceae	Shigella	+	B1	+	+	+
16765446	Gammaproteobacteria	chr	Salmonella enterica serovar Typhi str. LT2	TAD-CD	Enterobacteriales	Enterobacteriaceae	Salmonella	+	B1	+	+	+
157369828	Gammaproteobacteria	chr	Serratia proteamaculans 568	TAD-CD	Enterobacteriales	Enterobacteriaceae	Serratia	+	B1	+	+	+
157371133	Gammaproteobacteria	chr	Serratia proteamaculans 568	TAD-CD	Enterobacteriales	Enterobacteriaceae	Serratia	+	B1			
82776271	Gammaproteobacteria	chr	Shigella dysenteriae Sd197	TAD-CD	Enterobacteriales	Enterobacteriaceae	Shigella	+	B1	+	+	+
152971049	Gammaproteobacteria	chr	Klebsiella pneumoniae MGH 78578	TAD-CD	Enterobacteriales	Enterobacteriaceae	Klebsiella	+	B1	+	+	+
253687691	Gammaproteobacteria	chr	Pectobacterium carotovorum PC1	TAD-CD	Enterobacteriales	Enterobacteriaceae	Pectobacterium	+	B1	+	+	+
110642270	Gammaproteobacteria	chr	Escherichia coli 536	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
218558939	Gammaproteobacteria	chr	Escherichia coli S88	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
218705593	Gammaproteobacteria	chr	Escherichia coli UMN026	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
205353259	Gammaproteobacteria	chr	Salmonella enterica serovar Gallinarum str. 287/91	TAD-CD	Enterobacteriales	Enterobacteriaceae	Salmonella	+	B1	+	+	+
218694514	Gammaproteobacteria	chr	Escherichia coli 55989	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
218695683	Gammaproteobacteria	chr	Escherichia coli 55989	TAD-CD	Enterobacteriales	Enterobacteriaceae	Escherichia	+	B1	+	+	+
378954528	Gammaproteobacteria	chr	Salmonella enterica serovar Gallinarum/pullorum str. RKS5078	TAD-CD	Enterobacteriales	Enterobacteriaceae	Salmonella	+	B1	+	+	+
188533466	Gammaproteobacteria	chr	Erwinia tasmaniensis Et1/99	TAD-CD	Enterobacteriales	Enterobacteriaceae	Erwinia	+	B1	+	+	+
311278943	Gammaproteobacteria	chr	Enterobacter cloacae SCF1	TAD-CD	Enterobacteriales	Enterobacteriaceae	Enterobacter	+	B1	+	+	+
157144994	Gammaproteobacteria	chr	Citrobacter koseri ATCC BAA-895	TAD-CD	Enterobacteriales	Enterobacteriaceae	Citrobacter	+	B1	+	+	+
336251170	Gammaproteobacteria	chr	Enterobacter aerogenes KCTC 2190	TAD-CD	Enterobacteriales	Enterobacteriaceae	Enterobacter	+	B1	+	+	+
197248743	Gammaproteobacteria	chr	Salmonella enterica serovar Agona str. SL483	TAD-CD	Enterobacteriales	Enterobacteriaceae	Salmonella	+	B1	+	+	+
322834286	Gammaproteobacteria	chr	Rahnella sp. Y9602	TAD-CD	Enterobacteriales	Enterobacteriaceae	Rahnella	+	B1	+	+	+
378445552	Gammaproteobacteria	chr	Salmonella enterica serovar Typhi	TAD-CD	Enterobacteriales	Enterobacteriaceae	Salmonella	+	B1	+	+	+
146312317	Gammaproteobacteria	chr	Enterobacter sp. 638	TAD-CD	Enterobacteriales	Enterobacteriaceae	Enterobacter	+	B1	+	+	+
146312357	Gammaproteobacteria	chr	Enterobacter sp. 638	TAD-CD	Enterobacteriales	Enterobacteriaceae	Enterobacter	+	B1	+		
379701340	Gammaproteobacteria	chr	Salmonella enterica serovar Typhi str. ST4/74	TAD-CD	Enterobacteriales	Enterobacteriaceae	Salmonella	+	B1	+	+	+
56412983	Gammaproteobacteria	chr	Salmonella enterica serovar Paratyphi A str. ATCC 9150	TAD-CD	Enterobacteriales	Enterobacteriaceae	Salmonella	+	B1	+	+	+
333983117	Gammaproteobacteria	chr	Methylobacterium methanica MC09	TAD-CD	Methylococcales	Methylococcaceae	Methylobacterium	+	-			
110833768	Gammaproteobacteria	chr	Alcanivorax borkumensis SK2	TAD-CD	Oceanospirillales	Alcanivoracaceae	Alcanivorax	+	B1			
83647368	Gammaproteobacteria	chr	Hahella chejuensis KCTC 2396	TAD-CD	Oceanospirillales	Hahellaceae	Hahella	+	C4			
92113836	Gammaproteobacteria	chr	Chromohalobacter salexigens DSM 3043	TAD-CD	Oceanospirillales	Halomonadaceae	Chromohalobacter	+	B1			
15602883	Gammaproteobacteria	chr	Pasteurella multocida str. Pm70	TAD-CD	Pasteurellales	Pasteurellaceae	Pasteurella	+	B1			
219870329	Gammaproteobacteria	chr	Haemophilus parasuis SH0165	TAD-CD	Pasteurellales	Pasteurellaceae	Haemophilus	+	B1			
378773829	Gammaproteobacteria	chr	Pasteurella multocida 36950	TAD-CD	Pasteurellales	Pasteurellaceae	Pasteurella	+	B1			
215485092	Gammaproteobacteria	chr	Acinetobacter baumannii AB307-0294	TAD-CD	Pseudomonadales	Moraxellaceae	Acinetobacter	+	B1	+	+	+
169797742	Gammaproteobacteria	chr	Acinetobacter baumannii AYE	TAD-CD	Pseudomonadales	Moraxellaceae	Acinetobacter	+	B1	+	+	+
299772059	Gammaproteobacteria	chr	Acinetobacter oleivorans DR1	TAD-CD	Pseudomonadales	Moraxellaceae	Acinetobacter	+	B1	+	+	+
375136586	Gammaproteobacteria	chr	Acinetobacter calcoaceticus PHEA-2	TAD-CD	Pseudomonadales	Moraxellaceae	Acinetobacter	+	B1	+	+	+
184156391	Gammaproteobacteria	chr	Acinetobacter baumannii ACICU	TAD-CD	Pseudomonadales	Moraxellaceae	Acinetobacter	+	B1	+	+	+
213155460	Gammaproteobacteria	chr	Acinetobacter baumannii AB0057	TAD-CD	Pseudomonadales	Moraxellaceae	Acinetobacter	+	B1	+	+	+
169632080	Gammaproteobacteria	chr	Acinetobacter baumannii	TAD-CD	Pseudomonadales	Moraxellaceae	Acinetobacter	+	B1	+	+	+
126640162	Gammaproteobacteria	chr	Acinetobacter baumannii ATCC 17978	TAD-CD	Pseudomonadales	Moraxellaceae	Acinetobacter	+	B1	+	+	+
50083361	Gammaproteobacteria	chr	Acinetobacter sp. ADP1	TAD-CD	Pseudomonadales	Moraxellaceae	Acinetobacter	+	B1	+	+	+
148652063	Gammaproteobacteria	chr	Psychrobacter sp. PRwf-1	TAD-CD	Pseudomonadales	Moraxellaceae	Psychrobacter	+	-			
146282126	Gammaproteobacteria	chr	Pseudomonas stutzeri A1501	TAD-CD	Pseudomonadales	Pseudomonadaceae	Pseudomonas	-	B1	+		
146282834	Gammaproteobacteria	chr	Pseudomonas stutzeri A1501	TAD-CD	Pseudomonadales	Pseudomonadaceae	Pseudomonas	-	B1	+		

66046454	Gammaproteobacteria	chr	<i>Pseudomonas syringae</i> pv. <i>syringae</i> B728a	TAD-CD	Pseudomonadales	Pseudomonadaceae	<i>Pseudomonas</i>	+	B1	+
71736180	Gammaproteobacteria	chr	<i>Pseudomonas syringae</i> pv. <i>phaseolicola</i> 1448A	TAD-CD	Pseudomonadales	Pseudomonadaceae	<i>Pseudomonas</i>	+	B1	+
28870604	Gammaproteobacteria	chr	<i>Pseudomonas syringae</i> pv. <i>tomato</i> str. DC3000	TAD-CD	Pseudomonadales	Pseudomonadaceae	<i>Pseudomonas</i>	+	B1	+
226945058	Gammaproteobacteria	chr	<i>Azotobacter vinelandii</i> DJ	TAD-CD	Pseudomonadales	Pseudomonadaceae	<i>Azotobacter</i>	+	B1	
339493731	Gammaproteobacteria	chr	<i>Pseudomonas stutzeri</i> ATCC 17588	TAD-CD	Pseudomonadales	Pseudomonadaceae	<i>Pseudomonas</i>	-	B1	+
339494470	Gammaproteobacteria	chr	<i>Pseudomonas stutzeri</i> ATCC 17588	TAD-CD	Pseudomonadales	Pseudomonadaceae	<i>Pseudomonas</i>	-	B1	+
77460065	Gammaproteobacteria	chr	<i>Pseudomonas fluorescens</i> Pf0-1	TAD-CD	Pseudomonadales	Pseudomonadaceae	<i>Pseudomonas</i>	+	B1	
333899890	Gammaproteobacteria	chr	<i>Pseudomonas fulva</i> 12-X	TAD-CD	Pseudomonadales	Pseudomonadaceae	<i>Pseudomonas</i>	+	C4	
28901459	Gammaproteobacteria	chr II	<i>Vibrio parahaemolyticus</i> RIMD 2210633	TAD-CD	Vibrionales	Vibrionaceae	<i>Vibrio</i>	+	B1	+
156977875	Gammaproteobacteria	chr II	<i>Vibrio harveyi</i> ATCC BAA-1116	TAD-CD	Vibrionales	Vibrionaceae	<i>Vibrio</i>	+	B1	+
197334108	Gammaproteobacteria	chr I	<i>Vibrio fischeri</i> MJ11	TAD-CD	Vibrionales	Vibrionaceae	<i>Aliivibrio</i>	+	B1	+
59710772	Gammaproteobacteria	chr I	<i>Vibrio fischeri</i> ES114	TAD-CD	Vibrionales	Vibrionaceae	<i>Aliivibrio</i>	-	B1	+
336123021	Gammaproteobacteria	chr I	<i>Vibrio anguillarum</i> 775	TAD-CD	Vibrionales	Vibrionaceae	<i>Vibrio</i>	+	B1	+
37678524	Gammaproteobacteria	chr I	<i>Vibrio vulnificus</i> YJ016	TAD-CD	Vibrionales	Vibrionaceae	<i>Vibrio</i>	+	B1	+
262396414	Gammaproteobacteria	chr II	<i>Vibrio</i> sp. Ex25	TAD-CD	Vibrionales	Vibrionaceae	<i>Vibrio</i>	+	B1	+
54309846	Gammaproteobacteria	chr I	<i>Photobacterium profundum</i> SS9	TAD-CD	Vibrionales	Vibrionaceae	<i>Photobacterium</i>	+	B1	
27364230	Gammaproteobacteria	chr I	<i>Vibrio vulnificus</i> CMCP6	TAD-CD	Vibrionales	Vibrionaceae	<i>Vibrio</i>	+	B1	+
320157623	Gammaproteobacteria	chr I	<i>Vibrio vulnificus</i> MO6-24/O	TAD-CD	Vibrionales	Vibrionaceae	<i>Vibrio</i>	+	B1	+
218708277	Gammaproteobacteria	chr I	<i>Vibrio splendidus</i> L.GP32	TAD-CD	Vibrionales	Vibrionaceae	<i>Vibrio</i>	-	B1	+
375264247	Gammaproteobacteria	chr I	<i>Vibrio</i> sp. EJY3	TAD-CD	Vibrionales	Vibrionaceae	<i>Vibrio</i>	+	B1	
375129279	Gammaproteobacteria	chr I	<i>Vibrio furnissii</i> NCTC 11218	TAD-CD	Vibrionales	Vibrionaceae	<i>Vibrio</i>	+	B1	+
156976431	Gammaproteobacteria	chr II	<i>Vibrio harveyi</i> ATCC BAA-1116	TAD-CD	Vibrionales	Vibrionaceae	<i>Vibrio</i>	+	C4	
360034842	Gammaproteobacteria	chr I	<i>Vibrio cholerae</i> O1 str. 2010EL-1786	TAD-CD	Vibrionales	Vibrionaceae	<i>Vibrio</i>	+	C4	
229608480	Gammaproteobacteria	chr I	<i>Vibrio cholerae</i> MJ-1236	TAD-CD	Vibrionales	Vibrionaceae	<i>Vibrio</i>	+	C4	
37676052	Gammaproteobacteria	chr II	<i>Vibrio vulnificus</i> YJ016	TAD-CD	Vibrionales	Vibrionaceae	<i>Vibrio</i>	+	C4	
227081111	Gammaproteobacteria	chr I	<i>Vibrio cholerae</i> M66-2	TAD-CD	Vibrionales	Vibrionaceae	<i>Vibrio</i>	+	C4	
262396618	Gammaproteobacteria	chr II	<i>Vibrio</i> sp. Ex25	TAD-CD	Vibrionales	Vibrionaceae	<i>Vibrio</i>	+	C4	
147674262	Gammaproteobacteria	chr II	<i>Vibrio cholerae</i> O395	TAD-CD	Vibrionales	Vibrionaceae	<i>Vibrio</i>	+	C4	
15640953	Gammaproteobacteria	chr I	<i>Vibrio cholerae</i> O1 biovar El Tor str. N16961	TAD-CD	Vibrionales	Vibrionaceae	<i>Vibrio</i>	+	C4	
379740770	Gammaproteobacteria	chr II	<i>Vibrio cholerae</i> IEC224	TAD-CD	Vibrionales	Vibrionaceae	<i>Vibrio</i>	+	C4	
27367925	Gammaproteobacteria	chr II	<i>Vibrio vulnificus</i> CMCP6	TAD-CD	Vibrionales	Vibrionaceae	<i>Vibrio</i>	+	C4	
320158195	Gammaproteobacteria	chr II	<i>Vibrio vulnificus</i> MO6-24/O	TAD-CD	Vibrionales	Vibrionaceae	<i>Vibrio</i>	+	C4	
375263778	Gammaproteobacteria	chr II	<i>Vibrio</i> sp. EJY3	TAD-CD	Vibrionales	Vibrionaceae	<i>Vibrio</i>	+	C4	
319788570	Gammaproteobacteria	chr	<i>Pseudoxanthomonas suwonensis</i> 11-1	TAD-CD	Xanthomonadales	Xanthomonadaceae	<i>Pseudoxanthomonas</i>	+	B1	
357417204	Gammaproteobacteria	chr	<i>Pseudoxanthomonas spadix</i> BD-a59	TAD-CD	Xanthomonadales	Xanthomonadaceae	<i>Pseudoxanthomonas</i>	+	B1	
261415382	Other Bacteria	chr	<i>Fibrobacter succinogenes</i> S85	TAD-CD	Fibrobacterales	Fibrobacteraceae	<i>Fibrobacter</i>	+	-	
261415985	Other Bacteria	chr	<i>Fibrobacter succinogenes</i> S85	TAD-CD	Fibrobacterales	Fibrobacteraceae	<i>Fibrobacter</i>	+	-	
261417297	Other Bacteria	chr	<i>Fibrobacter succinogenes</i> S85	TAD-CD	Fibrobacterales	Fibrobacteraceae	<i>Fibrobacter</i>	+	-	
226225985	Other Bacteria	chr	<i>Gemmatimonas aurantiaca</i> T-27	TAD-CD	Gemmatimonadales	Gemmatimonadaceae	<i>Gemmatimonas</i>	+	-	
302038020	Other Bacteria	chr	<i>Candidatus Nitrospira defluvii</i>	TAD-CD	Nitrospirales	Nitrospiraceae	<i>Nitrospira</i>	+	-	
189218583	Other Bacteria	chr	<i>Methylacidiphilum inferorum</i> V4	TAD-CD	Methylacidiphilales	Methylacidiphilaceae	<i>Methylacidiphilum</i>	+	-	
182413923	Other Bacteria	chr	<i>Opitutus terrae</i> PB90-1	TAD-CD	?	Opitutaceae	<i>Opitutus</i>	+	-	
182415056	Other Bacteria	chr	<i>Opitutus terrae</i> PB90-1	CD	?	Opitutaceae	<i>Opitutus</i>	+	-	
182415680	Other Bacteria	chr	<i>Opitutus terrae</i> PB90-1	CD	?	Opitutaceae	<i>Opitutus</i>	+	-	
294053928	Other Bacteria	chr	<i>Coralimargarita akajimensis</i> DSM 45221	TAD-CD	Puniceococcales	Puniceococcaceae	<i>Coralimargarita</i>	+	-	
294055965	Other Bacteria	chr	<i>Coralimargarita akajimensis</i> DSM 45221	TAD-CD	Puniceococcales	Puniceococcaceae	<i>Coralimargarita</i>	+	-	

187735905	Other Bacteria	chr	Akkermansia muciniphila ATCC BAA-835	TAD-CD	Verrucomicrobiales	Verrucomicrobiaceae	Akkermansia	+	-
187736556	Other Bacteria	chr	Akkermansia muciniphila ATCC BAA-835	TAD-CD	Verrucomicrobiales	Verrucomicrobiaceae	Akkermansia	+	-
296124343	Planctomycetes	chr	Planctomyces limnophilus DSM 3776	TAD-CD	Planctomycetales	Planctomycetaceae	Planctomyces	+	A3
320104651	Planctomycetes	chr	Isosphaera pallida ATCC 43644	TAD-CD	Planctomycetales	Planctomycetaceae	Isosphaera	+	-
325108356	Planctomycetes	chr	Planctomyces brasiliensis DSM 5305	TAD-CD	Planctomycetales	Planctomycetaceae	Planctomyces	+	-
325110734	Planctomycetes	chr	Planctomyces brasiliensis DSM 5305	TAD-CD	Planctomycetales	Planctomycetaceae	Planctomyces	+	-
325110970	Planctomycetes	chr	Planctomyces brasiliensis DSM 5305	TAD-CD	Planctomycetales	Planctomycetaceae	Planctomyces	+	-
32471964	Planctomycetes	chr	Rhodopirellula baltica SH 1	TAD-CD	Planctomycetales	Planctomycetaceae	Rhodopirellula	+	-
32476414	Planctomycetes	chr	Rhodopirellula baltica SH 1	TAD-CD	Planctomycetales	Planctomycetaceae	Rhodopirellula	+	-
296124107	Planctomycetes	chr	Planctomyces limnophilus DSM 3776	CD	Planctomycetales	Planctomycetaceae	Planctomyces	+	-
374317281	Spirochaetes	chr	Sphaerochaeta pleomorpha str. Grapes	TAD-CD	Spirochaetales	Spirochaetaceae	Sphaerochaeta	+	-
325971830	Spirochaetes	chr	Sphaerochaeta globus str. Buddy	TAD-CD	Spirochaetales	Spirochaetaceae	Sphaerochaeta	+	-
160902408	Thermotogae	chr	Petrotoga mobilis SJ95	TAD-CD	Thermotogales	Thermotogaceae	Petrotoga	+	-
374340187	Thermotogae	chr	Marinitoga piezophila KA3	TAD-CD	Thermotogales	Thermotogaceae	Marinitoga	+	-
239616425	Thermotogae	chr	Kosmotoga olearia TBF 19.5.1	TAD-CD	Thermotogales	Thermotogaceae	Kosmotoga	+	-

Table S3. Domain organization of BY-kinases in each bacterial phylum. Three types of BY-kinases domain organization were identified. TAD-AD, included the TAD-CD type kinases which containing both TAD and CD domain; TAD+CD, indicated CD type kinases which only containing CD domain, but neighbored with a protein harboring TAD domain; orphan CD, indicated CD type kinases without a corresponding protein with TAD domain. Column type, indicate the number of proteins corresponding to each type of domain organization with the corresponding number of genomes in brackets.

	Proteins (Genomes)		
	TAD-CD	TAD+CD	orphan CD
<i>Acidobacteria</i>	12(7)	1(1)	0
<i>Actinobacteria</i>	42(36)	1(1)	1(1)
<i>α-proteobacteria</i>	83(63)	1(1)	0
<i>Bacteroidetes/Chlorobi</i>	27(23)	0	1(1)
<i>β-proteobacteria</i>	103(42)	0	0
<i>Chloroflexi</i>	6(5)	2(2)	0
<i>Cyanobacteria</i>	18(7)	0	1(1)
<i>Deinococcus-Thermus</i>	1(1)	0	1(1)
<i>δ-proteobacteria</i>	18(15)	15(13)	1(1)
<i>Firmicutes</i>	3(3)	208(171)	13(13)
<i>Fusobacteria</i>	0	2(1)	0
<i>γ-proteobacteria</i>	209(165)	0	0
<i>Other Bacteria</i>	11(7)	0	2(1)
<i>Planctomycetes</i>	7(4)	0	1(1)
<i>Spirochaetes</i>	2(2)	0	0
<i>Thermotogae</i>	3(3)	0	0

Table S4. Distribution of BY-kinases in *Burkholderia*. Burk1 to 6 indicate the corresponding subclades in phylogenetic analysis (Figure S2)

Organism	BY-Kinases	chr	plasmid	Burk1	Burk2	Burk3	Burk4	Burk5	Burk6
<i>Burkholderia ambifaria</i> AMMD	5	5	0	1	1	1	0	1	1
<i>Burkholderia ambifaria</i> MC40-6	5	5	0	1	0	2	0	1	1
<i>Burkholderia cenocepacia</i> AU 1054	1	1	0	0	0	0	0	0	1
<i>Burkholderia cenocepacia</i> HI2424	1	1	0	0	0	0	0	0	1
<i>Burkholderia cenocepacia</i> J2315	2	2	0	1	0	0	0	0	1
<i>Burkholderia cenocepacia</i> MC0-3	2	2	0	1	0	0	0	0	1
<i>Burkholderia gladioli</i> BSR3	4	3	1	1	0	1	0	1	1
<i>Burkholderia glumae</i> BGR1	1	1	0	0	0	0	0	0	1
<i>Burkholderia multivorans</i> ATCC 17616	1	1	0	0	0	0	0	0	1
<i>Burkholderia multivorans</i> ATCC 17616	1	1	0	0	0	0	0	0	1
<i>Burkholderia phymatum</i> STM815	5	4	1	0	0	1	1	1	1
<i>Burkholderia phytofirmans</i> PsJN	6	6	0	1	0	1	2	1	1
<i>Burkholderia pseudomallei</i> 1106a	2	2	0	1	0	0	0	0	1
<i>Burkholderia pseudomallei</i> 1710b	2	2	0	1	0	0	0	0	1
<i>Burkholderia pseudomallei</i> 668	2	2	0	1	0	0	0	0	1
<i>Burkholderia pseudomallei</i> K96243	2	2	0	1	0	0	0	0	1
<i>Burkholderia rhizoxinica</i> HK1 454	1	0	1	0	0	0	0	1	0
<i>Burkholderia</i> sp. 383	4	4	0	2	0	1	0	0	1
<i>Burkholderia</i> sp. CCGE1001	5	5	0	0	1	0	1	2	1
<i>Burkholderia</i> sp. CCGE1002	6	6	0	0	2	1	1	1	1
<i>Burkholderia</i> sp. CCGE1003	5	5	0	0	1	0	1	2	1
<i>Burkholderia</i> sp. YI23	2	2	0	1	0	0	1	1	0
<i>Burkholderia thailandensis</i> E264	2	2	0	1	0	0	0	0	1
<i>Burkholderia vietnamiensis</i> G4	3	3	0	0	0	0	2	0	1
<i>Burkholderia xenovorans</i> LB400	8	8	0	0	0	1	4	2	1
Total number of proteins	78	75	3	14	5	9	13	14	23
Total number of organisms				13	4	8	8	11	23

Table S5. Estimates of evolutionary rates in BY-kinases and other conserved bacterial genes under the M0 model.

Gene	Description	lnL	ω (dN/dS)	dN	dS
<i>byk</i>	BY-kinases	-26962.13	0.17937	0.1607	0.8959
<i>frr</i>	Ribosome-recycling factor	-13437	0.05257	0.0898	1.7077
<i>infC</i>	Translation initiation factor IF-3	-7848.96	0.052	0.0845	1.6258
<i>nusA</i>	Transcription termination/antitermination protein	-22192.35	0.06473	0.0856	1.3229
<i>pyrG</i>	CTP synthase	-41579.82	0.08722	0.0708	0.8122
<i>rplB</i>	50S ribosomal protein L2	-19052.07	0.11507	0.0605	0.5256
<i>rplD</i>	50S ribosomal protein L4	-18020.52	0.13859	0.1034	0.7464
<i>rplL</i>	50S ribosomal protein L7/L12	-8990.27	0.11754	0.0686	0.5839
<i>rplM</i>	50S ribosomal protein L13	-12202.1	0.12987	0.0754	0.5806
<i>rplN</i>	50S ribosomal protein L14	-8736.67	0.05474	0.0414	0.7571
<i>rplP</i>	50S ribosomal protein L16	-9606.49	0.09349	0.0579	0.6196
<i>rplS</i>	50S ribosomal protein L19	-8886.71	0.119	0.0697	0.5856
<i>rplT</i>	50S ribosomal protein L20	-9483.45	0.09151	0.066	0.7212
<i>rpmA</i>	50S ribosomal protein L27	-4646.37	0.03017	0.0678	2.2467
<i>rpoB</i>	DNA-directed RNA polymerase subunit beta	-72999.5	0.0761	0.0486	0.6384
<i>rpsB</i>	30S ribosomal protein S2	-7233.42	0.10006	0.0701	0.7009
<i>rpsE</i>	30S ribosomal protein S5	-10107.89	0.09634	0.0668	0.6929
<i>rpsJ</i>	30S ribosomal protein S10	-6825.36	0.03687	0.0358	0.9723
<i>rpsM</i>	30S ribosomal protein S13	-8967.85	0.08291	0.054	0.6519
<i>rpsS</i>	30S ribosomal protein S19	-5932.34	0.07907	0.0445	0.5633
<i>smpB</i>	SsrA-binding protein	-12052.98	0.04435	0.0919	2.0728
<i>tsf</i>	Elongation factor Ts	-15870.33	0.0592	0.0951	1.6069

Table S6. Positive selection tests of BY-kinases under different codon models.**(A)** For BY-kinases codon sequences from BYKsel dataset

Model	NP ^a	ω^b	parameter estimates ^c	L ^d	p-value ^e	PSS ^f
M0 (one ratio)	1	0.1794	$\omega=0.17937$	-26962.1298	0	None
M3 (discrete)	5	0.2066	p0 = 0.04938; p1 = 0.40359; p2 = 0.54703 $\omega_0 = 0.00000$; $\omega_1 = 0.09166$; $\omega_2 = 0.31008$	-26225.315		None
M1a (nearly neutral)	2	0.5009	p0 = 0.63133; p1 = 0.36867 $\omega_0 = 0.20948$; $\omega_1 = 1.00000$	-26626.2943	1	Not allowed
M2a (positive selection)	4	0.5009	p0 = 0.63133; p1 = 0.31333; p2 = 0.05535 $\omega_0 = 0.20948$; $\omega_1 = 1.00000$; $\omega_2 = 1.00000$	-26626.2943		None
M7 (beta)	2	0.2029	p = 0.87163; q = 3.36415	-26139.9836	1	Not allowed
M8 (beta+ ω)	4	0.2029	p0 = 0.99999; p = 0.87163; q = 3.36415; (p1 = 0.00001); $\omega = 1.00000$	-26139.985		None

(B) For 3 BY-kinases from organisms (*Streptococcus pneumoniae* TIGR4, *Streptococcus suis* SC84 and *Eubacterium eligens* ATCC27750) with low levels of substitution saturation

Model	NP ^a	ω^b	parameter estimates ^c	L ^d	p-value ^e	PSS ^f
M0 (one ratio)	1	0.00283	$\omega = 0.00283$	-1861.80038	0	None
M3 (discrete)	5	0.0793	p0 = 0.31124; p1 = 0.59586; p2 = 0.09291 $\omega_0 = 0.00057$; $\omega_1 = 0.00613$; $\omega_2 = 0.81265$	-1846.013815		None
M1a (nearly neutral)	2	0.1947	p0 = 0.81831; p1 = 0.18169 $\omega_0 = 0.01586$; $\omega_1 = 1.00000$	-1851.566278	1	Not allowed
M2a (positive selection)	4	0.3456	p0 = 0.81822; p1 = 0.00008; p2 = 0.18170 $\omega_0 = 0.01596$; $\omega_1 = 1.00000$; $\omega_2 = 1.82991$	-1851.564337		None
M7 (beta)	2	0.008	p = 0.83096 q = 99.00000	-1847.044341	1	Not allowed
M8 (beta+ ω)	4	0.1568	p0 = 0.99787 p = 0.84114 q = 99.00000 (p1 = 0.00213) $\omega = 69.66597$	-1847.024969		None

a, NP denotes the number of parameters in the test model (? check again this column). b, ω indicated the average dN/dS. c, parameters in the ω distribution. d, L is the log-likelihood score under the model. e, p-values are for the comparison of three pairs: M0/M3, M1a/M2a, and M7/M8. f, PSS indicates positively selected sites with Bayes Empirical Bayes (BEB) analysis.

Table S7. The taxonomic information of BY-kinases in each defined subgroup.

	A1	A2	A3	B1	B2	C1	C2	C3	C4	C5	C6	C7	C8	C9
<i>Acidobacteria</i>			1											
<i>Actinobacteria</i>	27		2										12	
<i>Alphaproteobacteria</i>							33	14		9				
<i>Bacteroidetes/Chlorobi</i>			1									11		7
<i>Betaproteobacteria</i>				5	95					1				
<i>Chloroflexi</i>			3											
<i>Cyanobacteria</i>		9												
<i>Deltaproteobacteria</i>			5	1	5	14								
<i>Gammaproteobacteria</i>				178					24	2				
<i>Firmicutes</i>			177									39		
<i>Planctomycetes</i>			1											
Total	27	9	190	184	100	14	33	14	24	12	39	11	12	7

Numbers in bold indicate the dominant taxonomic groups in BY-kinase subgroups.

Table S8. The occurrence frequency of Y-H and Y-R pairs in each BY-kinase subgroup.

	Y (%)	H (%)	R (%)	Y-H (%)	Y-R (%)	Y-H / Y-R (%)
A1	0	18.5	0	0	0	0
A2	0	100	0	0	0	0
A3	53	83.68	0.53	0.53	0	0
B1	87.0	88.6	89.1	77.7	79.3	71.7
B2	6	38	0	3	0	0
C1	0	78.57	21.43	0	0	0
C2	0	0	-	0	-	-
C3	0	28.57	-	0	-	-
C4	0	0	0	0	0	0
C5	0	100	0	0	0	0
C6	0	0	0	0	0	0
C7	0	0	0	0	0	0
C8	0	0	0	0	0	0
C9	0	100	0	0	0	0

Table S9. Distribution of Ugd family proteins in prokaryotes. Ugd, the number of Ugd family proteins in corresponding phyla was shown and number in the bracket indicated corresponding organisms harboring the Ugd family proteins. BY-kinases, the number of BY-kinases in corresponding phyla was shown and number in the bracket indicated corresponding organisms harboring the BY-kinases. Ugd/BY-kinase, the number of genomes harboring both Ugd family proteins and BY-kinases.

	Ugd	BY-kinase	Ugd/BY-kinase
<i>Acidobacteria</i>	21(7)	13(7)	7
<i>Actinobacteria</i>	280(144)	44(37)	31
<i>Alphaproteobacteria</i>	235(140)	84(64)	64
<i>Aquificae</i>	16(9)	0	0
<i>Bacteroidetes/Chlorobi</i>	173(68)	28(24)	24
<i>Betaproteobacteria</i>	173(86)	103(42)	42
<i>Chlamydiae</i>	7(4)	0	0
<i>Chloroflexi</i>	18(9)	8(5)	5
<i>Crenarchaeota</i>	24(21)	0	0
<i>Cyanobacteria</i>	55(39)	19(7)	7
<i>Deinococcus-Thermus</i>	8(8)	2(2)	1
<i>Deltaproteobacteria</i>	113(43)	34(24)	24
<i>Epsilonproteobacteria</i>	31(19)	0	0
<i>Euryarchaeota</i>	142(70)	0	0
<i>Firmicutes</i>	390(202)	224(183)	126
<i>Fusobacteria</i>	3(2)	2(1)	1
<i>Gammaproteobacteria</i>	562(281)	209(165)	160
<i>Other Archaea</i>	4(2)	0	0
<i>Other Bacteria</i>	40(25)	13(7)	7
<i>Planctomycetes</i>	12(5)	8(4)	4
<i>Spirochaetes</i>	24(18)	2(2)	2
<i>Thermotogae</i>	15(13)	3(3)	3
Total	2346(1215)	796(577)	508

SUPPORTING FIGURES

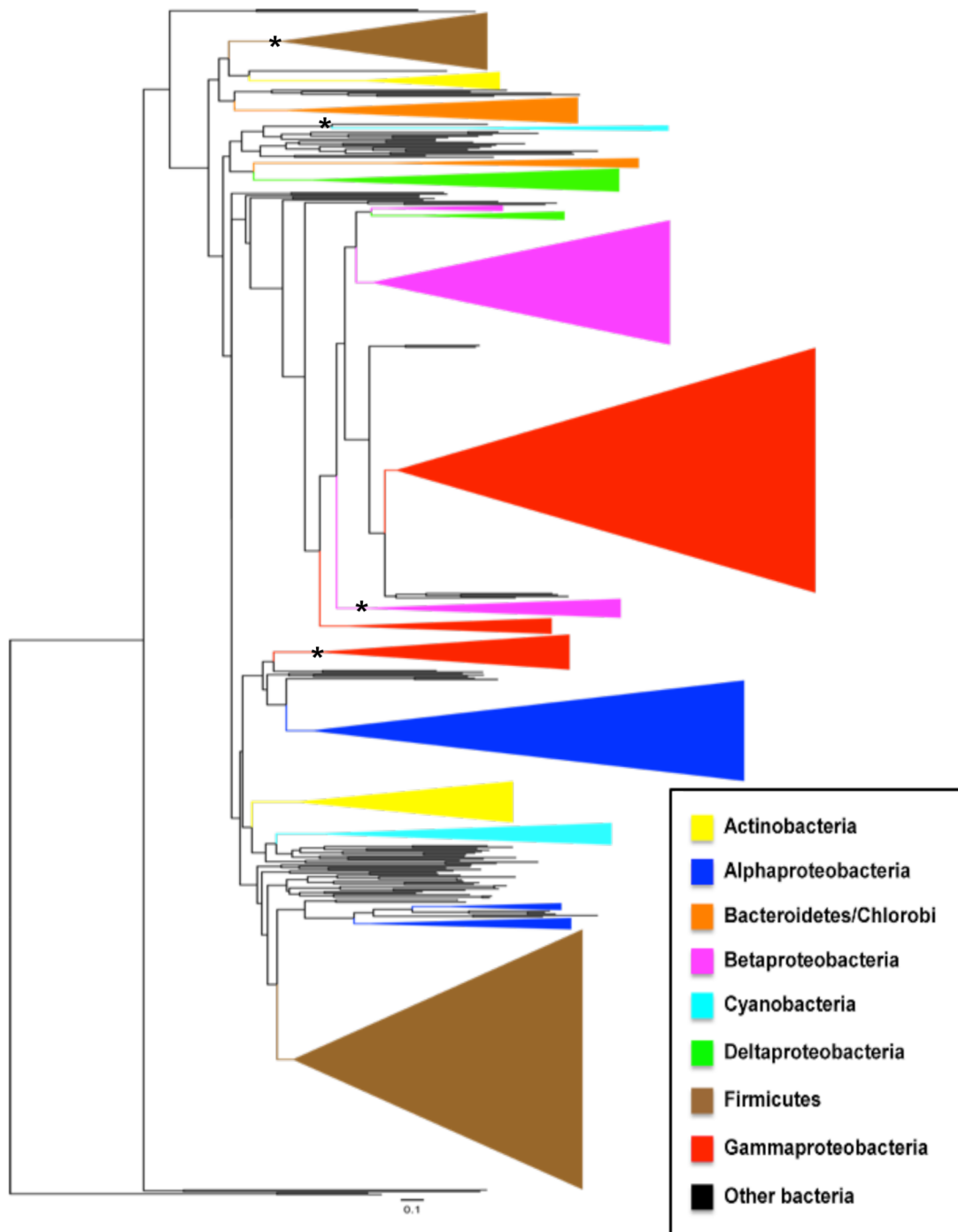


Figure S1. The phylogenetic tree of BY-kinases based on the CD domain from 796 sequences. The tree was rooted by using MinD proteins from *E. coli* (AAC74259) and from *B. subtilis* (CAB14759) as outgroups. The leaves are coloured according to taxonomic phylum. The branches with high bootstrap values (BV>0.5) are indicated with asterisk.

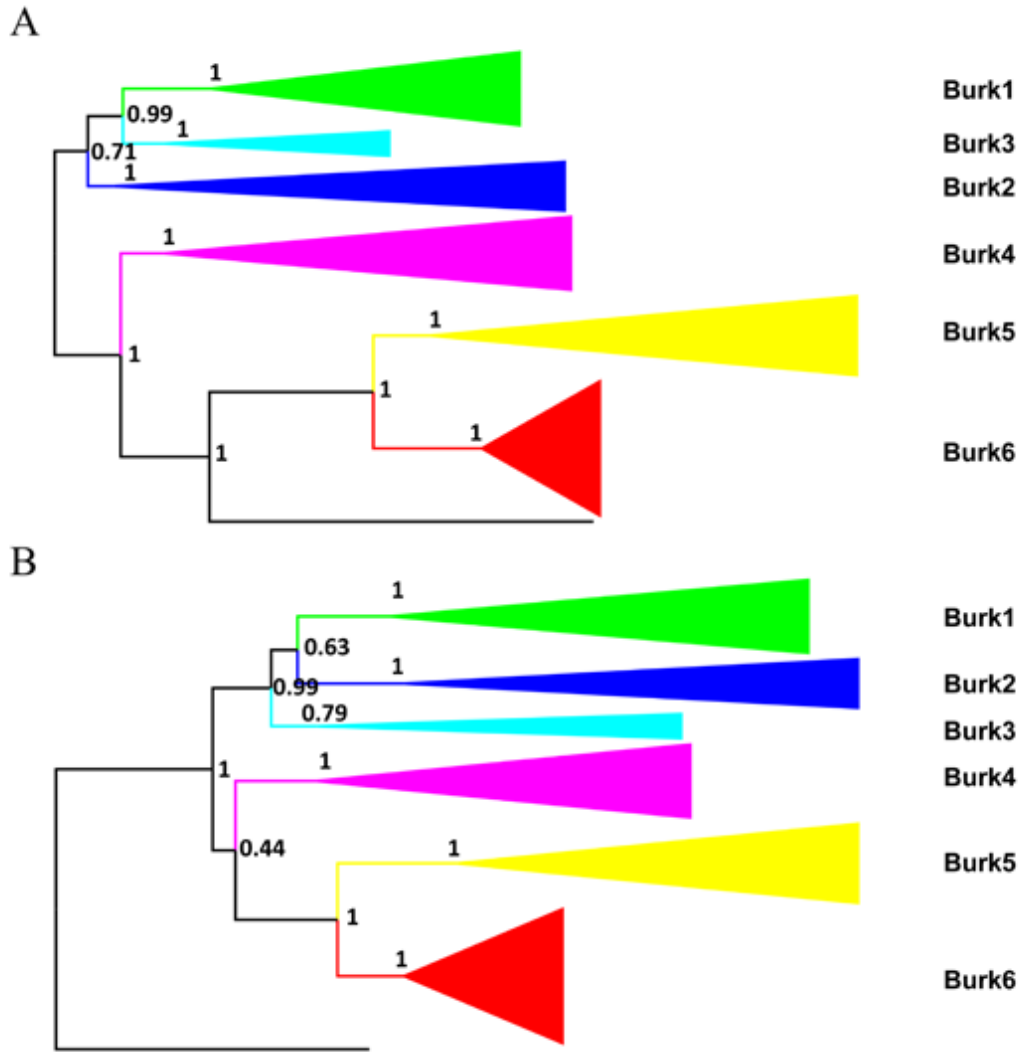


Figure S2. Phylogenetic analysis of BY-kinases in *Burkholderia*. The Bayesian trees were inferred from the BY-kinase full sequence (**A**) and CD (**B**). In both of trees, the *Burkholderia* BY-kinases form six distinct clades (Burk1-Burk6).

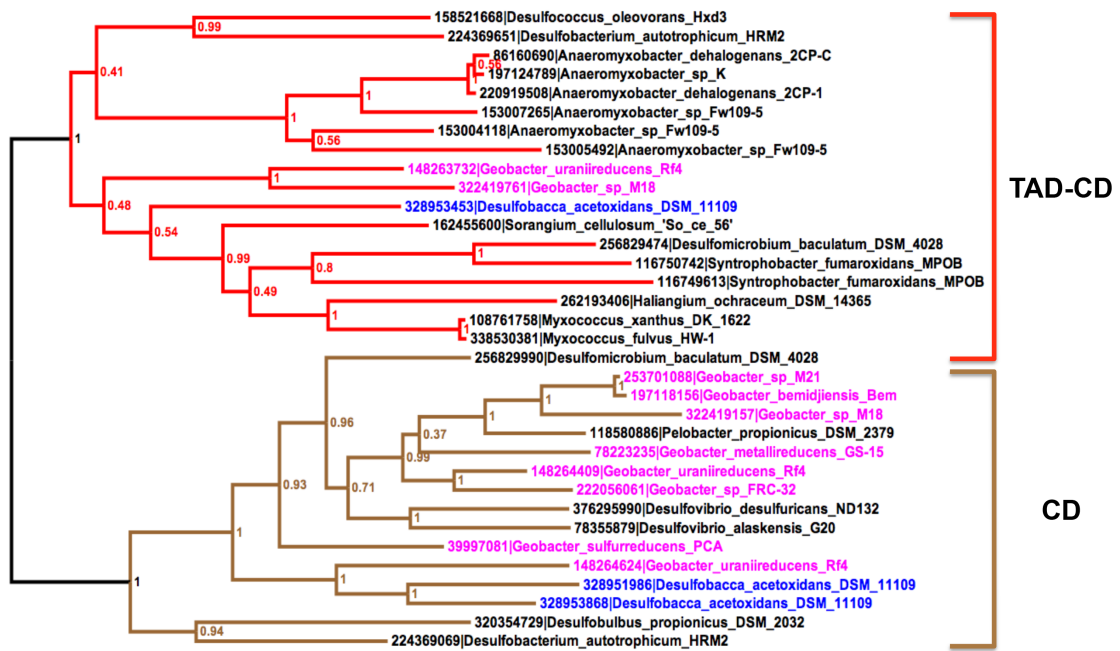


Figure S3. Phylogenetic analysis of BY-kinases in *Deltaproteobacteria*. The Bayesian trees were inferred from the BY-kinase CD sequences. The red branches indicated proteins with both TAD and CD, while the brown branches indicated the proteins only with CD. The BY-kinases from *Geobacter* and *Desulfobacca* genera are highlighted with colors.

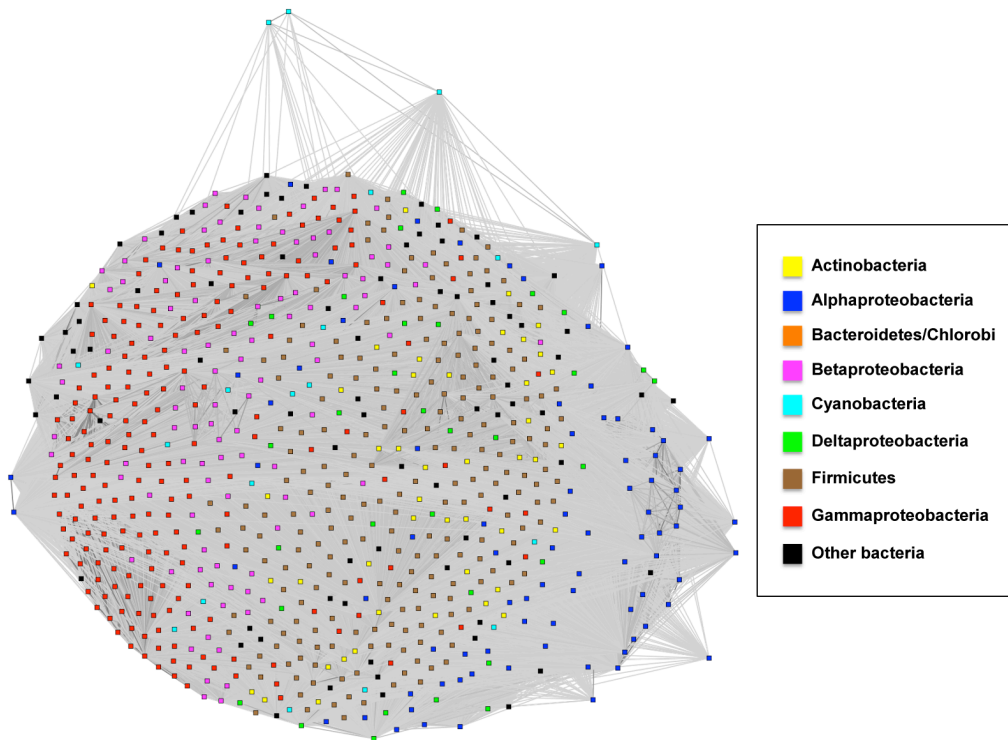


Figure S4A. The protein similarity network (PSN) reconstructed from the BY-kinases CD domain with an E-value cut-off of 10^{-20} . Nodes represent BY-kinases sequences, and the nodes from the same taxonomic groups are in the same color. The edges are colored with a gray scale, and the darker the color is, the more significant similarity is.

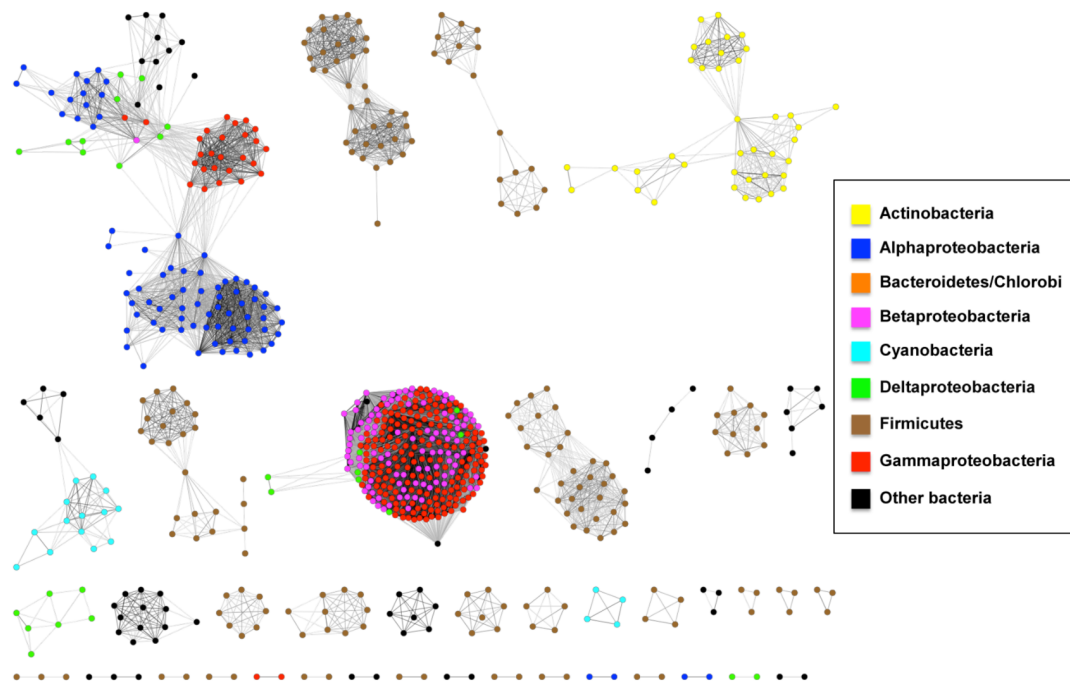


Figure S4B. The protein similarity network (PSN) reconstructed from the BY-kinases CD domain with an E-value cut-off of 10^{-100} . Nodes represent BY-kinases sequences, and the nodes from the same taxonomic groups are in the same color. The edges are colored with a gray scale, and the darker the color is, the more significant similarity is.

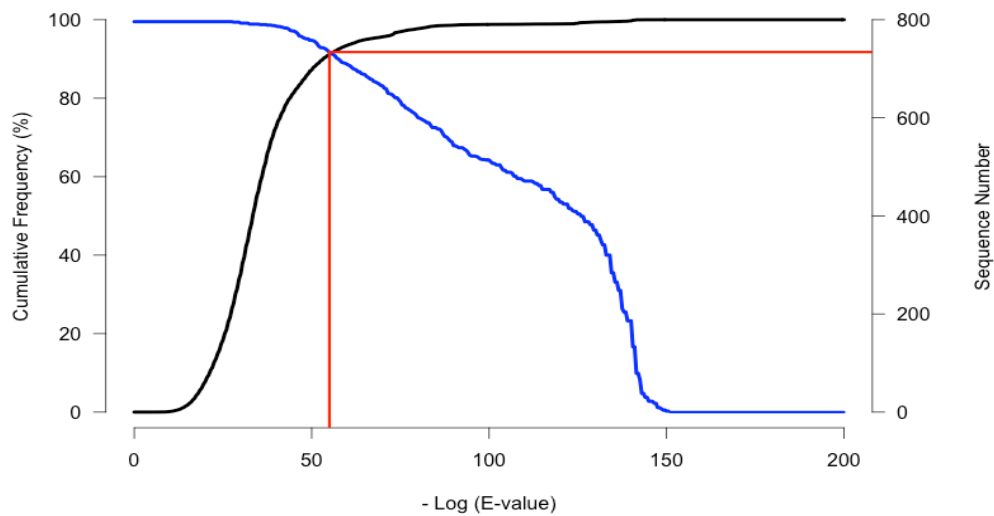
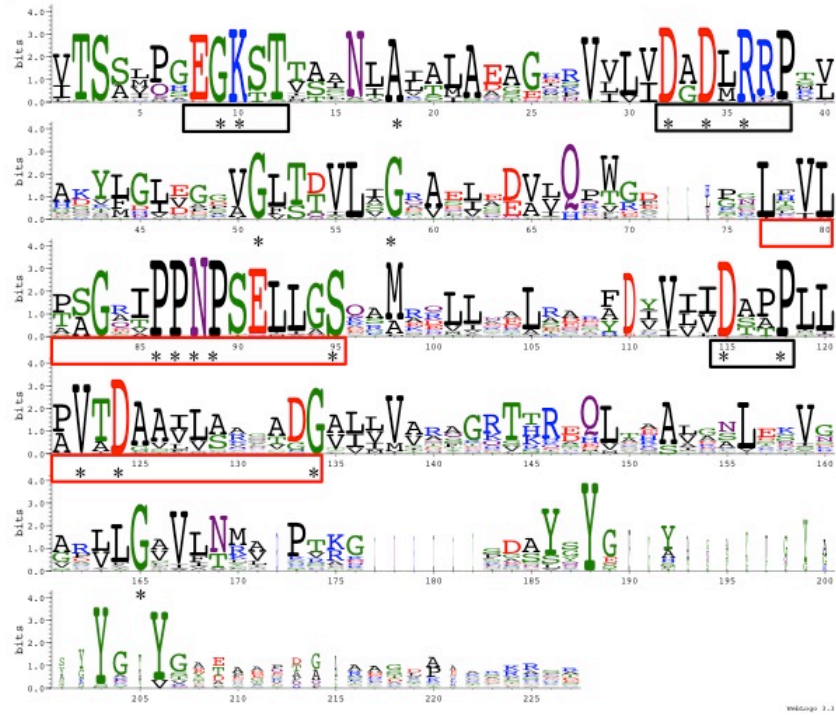
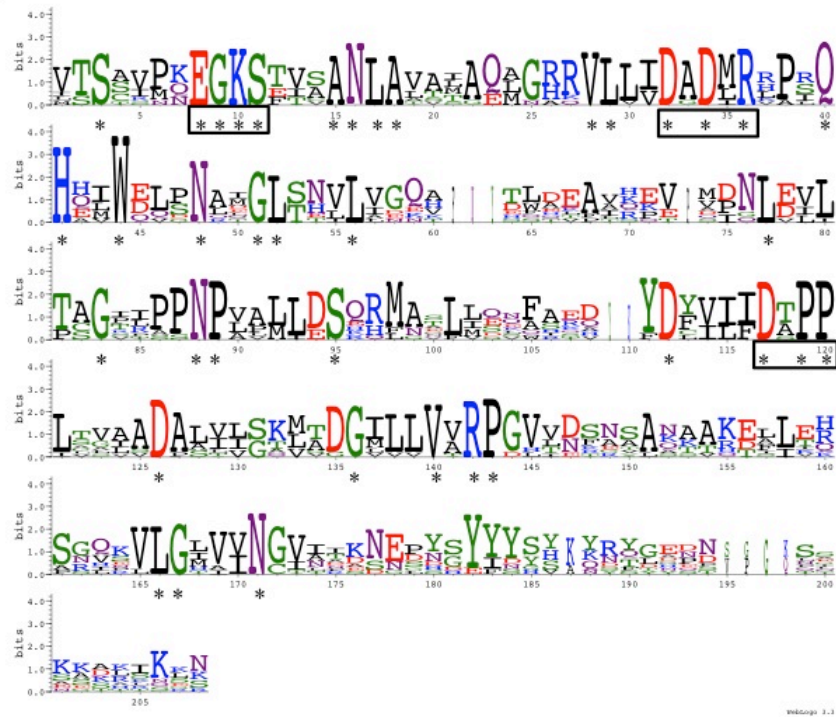


Figure S4C. The distribution of pairwise alignments E-values. The curve in black corresponds to the cumulative frequency of E-values from BY-kinase pairwise alignments (left Y axis). 8.8% of pairwise alignments have a E-value greater than 10^{-20} ($-\log(\text{E-value}) < 20$), 91.1% of pairwise alignments have a E-value greater than 10^{-55} ($-\log(\text{E-value}) < 55$), and 98.8% of alignments have a E-value greater than 10^{-100} ($-\log(\text{E-value}) < 100$). The blue curve indicates the number of sequences obtained after filtering with a given E-value (right Y axis). The optimal E-value (10^{-55}) corresponds to the cross-point of the two curves, leading to 736 (over 796) sequences for further analysis.

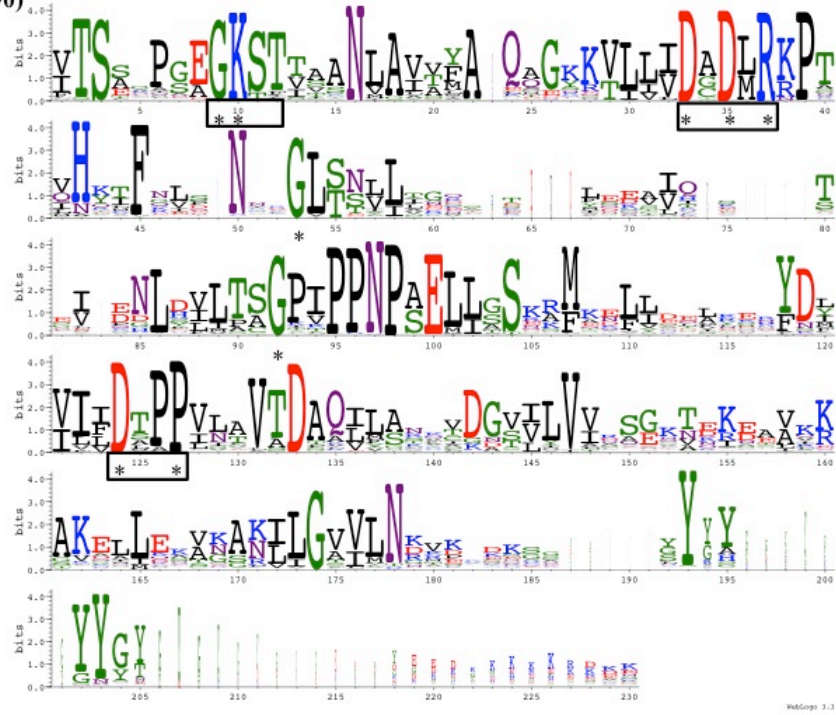
A1 (27)



A2(9)

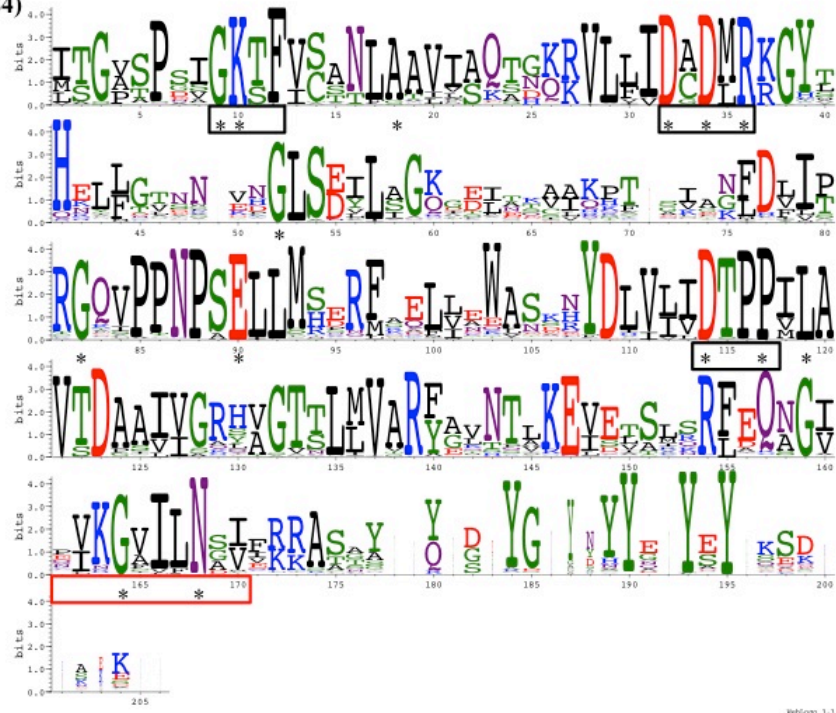


A3(190)



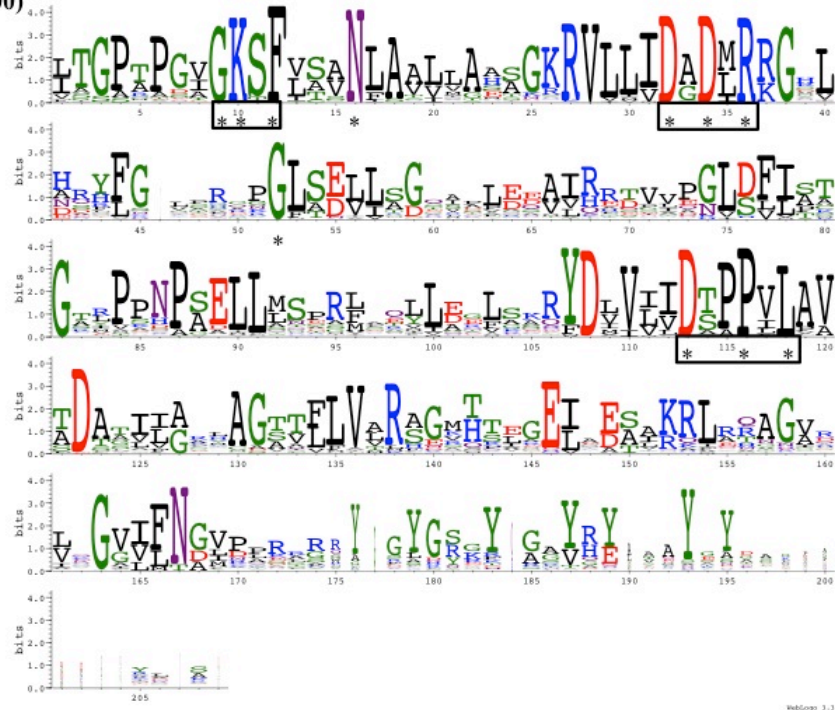
WebLogo 3.1

B1(184)

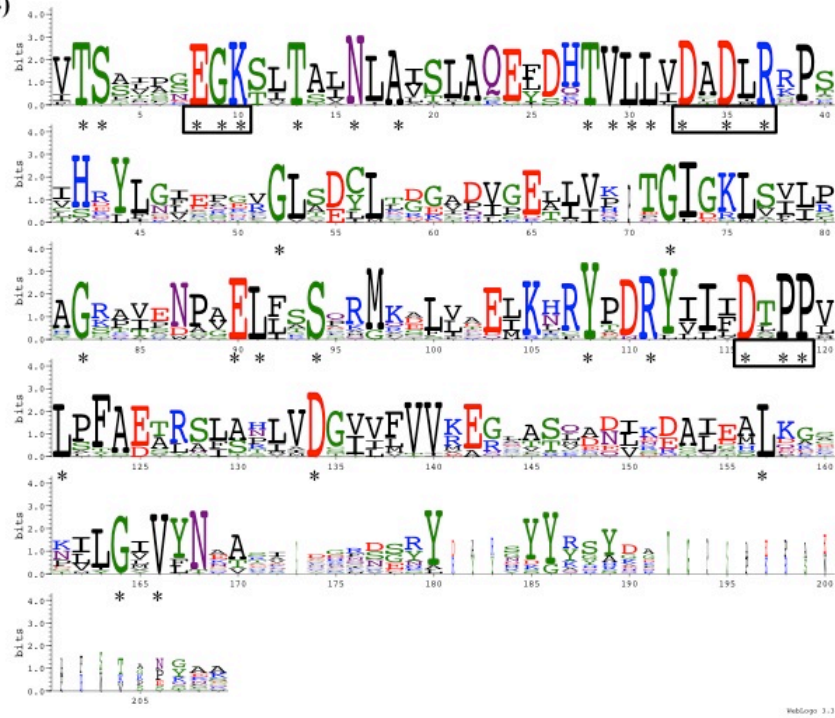


WebLogo 3.1

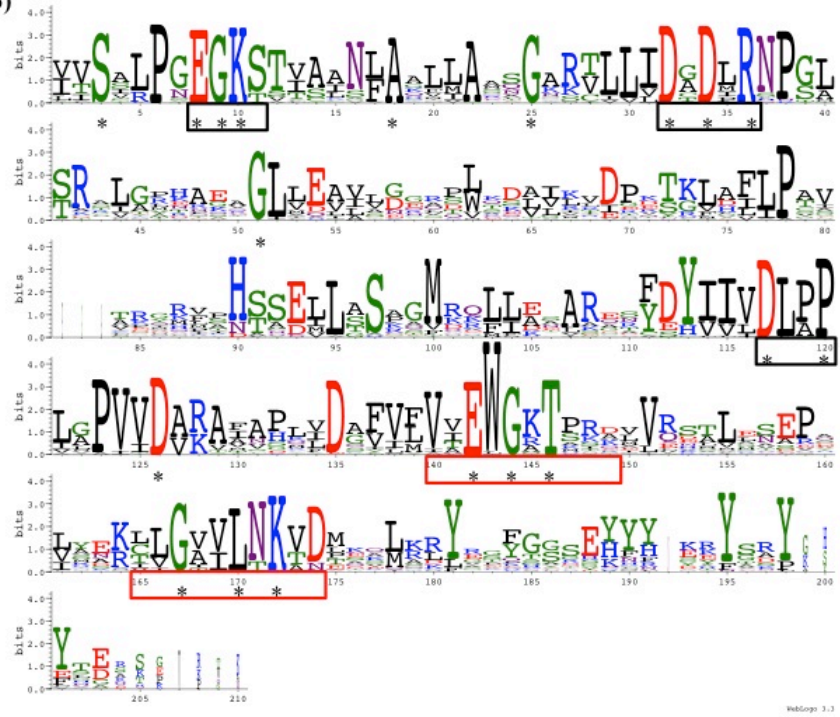
B2(100)



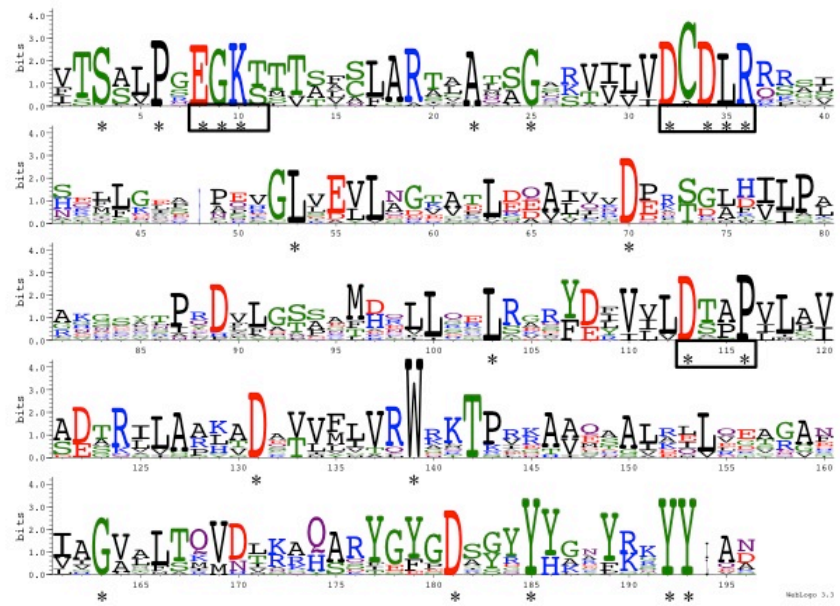
C1(14)



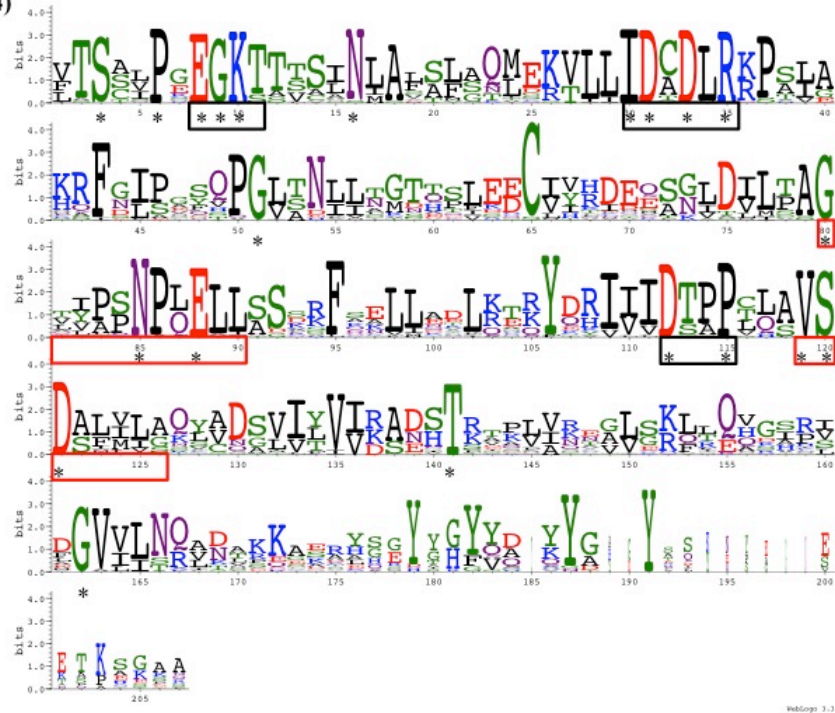
C2(33)



C3(14)

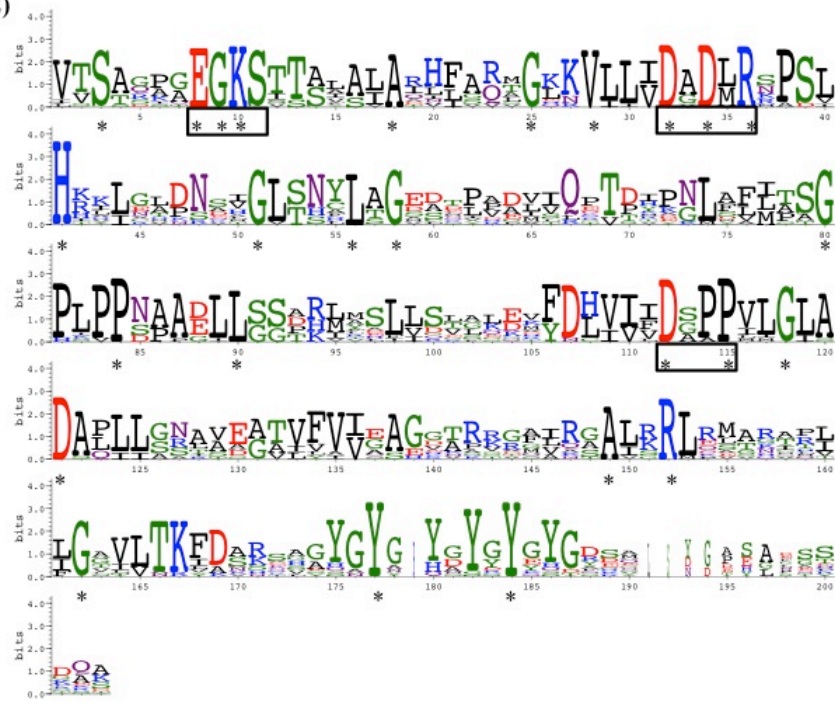


C4(24)



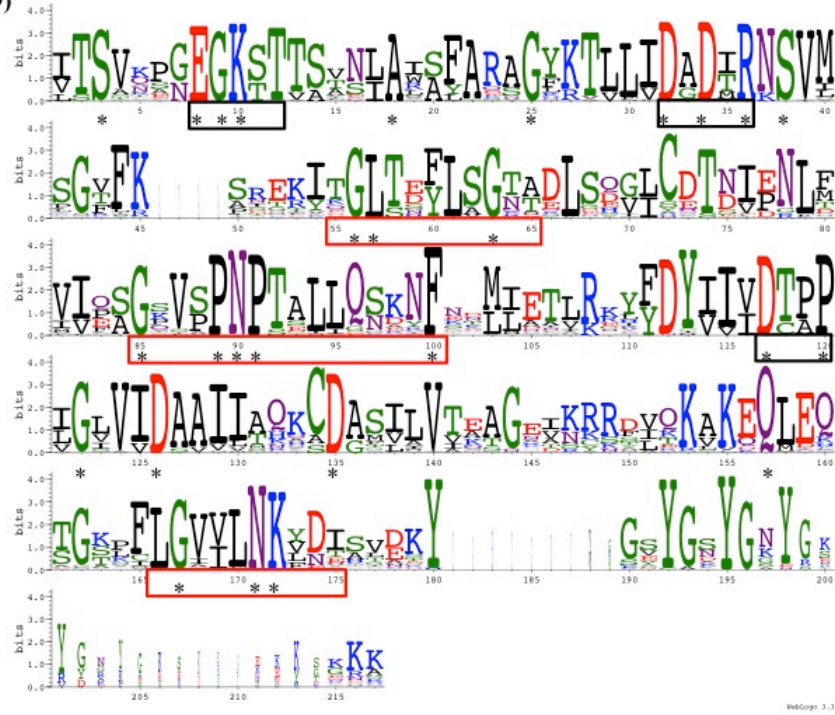
WebLogo 3.3

C5(12)



WebLogo 3.3

C6(39)



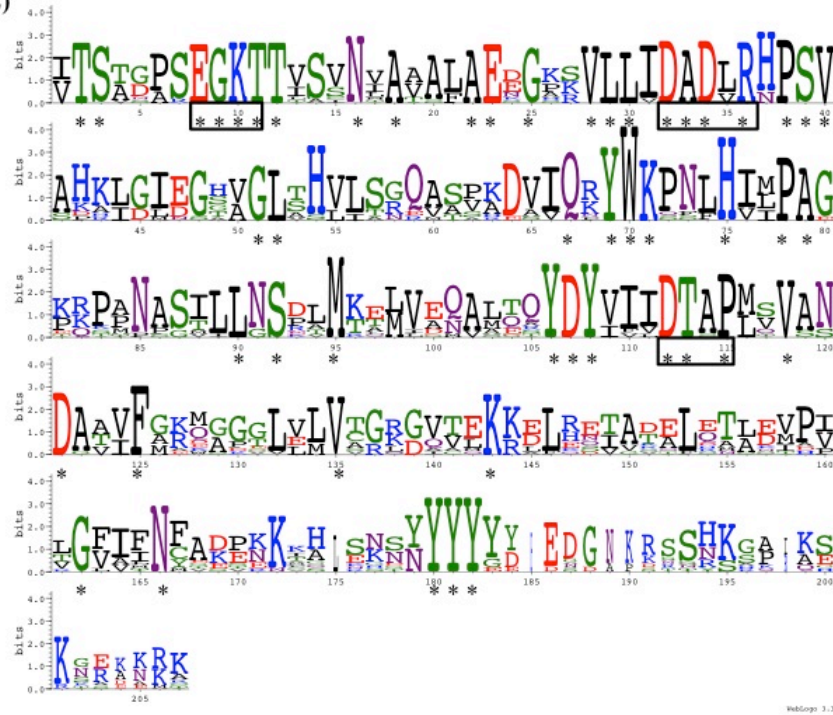
WebLogo 3.1

C7(11)



WebLogo 3.1

C8(12)



C9(7)



Figure S5. Sequence logos of the BY-kinase subgroups. The sequence logos were constructed from the multiple alignment of each subgroup (A1 – C9). The number of sequences within each subgroup is indicated in parentheses. Asterisk indicated the strong conserved site (100% identity) in the alignment. Black frame indicated the conserved A, A', and B motifs, while red frames indicated the ten most significant signature motifs in subgroups have more than 20 sequences.

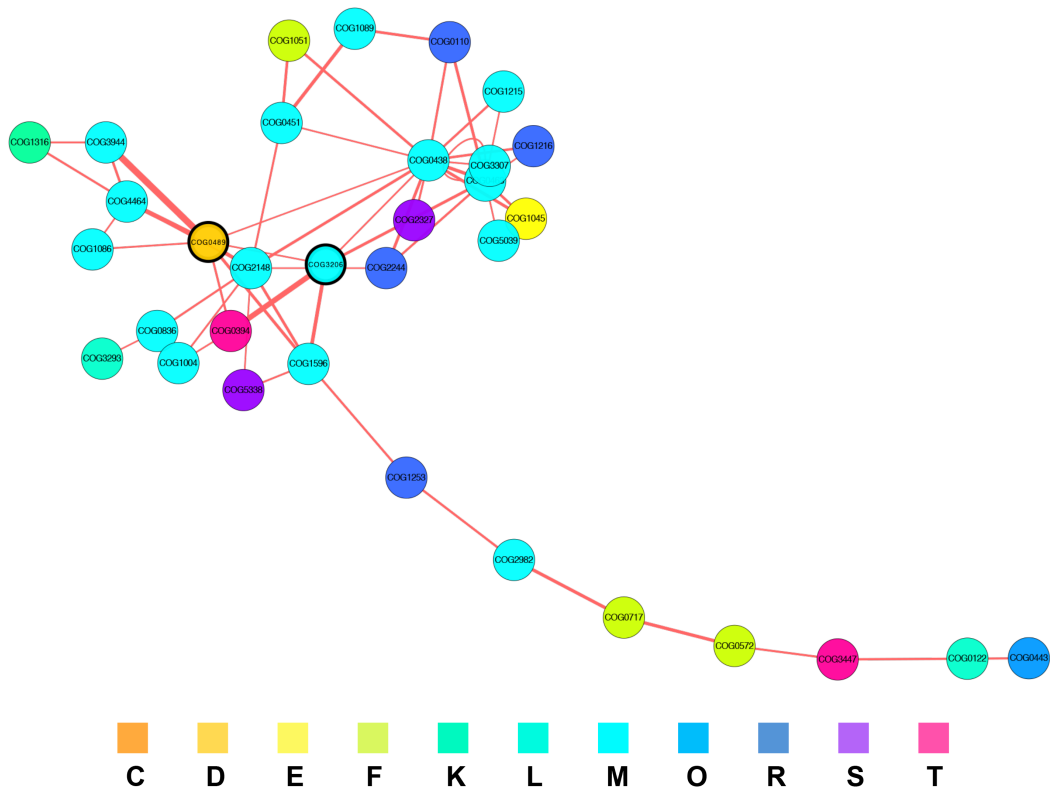


Figure S6. Functional module relationships of BY-kinases in a genomic-context network. The BY-kinases are classified into COG0489 or COG3206. A high number of edges linking to BY-kinases are classified into COG class M, which involved in cell wall/membrane/envelop biogenesis. In particular, COG0394 (Protein-tyrosine-phosphatase) is linked to BY-kinase in some genomes. Nodes are colored in function of the COG classes, and the width of links corresponds to strength of co-occurrences.

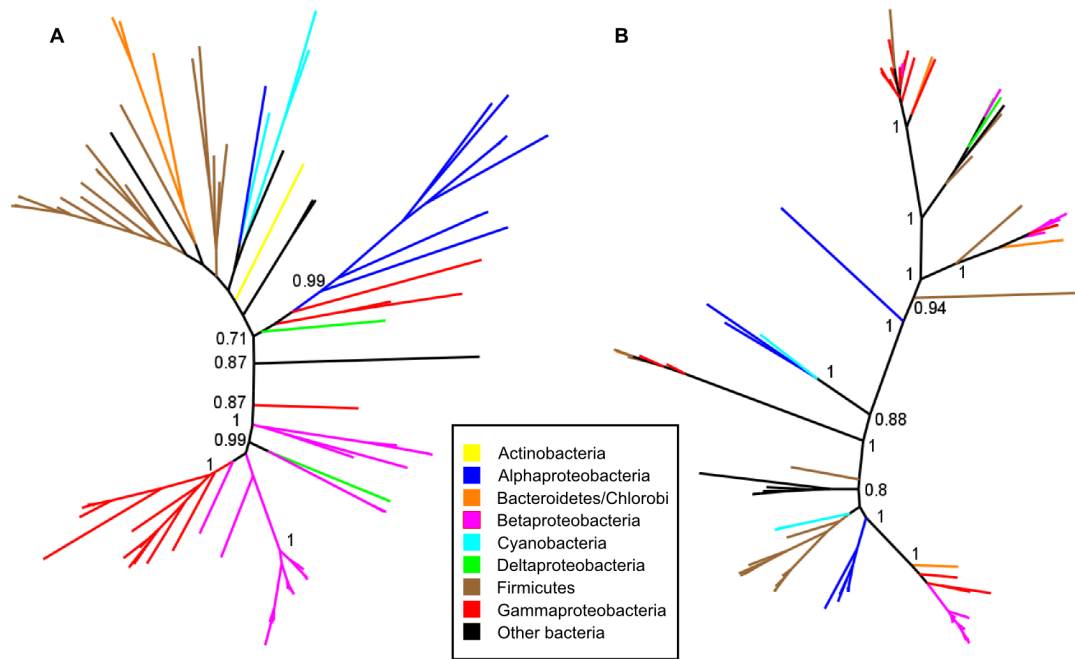


Figure S7. Phylogenetic analysis of BY-kinase and Ugd pairs. (A) The unrooted tree of BY-kinases. (B) The unrooted tree of paired Ugd proteins. Numbers indicate corresponding posterior probability.