

**Supporting Table 1.** Comparative annotation of *Buchnera* genomes. LCSA, last common symbiont ancestor of *Buchnera* strains. BBp, *Buchnera aphidicola*, endosymbiont of *Baizongia pistaciae*. BAp, *Buchnera aphidicola*, endosymbiont of *Acyrtosiphon pisum*. Bsg, *Buchnera aphidicola*, endosymbiont of *Schizaphis graminum*. In green, missing genes in some of the three symbionts; in red, pseudogenes.

Position	LCSA	BBp	BAp	Bsg	Function
1	gidA	+	+	+	DNA replication, recombination, modification and repair
2	atpB	+	+	+	Energy metabolism
3	atpE	+	+	+	Energy metabolism
4	atpF	+	+	+	Energy metabolism
5	atpH	+	+	+	Energy metabolism
6	atpA	+	+	+	Energy metabolism
7	atpG	+	+	+	Energy metabolism
8	atpD	+	+	+	Energy metabolism
9	atpC	+	+	+	Energy metabolism
10	gyrB	+	+	+	DNA replication, recombination, modification and repair
11	dnaN	+	+	+	DNA replication, recombination, modification and repair
12	dnaA	+	+	+	DNA replication, recombination, modification and repair
13	rpmH	+	+	+	Translation, post-translational modification
14	rnpA	+	+	+	DNA replication, recombination, modification and repair
15	yidD	+	-	+	Hypothetical, unclassified, unknown
16	yidC	+	+	+	Hypothetical, unclassified, unknown
17	thdF	+	+	+	Cell processes (incl. adaptation, protection)
18	mutH	+	-	-	DNA replication, recombination, modification and repair
19	tRNA-Phe	+	+	+	RNAs
20	mopB	+	+	+	Cell processes (incl. adaptation, protection)
21	mopA	+	+	+	Cell processes (incl. adaptation, protection)
22	yjeK	+	-	+	Amino acid biosynthesis and metabolism
23	efp	+	+	+	Translation, post-translational modification
24	dnaC	+	+	+	DNA replication, recombination, modification and repair
25	dnaT	-	+	+	DNA replication, recombination, modification and repair

26	yhhF	+	+	+ -	Hypothetical, unclassified, unknown
27	ftsY	+	+	+	Cell processes (incl. adaptation, protection)
28	rpoH	+	+	+	Transcription, RNA processing and degradation
29	glmS	+	+	+	Central intermediary metabolism
30	glmU	+	+	+	Central intermediary metabolism
31	yigL	+	+ -	+	Hypothetical, unclassified, unknown
32	metR	-	+ -	+	Amino acid biosynthesis and metabolism
33	metE	+	+	+	Amino acid biosynthesis and metabolism
34	purH	+	+	+	Nucleotide biosynthesis and metabolism
35	hupA	+	+	+	DNA replication, recombination, modification and repair
36	rpoC	+	+	+	Transcription, RNA processing and degradation
37	rpoB	+	+	+	Transcription, RNA processing and degradation
38	rplL	+	+	+	Translation, post-translational modification
39	rplJ	+	+	+	Translation, post-translational modification
40	rplA	+	+	+	Translation, post-translational modification
41	rplK	+	+	+	Translation, post-translational modification
42	nusG	+	+	+	Transcription, RNA processing and degradation
43	secE	+	+	+	Transport and binding proteins
44	tRNA-Thr	+	+	+	RNAs
45	tRNA-Gly	+	+	+	RNAs
46	tRNA-Tyr	+	+	+	RNAs
47	tRNA-Thr	+	+	+	RNAs
48	murB	+	+	+	Cell structure
49	metF	+	+	+	Central intermediary metabolism
50	argE	-	+	+	Amino acid biosynthesis and metabolism
51	argC	-	+	+	Amino acid biosynthesis and metabolism
52	argB	-	+	+	Amino acid biosynthesis and metabolism
53	argG	+	+	+	Amino acid biosynthesis and metabolism
54	argH	+	+	+	Amino acid biosynthesis and metabolism
55	yibN	+	+	+	Hypothetical, unclassified, unknown
56	secB	-	+	+	Transport and binding proteins
57	cysE	+	+	+	Amino acid biosynthesis and metabolism
58	rpoD	+	+	+	Transcription, RNA processing and degradation
59	dnaG	+	+	+	DNA replication, recombination, modification and repair
60	rpsU	+	+	+	Translation, post-translational modification

61	ygjD	+	+	+	Energy metabolism
62	ribB	+	+	+	Biosynthesis of cofactors, prosthetic groups and carriers
63	yb3052	-	+	+	Central intermediary metabolism
64	cca	+	+	+	Translation, post-translational modification
65	bacA	+	+	+	Cell processes (incl. adaptation, protection)
66	crr	+	+	+	Transport and binding proteins
67	ptsI	+	+	+	Transport and binding proteins
68	ptsH	+	+	+	Transport and binding proteins
69	cysK	-	+	+	Amino acid biosynthesis and metabolism
70	lig	+	+	+/-	DNA replication, recombination, modification and repair
71	tRNA-Lys	+	+	+	RNAs
72	tRNA-Val	+	+	+	RNAs
73	gltX	+	+	+	Translation, post-translational modification
74	tRNA-Ala	+	+	+	RNAs
75	fliE	+	+	+	Cell structure
76	fliF	+	+	+	Cell structure
77	fliG	+	+	+	Cell structure
78	fliH	+	+	+	Cell structure
79	fliI	+	+	+	Cell processes (incl. adaptation, protection)
80	fliJ	+	+	+	Cell processes (incl. adaptation, protection)
81	fliK	+	+	+	Cell processes (incl. adaptation, protection)
82	fliM	+	+	+	Cell structure
83	fliN	+	+	+	Cell structure
84	fliOP	+	+	+	Cell structure
85	fliQ	+	+	+	Cell structure
86	fliR	+	+	+	Cell structure
87	rpmG	+	+	+	Translation, post-translational modification
88	rpmB	+	+	+	Translation, post-translational modification
89	ytfN	+	+	+	Hypothetical, unclassified, unknown
90	ppa	+	+	+	Central intermediary metabolism
91	pmbA	+	+	+	Translation, post-translational modification
92	rnpB	+	+	+	RNAs
93	yraL	+	+	+	Hypothetical, unclassified, unknown
94	fabB	+	+	+	Fatty acid and phospholipid metabolism
95	talA	+	+	+	Energy metabolism
96	tktB	+	+	+	Energy metabolism

97	dapE	+	+	+	Amino acid biosynthesis and metabolism
98	dapA	+	+	+	Amino acid biosynthesis and metabolism
99	bcp	-	-	+	Transport and binding proteins
100	aroC	+	+	+	Amino acid biosynthesis and metabolism
101	yb2331	+	+	+	Hypothetical, unclassified, unknown
102	hisG	+	+	+	Amino acid biosynthesis and metabolism
103	hisD	+	+	+	Amino acid biosynthesis and metabolism
104	hisC	+	+	+	Amino acid biosynthesis and metabolism
105	hisB	+	+	+	Amino acid biosynthesis and metabolism
106	hisH	+	+	+	Amino acid biosynthesis and metabolism
107	hisA	+	+	+	Amino acid biosynthesis and metabolism
108	hisF	+	+	+	Amino acid biosynthesis and metabolism
109	hisI	+	+	+	Amino acid biosynthesis and metabolism
110	gnd	+	+	+	Energy metabolism
111	dcd	+	+	+	Nucleotide biosynthesis and metabolism
112	metG	+	+	+	Translation, post-translational modification
113	mesJ	+	+	+	Cell processes (incl. adaptation, protection)
114	tRNA-Val	+	+	+	RNAs
115	norM	+	-	-	Hypothetical, unclassified, unknown
116	ribE	+	+	+	Biosynthesis of cofactors, prosthetic groups and carriers
117	rnfA	+	+	+	Other known genes
118	rnfB	+	+	+	Other known genes
119	rnfC	+	+	+ -	Other known genes
120	ydgO	+	+	+	Other known genes
121	rnfG	+	+	+	Other known genes
122	ydgQ	+	+	+	Hypothetical, unclassified, unknown
123	nth	+	+	+	Transcription, RNA processing and degradation
124	priA	-	+	+	DNA replication, recombination, modification and repair
125	tyrS	+	+	+	Translation, post-translational modification
126	ydiC	+	+	+	Hypothetical, unclassified, unknown
127	yb1688	+	+	+	Hypothetical, unclassified, unknown
128	aroH	+	+	+	Amino acid biosynthesis and metabolism
129	thrS	+	+	+	Translation, post-translational modification
130	infC	+	+ -	+ -	Translation, post-translational modification
131	rpmI	+	+	+	Translation, post-translational modification
132	rplT	+	+	+	Translation, post-translational modification
133	pheS	+	+	+	Translation, post-translational modification
134	pheT	+	+	+	Translation, post-translational modification

135	himA	-	+	+	DNA replication, recombination, modification and repair
136	queA	-	+	+	Translation, post-translational modification
137	tgt	-	+	+	Translation, post-translational modification
138	yajC	+	+	+	Hypothetical, unclassified, unknown
139	glyS	+	+	+	Translation, post-translational modification
140	glyQ	+	+	+	Translation, post-translational modification
141	folE	-	+/-	+	Biosynthesis of cofactors, prosthetic groups and carriers
142	nfo	+	+	+	Transcription, RNA processing and degradation
143	rplY	+	+	+	Translation, post-translational modification
144	yabl	+	+	+	Hypothetical, unclassified, unknown
145	surA	-	+	+	Other known genes
146	ksgA	+	+	+	Cell processes (incl. adaptation, protection)
147	apaH	+	+	+	Nucleotide biosynthesis and metabolism
148	folA	+	+	+	Biosynthesis of cofactors, prosthetic groups and carriers
149	carB	+	+	+	Nucleotide biosynthesis and metabolism
150	carA	+	+	+	Nucleotide biosynthesis and metabolism
151	dapB	+	+	+	Amino acid biosynthesis and metabolism
152	lytB	+	+	+	Regulatory function
153	lspA	+	+	+	Transport and binding proteins
154	ileS	+	+	+	Translation, post-translational modification
155	ribF	-	+	+	Biosynthesis of cofactors, prosthetic groups and carriers
156	rpsT	+	+	+	Translation, post-translational modification
157	dnaJ	+	+	+	Cell processes (incl. adaptation, protection)
158	dnaK	+	+	+	Cell processes (incl. adaptation, protection)
159	nuoA	+	+	+	Energy metabolism
160	nuoB	+	+	+	Energy metabolism
161	nuoCD	+	+	+	Energy metabolism
162	nuoE	+	+	+	Energy metabolism
163	nuoF	+	+	+	Energy metabolism
164	nuoG	+	+	+	Energy metabolism
165	nuoH	+	+	+	Energy metabolism
166	nuoI	+	+	+	Energy metabolism
167	nuoJ	+	+	+	Energy metabolism
168	nuoK	+	+	+	Energy metabolism
169	nuoL	+	+	+	Energy metabolism

170	nuoM	+	+	+	Energy metabolism
171	nuoN	+	+	+	Energy metabolism
172	ygjT	+	-	+	Transport and binding proteins
173	folC	+	+	+	Biosynthesis of cofactors, prosthetic groups and carriers
174	cvpA	+	+-	+-	Cell processes (incl. adaptation, protection)
175	prsA	+	+	+	Nucleotide biosynthesis and metabolism
176	yehB	+-	+	+	Biosynthesis of cofactors, prosthetic groups and carriers
177	prfA	+	+	+	Translation, post-translational modification
178	hemK	+	+	+	Biosynthesis of cofactors, prosthetic groups and carriers
179	yehA	+	+	+	Hypothetical, unclassified, unknown
180	nadE	-	+	+	Biosynthesis of cofactors, prosthetic groups and carriers
181	ackA	+	+	+	Energy metabolism
182	pta	+	+	+	Energy metabolism
183	yfaE	+	+	+-	Hypothetical, unclassified, unknown
184	nrdB	+	+	+	Nucleotide biosynthesis and metabolism
185	nrdA	+	+	+	Nucleotide biosynthesis and metabolism
186	gyrA	+	+	+	DNA replication, recombination, modification and repair
187	yba2	+	+	+	Hypothetical, unclassified, unknown
188	ahpC	+	+	+	Cell processes (incl. adaptation, protection)
189	ung	+	+	+-	DNA replication, recombination, modification and repair
190	grpE	+	+	+	Cell processes (incl. adaptation, protection)
191	yfjB	+	+	+	Hypothetical, unclassified, unknown
192	tmRNA	+	+	+	RNAs
193	smpA	-	+	+	Cell structure
194	ydhD	+	+	+	Hypothetical, unclassified, unknown
195	rnt	+	+	+	DNA replication, recombination, modification and repair
196	sodA	+	+	+	Cell processes (incl. adaptation, protection)
197	pth	+	+	+	Translation, post-translational modification
198	yehF	+	+	+	Hypothetical, unclassified, unknown
199	thrC	+	+	+	Amino acid biosynthesis and metabolism
200	thrB	+	+	+	Amino acid biosynthesis and metabolism
201	thrA	+	+	+	Amino acid biosynthesis and metabolism

202	hpt	-	+	+	Nucleotide biosynthesis and metabolism
203	panC	-	+	+	Biosynthesis of cofactors, prosthetic groups and carriers
204	panB	-	+	+	Biosynthesis of cofactors, prosthetic groups and carriers
205	dksA	+	+	+	DNA replication, recombination, modification and repair
206	truA	+	+	+	Translation, post-translational modification
207	mrcB	+	+	+ -	Cell structure
208	secA	+	+	+	Transport and binding proteins
209	mutT	-	+	+	Nucleotide biosynthesis and metabolism
210	yacE	-	+	+	Hypothetical, unclassified, unknown
211	guaC	+	+	+	Nucleotide biosynthesis and metabolism
212	aceE	+	+	+	Energy metabolism
213	aceF	+	+	+	Energy metabolism
214	lpdA	+	+	+	Energy metabolism
215	speD	-	+	+	Central intermediary metabolism
216	speE	-	+	+	Central intermediary metabolism
217	pfs	+	+	+	Hypothetical, unclassified, unknown
218	yadR	+	+	+	Hypothetical, unclassified, unknown
219	ftsZ	+	+	+	Cell processes (incl. adaptation, protection)
220	ftsA	+	+	+	Cell processes (incl. adaptation, protection)
221	ddlB	+	+ -	+	Cell structure
222	murC	+	+	+ -	Cell structure
223	murG	+	+	+	Cell structure
224	ftsW	+	+	+	Cell processes (incl. adaptation, protection)
225	murD	+	+	+	Cell structure
226	mraY	+	+	+ -	Cell structure
227	murF	+	+	+ -	Cell structure
228	murE	+	+	+ -	Cell structure
229	ftsI	+	+	+	Cell processes (incl. adaptation, protection)
230	ftsL	+	+	+	Cell processes (incl. adaptation, protection)
231	yabC	+	+	+	Hypothetical, unclassified, unknown
232	ilvH	+	+	+	Amino acid biosynthesis and metabolism
233	ilvI	+	+	+	Amino acid biosynthesis and metabolism
234	apbE	+	+ -	+ -	Biosynthesis of cofactors, prosthetic groups and carriers
235	htrA	+	+	+	Translation, post-translational modification

236	dapD	+	+	+	Amino acid biosynthesis and metabolism
237	map	+	+	+	Translation, post-translational modification
238	rpsB	+	+	+	Translation, post-translational modification
239	tsf	+	+	+	Translation, post-translational modification
240	pyrH	+	+	+	Nucleotide biosynthesis and metabolism
241	frr	+	+	+	Translation, post-translational modification
242	dxr	+-	+	+	Hypothetical, unclassified, unknown
243	uppS	+	+	+	Central intermediary metabolism
244	yaeT	-	+	+	Cell structure
245	fabZ	+	-	+	Fatty acid and phospholipid metabolism
246	dnaE	+	+	+	DNA replication, recombination, modification and repair
247	proS	+	+	+	Translation, post-translational modification
248	flhB	+	+	+	Cell processes (incl. adaptation, protection)
249	flhA	+	+	+	Cell structure
250	argS	+	+	+	Translation, post-translational modification
251	rrf-16S rRNA	+	+	+	RNAs
252	tRNA-Ile	+	+	+	RNAs
253	tRNA-Ala	+	+	+	RNAs
254	gloB	+	+	+	Hypothetical, unclassified, unknown
255	rnhA	+	+-	+	DNA replication, recombination, modification and repair
256	dnaQ	+	+	+	DNA replication, recombination, modification and repair
257	tRNA-Asp	+	+	+	RNAs
258	lpcA	-	+	+	Cell structure
259	gpt	+	+	+	Nucleotide biosynthesis and metabolism
260	grpE1	+	+	+	Cell processes (incl. adaptation, protection)
261	yfjF	+	+	+	Hypothetical, unclassified, unknown
262	smpB	+	+	+	Hypothetical, unclassified, unknown
263	yfhC	+	+	+	Other known genes
264	acpS	+	+	+	Fatty acid and phospholipid metabolism
265	era	+	+	+	Regulatory function
266	rnc	+	+	+	DNA replication, recombination, modification and repair
267	lepB	+	+	+	Transport and binding proteins
268	lepA	+	+	+	Translation, post-translational modification
269	trmU	+	+	+	Translation, post-translational modification
270	ycfC	+	+	-	Hypothetical, unclassified, unknown



271	purB	+	+	+	Nucleotide biosynthesis and metabolism
272	mltE	+	+	+ -	Energy metabolism
273	fabI	+	+	+	Fatty acid and phospholipid metabolism
274	rnb	+	+	+	DNA replication, recombination, modification and repair
275	ychE	+	+	+	Transport and binding proteins
276	lipB	+	+	+	Biosynthesis of cofactors, prosthetic groups and carriers
277	lipA	+	+	+	Biosynthesis of cofactors, prosthetic groups and carriers
278	pyrF	+	+	+	Nucleotide biosynthesis and metabolism
279	ribA	+	+	+	Biosynthesis of cofactors, prosthetic groups and carriers
280	hns	-	+	-	DNA replication, recombination, modification and repair
281	cls	+	+	+	Fatty acid and phospholipid metabolism
282	yciA	+	+	+	Hypothetical, unclassified, unknown
283	yciB	+	+	+	Cell processes (incl. adaptation, protection)
284	yciC	+	+	+	Hypothetical, unclassified, unknown
285	trpA	+	+	+	Amino acid biosynthesis and metabolism
286	trpB	+	+	+	Amino acid biosynthesis and metabolism
287	trpC	+	+	+	Amino acid biosynthesis and metabolism
288	trpD	+	+	+	Amino acid biosynthesis and metabolism
289	yedA	+ -	+	+	Energy metabolism
290	yciL	+	+	+	Hypothetical, unclassified, unknown
291	sohB	+	+	+	Cell processes (incl. adaptation, protection)
292	topA	-	+	+	DNA replication, recombination, modification and repair
293	suhB	+	+	+	Regulatory function
294	yfgB	+	+	+	Other known genes
295	gcpE	+ -	+	+	Cell structure
296	hisS	+	+	+	Translation, post-translational modification
297	glyA	+	+	+	Amino acid biosynthesis and metabolism
298	bioD	+	+	+ -	Biosynthesis of cofactors, prosthetic groups and carriers
299	bioC	+	-	-	Biosynthesis of cofactors, prosthetic groups and carriers
300	bioF	+	-	-	Biosynthesis of cofactors, prosthetic groups and carriers
301	bioB	+	+	+	Biosynthesis of cofactors, prosthetic groups and carriers

302	bioA	+	+	+	Biosynthesis of cofactors, prosthetic groups and carriers
303	ybhE	+	+	+	Central intermediary metabolism
304	mfd	+	+	+ -	DNA replication, recombination, modification and repair
305	ycfU	-	+	+	Hypothetical, unclassified, unknown
306	ycfV	-	+	+	Hypothetical, unclassified, unknown
307	ycfW	-	+ -	+	Other known genes
308	gapA	+	+	+	Energy metabolism
309	yqcD	-	-	+	Hypothetical, unclassified, unknown
310	fldA	+	+	+	Energy metabolism
311	phrB	+	+	+ -	DNA replication, recombination, modification and repair
312	ybgl	+	+	+	Hypothetical, unclassified, unknown
313	sucA	+	+	+	Energy metabolism
314	sucB	+	+	+	Energy metabolism
315	pal	+	-	-	Cell structure
316	gpmA	+	+	+	Energy metabolism
317	pfkA	+	+	+	Energy metabolism
318	glpF	-	+	+	Transport and binding proteins
319	tpiA	+	+	+	Energy metabolism
320	himD	-	+	+	DNA replication, recombination, modification and repair
321	rpsA	+	+	+	Translation, post-translational modification
322	cmk	+	+ -	+ -	Nucleotide biosynthesis and metabolism
323	aroA	+	+	+	Amino acid biosynthesis and metabolism
324	serC	+	+	+	Amino acid biosynthesis and metabolism
325	serS	+	+	+	Translation, post-translational modification
326	trxB	+	+	+	Nucleotide biosynthesis and metabolism
327	infA	+	+	+	Translation, post-translational modification
328	aspS	+	+	+	Translation, post-translational modification
329	znuB	+	+	+	Transport and binding proteins
330	znuC	+	+	+	Transport and binding proteins
331	znuA	-	-	+	Transport and binding proteins
332	yebA	+	-	+	Cell structure
333	pykA	+	+	+	Energy metabolism
334	zwf	+	+	+	Energy metabolism
335	htpX	+	+	+	Cell processes (incl. adaptation, protection)
336	cspC	-	+	-	Transcription, RNA processing and degradation
337	yoaE	+	+	+	Hypothetical, unclassified, unknown

338	yeaZ	+	+	+	Hypothetical, unclassified, unknown
339	minE	+	+	+	Cell processes (incl. adaptation, protection)
340	minD	+	+	+	Cell processes (incl. adaptation, protection)
341	minC	+	+	+	Cell processes (incl. adaptation, protection)
342	yjjT	+	+	+	Transcription, RNA processing and degradation
343	tRNA-Leu	+	+	+	RNAs
344	tRNA	+	+	+	RNAs
345	tRNA-Ser	+	+	+	RNAs
346	ompA	-	+	+	Cell structure
347	mviN	+	+	+	Cell processes (incl. adaptation, protection)
348	pyrC	-	+	+	Nucleotide biosynthesis and metabolism
349	flgN	-	+	+	Cell processes (incl. adaptation, protection)
350	flgA	-	+	+	Cell processes (incl. adaptation, protection)
351	flgB	+	+	+	Cell processes (incl. adaptation, protection)
352	flgC	+	+	+	Cell processes (incl. adaptation, protection)
353	flgD	-	+	+	Cell processes (incl. adaptation, protection)
354	flgE	-	+	+	Cell processes (incl. adaptation, protection)
355	flgF	+	+	+	Cell processes (incl. adaptation, protection)
356	flgG	+	+	+	Cell processes (incl. adaptation, protection)
357	flgH	+	+	+	Cell processes (incl. adaptation, protection)
358	flgI	+	+	+	Cell processes (incl. adaptation, protection)
359	flgJ	+	+	+	Cell processes (incl. adaptation, protection)
360	flgK	-	+	+	Cell processes (incl. adaptation, protection)
361	rne	+	+	+	DNA replication, recombination, modification and repair
362	rluC	+	+	+	Translation, post-translational modification
363	rpmF	+	+	+	Translation, post-translational modification

364	fabD	+	+-	+	Fatty acid and phospholipid metabolism
365	fabG	+	+	+	Fatty acid and phospholipid metabolism
366	acpP	+	+	+	Fatty acid and phospholipid metabolism
367	tmk	+	+	+	Nucleotide biosynthesis and metabolism
368	holB	+	+	+	DNA replication, recombination, modification and repair
369	ycfH	+	+	+	Hypothetical, unclassified, unknown
370	ptsG	+	+	+	Transport and binding proteins
371	ycfF	+	+	+	Hypothetical, unclassified, unknown
372	ycfM	+-	+	+-	Hypothetical, unclassified, unknown
373	ompF	-	+	+	Cell structure
374	asnS	+	+	+	Translation, post-translational modification
375	pncB	-	+	+	Biosynthesis of cofactors, prosthetic groups and carriers
376	pyrD	-	+	+	Nucleotide biosynthesis and metabolism
377	ycbY	-	+	+	Hypothetical, unclassified, unknown
378	uup	-	+	+	Transport and binding proteins
379	yceA	+	+	+	Hypothetical, unclassified, unknown
380	valS	+	+	+	Translation, post-translational modification
381	pepA	+	+	+	Translation, post-translational modification
382	argF	+	+	+	Amino acid biosynthesis and metabolism
383	pyrB	-	+	+	Nucleotide biosynthesis and metabolism
384	pyrI	-	+	+	Nucleotide biosynthesis and metabolism
385	yhaR	+	+	+	Hypothetical, unclassified, unknown
386	deaD	+	+	+	Transcription, RNA processing and degradation
387	pnp	+	+	+	Transcription, RNA processing and degradation
388	rpsO	+	+	+	Translation, post-translational modification
389	truB	+	+	+	Translation, post-translational modification
390	rbfA	+	+	+	Translation, post-translational modification
391	infB	+	+	+	Translation, post-translational modification
392	nusA	+	+	+	Transcription, RNA processing and degradation
393	tRNA-Leu		+	+	+ RNAs
394	secG	+-	+	+	Transport and binding proteins
395	mrsA	+	+	+-	Central intermediary metabolism
396	hflB	+	+	+	Cell processes (incl. adaptation, protection)
397	ftsJ	+	+	+	Cell processes (incl. adaptation, protection)
398	greA	+	+	+	Translation, post-translational modification

399	yrbA	+	+	+	Hypothetical, unclassified, unknown
400	murA	+	+	+	Cell structure
401	rplU	+	+	+	Translation, post-translational modification
402	rpmA	+	+	+	Translation, post-translational modification
403	yhbZ	+	+	+	Other known genes
404	rpsI	+	+	+	Translation, post-translational modification
405	rplM	+	+	+	Translation, post-translational modification
406	pheA	+	+	+	Amino acid biosynthesis and metabolism
407	ffh	+	+	+	Transport and binding proteins
408	rpsP	+	+	+	Translation, post-translational modification
409	rimM	+	+	+	Other known genes
410	trmD	+	+	+	Translation, post-translational modification
411	rplS	+	+	+	Translation, post-translational modification
412	tldD	+	+	+	Hypothetical, unclassified, unknown
413	aroQ	+	+	+	Amino acid biosynthesis and metabolism
414	fis	-	+	+	DNA replication, recombination, modification and repair
415	rluD	+	+	+	Other known genes
416	yfiO	-	+	+	Hypothetical, unclassified, unknown
417	alaS	+	+	+	Translation, post-translational modification
418	csrA	+	+	+	Regulatory function
419	tRNA-Ser	+	+	+	RNAs
420	tRNA-Arg	+	+	+	RNAs
421	gshA	+	+	+	Biosynthesis of cofactors, prosthetic groups and carriers
422	metK	-	+	+	Central intermediary metabolism
423	endA	+	+	+ -	Transcription, RNA processing and degradation
424	yggJ	-	+	+	Hypothetical, unclassified, unknown
425	ygfA	+	-	+	Biosynthesis of cofactors, prosthetic groups and carriers
426	rpiA	+	+	+	Energy metabolism
427	tRNA-Gln	+	+	+	RNAs
428	tRNA-Leu	+	+	+	RNAs
429	tRNA-Met	+	+	+	RNAs
430	glnS	+	+	+	Translation, post-translational modification
431	pyrG	+	+	+	Nucleotide biosynthesis and metabolism
432	eno	+	+	+	Energy metabolism
433	ygcF	-	-	+	Hypothetical, unclassified, unknown
434	ygcM	-	-	+	Hypothetical, unclassified, unknown
435	nlpD	-	+	+ -	Cell structure
436	ygbB	+ -	+	+	Biosynthesis of cofactors, prosthetic

					groups and carriers
437	ygbP	+-	+	+	Biosynthesis of cofactors, prosthetic groups and carriers
438	ygbQ	-	+	+	Hypothetical, unclassified, unknown
439	cysC	-	+	+	Central intermediary metabolism
440	cysN	-	+	+-	Central intermediary metabolism
441	cysD	-	+	+-	Central intermediary metabolism
442	cysG	-	+	+-	Biosynthesis of cofactors, prosthetic groups and carriers
443	cysH	-	+	+-	Central intermediary metabolism
444	cysl	-	+	+-	Central intermediary metabolism
445	cysJ	-	+	+	Central intermediary metabolism
446	mutS	+	+	+	DNA replication, recombination, modification and repair
447	dsbA	+	+	+	Translation, post-translational modification
448	polA	+	+	+	DNA replication, recombination, modification and repair
449	yihA	+	+	+	Hypothetical, unclassified, unknown
450	typA	+	+	+	Other known genes
451	gmk	+	+	+	Nucleotide biosynthesis and metabolism
452	thyA	+	+	+	Nucleotide biosynthesis and metabolism
453	lgt	+	+	+-	Fatty acid and phospholipid metabolism
454	lysA	+	+	+	Amino acid biosynthesis and metabolism
455	lysS	+	+	+	Translation, post-translational modification
456	prfB	+	+	+-	Translation, post-translational modification
457	ygfZ	+	+	+	Hypothetical, unclassified, unknown
458	yleA	+	+	+	Hypothetical, unclassified, unknown
459	ybeY	+	+	+	Hypothetical, unclassified, unknown
460	ybeX	+	+	+	Transport and binding proteins
461	leuS	+	+	+	Translation, post-translational modification
462	holA	+	+	+	DNA replication, recombination, modification and repair
463	ybeN	-	+	+	Hypothetical, unclassified, unknown
464	yhhP	+	+	+	Hypothetical, unclassified, unknown
465	asd	+	+	+	Amino acid biosynthesis and metabolism
466	yhgN	+	+	+	Hypothetical, unclassified, unknown
467	pgk	+	+	+	Energy metabolism
468	fba	+	+	+	Energy metabolism
469	yggB	+	+	+	Transport and binding proteins
470	recC	+	+	+	Transcription, RNA processing and degradation
471	recB	+	+	+	Transcription, RNA processing and

					degradation
472	recD	+	+	+	Transcription, RNA processing and degradation
473	argA	-	+	+	Amino acid biosynthesis and metabolism
474	tRNA-Met	+	+	+	RNAs
475	mltA	-	+	+	Cell structure
476	ribH	+	+	+	Biosynthesis of cofactors, prosthetic groups and carriers
477	thiL	-	+	+	Other known genes
478	ribD	+	+	+	Biosynthesis of cofactors, prosthetic groups and carriers
479	nusB	+	+	+	Transcription, RNA processing and degradation
480	dxs	+-	+	+	Biosynthesis of cofactors, prosthetic groups and carriers
481	ispA	-	+	+	Biosynthesis of cofactors, prosthetic groups and carriers
482	yajR	+	+	+	Transport and binding proteins
483	yccK	+	+	+	Central intermediary metabolism
484	cyoE	+	+	+	Energy metabolism
485	cyoD	+	+	+	Energy metabolism
486	cyoC	+	+	+	Energy metabolism
487	cyoB	+	+	+	Energy metabolism
488	cyoA	+	+	+	Energy metabolism
489	bolA	+	+	+	Cell structure
490	tig	-	+	+	Cell processes (incl. adaptation, protection)
491	clpP	+	+	+	Translation, post-translational modification
492	clpX	+	+	+	Translation, post-translational modification
493	lon	+	+	+	Regulatory function
494	ppiD	+	+	+	Cell processes (incl. adaptation, protection)
495	ybaX	-	-	+	Hypothetical, unclassified, unknown
496	mdl	+	+	+	Transport and binding proteins
497	mdlB	+	+	+	Transport and binding proteins
498	dnaX	+	+	+	DNA replication, recombination, modification and repair
499	ybaB	+	+	+	Hypothetical, unclassified, unknown
500	htpG	+	+	+	Cell processes (incl. adaptation, protection)
501	adk	+	+	+	Nucleotide biosynthesis and metabolism
502	tRNA-Arg	+	+	+	RNAs
503	fold	+	+	+	Biosynthesis of cofactors, prosthetic

					groups and carriers
504	cysS	+	+	+	Translation, post-translational modification
505	ybeD	+	+	+	Hypothetical, unclassified, unknown
506	cspE	+	+	+	Other known genes
507	rrs-5S rRNA	+	+	+	RNAs
508	rrl-23S rRNA	+	+	+	RNAs
509	tRNA-Glu	+	+	+	RNAs
510	aroE	+	+	+	Amino acid biosynthesis and metabolism
511	yrdC	+	+	+	Hypothetical, unclassified, unknown
512	smg	-	+	+	Hypothetical, unclassified, unknown
513	def	+	+	+	Translation, post-translational modification
514	fnt	+	+	+	Translation, post-translational modification
515	rplQ	+	+	+	Translation, post-translational modification
516	rpoA	+	+	+	Transcription, RNA processing and degradation
517	rpsD	+	+	+	Translation, post-translational modification
518	rpsK	+	+	+	Translation, post-translational modification
519	rpsM	+	+	+	Translation, post-translational modification
520	rpmJ	+	+	+	Translation, post-translational modification
521	secY	+	+	+	Transport and binding proteins
522	rplO	+	+	+	Translation, post-translational modification
523	rpmD	+	+	+	Translation, post-translational modification
524	rpsE	+	+	+	Translation, post-translational modification
525	rplR	+	+	+	Translation, post-translational modification
526	rplF	+	+	+	Translation, post-translational modification
527	rpsH	+	+	+	Translation, post-translational modification
528	rpsN	+	+	+	Translation, post-translational modification
529	rplE	+	+	+	Translation, post-translational modification
530	rplX	+	+	+	Translation, post-translational modification
531	rplN	+	+	+	Translation, post-translational modification
532	rpsQ	+	+	+	Translation, post-translational modification
533	rpmC	+	+	+	Translation, post-translational modification
534	rplP	+	+	+	Translation, post-translational modification
535	rpsC	+	+	+	Translation, post-translational modification
536	rplV	+	+	+	Translation, post-translational modification
537	rpsS	+	+	+	Translation, post-translational modification
538	rplB	+	+	+	Translation, post-translational modification
539	rplW	+	+	+	Translation, post-translational modification
540	rplD	+	+	+	Translation, post-translational modification
541	rplC	+	+	+	Translation, post-translational modification

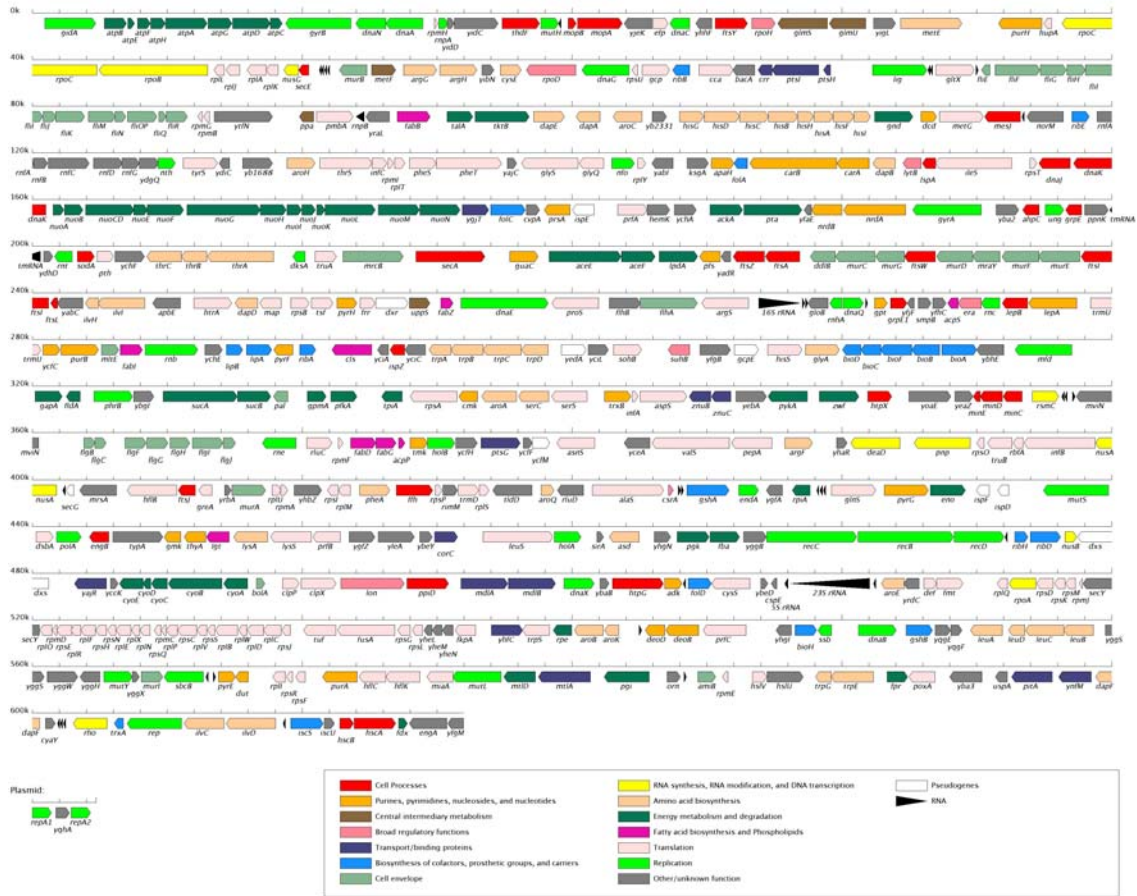


542	rpsJ	+	+	+	Translation, post-translational modification
543	tuf	+	+	+	Translation, post-translational modification
544	fusA	+	+	+	Translation, post-translational modification
545	rpsG	+	+	+	Translation, post-translational modification
546	rpsL	+	+	+	Translation, post-translational modification
547	yheL	+	+	+	Hypothetical, unclassified, unknown
548	yheM	+	+	+	Hypothetical, unclassified, unknown
549	yheN	+	+	+	Hypothetical, unclassified, unknown
550	fkpA	+	+	+	Translation, post-translational modification
551	argD	-	+	+	Amino acid biosynthesis and metabolism
552	yhfC	+	+	+	Transport and binding proteins
553	trpS	+	+	+	Translation, post-translational modification
554	rpe	+	+	+	Energy metabolism
555	aroB	+	+	+	Amino acid biosynthesis and metabolism
556	aroK	+	+	+	Amino acid biosynthesis and metabolism
557	tRNA-Ser	+	+	+	RNAs
558	deoD	+	+	+	Nucleotide biosynthesis and metabolism
559	deoB	+	+	+	Nucleotide biosynthesis and metabolism
560	prfC	+	+	+	Translation, post-translational modification
561	ansA	-	+/-	+/-	Amino acid biosynthesis and metabolism
562	yhgl	+	+	+	Hypothetical, unclassified, unknown
563	bioH	+	-	+/-	Biosynthesis of cofactors, prosthetic groups and carriers
564	ssb	+	+	+	DNA replication, recombination, modification and repair
565	dnaB	+	+	+	DNA replication, recombination, modification and repair
566	gshB	+	+	+	Biosynthesis of cofactors, prosthetic groups and carriers
567	yqgE	+	-	-	Transcription, RNA processing and degradation
568	yqgF	+	+	+	Hypothetical, unclassified, unknown
569	leuA	+	+	+	Amino acid biosynthesis and metabolism
570	leuB	+	+	+	Amino acid biosynthesis and metabolism
571	leuC	+	+	+	Amino acid biosynthesis and metabolism
572	leuD	+	+	+	Amino acid biosynthesis and metabolism
573	yggS	+	+	+	Hypothetical, unclassified, unknown
574	yggW	+	+	+	Biosynthesis of cofactors, prosthetic groups and carriers
575	yggH	+	+	+	Hypothetical, unclassified, unknown
576	mutY	+	+	+	DNA replication, recombination, modification and repair

577	yggX	+	+	+	Hypothetical, unclassified, unknown
578	murl	+	+	+	Cell structure
579	sbcB	+	+	+	Transcription, RNA processing and degradation
580	yeeX	-	+	+	Hypothetical, unclassified, unknown
581	tRNA-Asn	+	+	+	RNAs
582	tRNA-Met	+	+	+	RNAs
583	pyrE	+	+	+ -	Nucleotide biosynthesis and metabolism
584	dut	+	+	+	Nucleotide biosynthesis and metabolism
585	cysQ	-	+	+ -	Central intermediary metabolism
586	rplI	+	+	+	Translation, post-translational modification
587	rpsR	+	+	+	Translation, post-translational modification
588	rpsF	+	+	+	Translation, post-translational modification
589	vacB	-	+	+	Hypothetical, unclassified, unknown
590	purA	+	+	+	Nucleotide biosynthesis and metabolism
591	hflC	+	+	+	Translation, post-translational modification
592	hflK	+	+	+	Translation, post-translational modification
593	miaA	+	+	+ -	Translation, post-translational modification
594	mutL	+	+	+	DNA replication, recombination, modification and repair
595	mtlD	+	+	+	Energy metabolism
596	mtlA	+	+	+	Transport and binding proteins
597	pgi	+	+	+	Energy metabolism
598	orn	+	+	+	Other known genes
599	tRNA-Gly	+	+	+	RNAs
600	amiB	+	+	+	Cell structure
601	rpmE	+	+	+	Translation, post-translational modification
602	hslV	+	+	+	Translation, post-translational modification
603	hslU	+	+	+	Cell processes (incl. adaptation, protection)
604	trpG	+	+	+	Amino acid biosynthesis and metabolism
605	trpE	+	+	+	Amino acid biosynthesis and metabolism
606	ibpA	-	+	+	Cell processes (incl. adaptation, protection)
607	fpr	+	+	+	Energy metabolism
608	yjeA	+	+	+ -	Translation, post-translational modification
609	kdtB	-	+	+	Cell structure
610	yba3	+	+	+ -	Hypothetical, unclassified, unknown
611	yba4	-	+	+	Hypothetical, unclassified, unknown
612	uspA	+	-	-	Cell processes (incl. adaptation, protection)
613	yhiQ	-	+	+	Hypothetical, unclassified, unknown

614	pitA	+	+	+	Transport and binding proteins
615	ynfM	+	+	+	Transport and binding proteins
616	dapF	+	+	+	Amino acid biosynthesis and metabolism
617	cyaY	+	+	+	Hypothetical, unclassified, unknown
618	hemC	-	+	+ -	Biosynthesis of cofactors, prosthetic groups and carriers
619	hemD	-	+ -	+ -	Biosynthesis of cofactors, prosthetic groups and carriers
620	tRNA-Pro	+	+	+	RNAs
621	tRNA-His	+	+	+	RNAs
622	tRNA-Arg	+	+	+	RNAs
623	rho	+	+	+	Transcription, RNA processing and degradation
624	trxA	+	+	+	Biosynthesis of cofactors, prosthetic groups and carriers
625	rep	+	+	+	DNA replication, recombination, modification and repair
626	ilvC	+	+	+	Amino acid biosynthesis and metabolism
627	ilvD	+	+	+	Amino acid biosynthesis and metabolism
628	tRNA-Trp	+	+	+	RNAs
629	yfhO	+	+	+	Biosynthesis of cofactors, prosthetic groups and carriers
630	iscU	+	+	+	Other known genes
631	hscB	+	+	+	Cell processes (incl. adaptation, protection)
632	hscA	+	+	+	Cell processes (incl. adaptation, protection)
633	fdx	+	+	+	Energy metabolism
634	yfgK	+	+	+	Other known genes
635	yfgM	+	+	+	Hypothetical, unclassified, unknown
636	repA1	+	+	+	DNA replication, recombination, modification and repair
637	yqhA	+	+	+	Hypothetical, unclassified, unknown
638	repA2	+	+	+	DNA replication, recombination, modification and repair

# Supporting Figure 1.



Supporting Figure 2.

