

1 **Supplemental Figure 1.** PCR identification of *B. animalis* subsp. *lactis* ATCC 25527
2 using subspecies specific primers Bflact2/5.

3 **Supplemental Figure 1 Legend.** M- 100 bp ladder; Lane 1- DSM 10140 DNA +
4 Bflact2/5; Lane 2- ATCC 27673 DNA + Bflact2/5; Lane 3- ATCC 25527 DNA +
5 Bflact2/5; Lane 4- DSM 10140 DNA + Ban2/23Si; Lane 5- ATCC 27673 DNA +
6 Ban2/23Si; Lane 6- ATCC 25527 DNA + Ban2/23Si; Lane 7- Negative Control

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8 **Supplemental Figure 2.** *In silico* *KpnI* optical maps of three *B. animalis* strains

9 **Supplemental Figure 2 Legend.** *In silico* comparison of BI-04 (*B. animalis* subsp.
10 *lactis*), ATCC 27673 (*B. animalis* subsp. *lactis*), and ATCC 25527 (*B. animalis* subsp.
11 *animalis*).

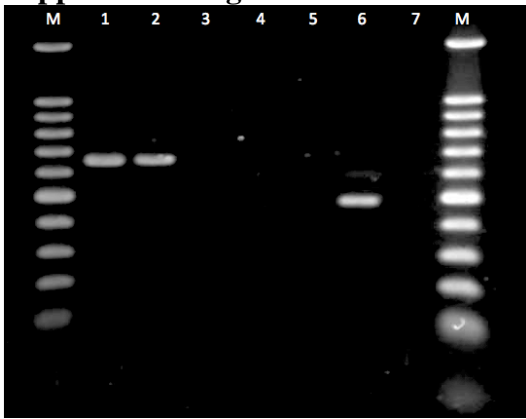
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13 **Supplemental Figure 3** Additional Genomic Islands present in *B. animalis* subsp. *lactis*
14 ATCC 27673

15 **Supplemental Figure 3 Legend.** Genomic islands identified in *B. animalis* subsp. *lactis*
16 ATCC 27673 compared to in *B. animalis* subsp. *lactis* BI-04, A. Genomic Island 1, B.
17 Genomic Island 2, and C. Genomic Island 4. Green arrow correspond to mobile genetic
18 elements, and white to hypothetical or not-specified genes. Aligned genes from BI-04
19 (top) and ATCC 27673 (bottom) represent gene homology flanking Genomic Island.

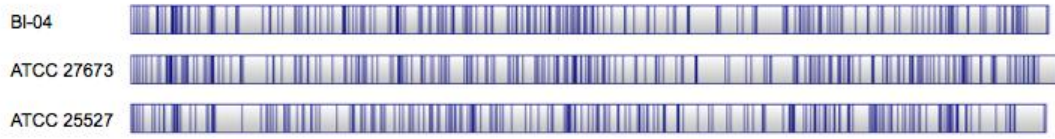
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21 **Supplemental Figure 1**



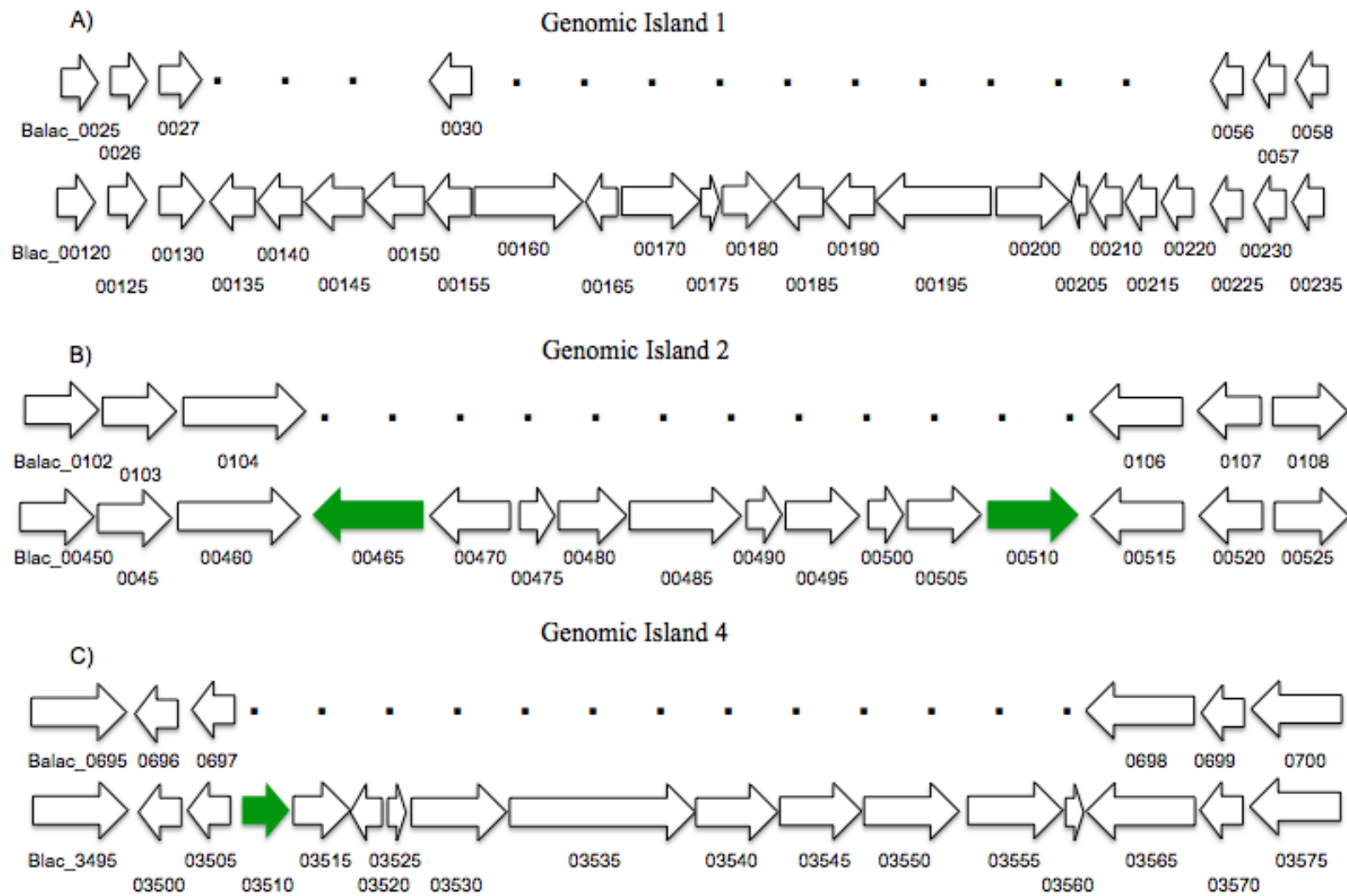
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24 **Supplemental Figure 2**



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27 **Supplemental Figure 3**



30 **Supplemental Table 1:** Unique genes in *B. animalis* subsp. *lactis* ATCC 27673

BLAC_Number	Amino Acid Length	Putative Gene Product	BLAC_Number	Amino Acid Length	Putative Gene Product
Island 1			Island 5		
BLAC_00135	134	Histone acetyltransferase HPA2 and related acetyltransferases	BLAC_05725	593	Site-specific recombinases, DNA invertase
BLAC_00140	134	hypothetical protein	BLAC_05730	148	hypothetical protein
BLAC_00145	236	hypothetical protein	BLAC_05735	768	hypothetical protein
BLAC_00150	262	hypothetical protein	BLAC_05740	77	hypothetical protein
BLAC_00160	681	Uncharacterized conserved protein	BLAC_05745	186	atpase chromosome partitioning protein ParA
BLAC_00165	101	hypothetical protein	BLAC_05750	118	cAMP-binding domain-catabolite gene activator
BLAC_00170	402	hypothetical protein	BLAC_05755	93	hypothetical protein
BLAC_00175	83	hypothetical protein	BLAC_05760	509	mobilization protein
BLAC_00180	188	hypothetical protein	BLAC_05765	173	mobilization protein
BLAC_00185	212	hypothetical protein	BLAC_05770	102	hypothetical protein
BLAC_00190	191	hypothetical protein	BLAC_05775	622	hypothetical protein
BLAC_00195	702	hypothetical protein	BLAC_05780	74	transcriptional regulator
BLAC_00200	437	hypothetical protein	BLAC_05990	32	hypothetical protein
BLAC_00205	62	hypothetical protein	BLAC_06025	533	Oligopeptide ABC transporter, periplasmic oligopeptide-binding protein OppA (TC 3.A.1.5.1)
BLAC_00210	101	hypothetical protein	BLAC_06485	97	hypothetical protein
BLAC_00215	94	hypothetical protein	BLAC_06490	87	hypothetical protein

BLAC_00220	157	hypothetical protein	BLAC_06495	279	Protein tyrosine phosphatase (EC 3.1.3.48)
BLAC_00335	63	hypothetical protein	BLAC_06500	268	hypothetical protein
Island 2			BLAC_06505	90	hypothetical protein
BLAC_00465	382	phage integrase	BLAC_06525	200	Transcriptional regulator, MarR family
BLAC_00470	251	hypothetical protein	BLAC_06535	130	Alcohol dehydrogenase (EC 1.1.1.1)
BLAC_00475	98	hypothetical protein	BLAC_06540	63	hypothetical protein
BLAC_00480	130	hypothetical protein	BLAC_06650	155	hypothetical protein
BLAC_00485	429	hypothetical protein	BLAC_06760	76	hypothetical protein
BLAC_00490	89	hypothetical protein	BLAC_06940	311	hypothetical protein
BLAC_00495	208	hypothetical protein	Island 6		
BLAC_00500	62	hypothetical protein	BLAC_07020	107	IS3 family transposase
BLAC_00505	220	hypothetical protein	BLAC_07025	311	transposase subunit B
BLAC_00510	289	phage major capsid protein, HK97	BLAC_07030	635	hypothetical protein
BLAC_00690	70	hypothetical protein	BLAC_07035	268	hypothetical protein
BLAC_00695	471	hypothetical protein	BLAC_07040	63	hypothetical protein
BLAC_00700	711	hypothetical protein	BLAC_07045	140	hypothetical protein
BLAC_00705	45	hypothetical protein	BLAC_07050	276	hypothetical protein
BLAC_00725	145	hypothetical protein	BLAC_07055	307	hypothetical protein
Island 3			BLAC_07060	439	transposase
BLAC_00780	463	sugar ABC transport permease- binding protein	BLAC_07065	428	transposase
BLAC_00785	461	sugar ABC transport permease- binding protein	BLAC_07070	281	glycosyl transferase family protein
BLAC_00790	356	sugar ABC transport	BLAC_07075	462	glycosyl transferase, group

BLAC_00795	313	permease binding protein dependent transport systems- inner membrane component	BLAC_07080	414	1 glycosyltransferase
BLAC_2100	30	hypothetical protein	BLAC_07085	433	O-antigen polymerase (wzy)
BLAC_2265	70	hypothetical protein	BLAC_07090	867	endo-1,4-beta-xylanase
BLAC_2400	111	hypothetical protein	BLAC_07095	107	IS3 family transposase
BLAC_2880	76	hypothetical protein	BLAC_07100	311	transposase subunit B
BLAC_2885	48	hypothetical protein	BLAC_07105	150	hypothetical protein
BLAC_2900	141	Predicted acetyltransferase	BLAC_07110	329	RelA/SpoT domain- containing protein
BLAC_2910	491	Type II restriction endonuclease, MutH family	BLAC_07120	74	hypothetical protein
BLAC_2915	435	DNA-cytosine methyltransferase (EC 2.1.1.37)	BLAC_07125	120	CRISPR-associated protein, Cas2
BLAC_2920	257	possible restriction endonuclease	BLAC_07130	110	CRISPR-associated protein Cas1
Island 4			BLAC_07135	235	CRISPR-associated protein, Cas6e
BLAC_03510	237	phage integrase	BLAC_07140	244	CRISPR-associated protein, Cas5
BLAC_03515	300	hypothetical protein	BLAC_07145	338	CRISPR-associated protein, Cas7
BLAC_03520	149	hypothetical protein	BLAC_07150	209	CRISPR-associated protein, Cse2
BLAC_03525	71	hypothetical protein	BLAC_07155	581	CRISPR-associated protein Cse1

BLAC_03530	695	type II restriction endonuclease	BLAC_07160	61	hypothetical protein
BLAC_03535	1128	hypothetical protein	BLAC_07165	1035	CRISPR-associated helicase Cas3
BLAC_03540	438	hypothetical protein	BLAC_07450	519	possible cell surface protein
BLAC_03545	404	hypothetical protein	BLAC_07455	853	hypothetical protein
BLAC_03550	648	helicase domain-containing protein	BLAC_07590	141	hypothetical protein
BLAC_03555	568	hypothetical protein	BLAC_07995	462	Pyridine nucleotide-disulfide oxidoreductase
BLAC_03560	86	hypothetical protein			
BLAC_03730	189	hypothetical protein			
BLAC_03745	34	RNA binding methyltransferase FtsJ like			
BLAC_04005	233	hypothetical protein			
BLAC_04010	274	xylose isomerase			
BLAC_04125	109	Transposase			
BLAC_04130	288	hypothetical protein			
BLAC_04135	265	Putative helicase			
BLAC_04145	69	hypothetical protein			
BLAC_05220	79	hypothetical protein			
BLAC_05665	419	ABC-type multidrug transport system, permease component			

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33 **Supplemental Table 2:** Unique genes in *B. animalis* subsp. *lactis* Bl-04

BALAC_Number	Amino Acid Length	Putative Gene Product	BALAC_Number	Amino Acid Length	Putative Gene Product
Balac_0011	441	multidrug transport protein	Island 3		
Island 1			Balac_1179	367	Integrase
Balac_0028	92	hypothetical protein	Balac_1180	206	hypothetical protein
Balac_0029	90	hypothetical protein	Balac_1181	69	hypothetical protein
Balac_0030	117	hypothetical protein	Balac_1182	71	hypothetical protein
Balac_0031	361	hypothetical protein	Balac_1183	79	hypothetical protein
Balac_0032	70	hypothetical protein	Balac_1184	64	hypothetical protein
Balac_0033	454	DNA-cytosine methyltransferase (EC 2.1.1.37)	Balac_1185	64	hypothetical protein
Balac_0034	282	hypothetical protein	Balac_1186	401	hypothetical protein
Balac_0035	808	hypothetical protein	Balac_1187	91	hypothetical protein
Balac_0036	194	hypothetical protein	Balac_1188	63	hypothetical protein
Balac_0037	712	hypothetical protein	Balac_1189	79	hypothetical protein
Balac_0038	123	hypothetical protein	Balac_1190	106	hypothetical protein
Balac_0039	38	hypothetical protein	Balac_1191	588	Putative phage prohead protease
Balac_0040	68	hypothetical protein	Balac_1192	74	hypothetical protein
Balac_0041	77	hypothetical protein	Balac_1204	599	Cell division protein FtsI [Peptidoglycan synthetase] (EC 2.4.1.129)
Balac_0042	50	hypothetical protein	Balac_1258	494	phosphotransferase
Balac_0043	87	hypothetical protein	Balac_1285	73	hypothetical protein

Balac_0044	128	transcriptional modulator of MazE/toxin, MazF	Balac_1292	56	hypothetical protein
Balac_0045	297	Transcriptional regulator	Balac_1293	257	protein tyrosine/serine phosphatase
Balac_0046	88	Aldo/keto reductase of diketogulonate reductase family(EC:1.1.1.274)	Balac_1294	97	hypothetical protein
Balac_0047	217	oxidoreductase, aldo/keto reductase family	Balac_1298	184	possible MarR-type transcriptional regulator
Balac_0048	750	Beta-glucosidase (EC 3.2.1.21)	Island 4		
Balac_0049	146	hypothetical protein	Balac_1301	63	hypothetical protein
Balac_0052	509	lysosomal glucosyl ceramidase-like protein	Balac_1302	87	hypothetical protein
Balac_0053	702	Beta-galactosidase (EC 3.2.1.23)	Balac_1303	349	CRISPR-associated Csb3
Balac_0054	385	Glycoside-Pentoside-Hexuronide (GPH):Cation symporter family protein	Balac_1304	1018	CRISPR-associated Cas3
Balac_0055	214	Transcriptional regulator, TetR family	Balac_1305	546	CRISPR-associated Csb2
Balac_0122	250	Transcriptional regulator, MerR family	Balac_1306	398	CRISPR-associated Csb1
Balac_0177	733	hypothetical protein	Balac_1307	98	CRISPR-associated Cas2
Balac_0261/ <i>fbp</i>	2697	hypothetical protein	Balac_1308	497	CRISPR-associated RecB family exonuclease Cas4b / CRISPR-associated protein Cas1

Balac_0262	42	ATP-dependent DNA helicase RecG (EC 3.6.1.-)	Balac_1329	299	Dihydrodipicolinate synthase (EC 4.2.1.52)
Balac_0299	314	putative membrane protein	Balac_1333	1518	ATP-dependent DNA helicase
Balac_0435	66	O-acetylhomoserine sulfhydrylase (EC 2.5.1.49)	Balac_1350	31	hypothetical protein
Balac_0447	709	putative 67 kDa myosin-crossreactive streptococcal antigen	Balac_1371	537	UDP-phosphate sugar phosphotransferase (EC 2.7.8.6)
Balac_0460	337	UDP-glucose 4-epimerase (EC 5.1.3.2)	Balac_1387	311	polysaccharide biosynthesis protein
Balac_0472	1166	hypothetical protein	Island 5		
Balac_0476/ <i>lacZ</i>	1068	Beta-galactosidase (EC 3.2.1.23)	Balac_1389	445	flippase wzx
Balac_0481	58	hypothetical protein	Balac_1390	335	hypothetical protein
Balac_0502	303	hypothetical protein	Balac_1391	288	Group 2 family glycosyl transferase
Balac_0518	642	Sialic acid-specific 9-O-acetylerase	Balac_1399	379	dTDP-glucose 4,6-dehydratase (EC 4.2.1.46)
Balac_0537	268	Methionine aminopeptidase (EC 3.4.11.18)	Balac_1400	155	polysaccharide biosynthesis protein CpsF
Balac_0547	80	hypothetical protein	Balac_1401	167	Beta-1,4-galactosyltransferase CpsIVG
Balac_0565	653	ATP-dependent DNA helicase RecQ	Balac_1402	318	Glycosyl transferase

Balac_0572	128	hypothetical protein	Balac_1403	279	Glycosyl transferase
Balac_0574	1042	DNA/RNA helicase of DEAD/DEAH box family	Balac_1404	378	hypothetical protein
Balac_0575	119	hypothetical protein	Balac_1405	1194	multidrug ABC transporter ATPase and permease
Balac_0576	656	hypothetical protein	Balac_1412	112	hypothetical protein
Balac_0603	59	hypothetical protein	Island 6		
Balac_0616	45	hypothetical protein	Balac_1440	373	hypothetical protein
Balac_0713	446	ABC transporter, permease protein	Balac_1441	62	hypothetical protein
Balac_0744/ <i>glmU</i>	461	N-acetylglucosamine-1-phosphate uridylyltransferase (EC 2.7.7.23) / Glucosamine-1-phosphate N-acetyltransferase (EC 2.3.1.157)	Balac_1442	132	hypothetical protein
Balac_0767	505	hypothetical protein	Balac_1443	254	putative plasmid transfer protein
Balac_0779	190	hypothetical protein	Balac_1444	306	replication initiation protein
Balac_0813	97	hypothetical protein	Balac_1445	76	hypothetical protein
Balac_0821	208	Holliday junction DNA helicase RuvA	Balac_1446	373	HNH endonuclease
Island 2			Balac_1447	364	modification methylase EcoRI (Adenine-specific methyltransferase EcoRI) (M.EcoRI)(EC:2.1.1.72)

Balac_0924	327	Pullulanase (EC 3.2.1.41)	Balac_1448	407	phage integrase
Balac_0925	57	hypothetical protein	Balac_1451	44	hypothetical protein
Balac_0927	230	hypothetical protein	Balac_1463	32	hypothetical protein
Balac_0928	401	hypothetical protein	Balac_1484/ <i>capB</i>	561	possible cell surface protein
Balac_0929	390	hypothetical protein	Balac_1485	672	hypothetical protein
Balac_0930	142	hypothetical protein	Balac_1510	36	hypothetical protein
Balac_0931	151	hypothetical protein	Balac_1517	536	1,4-beta-N-acetylmuramidase
Balac_0932	322	hypothetical protein	Balac_1519	186	N-acetylmuramoyl-L-alanine amidase
Balac_0956	293	ABC transporter, ATP-binding protein	Balac_1520	176	Tpx-1 family protein
Balac_1005	550	DNA segregation ATPase galactoside O-acetyltransferase(Balac_1521	234	hypothetical protein
Balac_1132	214	EC:2.3.1.79,EC:2.3.1.18)	Balac_1522	443	hypothetical protein
			Balac_1541	35	hypothetical protein
			Balac_1578	197	hypothetical protein
			Balac_1599	438	Multiple sugar ABC transporter, substrate-binding protein
			Balac_1607	997	cation-transporting ATPase PacL

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