

Supplemental Table 1
16S rRNA sequences used for phylogenetic analysis

Strain Name	Accession #	Gene Length (bp)
<i>Borrelia afzelii</i> DSM 10508 ^T	FR733687	1524
<i>Borrelia afzelii</i> PKo	CP000395	1537
<i>Borrelia americana</i> SCW-41 ^T	EU081285	1362
<i>Borrelia anserine</i> ES-1	U42284	1523
<i>Borrelia burgdorferi</i> B31 ^T	AE000783	1538
<i>Borrelia carolinensis</i> SCW-22 ^T	EU085407	1362
<i>Borrelia coriaceae</i> Co53 ^T	U42286	1519
<i>Borrelia crocidurae</i> Achema	CP003426	1525
<i>Borrelia duttonii</i> Ly	CP000976	1539
<i>Borrelia garinii</i> 20047 ^T	D67018	1367
<i>Borrelia garinii</i> PBi	CP000013	1538
<i>Borrelia hermsii</i> DAH	AY597657	1273
<i>Borrelia hispanica</i> UESV/246	U42294	1523
<i>Borrelia japonica</i> HO14 ^T	L40597	1493
<i>Borrelia latyschewii</i> S	JF681793	1423
<i>Borrelia lusitaniae</i> PotiB2 ^T	X98228	1523
<i>Borrelia miyamotoi</i> HT31 ^T	D45192	1368
<i>Borrelia parkeri</i> 6232	AF307100	1523
<i>Borrelia persica</i> H1039	HM161645	1526
<i>Borrelia recurrentis</i> A1	CP000993	1539
<i>Borrelia sinica</i> CMN3 ^T	AB022101	1502
<i>Borrelia</i> sp. SV1	ABJZ02000005	1538
<i>Borrelia spielmanii</i> A14S	ABKB02000009	1537
<i>Borrelia spielmanii</i> DSM 16813 ^T	HE582779	1523
<i>Borrelia tanukii</i> Hk501 ^T	D67023	1367
<i>Borrelia turcica</i> IST7 ^T	AB473539	1539
<i>Borrelia turdi</i> Ya501 ^T	D67022	1366
<i>Borrelia turicatae</i> 91E135	CP000049	1230
<i>Borrelia valaisiana</i> VS116 ^T	ABCY02000001	1514
<i>Brachyspira aalborgi</i> NCTC 11492 ^T	Z22781	1450
<i>Brachyspira alvinipulli</i> C1 ^T	EF455559	1433
<i>Brachyspira hyodysenteriae</i> ATCC 27164 ^T	U14930	1433
<i>Brachyspira innocens</i> B256 ^T	U14920	1433
<i>Brachyspira intermedia</i> PWS/A ^T	CP002874	1495
<i>Brachyspira murdochii</i> DSM 12563 ^T	CP001959	1503
<i>Brachyspira pilosicoli</i> P43/6/78 ^T	AY155458	1462
<i>Brevinema andersonii</i> ATCC 43811 ^T	GU993264	1490
<i>Cristispira</i> sp. CP1	U42638	1491

<i>Exilispira thermophila</i> RASEN ^T	AB364473	1456
<i>Leptonema illini</i> DSM 21528 ^T	AHKT01000009	1486
<i>Leptospira alexanderi</i> L60 ^T	AHMT01000154	1490
<i>Leptospira alstoni</i> 79601 ^T	AY631881	1431
<i>Leptospira biflexa</i> Patoc 1 (Ames) ^T	CP000777	1500
<i>Leptospira borgpetersenii</i> L550	CP000348	1511
<i>Leptospira borgpetersenii</i> Veldrat Bataviae 46 ^T	AY887899	1431
<i>Leptospira broomii</i> 5399 ^T	AHMO01000010	1489
<i>Leptospira fainei</i> BUT 6 ^T	AKWZ01000004	1489
<i>Leptospira inadai</i> 10 ^T	AHMM01000015	1489
<i>Leptospira interrogans</i> RGA ^T	Z12817	1396
<i>Leptospira kirschneri</i> 3522 C ^T	AHMN01000021	1489
<i>Leptospira kmetyi</i> Bejo-Iso9 ^T	AHMP01000041	1490
<i>Leptospira licerasiae</i> VAR 010 ^T	AHOO02000011	1509
<i>Leptospira meyeri</i> ATCC 43287 ^T	AY631878	1422
<i>Leptospira noguchii</i> CZ214 ^T	AKWY01000041	1490
<i>Leptospira santarosai</i> LT 821 ^T	ADOR01000100	1346
<i>Leptospira terpstae</i> ATCC 700639 ^T	AY631888	1422
<i>Leptospira vanthielii</i> ATCC 700522 ^T	AY631897	1422
<i>Leptospira weilii</i> 2006001853	AFLV02000062	1509
<i>Leptospira weilii</i> Celledoni ^T	AY631877	1431
<i>Leptospira wolbachii</i> CDC ^T	AY631879	1422
<i>Leptospira wolffii</i> Khorat-H2 ^T	AKWX01000041	1489
<i>Leptospira yanagawae</i> ATCC 700523 ^T	AY631882	1422
<i>Sphaerochaeta coccoides</i> DSM 17374 ^T	CP002659	1523
<i>Sphaerochaeta globosa</i> Buddy ^T	CP002541	1535
<i>Sphaerochaeta pleomorpha</i> Grapes ^T	AF357917	1530
<i>Spirochaeta africana</i> DSM 8902 ^T	X93928	1474
<i>Spirochaeta alkalica</i> DSM 8900 ^T	X93927	1475
<i>Spirochaeta Americana</i> ASpG1 ^T	AF373921	1467
<i>Spirochaeta asiatica</i> Z-7591 ^T	X93926	1469
<i>Spirochaeta aurantia</i> J1 ^T	FR749896	1528
<i>Spirochaeta bajacaliforniensis</i> DSM 16054 ^T	AJ698859	1521
<i>Spirochaeta cellobiosiphila</i> SIP1 ^T	EU448140	1435
<i>Spirochaeta dissipatitropha</i> ASpC2 ^T	AY995150	1459
<i>Spirochaeta halophila</i> RS1 ^T	M88722	1565
<i>Spirochaeta isovalerica</i> DSM 2461 ^T	FR749931	1534
<i>Spirochaeta litoralis</i> DSM 2029 ^T	FR733665	1533
<i>Spirochaeta perfilievii</i> P ^T	AY337318	1428
<i>Spirochaeta smaragdinae</i> DSM 11293 ^T	CP002116	1530
<i>Spirochaeta thermophila</i> DSM 6578 ^T	CP002903	1534

<i>Treponema amylovorum</i> HA2P ^T	Y09959	1443
<i>Treponema azotonutricium</i> ZAS-9 ^T	CP001841	1463
<i>Treponema berlinense</i> 7CPL208 ^T	AY230217	1440
<i>Treponema brennaboreense</i> DSM 12168 ^T	CP002696	1531
<i>Treponema bryantii</i> RUS-1 ^T	FR749895	1535
<i>Treponema caldaria</i> DSM 7334 ^T	CP002868	1531
<i>Treponema denticola</i> ATCC 35405 ^T	AE017226	1516
<i>Treponema isoptericolens</i> SPIT5 ^T	AM182455	1464
<i>Treponema lecithinolyticum</i> PFB4G ^T	X87139	1479
<i>Treponema maltophilum</i> BR ^T	X87140	1494
<i>Treponema medium</i> G7201 ^T	D85437	1381
<i>Treponema pallidum</i> Nichols	AE000520	1495
<i>Treponema paraluisuniculi</i> Cuniculi A	CP002103	1537
<i>Treponema parvum</i> OMZ 833 ^T	AF302937	1485
<i>Treponema pectinovorum</i> ATCC 33768 ^T	GU562449	1438
<i>Treponema pedis</i> T3552B ^T	EF061268	1417
<i>Treponema phagedenis</i> F0421	AEFH01000172	1537
<i>Treponema porcinum</i> 14V28 ^T	AY518274	1426
<i>Treponema primitia</i> ZAS-2 ^T	CP001843	1463
<i>Treponema putidum</i> JZC3 ^T	AJ543428	1408
<i>Treponema saccharophilum</i> DSM 2985 ^T	AGRW01000033	1531
<i>Treponema socranskii</i> ATCC 35536 ^T	AF033306	1543
<i>Treponema</i> sp. JC4	JQ783348	1479
<i>Treponema stenostrepta</i> DSM 2028 ^T	FR733664	1528
<i>Treponema succinifaciens</i> DSM 2489 ^T	CP002631	1531
<i>Treponema vincentii</i> ATCC 35580	ACYH01000036	1518
<i>Treponema zuelzeriae</i> DSM 1903 ^T	FR749929	1532
<i>Turneriella parva</i> DSM 21527 ^T	CP002959	1506
<i>Nostoc flagelliforme</i> Sunitezuoqi	GU810186	1479
<i>Thermosynechococcus elongatus</i> BP-1	BA000039	1491

^T Type strain

			277	306
			RIIADHIKASCFILAD	NF SVLPSNVGGQYV
			-----	-----
			-----	-----
			-----	A-----
			-----	A----I----
			---S--V--A-----	SS GIF-----
			---S-----A-----	SS G-F---L-----
			---S--V--A-----	SS V-F---L-----
			---S--V--A-----	SS V-F---L-----
			---S--V--A-----	SS V-F---L-----
			---S--V--A-----	SS V-F---L-----
			---S--V--A-----	SS V-S---L-----
			---S-----AT---G-	ER G-T-----
			---S-----TAV-LIG-	EA G-V---L-----
			-----VRTAV---G-	ER G-K---L-----I
			-----RT-V---G-	QK G-A-----I
			--L---RT-V---G-	QR G-A-----I
			-----VRT-V---G-	PK GMA-----I
			---C--GR-AT---G-	PK A-S-----A---
			-----VRTA---G-	PK TT---I-A---
			---C--VR-AT---G-	PK G-----A---
			---C--VR-AT---S-	PK --A-----A---
			---S--VR--T-V-G-	PK A-T-----A---
			---S--LR--S---G-	PK A-S-----A---
			-----SR--V---G-	QK G-S-----A---
			--VC---R-AT---G-	PV P-R-----A---
			--VC---R-AT---G-	PV P-R-----A---
			---C--R-ATV--G-	PK A-V-----A---
			-----SRSAV---G-	QK G-S-----A---
			-----TRS-V---G-	QR G-T-DR--A---
			-VLT--ARS-T-A-S-	GI--D-T-R---
			-VLT---RTL-AMS-	GIF---ESR---
			-VVT---RSVL-SIG-	GIY-DRT-R---
			-VVT---RSVL-SIG-	GIY-DRT-R---
			-VVT---RSVL-SIG-	GIY-DRT-R---
			-VVT---RSVL-SIG-	GIY-DRT-R---
			-VVT---RSVL-SIG-	GIY-DRT-R---
			-V-T---RSAL-AVS-	GIY-DRT-R---
			-VVT---RSVL-SIG-	GIY-DRT-R---
			-V-T---RSVL-TVS-	GIY-DRT-R---
			-VVT---RSVL-SIG-	GIY-DRT-R---
			-V-T---SRSVF-S-G-	GIY-DRT-R---
			-V-T---SRSVF-S-G-	GIY-DRT-R---
			NL---LR-LV-V--E	GCV---E-R---
			NL---LR-LV-VISE	GCT---E-R---
			NL---LR-LV-VISE	GCT---E-R---
			NL---LR-LV-VISE	GCT---E-R---
			NLL---LR-LV-V--E	GCK---E-R---
			-V---LR---LI--	G---A-E-R---
			-V---LR--S-LI--	G-----E-R---
			K-V---FR-M--LIG-	G-I-----R---
			-V----RSCA-LI--	G-M---E-R---
			-V----RSCS-LI--	G-M---E-R---
			KV-S--RSV--M---	GI---E-P---
			KV----R-CS-LI--	G-----E-R---
			KV----R--V-LIG-	G-----E-R---I
			-V---SR-TA-LI--	G-----E-R---
			---T---R-MS-MI--	GI---E-R---
			-----AR--T-LIS-	G---A-E-R---
			-V---AR-TT-LIS-	G-----E-R---
<i>Spirochaetaceae</i> (30/30)	Borrelia crocidurae	386859446		
	Borrelia recurrentis	203287678		
	Borrelia duttonii	203284140		
	Borrelia turicatae	119953017		
	Borrelia hermsii	187918093		
	Borrelia spielmanii	224534195		
	Borrelia afzelii	216264058		
	Borrelia bissettii	343127539		
	Borrelia burgdorferi	387827136		
	Borrelia sp. SV1	225552345		
	Borrelia valaisiana	224532246		
	Borrelia garinii	386853627		
	Spirochaeta thermophila	386347103		
	Spirochaeta africana	383791404		
	Spirochaeta smaragdinae	302339632		
	Sphaerochaeta coccoides	330837065		
	Sphaerochaeta globosa	325971945		
	Sphaerochaeta pleomorpha	374317032		
	Treponema caldaria	339499545		
	Treponema denticola	325474209		
	Treponema brennaborensis	332297434		
	Treponema phagedenis	320536417		
	Treponema primitia	374814755		
	Treponema azotonutricium	333995407		
	Treponema saccharophilum	381179175		
	Treponema paraluis-cuniculi	338706964		
	Treponema pallidum	15640001		
	Treponema vincentii	257456350		
	Treponema succinifaciens	328947373		
	Treponema sp. JC4	384108417		
	Leptonema illini	374585996		
	Turneriella parva	392404112		
	Leptospira interrogans	458567507		
	Leptospira santarosai	421084391		
	Leptospira noguchii	464177692		
	Leptospira borgpetersenii	116331894		
	Leptospira kirschneri	464212977		
	Leptospira inadai	398342628		
	Leptospira weilii	417779829		
	Leptospira licherasiae	359686873		
	Leptospira alstoni	463328226		
	Leptospira biflexa	183220780		
	Leptospira meyeri	408793986		
	Brachyspira murdochii	296126160		
	Brachyspira intermedia	384207866		
	Brachyspira hampsonii	429123255		
	Brachyspira hyodysenteriae	225620397		
	Brachyspira pilosicoli	431808332		
	Rhodospirillum photometricum	384260715		
	Brucella melitensis	17987072		
	Rhizopus oryzae	384490438		
	Shewanella baltica	353535042		
	Vibrio splendidus	84390150		
	Jonquetella anthropi	260654150		
	Neisseria weaveri	343969894		
	Leptotrichia goodfellowii	262038170		
	Pelobacter carbinolicus	116878605		
	Clostridium bartlettii	164688540		
	Granulicella mallensis	374312679		
	Deferribacter desulfuricans	291279844		
Other <i>Spirochaetes</i> (0/18)				
Other Bacteria (0/>250)				

Supplemental Figure 01: A partial sequence alignment of conserved region of Alanine-tRNA synthetase showing a 2 amino acid insertion specific for the family *Spirochaetaceae*.

			256		297
<i>Spirochaetaceae</i> (30/30)	<i>Borrelia burgdorferi</i>	387827445	PLALLYKERDYSRVSN	DVADSNIS	VTKLLGDVEGKNVFMSSD
	<i>Borrelia garinii</i>	51598795	-----	-----	-----
	<i>Borrelia</i> sp. SV1	496158147	-----	-----	-----
	<i>Borrelia valaisiana</i>	492960169	-----	-S-----	-----
	<i>Borrelia bissettii</i>	343127845	-----	-V-----	-----
	<i>Borrelia spielmanii</i>	493478988	-----	-N-----	-----
	<i>Borrelia afzelii</i>	384207032	-----	-----S	-IT-----
	<i>Borrelia hermsii</i>	187918407	-----	-K-TH	N-N-----
	<i>Borrelia recurrentis</i>	203287984	-----	-K-TH	N-T-----
	<i>Borrelia duttonii</i>	203284450	-----	-K-TH	N-T-----
	<i>Borrelia crocidurae</i>	386859775	-----	-K-TH	N-T-----
	<i>Borrelia turicatae</i>	119953329	-----	-K-TH	N-N-----
	<i>Spirochaeta thermophila</i>	386346567	---VI-----	-K--T	-ASN----
	<i>Spirochaeta smaragdinae</i>	302337090	-----	-----R	-ASS---T
	<i>Sphaerochaeta pleomorpha</i>	374317254	---M-----	-I--K	-AKH---K
	<i>Sphaerochaeta globosa</i>	325971852	---M-----	-I--K	-AKH---K
	<i>Sphaerochaeta coccoides</i>	330837008	---M-----	-M--R	-AKH---K
	<i>Treponema caldaria</i>	339498915	-----	-----TQ	NAL-N--A
	<i>Treponema primitia</i>	333996912	-----	-----TK	-AM-N---
	<i>Treponema azotonutricium</i>	333994388	-----	-----K--R	NALEN--A
	<i>Treponema denticola</i>	42528223	---MI-----	-V-TQ	NAKQ---I
	<i>Treponema succinifaciens</i>	328948985	---MI-----	-I-TQ	-AKNT--K
	<i>Treponema saccharophilum</i>	488791143	---MI-----	-V-TQ	-AKNT--K
	<i>Treponema brennaborensense</i>	332297752	---MI-----	-V-TQ	NAK-T--K
	<i>Treponema</i> sp. JC4	496394911	---MI-----	-I-TQ	NANET--K
	<i>Treponema pallidum</i>	15639286	---MI--V---	-V-AQ	NAKQ---V
	<i>Treponema vincentii</i>	493197584	---MI-----	-V-TQ	NAKQT--V
	<i>Treponema phagedenis</i>	488785632	---MI-----	-VITQ	NAKQ---I
Other <i>Spirochaetes</i> (0/18)	<i>Brachyspira hyodysenteriae</i>	225216214	DI-IID-R--	-RANECE	-MNII---N-
	<i>Brachyspira murdochii</i>	296125819	DI-IID-R--	-RANECE	-MNII---N-
	<i>Brachyspira intermedia</i>	384208208	DI-IID-R--	-RANECE	-MNII---N-
	<i>Leptonema illini</i>	488860053	G--IID-R-	-PKAN-AE	IMHVI---K-
	<i>Turneriella parva</i>	392404244	T--IID-R-	-PKAN--E	-MHVI-EI---
	<i>Leptospira wolffii</i>	514354150	T--IID-R-	-PKAN--E	-MNVI--I---
Other <i>Bacteria</i> (0/>250)	<i>Leptospira inadai</i>	498101250	T--IID-R-	-PKAN--E	-MHVI-EI---
	<i>Leptospira interrogans</i>	446935455	S--IID-R-	-PKAN--E	-MNVI-EI---
	<i>Alkaliphilus oremlandii</i>	158321665	-I-IID-R-	-PKAN-AE	-MNII--I---
	<i>Thermoanaerobacter wiegelsii</i>	345018833	---IID-R-	-PKAN-AE	IMNII---R-
	<i>Clostridium leptum</i>	490600469	---IID-R-	-QRAN-CE	-MNII---K-
	<i>Peptoniphilus harei</i>	492764066	-I-IIE-R-	-PKAN--E	-MNII-----
	<i>Dictyoglomus thermophilum</i>	206900384	---II--R-	-PAPE-AE	-EEII-----
	<i>Chthonomonas calidirosea</i>	512552276	-I-IIA-R-	-PAPNKVE	IMEII-----
	<i>Lactobacillus oris</i>	489810073	-I-IID-R-	-PKAN-AQ	-MNII---K-
	<i>Bacillus bataviensis</i>	494143805	---IID-R-	-PRAN-AE	IMNII---Q-
	<i>Enterococcus moraviensis</i>	498461095	-I-IID-R-	-PKAN-AE	-MNII-H---
	<i>Facklamia ignava</i>	493751806	-I-IVD-R-	-PKAN-AE	-MHIV---K-
	<i>Thermotoga thermarum</i>	338730625	---I-D-R-	-PADNMAE	-VNVI---K-
	<i>Thermosipho africanus</i>	490205698	---I-D-R-	-PNDN-AE	ILNII-E---
	<i>Helicobacter mustelae</i>	291276443	D-VIVD-K-	-EKAN--E	-MNII-E-Q-
	<i>Wolinella succinogenes</i>	34557951	D-VIVD-K-	-EKAN--E	-MNII---Q-
	<i>Caminibacter mediatlanticus</i>	494738649	DMVIVD-R-	-EKAN--E	-MNII---K-
	<i>Stigmatella aurantiaca</i>	310823075	---IID-R-	-PRPNS-E	-MN-I---K-

Supplemental Figure 02: A partial sequence alignment of conserved region of Phosphoribosylpyrophosphate synthetase showing a 8 amino acid insertion specific for the family *Spirochaetaceae*. Sequences from some members of the class Clostridia which have additional 4 amino acid and 1 amino acid inserts in this region are not shown.

		340	373
Spirochaetaceae (30/30)	Treponema pallidum	15639201	RENGGTIPGIRADKTEE YLQGILNRLVLPGLYL
	Treponema paraluisicuniculi	338706183	-----S-----T-----
	Treponema vincentii	257456912	---R---I-----
	Treponema brennaborense	332298893	---KV-----
	Treponema phagedenis	320538146	---R-----
	Treponema saccharophilum	381181181	-M-RV---I-----
	Treponema denticola	42526299	---K---I-----
	Treponema succinifaciens	328949257	---KV---I-----
	Treponema sp. JC4	384108321	---TK-----F-
	Treponema primitia	374814283	---TK---I-----
	Treponema azotonutricium	333996145	---TK---I-----
	Treponema caldaria	339499042	---MA---II-----
	Spirochaeta smaragdinae	302337497	---ST---I---AIF-
	Spirochaeta africana	383789808	---FTK---II---A-F-
	Spirochaeta thermophila	386346286	---FTN---II---A-F-
	Sphaerochaeta pleomorpha	374316512	---SKV---V---IF-
	Sphaerochaeta globosa	325972641	---TRV---I---F-
	Sphaerochaeta coccoides	330837635	---TR---I---AIF-
	Borrelia hermsii	187918364	---DK-M---TLFS--IF-
	Borrelia recurrentis	203287942	---DK-M---TLFS--IF-
	Borrelia duttonii	203284408	---DK-M---TLFS--IF-
	Borrelia turicatae	119953287	---DR-M---TLFS--IF-
	Borrelia valaisiana	224531848	---DE-M-KTLFS--IF-
	Borrelia garinii	219684447	---DE-M-KTLFS--IF-
	Borrelia burgdorferi	195941635	---DE-M-KTLFS--IF-
	Borrelia spielmanii	224534664	---DE-M-KTLFS--IF-
	Borrelia afzelii	111115327	---DE-M-KTLFS-AIF-
	Borrelia sp. SV1	225551928	---DE-M-KTLFS--VF-
	Borrelia bissettii	343127805	---DE-M-KTLFS--IF-
Other Spirochaetes (0/18)	Leptospira interrogans	328488365	KKY--F----P-SHTK E IEKV---IT---AMF-
	Leptospira borgpetersenii	317160322	KKY--F----PGSHTK E IEKV---IT---AMF-
	Leptospira inadai	188038371	KKY--F----PGSHTK E IEKV---IT---AMF-
	Leptospira noguchii	188038335	KKY--F----PGSHTK E IEKV---IT---AMF-
	Leptospira weilii	188038453	KKY--F----PGSHTK E IEKV---IT---AMF-
	Leptospira santarosai	188038493	KKY--F----PGSHTK E IEKV---IT---AMF-
	Leptospira meyeri	188038455	KKY--F----PGSHTK E IEKV---IT---AMF-
	Leptospira alstoni	463330366	KKY--F----PGSHTK E IEKV---IT---AMF-
	Leptospira kirschneri	328488641	KKY--F----PGSHTK E IEKV---IT---AMF-
	Leptospira broomii	398348408	-KYN-F----PGSHTK E IEKV---IT---AIF-
	Leptospira licherasiae	359687069	-KYN-F----PGSHTK E IEKV---IT---AVF-
	Leptospira biflexa	183221328	KKY--F---V-PGSQ-K E MIEK---IT--GALFL
	Leptospira meyeri	408790999	KKY--F---V-PGSQ-K D MIEK---IT--GALFL
	Leptonema illini	374587569	KKY--F----PGANTK E -VEKT---II---AVF-
	Turneriella parva	392404103	KK--Y--V-PGAHT- E T-ER---IT-S-AIF-
	Brachyspira pilosicoli	434383102	KKQ--F---Y-PGTQTA E --KTV-S-ITIG---F-
	Brachyspira hampsonii	445062100	KKS--F---Y-PGTQTA E --KTV-S-ITIG--IF-
	Brachyspira murdochii	296126885	KKS--F---Y-PGTQTA E --KTV-S-ITIG--IF-
	Brachyspira hyodysenteriae	225621047	KKS--F---Y-PGTQTA E --KTV-S-ITIG--IF-
	Brachyspira intermedia	384209992	KKS--F---Y-PGTQTA E --KTV-S-ITIG--IF-
Other Bacteria (0/>250)	Chloroflexus aggregans	219848867	QR---F-----PG-KT- E --MKV---IT-A-A-F-
	Streptomyces auratus	398784950	KKY--F-----GRPTA E --SYV---ITW-----
	Persephonella marina	225850755	-KS-AF-----GSQTA E --NHV-S-I-F---IF-
	Peptoniphilus lacrimalis	282882522	QQ---F-----PG-PTS E ---RS-----AIA-
	Odoribacter laneus	374386792	KK---F---VKPG-KTM E F-DT-MS-IT---IF-
	Bacillus methanolicus	387588912	KKQ--Y-----PG-NTQ E --TRV-Y-T-----F-
	Thermotoga lettingae	157363462	-KY--F-----PG-ST- E -I-R-I---VTFM-A-F-
	Synechococcus elongatus	56751892	KKM-SS---V-PGRATS Q -V--V---TIL-AVF-
	Chlorobaculum parvum	193211871	-RQ--F---V-PG-ST- E FIDN--T-IT---AIA-
	Campylobacter jejuni	57790395	KKQ--F-----PGEPTS N --NEVAS--T-S---I--
	Dictyoglomus thermophilum	206900395	KKY--F---V-PG-PT- E ---RT-----NFF-GVF-
	Thermus aquaticus	218294774	--Y--F-----PGEPTV K F-EH-VS--T-W-A-F-
	Dehalococcoides ethenogenes	57234767	QRQ--FV----PG-MTD Q --S-VIG-ITWA-A-F-
	Selenomonas sputigena	260886896	KKY--F-----PG-PT- E --DTVMT-IT-A-AFF-
	Nodularia spumigena	119511161	KKM-SS-----PG-ATS E --ERVI---TFL-AIF-

Supplemental Figure 3: A partial sequence alignment of conserved region of Preprotein translocase secY showing a one amino acid deletion specific for genera *Spirochaetaceae*.

		137	176
Spirochaetaceae (30/30)	Treponema vincentii	257457828	RMYLRWAERRGFSVETLDELEA
	Treponema brennaborensis	332297634	---V-----K---V-M---
	Treponema sp. JC4	384108691	-----H-YKT-VV----
	Treponema primitia	333998623	-----AA-E--R-D-
	Treponema azotonutricium	333995193	-----TLTEV-R---
	Treponema phagedenis	320535245	-----NDYKT----M---
	Treponema denticola	325474491	-----C-S---KT--I-VV-
	Treponema saccharophilum	381180503	---I-----H-YKL--V-LQ-D
	Treponema paraluisiculi	338706540	---T-----S-C-HIV-L--S
	Treponema pallidum	15639564	---T-----S-C-HIV-L--S
	Treponema succinifaciens	328948955	---Q----H-YK--V-SQE--
	Treponema caldaria	339499853	-----I-EV-M---
	Spirochaeta smaragdinae	302338432	---T-----E--Q--L---
	Spirochaeta thermophila	386347018	-----L--K--TQIV-MV-D
	Spirochaeta africana	383790275	---S--V-Q--YTSTV--L---
	Sphaerochaeta coccoides	330836506	-----C--N--KS-I--MQ-D
	Sphaerochaeta globosa	325971169	-----YC--N--KS-V--L--D
	Sphaerochaeta pleomorpha	374314901	-----YC--N--KS-I--LQ-D
	Borrelia hermsii	187917953	-I---YS---YKT-LI-L---
	Borrelia duttonii	203284000	-T---YS---YKI-LI-L--S
	Borrelia crocidurae	386859303	-T---YS---YKI-LI-L--S
	Borrelia recurrentis	203287543	-T---YS---YKI-LI-L--S
	Borrelia turicatae	119952877	-I---YS--H-YKT-LI-L---
	Borrelia burgdorferi	216264821	---S-Y---KKYKT-LI-L---
	Borrelia afzelii	111114896	---S-Y---KKYKT-LI-L---
	Borrelia garinii	51598335	---S-Y---KKYKT-LI-L---
	Borrelia spielmanii	224534879	---S-Y---KKYKT-LI-L---
	Borrelia bissettii	343127396	---S-Y---KKYKT-LI-L---
	Borrelia sp. SV1	225552175	---S-Y---KKYKT-LI-L---
	Borrelia valaisiana	224532320	---S-YV--KKYKT-LI-L---
Other Spirochaetes (0/18)	Brachyspira hyodysenteriae	225621552	---V-FC--H--T---T---PG
	Brachyspira intermedia	384208365	---V-FC--H--T---T---PG
	Brachyspira pilosicoli	300869767	---V-FC--H--T---T---PG
	Brachyspira murdochii	296127692	---V-FC--H--T---IT---PG
	Brachyspira hampsonii	445064386	---V-FC--H--T---T---PG
	Leptonema illini	374587319	---T--F-K--YD----FQ---
	Turneriella parva	392403518	-A-M-YG-KA--N--LI-YQ-G
	Leptospira interrogans	464380401	---T-YF-KK-YQYSLI-IOAG
	Leptospira kmetyi	398338096	---M-YF-KK-YQYSLI-IOAG
	Leptospira kirschneri	421130238	---T-YF-KK-YQYSLI-IOAG
	Leptospira interrogans	459450376	---T-YF-KK-YQYSLI-VQAG
	Leptospira noguchii	464368208	---T-YF-KK-YQYSLI-VQAG
	Leptospira borgpetersenii	421100863	---I-YF-KK-YRYSLI-IOAG
	Leptospira weilii	417778830	---I-YF-KK-YQYSLI-IOAG
	Leptospira licerasiae	359690548	---KYFDKK-YQYSVV-FQ-G
	Leptospira inadai	398344616	---KYFDKK-YQYSVV-FQ-G
	Leptospira broomii	398349614	---KYFDKK-YQYSVV-FQ-G
	Leptospira santarosai	464372999	---V-YF-KK-YKYSLI-VQAG
Other Bacteria (0/>250)	Symbiobacterium thermophilum	51891274	---V-----K--E--R-DG
	Clostridium perfringens	168215798	---T--C-KK-Y-L--I-Y-PG
	Bacillus mojavensis	398308472	---T-----K-----Y-PG
	Paenibacillus vortex	315649817	---T---K---K-----Y-PG
	Desulfurivibrio alkaliphilus	297568438	-----KK---T-I--H-PG
	Escherichia coli	331674376	-----S---KT-IIE-S-G
	Planctomyces maris	149177843	-----C-----N--L--RSD
	Thermanaerovibrio velox	365873548	---V-----N--K-KL----PD
	Fervidobacterium nodosum	154250427	---M---K-----LV-YQ-G
	Methylobacillus flagellatus	91775149	-----YC-NK--K--V-E-S-G
	Magnetococcus marinus	117924338	-----YC-KS--KT-EV-Y-AG
	Dehalococcoides ethenogenes	57234653	---FM---KK--GM-V--QSPG
	Thermomicrobium roseum	221633612	-----Q-A--AA-VV-L--G
	Sphaerobacter thermophilus	269836751	-----SN---QAQV--VT-G
	Frankia alni	111220808	-----H-YPT-VF-TS--
	Veillonella atypica	303229877	-----KT-----LM--QPG
	Leptotrichia hofstadii	260889274	---D---N-HD-K--I--S-AG
	Chloroflexus aurantiacus	163846312	---T-----YT-NLI-MS-G
	Akkermansia muciniphila	187734757	---I--C-----TY-ESTDG
			DEGLKSITLQIRGDYAYG
			EG-I--V-----S-E----
			EG-I-----I--T---V--
			EG-I--A-CR-D-----
			EG-I--A-VK-E-----
			-G-I-----KVS-E--F-
			EG-I--A-F--S-EF-F-
			EG-I--T-I--E---V--
			EG-V--V--K-C-SH-F-
			EG-V--V--K-C-SH-F-
			EG----NMK-S-P-V--
			EG-I--V-VK-E-----
			EG-V--V----N--FVF-
			EG-I--V-VEVK-----F-
			EG-V--V-IEVV-P--F-
			EG-I--T-IRVS-Q--F-
			EG-I--A-IRVS-P-SF-
			EG-I--V-IRVS-Q-SF-
			EG-I--V-IE-K-K----
			EG-I--V-IE-K-K----
			EG-I--V-IE-K-K----
			EG-I--V-IE-K-E----
			EG-I--V-IE-K-E----
			EG-I--V-IE-K-E----
			EG-I--V-IE-K-E----
			EG-I--V-IE-K-E----
			EG-I--V-IE-K-E----
			EA-I-Q-SFYVQ-L----
			EA-I-Q-SFYVQ-L----
			EA-I-Q-SFYVQ-L----
			EA-I-Q-SFYVQ-L----
			EA-I-Q-SFYVQ-L----
			EA-I--AS-LVK-EN-F-
			EA-I-NA-ILVS-PN--
			GA-I-NA--HVI--F-F-
			GA-I-NA--HVI--F-F-
			GA-I-NA--HVI--F-F-
			GA-I-NA--HVI--F-F-
			GA-I-NA--HVA--F-F-
			GA-I-NA--HVI--F-F-
			GA-I-NA--HVI--F-F-
			GA-I-NA--HVV--F-F-
			EA-I--V-IAV--P----
			EA-V--V--KVK-EF--
			EA-I--V--L-K-HN--
			EA-I--V--L-K-YN--
			EA-T--V-VLVK-RW--
			VA-I--V-IK-S-----
			EA-IR-A-IR-E-----
			EA-I--V-I-VS-E----
			EA-I--A--Y-K--F--
			VA-I--AS-K-S-----
			EA-I--V-IKVE-----
			EA-I--A-----E-E----
			EA-I--A-VEV--P----
			EA-I--A-IE--P----
			EA----A-F-VKAP----
			EA-I--A-FL-K-EN-F-
			EA-I--V--N-K-N----
			EA-I--A-IE--P----
			-A-IR-V--KVD-E----

Supplemental Figure 4: Partial sequence alignment of conserved region of Peptide chain release factor 2 prfB showing a one amino acid deletion specific for genera *Spirochaetaceae*.

		720	751
Spirochaetaceae (30/30)	Borrelia burgdorferi	224532424	ATHFHELSSINH QAFINLSMKIEKQGNDLVFL
	Borrelia sp. SV1	225551681	-----K-----
	Borrelia spielmanii	224534129	-----A-----E-----
	Borrelia garinii	51599049	-----A-----K-----
	Borrelia valaisiana	224531774	-----A-----K-----I--
	Borrelia bissettii	343128094	-----K-----S-----
	Borrelia afzelii	216263544	-----A-----K-----E-----
	Borrelia hermsii	187918651	-----A-----DS-V-----R---E-I--
	Borrelia crocidurae	386860036	-----A-----DS-V-----Q--DE-I--
	Borrelia duttonii	203284693	-----A-----DS-V-----Q--DE-I--
	Borrelia recurrentis	203288226	-----A-----DS-V-----Q--DE-I--
	Borrelia turicatae	119953574	-----A-K-----DS-V-----R--DE-I--
	Spirochaeta africana	383790736	---Y-Q---M-E---PD-T---LSVVEN-S-I---
	Spirochaeta thermophila	386346893	-----TK-T---P-VF----AVREDRGI---
	Spirochaeta smaragdinae	302338534	-----TELQ---DSIQK-RLMVKEE-DRVI--
	Sphaerochaeta globosa	325971227	---Y---AR-DT---S-LQL-TLQVSEM-GQVR--
	Sphaerochaeta coccoides	330836559	---Y---TMLDT---SQIQL-TLEVAQKARKII-M
	Sphaerochaeta pleomorpha	374314845	---Y---AQLDT---SLVQL-TLQVLEK-GEIL-V
	Treponema caldaria	339499969	---Y---R-E---PRLA-R---EVLE-DGRIL--
	Treponema primitia	333997850	---Y---ALLS---PHLA-R---EVLN--GEI---
	Treponema succinifaciens	328948686	---Y---TRLE---KSLKR-C-AVAEN-S-I---
	Treponema azotonutricium	333994679	---Y---Q-S---PRMS-R---EVSDDNGEI---
	Treponema denticola	42528103	---Y---TRLE---EKI---KLDVLEAEGKI---
	Leptonema illini	374584203	---Y---TALEE R TG-V--T-DVRESDRGVI--
	Leptospira licherasiae	359689895	---Y---TELSR L PGVW--H-ETVEKDDKVI--
	Leptospira broomii	398347395	---Y---TELSR L PGVW-IH-ETLEKEDKVL--
	Leptospira inadai	398345415	---Y---TELSR L PGVW-IH-ETLEKEDKVL--
	Leptospira biflexa	183220240	---Y---TELEK G AGIF--YLDTFEKDGEIL--
	Leptospira meyeri	408793270	---Y---TELEK G NGIF--YLDTFEKEGEIL--
	Leptospira alstoni	463330954	---Y---TELSR L SGIF--YLETLEKEDKVL--
	Leptospira weilii	464295206	---Y---TELSR L SGIF--YLETLEKEDKVL--
Other Spirochaetes (0/18)	Leptospira alexanderi	398332805	---Y---TELSR L SGIF--YLETLEKEDKVL--
	Leptospira borgpetersenii	418738801	---Y---TELSR L SGIF--YLETLEKEDKVL--
	Leptospira kirschneri	464409192	---Y---TELSR L GGIF--YLETLEKEDRVL--
	Leptospira noguchii	410940934	---Y---TELSR L GGIF--YLETLEKEDRVL--
	Leptospira interrogans	458653907	---Y---TELSR L GGIF--YLETLEKEDRVL--
	Leptospira santarosai	421110175	---Y---TELSR L GGIF--YLETLEKEDKVL--
	Brachyspira pilosicoli	434380887	---Y---TMLED L EGVK-YKVLV-EYKDEII-M
	Brachyspira hyodysenteriae	225620061	---Y---TMLED L EGVK-YKVLV-EYKDEII-M
	Brachyspira murdochii	296127255	---Y---TMLED L EGVK-YKVLV-EYKDEII-M
	Brachyspira hampsonii	429123686	---Y---TMLED L EGVK-YKVLV-EYKDEII-M
	Brachyspira intermedia	384209630	---Y---TMLED L EGVK-YKVLV-EYKDEII-M
	Turneriella parva	392403868	---YS--AHLIS QE RGIAG-TVSVVEKDGHV--M
	Peptoniphilus indolicus	350566699	---Y---TDLSN IY DEVE--TIAVD---E-I---
	Desulfosporosinus meridiei	354561670	---Y---TQLQD NF PGLV--HVGVKER-E-I---
	Methylosinus trichosporium	296444520	-----TQLTK RL PRLV--T--VKDHAGEV---
	Brucella melitensis	17988084	-----MTALSE KL ERLS-VT-RVKEWD--VI--
	Caulobacter crescentus	16124268	---Y---ATLET RM AFVS---LRAKEWNG-----
Other Bacteria (0/>250)	Rickettsia australis	383501920	---Y---TVM-N FL P-LQ-YTIA--ES-K-IL--
	Rickettsia akari	157825535	---Y---TVM-N FL P-LQ-YTIA--ES-K-IL--
	Thermobaculum terrenum	269926487	---Y---T-LEE FL PRVK-FR-EVLEE---V---
	Pelosinus fermentans	392960659	---Y---TELAD YH KTVK-Y-VAVKER-S-V---
	Prochlorococcus marinus	33862352	---Y---NGLSQ EL TNVA-FQVLV-ET-D-----
	Dictyoglomus turgidum	217967464	---Y---TELEK EL KHLK---VAVQEK-K-II--

Supplemental Figure 5: A partial sequence alignment of DNA mismatch repair protein mutS showing a two amino acid deletion specific for genera *Spirochaetaceae*.

			494		520
Spirochaetaceae (30/30)	Treponema paraluisuniculi	338706271	DQHAAHERIIFDTLQRNLGTA		QILLIP
	Treponema pallidum	15639295	-----		-----
	Treponema denticola	325474471	-----L-EG-KKS--PS		-E----
	Treponema vincentii	257457433	-----Q-KH-T-GV		-E----
	Treponema sp. JC4	384109565	----V----L--K-MN-Q-KS		-P----
	Treponema phagedenis	320535178	-----L-NE-KQS--IS		-E----
	Treponema saccharophilum	381181462	----V----L--EMMGAERI-		-T----
	Treponema succinifaciens	328948043	-----M-YNQIMAEA-QK		-S--V-
	Treponema brennaborens	332298473	-----LYNAFIAQA-RK		-A--V-
	Treponema primitia	333997998	-----LY-RFLSKPIL-		-E--V-
	Treponema caldaria	339500256	-----L--S-TTQPIQN		-D----
	Borrelia garinii	219685877	----V--K--YEK-RNSKK-V		-K----
	Borrelia spielmanii	224534215	----V--K--YEQ-RNSKK-V		-K----
	Borrelia valaisiana	224531620	----V--K--YEQ-RNSKK-V		-K----
	Borrelia bissettii	343127530	----V--K--YEK-RNSKK-I		-K----
	Borrelia afzelii	111115035	----V--K--YEK-RNSKK-I		-K----
	Borrelia crocidurae	386859437	----L--K--YQ--INSEK-I		-K--V-
	Borrelia recurrentis	203287669	----L--K--YQ--INSEK-I		-K--V-
	Borrelia duttonii	203284131	----L--K--YQ--INSEK-I		-K--V-
	Borrelia burgdorferi	387827127	----V--K--YEK-RNSKKNV		-K--V-
	Borrelia turicatae	119953008	----L--K--YQ--INSEKIT		-K----
	Borrelia sp. SV1	225551982	----V--K--YEK-RNSKKIV		-K--V-
	Spirochaeta smaragdinae	302338864	-----LYEQFVAGASRK		-Q----
	Spirochaeta africana	383790648	-M--G---LRY--- -HA-D-		-K-VV-
	Sphaerochaeta pleomorpha	374314579	-----L--EI--GKKEV		-A-M--
	Sphaerochaeta globosa	325971464	-----L---EV--EKKNI		-Q-M--
Other Spirochaetes (0/18)	Leptospira inadai	398342440	---T----RYEEVLKK-KRK	NYGI	-P--T-
	Leptospira broomii	398348019	---T----RYEEVLRK-KRK	NYGI	-P--T-
	Leptospira licherasiae	359687950	---T----RYEEVLRK-KKK	NYGI	-P--T-
	Leptospira borgpetersenii	421099993	---T----RYEEVLRK-ERK	NYGI	-P--T-
	Leptospira santarosai	469839967	---T----RYEEVLRK-EKK	NYGI	-P--T-
	Leptospira weilii	417781228	---T----RYEEVLRK-EKK	NYGI	-P--T-
	Leptospira meyeri	408790829	---T----RYEEVLRD-KSK	AYKS	-S--T-
	Leptospira biflexa	183221533	---T----RYEEVLRD-KSK	AYKS	-S--T-
	Leptospira alstoni	463332188	---T----RYEEVLRK-EKK	NYGI	-P--T-
	Leptospira kmetyi	398336310	---T----RYEEVLRK-EKK	NYGI	-P--T-
	Leptospira noguchii	470025988	---T----RYEEVLRK-EKK	NYGI	-P--T-
	Leptospira interrogans	470048520	---T----RYEEVLRK-EKK	NYGI	-P--T-
	Leptospira kirschneri	463329343	---T----RYEEVL-K-EKR	NYGI	-P--T-
	Brachyspira hampsonii	445064025	-----Y--LNYERIYKT-MSK	KIEY	EK----
	Brachyspira hyodysenteriae	225619059	-----Y--LNYERIYKT-MSK	KIEY	EK----
	Brachyspira intermedia	384209368	-----Y--LNYERIYKT-MSK	KIEY	EK----
	Brachyspira pilosicoli	431807712	-----Y--LNYERIYKT-MSG	KLEY	EK----
	Brachyspira murdochii	296125279	-----Y--LNYERIYKT-ISK	KIEY	EK----
	Turneriella parva	392404678	---T----NYERFL-R-AEK	RDMA	-Q-AT-
	Leptonema illini	374587101	---T----N-EKKRRE-EAR	RFQR	----H-
Other Bacteria (0/>250)	Desulfotobacterium hafniense	98984335	-----NYER-LAEHQNN	PGNS	-M----
	Clostridium thermocellum	256003774	-----R-EE-KEYARN	ESLA	-Y--T-
	Rhodobacterales bacterium	254466092	-----LVYEK-K-QMAEN	GVAA	-A----
	Phaeobacter gallaeciensis	163739395	-----LVYEK-K-QMAET	GVAA	-A----
	Rhodopseudomonas palustris	90422900	-----LVYEK-KAS-A-N	GVQR	-----
	Sagittula stellata	126729914	-----LVYEK-K-QMAEN	GVPA	-A----
	Oceanibulbus indolifex	163745482	-----LVYEK-K-QMNDN	GVAA	-A----
	Agrobacterium radiobacter	222085025	-----LV-EEMRKA-HSK	RLSS	-V----
	Rhizobium etli	86356494	-----LV-EAMRKA-HSK	RLAS	-V----
	Sinorhizobium medicae	150395653	-----LV-E-MRTA-HAR	PVPA	-A----
	Roseobacter denitrificans	110678039	-----LVYEK-K-QMAEN	GVAS	-A----
	Bradyrhizobium japonicum	27382604	-----VYEG-KAS-AAN	GVQR	-----
	Nitrobacter hamburgensis	92118635	-----VYEK-KAA-ERD	GVQR	-----
	Rhodobacterales bacterium	84684369	-----LVYEK-K-QMAEN	GVAS	-A----
	Agrobacterium tumefaciens	159184423	-----LV-EEMRNA-HSR	RPPS	-V----
	Rhodopseudomonas palustris	283843048	-----VYER-KAS-EAN	GVQR	-----
	Silicibacter lacuscaerulensis	260432213	-----LVYEK-KKQMAEN	GVAA	-A----
	Nitrobacter winogradskyi	75676732	-----VYER-KTA-ARD	GVQR	-----

Supplemental Figure 6: A partial sequence alignment for DNA mismatch repair protein mutL showing a four amino acid deletion specific for the *Spirochaetaceae*.

Brachyspiraceae (4/4)	Brachyspira pilosicoli	300871449	ATTRPETILADVAIAVHPDDERYAHLTEQ	D	VLILPIVGR	
	Brachyspira intermedia	343386875	-----N-----	-	I-----	
	Brachyspira hyodysenteriae	225619103	-----	-	I-----	
	Brachyspira murdochii	296127588	-----E-----	N	-----	
Other Spirochaetes (0/44)	Treponema vincentii	257457527	-----L-G-T-V-----P--T--VGK		K-V--LT--	
	Treponema phagedenis	488788316	-----L-G-T-V---E-----VGK		L-E--LT--	
	Treponema azotonutricium	333995473	-----L-G-T-V---E-----IGK		M-K--LTD-	
	Treponema denticola	488748126	-----L-G-T-----E-P--SIIGK		E--LAN-	
	Treponema succinifaciens	328948525	-----L-G-T-V--N-E---KSVVGK		K-K--LT--	
	Spirochaeta thermophila	386346193	-----M-G-T-V---G---R--VGK		E--V-L-N-	
	Spirochaeta africana	383791644	-----M-G-T-V---E-----VG-		E-E--LT--	
	Sphaerochaeta coccoides	330836357	-----MFG---V--N-----AVVGK		K-R--LTD-	
	Sphaerochaeta pleomorpha	374314559	-----MFG---V--N-----TS-IGT		M-D--LTD-	
	Borrelia recurrentis	203288168	-----MFG-----N-N---KS-IGR		E--I--AN-	
	Borrelia duttonii	203284634	-----MFG-----N-N---KS-IGR		E--I--AN-	
	Borrelia garinii	490931452	-----MFG-T-----N-N---KS-VGK		E-TI-LT-	
	Borrelia crocidurae	386859975	-----MFG-----N-N---KS-IGR		E--I--AD-	
	Leptospira inadai	498103604	-----MFG---V-A-----KN-KGA		-VE--LTN-	
	Leptospira licerasiae	495868683	-----MFG---V-A-----KS-KGA		E-E--LTD-	
	Leptospira wolbachii	505589918	-----MFG---VCA---T---A-KGK		F-Y--A-K	
	Leptospira interrogans	446666658	-----M-G---VCAN-E---TS-KDV		--D--LTN-	
	Leptonema illini	488861362	-----M-G-T-----A-K--IGK		TCK--F-N-	
	Turneriella parva	392401702	-----G-E-L---E---K-KGA		KAKV-FLNK	
	Other Bacteria (0/>250)	Fusobacterium mortiferum	237736668	--S---M---V---E---K--VGK		K---L---
		Carboxydibrachium pacificum	254478609	-----M-G---V---E---K--IGK		T---L---
		Thermoanaerobacter tengcongens	20807263	-----M-G---V---E---R--IGK		T---L---
		Clostridiales genomosp.	289449837	-----M-G-T-V-----K--IGK		EV---L-N-
		Acetivibrio cellulolyticus	303239683	-----M-G-T-V-----Q--IGK		MV---L-N-
		Coprothermobacter proteolyticu	206895183	-----M-G-T-----KNVVGK		HV---L---
Anaerostipes caccae		167745430	-----M-G-T-V-----T--VGK		M-E--LC--	
Filifactor alocis		291171057	-----VG-T-V---E---R--IGK		M-VV-FI--	
Megamonas hypermegale		291532689	-----MFG-TGV-----SD-VGK		T-----	
Coprococcus catus		291521943	-----L-G-T-V---E---MD-IGK		NV---L---	
Syntrophothermus lipocalidus		297616869	-----M-G-TGV-----R--VGR		YA---I---	
Anaerotruncus colihominis		167770372	-----L-G-T-V-----K--IGK		MVL---NK	
Mitsuokella multacida		255659387	-----MFG-TGV-----KD-VGK		T-----	
Natranaerobius thermophilus		188585735	-----M-G-T-V-----S--IGK		TVM--LMD-	
Thermoanaerobacter ethanolicus		256751768	-----M-G---V--N---KDVVGK		T---L---	
Pelotomaculum thermopropionicu		147677147	-----M-G---V-----G--KEMVGK		T---L---	
Ruminococcus torques		153814976	-----L-G-T-----QDIIGK		NV---L-N-	
Caldicellulosiruptor saccharol		146297043	-----M-G-T-V--N-N---K--IGK		TVV---N-	
Mesorhizobium loti		13471197	-----M-G-T-V-----R--VGK		NVV-----	
Asticcacaulis excentricus		241774675	-----M-G-T-V-----QA-IGK		EV---T---	
Gluconacetobacter hansenii AT		296115214	-----M-G-M-V-----A--D-VG-		SV---LT--	
Erythrobacter litoralis		85373086	-----M---M-V---S---SVVGK		HVV--LT--	
Rhodobacter sphaeroides		77462536	-----M-G-TG---N-A-----IGK		EVV--L---	
Magnetospirillum gryphiswalden		144899871	-----M-G-S-V---E---T--VGK		MVR-----	
Rhodopseudomonas palustris		192291231	-----M-G-T-V--N-E---T--VGK		HV---L---	
Agrobacterium vitis		222148981	-----M-G-TG-----QSIIGK		HV-----	
Gluconobacter oxydans		58040911	-----M-G---V---E---DMIGK		TV---LT--	
Moraxella catarrhalis		296112744	-----L-G-S-V-----IGK		TIV---S-	
Thiomicrospira crunogena		78485844	-----MFG-Q-V-----Q--IG-		TIT--L---	
Pseudomonas aeruginosa		254236738	-----L-G-A-V-----K-IG-		FAE-----	
Idiomarina loihiensis		56461050	-----M-G--CV-----F--VGK		F-E---N-	
Marinobacter algicola		149378126	-----M-G-T-V-----Q--IGK		FVD--L---	
Shewanella amazonensis	119773927	-----M-G-S-V---E---S-IGK		EI-----N-		

Supplemental Figure 7: A partial sequence alignment of Valyl --tRNA synthetase showing a one aa insert specific for the *Brachyspiraceae*.

<i>Brachyspiraceae</i> (4/4)			660		703
		Brachyspira pilosicoli	300871449	WYIEISKFDLKDESKKEK	TIAVLLYVLEESMAMIHPMPFITEE
		Brachyspira hyodysenteriae	225619103	-----	-----
		Brachyspira murdochii	296127588	-----	-----
		Turneriella parva	392401702	---M--VA---D-MRDG	ALYT-YT-FRAALRLL--A-----
		Leptonema illini	488861362	--V-LI-SR-YEKEMTPS	KE AALQTAF---RSILNVL----H---
		Leptospira wolbachii	505589918	--L-LT-ARVYGNVSP--	QE KARL--IS--KK-LGLL-----
		Leptospira biflexa	183219675	--L-LT-ARVYGNVTP--	AK E-ARQ--VS--KK-LGLL-----
		Leptospira interrogans	488108805	-----LV-PRAYGKVSHRS	AE VAKQ--SD--IRALGLL-----L---
		Borrelia turicatae	119953516	-----IN-NSDDINLQ	NM --SK-IFF-K--LLIM--I-----
		Borrelia spielmanii	224534475	-----I--NS-DVNIQ	NM A-SK--FF-KKALVIL--I--V--K
		Borrelia duttonii	203284634	-----IN-CSDDFDLQ	NI --SK-IFF-K--LLIM--I-----
		Borrelia recurrentis	203288168	-----IN-CSDDFDLQ	NI --SK-IFF-K--LLIM--I-----
		Borrelia hermsii	187918595	-----IN-NSDDINLQ	NM I-SK-VFF-K--LRIM--I-----
		Spirochaeta smaragdinae	302338655	----A--LS-YSDDDD--	NR AVTL-MQ-----RLA---LS----
		Spirochaeta thermophila	386346193	----SA-LS-NGD--QE-	DR IVSL--F---QALKLL---L--V---
		Sphaerochaeta coccoides	330836357	----A--HN-ESN-PVVQ	DR AVSL--DI---LRL--L---Q---
		Treponema vincentii	257457527	--V-GT-LSY-NGDEA--	NR ITS--A---LRL--VL--V---
		Treponema denticola	42526872	--V-GT-LSF-YGDE---	DR AAS--A---LRL--LA-V---
		Treponema pallidum	189026258	--V-A--CS-QKP--QE-	DR AAS--CTL---TLRLL---L--V---
		Oceanobacillus iheyensis	23099516	----MA-LS-YG-DENK-	KT -RS-AH--DQT-R-L-----
		Paenibacillus larvae	167465172	----F--LS-YGDDEQA-	KK -QS-V---DHT-RL-----S--
		Gemella haemolysans	241889659	----A-IS-NG-DEAA-	KT -KSI-V---DA-LK-L-----V---
		Staphylococcus carnosus	224476754	----M--IPMNG-DEAQ-	QV -RS-S---RT-R-L--Y--V---
		Lysinibacillus sphaericus	169829404	----MA-LP-YG-DEAA-	KT -RSI-A---DQT-R-L-----
		Geobacillus thermodenitrificans	138896204	----MA-LP-YGDDETA-	KT -RS-A--DNT-RLL-----
		Anoxybacillus flavithermus	212638460	----MA-LP-YGDDEQA-	KT -RS-A--DQT-RLL-----V---
		Bacillus clausii	56964386	----MA-LA-YG-NEQA-	QA -RS-AH--DQT-R-L-----
		Paenibacillus curdlandolyticus	304407500	----FA-LN-YGSDAAA-	KA -QS-A--DRTQRL-----S--
		Staphylococcus aureus	282916924	----M--IPMNGNDEAQ-	QI -RS-S-T-DNI-R-L-----V--K
		Alicyclobacillus acidocaldarius	258511798	----FA-IN-YGDREEK-	RQ -QS---T--SRVL-LL--YI--V---
		Bacillus pseudofirmus	288553603	----MA-LP-NSDNEEA-	RT -RS-A--DQT-RLL--I-----
		Macrococcus caseolyticus	222151545	----M--IPMNG-DEVQ-	QM -RS-A-T-DSI-R-L-----V--H
		Exiguobacterium sibiricum	172058142	----MA-LP-NG-DEAA-	LT -RSI-A-T-DQI-RLM-----
		Granulicatella elegans	260584693	----M--ET-AGNDEAA-	LT -RSI-V---DQTLRLL--I--V---
		Lactobacillus ruminis	227526685	----MA-E--NGSDE-L-	HN -QNI-C---DQTLRLM--I--V--K
		Pediococcus pentosaceus	116493039	----M--EI-NG-DEQA-	VN -QN-A--DQTLRLL--V--V--K
		Streptococcus salivarius	228478388	----LT-EV-YSDNED--	VI -RS---T-DQILRLL--I--V---
		Anaerococcus hydrogenalis	212697050	----FA-ER-NSDDENK-	ST VKK-----KDMISLL-----
		Thermosediminibacter oceanii	302389257	----MA-I--YGDDENA-	KR -QR-YT---RVLRL--V-----
		Ruminococcus albus	304401635	----LA-NRFNG-DAQA-	KN VEN-A--TDILK-L-----
		Thermoanaerobacterium thermosa	304316504	----L--PV-YGDDLEA-	KK -KS-R--DNTLRLL-----
		Moorella thermoacetica	83589396	----LI-PR-YG-NRR-R	QV AQE--VT--GK-LQLL-----
		Subdoligranulum variabile	282600751	----C-SR-NSDDAVQA	DT ARK--V---DKALKLL-----
		Anaerococcus lactolyticus	227486662	----FA-IR-YGDDEDA-	AN VKK-----KSMILL-----
		Clostridium bartlettii	164686738	----V-PR-YG-D-EA-	QT ALY--T---KILKLL--Y-----
		Thermoanaerobacter tengcongens	20807263	----L--PV-YSNDEEA-	KV -KS-R--DNTLRLL-----
		Anaerococcus prevotii	257066730	----FA-IR-YGDD-EA-	AN VKK-----KNMLVLL-----
		Carboxydibrachium pacificum	254478609	----L--PV-YSNDEEA-	KV -KS-R--DNTLRLL-----

Supplemental Figure 8: A partial sequence alignment of Valyl --tRNA synthetase showing a two aa deletion in the *Brachyspiraceae*. This deletion is also found in *Turneriella parva*.

		760	793
<i>Brachyspiraceae</i> (4/4)	<i>Brachyspira hyodysenteriae</i>	225620632	IGGLKEKTIAAKRLG F IKHIIIPHENIRDLDEIP
	<i>Brachyspira murdochii</i>	296126569	-----Y-----
	<i>Brachyspira pilosicoli</i>	300870590	-----F-K-----
	<i>Brachyspira intermedia</i>	343385315	-----Y-----
Other Spirochaetes (0/44)	<i>Turneriella parva</i>	392403479	-----VL--F--G--T-V-C-KD-QK-FE---
	<i>Leptonema illini</i>	488861717	V--I--VL--RAA--NTVLL-ER-RA-FE---
	<i>Leptospira interrogans</i>	488011445	---R--IV---V--HK--Y-KD-LQH-Q---
	<i>Leptospira licerasiae</i>	495870264	---R--IV---V--VRK--F-SD-KPQ-----
	<i>Leptospira borgpetersenii</i>	488829383	---R--IV---V--IY---Y-KD-LQH-E---
	<i>Leptospira weilii</i>	488691420	---R--IV---V--IY---Y-KD-LQH-E---
	<i>Borrelia burgdorferi</i>	387827169	-----I-----S-VE---V-KA-RV--E---
	<i>Borrelia afzelii</i>	384206750	---R--I-----S-VE---V-RA-KV--E---
	<i>Borrelia garinii</i>	490931949	---R--I-----S-VE---V-KA-KV--E---
	<i>Treponema pallidum</i>	15639514	-----R-G--E--M-KA-V-----
	<i>Treponema denticola</i>	42526185	-----R-N--EV---QA-T-----
	<i>Treponema primitia</i>	333996820	-----R-NK-AQ-----KQ-L-----
	<i>Treponema succinifaciens</i>	328947911	---R--V---NK--T---KA-V-----
	<i>Treponema azotonutricium</i>	333995321	-----Q-NK-AR-----KQ-M---D---
	<i>Treponema brennaborensense</i>	332298163	---R--V---NK--S---KA-V---D---
	<i>Treponema paraluis-cuniculi</i>	338706484	-----R-G--E--M-KA-V-----
	<i>Treponema phagedenis</i>	320535218	-----R-N--E-----A-L---E---
	<i>Treponema vincentii</i>	257458481	-----R-N--E-----AA-----EK--
	<i>Treponema caldaria</i>	339500549	-----Q-NK-A-----KK-L-----
	<i>Spirochaeta smaragdinae</i>	302338652	-----R-NK--Q---KA-E---K---
	<i>Spirochaeta thermophila</i>	307719319	-----V---AR-V-E---KS-EK--E---
	<i>Sphaerochaeta coccoides</i>	330836360	-----IL--R-NK--QT-LF-KQ-Q---KL
	<i>Sphaerochaeta globosa</i>	325971485	-----VL--R-NK--DT---QF-K---KL
Other Bacteria (0/>250)	<i>Pasteurella multocida</i>	15603843	-----LL--H-G--TV---K--VK--E---
	<i>Haemophilus somnus</i>	170718066	-----LL--H-G--TV---K--VK--E---
	<i>Acinetobacter haemolyticus</i>	294649847	-----LL--H-G--LVF--QD-V-----
	<i>Mannheimia succiniciproducens</i>	52425899	-----LL--H-G--TV---KD-VK--E---
	<i>Actinobacillus succinogenes</i>	152978446	-----LL--H-G--TV---KD-VK--E---
	<i>Congregibacter litoralis</i>	88703269	-----LL--R-G--TV---K--E---Q-V-
	<i>Legionella pneumophila</i>	54294746	-----LL--H-G--V---E--VK--E---
	<i>Haemophilus influenzae</i>	145640434	-----LL--H-G--TVL--K--VK--E---
	<i>Pseudomonas putida</i>	170720929	-----LL--H-G--TV---E--V---K---
	<i>Grimontia hollisae</i>	262276276	-----LL--H-G--TV---K--E---E---
	<i>Photobacterium profundum</i>	90410784	-----LL--H-G--TV---K--E---E---
	<i>Hahella chejuensis</i>	83644981	-----LL--H-G--TVV--Q--V---K---
	<i>Shewanella denitrificans</i>	91793845	-----LL--H-G--VL--K--E---E---
	<i>Aggregatibacter actinomycetemc</i>	293391758	-----LL--H-G--TV---KD-VK--ED--
	<i>Aliivibrio salmonicida</i>	209694400	-----LL--H-G--TV---KD-E---E---
	<i>Pseudoalteromonas atlantica</i>	109899439	-----LL--H-G--TV---K--E---Q---
	<i>Providencia rettgeri</i>	268592034	-----LL--H-G--TVL--K--E---E---
	<i>Marinobacter aquaeolei</i>	120554756	-----LL--H-G--TV---D--V---K---
	<i>Aeromonas hydrophila</i>	117621379	-----LL--H-G--RVL--K--E---E---
	<i>Alteromonas macleodii</i>	239995519	-----LL--H-G--TVV--KD-E---E---
	<i>Vibrio angustum</i>	90579276	-----LL--H-G--TVL--K--E---E---
	<i>Ferrimonas balearica</i>	308050306	-----LL--H-G--RVL--K--E---E---
	<i>Moraxella catarrhalis</i>	296113021	-----LL--H-G--VL--KS-E---I---

Supplemental Figure 9: Partial sequence alignment of ATP-dependent protease La showing a one aa insert specific for the *Brachyspiraceae*.

<i>Brachyspiraceae</i> (4/4)		300871379	325	LTEDAALADYYEAAVKAY	P	361	KQPKKISNWIMVEVNAYL
		225620599		-----S-----			-----
		296126183		-----D-----			-----
		392404480		--A-RST-L---DVIR-G			APA--A---V---M
		488860131		-AR-RET-A-F-KVAELS			GDA--S---VKD--LGII
		498257551		--AEREI-----E-LQVS			GD--RT---VKD--
		495869152		--AEREI-----G-L-VS			GDA--T---VKD--
		490585039		--AEREI---F-E-L-VS			EDA--T---VKD--
		257457942		--AERS--EWF---AVKT			-D---VA---VLA--L-V-
		42526091		--SERE--EWF-E-A-KS			SS---CA---LA--L-I-
		488786306		--AEKE--WF-Q---SA			HD---TA---LA--L-V-
		383792008		I--EKSG--F-----QHG			AD-GAAAA-FVSDIKKQ-
		386347987		-I-EK-R--FF-E--RRG			VA-STAAA-LAGD-AKL-
		203287795		--S-KN-VK-F-E-ALTS			SE---VA---LS--LSV-
		203284258		--S-KN-VK-F-E-ALTS			SE---VA---LS--LSV-
		216264831		--A-KH-LK-F-E--INS			SD---VA---LS--LSV-
		224534315		--S-KH-LR-F-E--INS			SD---V---VLS--LSV-
		297583061		--QKQ-MS-FF-Q-IAQG			GP--QL---L-G-----
		81429159		--NTKEMS-FF----ANG			AA--QV---L-G-----
		295397188		--QTL-MS-FFD-T--G			AD--QA---L-G-----M
		212638109		--LTKEM--FF--T-ANG			AD--LA---L-----S---
		270291084		--QTKEMS-FF---IAFD			AD--LVA-YL-GD-----
		257869257		--LTKEMS-FF--TID-G			AE--QA---L-G--S---
		227432077		--QTL-MS-F-D-T-ASG			AD--RAA-YLIGD----M
		289435091		--LTKEMS-FF--TI--G			ADA-QA---L-G--S---
		20454922		--LTKEM--FFX-T-ANG			AD--LA---L-----SG--
		23098221		--ASKQMS-FF-E-TAEG			ADM-QV---L-G--S--M
		116493113		--QTKEMS-FF--T-AQG			AD--LTA-YL-GD-----
		241896422		--QTL-M-NFFDET-SFG			AD--RTA-YL-GD---F-
		241890109		--LTKEMS-MF-ET-ALG			AD--LA--YL--D-----
		241766795		--QSK-M-A-F--VA--C			S---LA-----G--SRR-
		171060715		M-TSR-I-AF-Q---E-C			G---LVA--L-G-LSRR-
		299129136		--QSQ-M-A-F-D-A--C			GA--LA---V-G-ISRR-
		254416508		---KLV-E-F----T-N			AN--QVA--V-GDIA---
		113477297		--D-FNV-K-F---A-G			GNS-QVA--V-GDIT-F-
		284054466		--D-RTV-E-F--T-A-G			ADT-QAA--L-GDIT---
		256828112		--AEKEV---F-T-LAT-			TE-----V-G--MRE-
		94987449		--SSRE---FF-K--L-			PK---A-L-KILLLHM-
		218778531		--SAREM-----C-EIF			-D--QVC--VTGALA-L-
		158520030		--GSR-----F--CAAEA			-T--PCA---GDLLGL-
		206889686		---EK--SEWF-E---LG			GK--EVA-----LLRL-
		188585104		I-A-KS--EFFDEC--T-			DE---A---G-ISR-V-
		260892976		--ATPEV---F-ETL-F-			P--RQVA--V-G-LARC-

Supplemental Figure 10: A partial sequence alignment of Glutamyl-tRNA amidotransferase subunit B showing a one aa insert specific for the *Brachyspiraceae*. Homologs for this sequence were not found in members of the *Sphaerochaeta* in our BLAST search.

Leptospiraceae (13/13)	Leptospira borgpetersenii sero	116330588	108	RLKKLEAMEADNSFEK	141	KTKKEVLTLRRELEKL
	Leptospira santarosai str- 200	359685178		-----		-----I-----
	Leptospira interrogans serovar	45656741		-----G-----		-----
	Leptospira licerasiae serovar	359689293		-----G-T-----		-----I-S-----D--
	Leptospira biflexa serovar Pat	183221976		--R--Q--EN----Q	-A	R----A-S-K-----
Other Spirochaetes (0/35)	Leptonema illini	488856648		-----ETGT-DQ	-A	R----I-M-Q--D--
	Turneriella parva	392402013		--R--EAF-T-TVHE	I-	-----I-Q-D--IAR-
	Brachyspira hyodysenteriae	225619456		----I-KE-V-GT-D-		LP----IL-LK-K-R-
	Brachyspira intermedia	384208873		----I-KE-V-GT-D-		LP----IL-LK-K-R-
	Borrelia burgdorferi	497944348		K-----K--V-GT-DM		IS---ISQ-N--KS--
	Borrelia bissetti	343127445		K-----K--V-GT-DM		IS---ISQ-N--KS--
	Borrelia garinii	51572957		K-----K--V-GT-DM		IS---ISQ-N--KF--
	Spirochaeta smaragdinae	302339355		----I-K--V-GT--S		L----IAK-NK-RSR-
	Spirochaeta africana	383791169		-----K--V-GT--S		LS---AK-NK-KAR-
	Sphaerochaeta coccoides	330836657		---I-K--V-GT-DS		L----ISL-TK-KT--
Other Bacteria (0/>250)	Treponema pallidum	189025832		----I-R--I-GT--H		LS---AS--K-HA--
	Treponema denticola	498381120		----I-R--I-GA--H		LS---AS--K-HA--
	Treponema paraluis-cuniculi	338706567		----I-R--I-GA--H		LS---AS--K-HA--
	Thioalkalimicrobium cyclicum A	334144061		--E--S--Q-GT---		I--R-----T--M---
	Xanthomonas oryzae pv. oryzae	58426194		--E--A-T-GT-D-		LV-H--S---R---
	Pseudoalteromonas sp. BS120429	359440425		--D--QSQ-GT---		L---T---N--M---
	Pseudoxanthomonas spadix BD-a5	357417898		--E--A-T-GT---		LV-H--G---RD--
	Glaciecola sp. HTCC2999	221133314		--E--QSQ-GT-D-		L---M-Q--MT--
	Stenotrophomonas maltophilia R	194365044		--E--G-T-GT---		LV-H--G---RD--
	Thioalkalivibrio sp. K90mix	289208671		--D--T-D--G--V		LN-R-A--R--KD--
	Rhodanobacter sp. 2APBS1	352086338		--E--A-T-G---		LV-H--AR--RD--
	Pseudoalteromonas sp. BS120439	359446683		--D--QSQ-GT---		L---A-M-T--M---
	Alteromonadales bacterium TW-7	119471167		--D--IQSQ-GT---		L---T-M-N--M---
	Alkalilimnicola ehrlichii MLHE	114321014		--D--QAE-GT-D-		L--R-A-S-S--M---
	Halomonas boliviensis LC1	359394092		--RD---RE-GT---		L-----VAT--Q---
	Glaciecola nitratireducens FR1	348029862		--D--VQST-GT-D-		I-----M-K--MT--
	Idiomarina loihiensis L2TR	56459953		--D--T-SQ-GT---		L---A-VNT--M---
	Shewanella denitrificans OS217	91792911		--E--SQSV-GT-D-		L---A-MRT-----
	Mitsuokella multacida DSM 2054	260881835		--E-----GT--V		L-----QG--H-M---
	Megamonas hypermegale ART12/1	291533219		--E-----E-GT--V		LS-----A-K--Q---
	Phascolarctobacterium succinat	323141025		--R-----GT-DL		LP----IS-KH-M---
	Veillonella dispar ATCC 17748	238019369		--Q----AE-GT--V		LP----IG--H-M---
	Selenomonas sp. oral taxon 137	313896175		--E-----ENG-T-V		L-----QG--H-M---
	Ruminococcus obeum A2-162	295108498		--QI-----GT--V		LP----IE--K--A--
	Lachnospiraceae bacterium 6_1_	331083047		--EI-----GT-DV		LP----IN-KK-----
	Clostridium lentocellum DSM 54	326791510		--Q--T--Q-GT--V		LP----IE--K-MD--
	Blautia hansenii DSM 20583	260589615		--EI-----GT-DV		LP----IN-KK-----
	Bryantella formatexigens DSM 1	255280807		--QI-T----GT-DV		LP----IA--K-K---
	Butyrivibrio crossotus DSM 287	293115676		--EI-----GT-DV		LP----IQ-KK-Q---
	Parvimonas micra ATCC 33270	160947372		-----L--E-GT-QR		LP----IK-K--A---

Supplemental Figure 11: A partial sequence alignment of 30S Ribosomal protein S2 showing a two aa insert specific for the *Leptospiraceae*.

			130	168
Leptospiraceae (13/13)	Leptospira biflexa	12657818	FNKMKLLTGAFARLNP	TASMWFHIGANMHQRERVYIETM
	Leptospira interrogans	45657404	-----	-----
	Leptospira borgpetersenii	116328165	-----	-----M-----
	Leptospira licerasiae	359689797	-----	-----M-----
	Leptospira santarosai	359686203	-----	-----M-----
	Leptospira noguchii	359724085	-----	-----M-----
	Turneriella parva	392401819	S.....	M.....F....
	Leptonema illini	488859423	M.....M..	S.....VN..
	Treponema socranskii	13560140	--G-NM--S-G-WDG	AKT-Q--V---VD-NV---G--
	Treponema vincentii	257456318	--G-NM--R---EGG	ENAV -G-----D--I---G--
	Treponema pedis	116805592	--G-NM--R---ETG	ENVV -----D--M---G--
	Treponema primitia	333999967	--G-N---R-G-IVG	ENVV -----D---Q-F-G--
	Treponema medium	13560154	--G-NM--R---EGG	ENAV -G-----D--I---G--
Other Spirochaetes (0/20)	Treponema azotonutricium	333993151	--G-N---R-G--IG	ENVV -----L-----D---Q-F-G--
	Treponema phagedenis	116805588	--G-NM--R---ETG	ENTV -----D--T-A--G--
	Treponema denticola	13560138	--G-NM--R---ETG	ENVV -G-----D--M---G--
	Treponema azotonutricium	333994878	--G-NM--R---TG	QNTA -----D---Q-F-G--
	Treponema brennaborens	332299029	--G-NM--R---QAG	DNTV -----L-----D--SQ-F-G--
	Treponema succinifaciens	328949180	--G-NM--R---PTG	ENSV -----L-----D--TQ--G--
	Treponema maltophilum	15214031	--G-NM--R---ATG	ENTV -G---L-----D--MQ-F-G--
	Treponema lecithinolyticum	13560146	--G-NM--R---ATG	ENTV -----L-----D--MQ-F-G--
	Treponema pectinovorum	13560156	--G-NM--R---QSTG	ENVV -G-----D--MQ-F-G--
	Treponema amylovorum	13560158	--G-NM--R---MPTG	ENVV -G-----D--MQI--G--
	Treponema pallidum	15639779	--G-NM--R---QGG	ENTV -----D--T-A--G--
	Treponema denticola	13560136	--G-NM--R---QETG	ENTV -----D--T-A--G--
	Treponema medium	116805566	--G-NM--R---ETG	ENTV -----D--V-A-VG--
	Treponema phagedenis	116805582	--G-NM--R---ETG	ENTV -G-----D--T-A--G--
	Treponema caldaria	339498655	--G-NM--R---ATG	ENVV -----D-----G--
	Spirochaeta smaragdinae	302338405	--G-NM--R---ETG	ENSV -----L-----D----IF-G--
	Spirochaeta thermophila	306532480	--G-N---R---ETG	ENVV -----D-----G--
	Brachyspira murdochii	296125671	---LNM---R---STG	ENTP -----L-----DE-K---G--
	Brachyspira hyodysenteriae	511892	---LNM---R---STG	ENTP -----L-----DE-K---G--
	Brachyspira pilosicoli	300869853	---LNM---R---STG	ENTP -----L-----DE-K---G--

Supplemental Figure 12: A partial sequence alignment of Flagellar filament core protein flaB protein showing a four aa deletion specific for the *Leptospiraceae*. Homologs for this sequence were not found in members of the *Sphaerochaeta* or *Borrelia* in our BLAST search.

		80	123
<i>Leptospiraceae</i> (13/13)	<i>Leptospira interrogans</i> serovar	294828153	FEIGSFQATGNKLDMAITGE M GFFKIQMPDGSFAFTRDGSFKID
	<i>Leptospira borgpetersenii</i>	116327820	-----S-----
	<i>Leptospira weilii</i>	359726120	-----S-----
	<i>Leptospira biflexa</i> serovar	183220919	-----L-L-----A-----T-SYS-----
	<i>Leptospira santarosai</i>	359686429	-----S-----S-----
	<i>Leptospira licerasiae</i>	359689089	-----L-S-----Y---
	<i>Leptonema illini</i>	488856803	--M--L-----F-L-V-S-V-----L---T-SY-----
	<i>Turneriella parva</i>	392404077	-QM--L-S--H-----SSD V-----L---T-GYQ-N-D----
	<i>Brachyspira pilosicoli</i>	300871597	-DQ--L-----L-LE-----QVL-----VSY-----V-
	<i>Brachyspira intermedia</i>	343386079	-DQ--L-----L-LE-----QVL-----VSY-----
	<i>Brachyspira hyodysenteriae</i>	225619854	-DQ--L-----L-LE-----QVL-----VSY-----
	<i>Brachyspira murdochii</i>	296127366	-DQ--L-----L-LE-----QVL-----VSY-----
	<i>Spirochaeta smaragdinae</i>	302338304	-TQ-AL-N---VT-L--Q-D---RVLLI---YGYS-----
Other <i>Spirochaetes</i> (0/32)	<i>Spirochaeta thermophila</i>	306532153	-TQ-AL-H-D-VS-L--Q-----RVLLY--TY-Y-----
	<i>Borrelia turicatae</i>	119953549	--Q-NL---NL-T-V--E-D---Y--LL---TYGY-----
	<i>Borrelia bissetii</i>	343128071	--Q-KM---NLLT-V--E-D---Y--LL---TY-Y-----
	<i>Borrelia hermsii</i>	187918627	--Q-NL---NLNT-V--E-N---Y--LL---TYGY-----
	<i>Borrelia recurrentis</i>	203288201	--Q-NL-V-NLNT-V--E-D---Y-VLLS---TYGY-----
	<i>Borrelia duttonii</i>	203284668	--Q-NL-V-NLNT-V--E-D---Y-VLLS---TYGY-----
	<i>Borrelia garinii</i>	219684180	--Q-KM-S-NLLT-V--E-D---Y--L---TY-Y-----
	<i>Borrelia burgdorferi</i>	218249434	--Q-KM-S-NLLT-V--E-D---Y--L---TY-Y-----
	<i>Borrelia spielmanii</i>	224534580	--Q-KM-S-NLLT-I--E-D---Y--L---TY-Y-----
	<i>Borrelia afzelii</i>	111115606	--Q-KM-S-NLLT-V--E-D---Y--L---TY-Y-----
	<i>Treponema denticola</i>	42526518	--Q--L-N--VTS-I--Q-----RVLQY--TY-Y-----
	<i>Treponema vincentii</i>	257457574	--Q--L-Q--VST-V--A-----RVLQY--TY-Y-----
	<i>Treponema brennaborensis</i>	332298514	--L-N--VDT---VV-----RV-QY---Y-----V-
	<i>Treponema azotonutricium</i>	333994524	-TQ-AL-N-D-AY---Q-D---R---Y---WSY-----V-
	<i>Treponema pallidum</i>	15639944	--Q--L-H--VSG-V--A-----RVLQY--TY-Y-----V-
	<i>Nitrosococcus watsoni</i>	300114797	-TQ-GLTQ---S---Q-R---QVL-----L-Y---T-Q--
	<i>Legionella pneumophila</i>	52841453	-SQ--L-N-Q-A--V--E-R---TVL-----TQSY-----T-
	<i>Pseudomonas syringae</i>	237799211	-TA--L-T-N-P--L-VN-R---QVTQ---TV-Y---T-HL-
	<i>Halothiobacillus neapolitanus</i>	261856358	Q-NLVT-N-A--L--N-R---QVLQ---V-Y---SL-
Other <i>Bacteria</i> (0/>250)	<i>Alkalilimnicola ehrlichii</i>	114320059	Q-NI-Q-E-S--I--E-D---Q-L---EI-YS---NV-
	<i>Pseudomonas aeruginosa</i>	15596279	-TP--L-T-EQP---VN-R---QVLL---TVSY-----HLN
	<i>Legionella drancourtii</i>	254496889	--Q--I-H-N-AY-V--Q-Q---T-L---TQ-Y--N-A-S--
	<i>Pantoea ananatis</i>	291617022	Q-NLSQ-N-SK-I--N-Q---Q-----TS-Y-----QV-
	<i>Nitrococcus mobilis</i>	88811803	-TQ-NIVQ---A--L--N-R---E-LQ---TL-Y-----Q--
	<i>Photobacterium profundum</i>	90411007	-TQ-NT-T-N-AM--M-E-----QVLL---NIGY--N-Q-T-N
	<i>Acidithiobacillus caldus</i>	255021356	MTQ-NLTS---A--LG-N-Q---Q-MQ---TI-Y---T-QLN
	<i>Vibrio angustum</i>	90579911	-TQ-NT-T-N-AM--M-E-D---QVLL---NIGY--N-Q-T-N
	<i>Pectobacterium atrosepticum</i>	50120641	Q-T-SE---SK-V--K-Q---QV-L---TT-Y---A-QL-
	<i>Chromohalobacter salexigens</i>	92114096	Q-GL-N-D-SK-L--N-Q---AV-----TS-Y-----Q--
	<i>Saccharophagus degradans</i>	90021853	-TP--L-V--QS--V--D-R---IPVLQ---TVSY---Q-HL-
	<i>Pseudomonas fluorescens</i>	70729006	-TA--L-T-EQP--L--N-R---Q-LQ---TT-Y---T-HLN
	<i>Erwinia amylovora</i>	292489131	Q--LTQ--RDY---Q-K---QV-L---TT-Y---SLN
	<i>Thiobacillus denitrificans</i>	74317650	-TQ-NL-Q---AK-V--Q-N---QVL---TTSY-----MA-
	<i>Rhodospirillum rubrum</i>	89902479	-AQ-NL-QS---V--Q-N---QVT---TTNY-----QVS
	<i>Gallionella capsiferriformans</i>	302878278	Q-NL-Q---Q--V--N-S---QVL---TGY-----QR-
	<i>Sideroxydans lithotrophicus</i>	291613040	Q-NL-Q-S-Q--V--Q-A---QVL---TT-Y-----QT-
	<i>Comamonas testosteroni</i>	264676572	-LQ--L-QSS-A--V--N-N---EVN---TI-Y-----EV-
	<i>Verminephrobacter eiseniae</i>	121607559	-VQ--L-ESR-N--V--N-N---QVML---LGY-----QV-
	<i>Delftia acidovorans</i>	160896077	-LQ-AL-QSN-A--V--D-N---QVN---TT-Y-----QV-
	<i>Nitrosospira multififormis</i>	82702455	-TQ-NL-Q---SK-V--Q-Q---QVLR---T-Y-----QT-
	<i>Burkholderia glumae</i>	238028847	YTQ-NL-Q---SR-V--N-Q---QVL---TT-Y-----QAN
	<i>Methylobacillus flagellatus</i>	91776311	Q-NL-Q---NK-V--S-----QVLL---T-Y---A-QL-
	<i>Cupriavidus metallidurans</i>	94312671	Q-NP-Q---AK-V--I-N---QVT---TTSY-----QV-

Supplemental Figure 13: A partial sequence alignment of Flagellar basal-body rod protein flgG showing a one aa insert specific for the *Leptospiraceae*. Homologs for this sequence were not found in members of the *Sphaerochaeta* in our BLAST search.

		183	221
<i>Treponema, Spirochaeta, and Sphaerochaeta</i> (18/18)	<i>Treponema pallidum</i> pall Nich	3322886	VADDLVEISCVNGNSLIGRG V HKSIGHHMEIRGLGIINI
	<i>Treponema denticola</i>	48374381	----V-----I---T-V--- A N-I-----
	<i>Treponema azotonutricium</i>	333993934	----V---H--S--I-M-T- A N-I-A-----V
	<i>Treponema vincentii</i>	257457470	-S--V---T-I----- A N-M-----
	<i>Treponema paraluis-cuniculi</i>	338706552	-----L----- - -----
	<i>Treponema phagedenis</i>	320536053	-----L----- - NRI-----
	<i>Treponema succinifaciens</i>	328949096	----I---R-----I--Q- A N-L-S-----
	<i>Treponema primitia</i>	333999608	----V---L-----T---A- A N-I-----
	<i>Treponema brennaborens</i>	332298756	----I--LR-----TVL-Q- A N-M-S-----V
	<i>Treponema</i> sp. JC4	384108379	----II--R-----T-L-- A NTM-S-----
	<i>Treponema saccharophilum</i>	381179163	----I-NVR-----STIL-Q- - NAL-S-----V
	<i>Treponema caldaria</i>	339501151	----V---R-M---I-M-S- A N-I-----
	<i>Spirochaeta thermophila</i>	307719865	----A---R--A--Y-L-TS A NRLL-----V
	<i>Spirochaeta smaragdinae</i>	302340520	IS--M---R-M---I-M-A- R NPVLA-----V
	<i>Spirochaeta africana</i>	373485299	----A--VRN-S--V-L-S- A N-AL-----
	<i>Spirochaeta thermophila</i>	307719865	----A---R--A--Y-L-TS A NRLL-----V
	<i>Sphaerochaeta coccoides</i>	330837531	IS--T-KLRNIGD-H---S- E NPLLA-----V
Other Spirochaetes (0/18)	<i>Sphaerochaeta globosa</i>	325970610	IS--T-KLRNISD-Y---M- E NPLLA-----L
	<i>Sphaerochaeta pleomorpha</i>	359351273	IS--T-RLRNISD-Y---M- E NPLLA-----L
	<i>Brachyspira murdochii</i>	296125291	IS--T--FRKLRDGRI--KT NEF-K-N--V--I-VVD-
	<i>Brachyspira pilosicoli</i>	300871210	I--T--FKKLDGRI--KK -DV-K-K--V--I--VD-
	<i>Brachyspira intermedia</i>	343387028	IS--T--FKKLDGRI--RK NEY-K-N--V--I-VVD-
	<i>Brachyspira hyodysenteriae</i>	225619048	IS--I--FKKLDGRI--K NEY-K-N--V--I-VVD-
	<i>Leptonema illini</i>	373874416	---M--LR-LADSY-M-YT SSI-E-N--L--I--DV
	<i>Leptospira santarosai</i>	359686188	---M---RRLSESY---TC SDLLR-----L--
	<i>Leptospira noguchii</i>	359724074	---M---RRLSESY---TC SDLLR-----L--
	<i>Leptospira weilii</i>	359726698	---M---RRLSESY---TC SDLLR-----L--
	<i>Leptospira licherasiae</i>	359689773	---M---RRLSESY---TC SDLLR-----L--
	<i>Leptospira borgpetersenii</i>	116331058	---M---RRLSESY---TC SDLLR-----L--
	<i>Leptospira interrogans</i>	24215103	---M---RRLSESY---TC SDLLR-----L--
	<i>Turneriella parva</i>	392401991	---A-R-I-RD-SR-Y-YV SQT-E--L-----S-
	<i>Staphylococcus aureus</i>	312438812	---N---RQI-KDE---KP P-L-E-LL-----V
	<i>Leptospira biflexa</i>	183221038	---M---RRLSESY---SC SDLLR-----L--
	<i>Pelobacter propionicus</i>	118579412	---M-Y-KKKMPAT-V-QS E---Q-L-----
Other Bacteria (0/>250)	<i>Plesiocystis pacifica</i>	149919230	---V--VTIRPPDTIW-SA THLHQ-----M--L-
	<i>Myxococcus xanthus</i>	108757669	---I-DVTRRK- AVY-A- NPV-K-----
	<i>Chthoniobacter flavus</i>	196232253	-S--MTRFRALE-RE-V-TS PDLTRN-----V--V
	<i>Clostridiales genomosp.</i>	289450449	I-----VRR-SDTT-L--A PQMLR-LL-L-----DV
	<i>Anaerococcus prevotii</i>	257066536	I--M-D-IS-- -R-S-TS PEN-R-Y-----V
	<i>Ruminococcus flavefaciens</i>	268610015	---A---RK-SNI--V-SS PDN-R-FL-L--I----
	<i>Anaerococcus lactolyticus</i>	227485076	---M-D-TAID KKIV-EA PEN-R-F--L-----V
	<i>Acetivibrio cellulolyticus</i>	303241087	---V---RR-SDK--V-TA PDI-R-FI----I--LDV
	<i>Ethanoligenens harbinense</i>	289639254	I--A---RR-SSKT-V-TS PEN-R-FV-L--I--V-
	<i>Eubacterium siraeum</i>	291531397	---A---RKASNIT-V-SS PDN-R-F--L--I----
	<i>Mariprofundus ferrooxydans</i>	114778516	I--M--F-RKSPGVVV--S PEALRY-----L--
	<i>Candidatus Protochlamydia</i>	46446108	IS--I-KVKKKE-TY-E-S- VALTR-----I---V
	<i>Waddlia chondrophila</i>	297621646	IS--I-KVKKRE-HY-E-S- AELTR-----I---V
	<i>Elusimicrobium minutum</i>	187250545	-S--I--VQRRR--I---SC PNM-R-Y--V-----DV

Supplemental Figure 14: A partial sequence alignment of conserved region of Bifunctional Hpr kinase/phosphatase showing a one amino acid insertion specific for *Treponema*, *Spirochaeta*, and *Sphaerochaeta*. Homologs for this sequence were not found in members of the *Borrelia* in our BLAST search.

		1	39
<i>Treponema, Spirochaeta, and Sphaerochaeta</i> (18/18)	Spirochaeta smaragdinae	302337499	MARIAGIDL P NKATKISLTYIYGIGRSSAMEICKKAGID
	Spirochaeta africana	373484190	----- --PVR-A-----T--EK--E-T-V-
	Spirochaeta coccoides	330837633	-----V--- --V-A-----NY--AK--EQTAVN
	Spirochaeta thermophila	386346288	-----V--- --QIQ-A-----RK--ERT--P
	Sphaerochaeta globosa	325972639	-----V--- --V-A-----F--V---E-TN-N
	Sphaerochaeta pleomorpha	359352158	-----V--- --V-A-----V--VD--E-TK-N
	Treponema caldaria	339499044	-----V--- --HVN-A-----P--D---A-TK--
	Treponema paraluisuniculi	338706185	-----V--- --HVSVAL-----S---RT--E--R-S
	Treponema denticola	42526301	-----V--- --HNVN-----ST--NK--EATKV-
	Treponema vincentii	257456914	----S-V--- --HVN-A-----SH--KA--E-SK--
	Treponema pallidum	15639203	-----V--- --HVSVA-----S---RT--E--R-S
	Treponema succinifaciens	328949255	-----V--- --HVN-A--V-----NK--EATNV-
	Treponema phagedenis	320538144	-----V--- --HVN-A-----SH--KT--E--K--
	Treponema primitia	333998869	-----V--- --HVN-A--V-----D---T--K--
	Treponema azotonutricium	333996144	---LV-V--- --HVN-A--V-----D---V--K--
	Treponema brennaborensense	332298891	-----V--- --HVN-A-----D-----TK-N
	Treponema azotonutricium	333996144	---LV-V--- --HVN-A--V-----D---V--K--
	Treponema saccharophilum	381181180	-----V--- --HVV-A-----KL--E-TK--
Other Spirochaetes (0/30)	Treponema sp. JC4	384108323	-----V-I- --HLGTA-----A-AK--EE-KL-
	Borrelia sp. SV1	225552343	----S----- N --QL--A--S-----TR-L-V-N-SS-S
	Borrelia hermsii	187918366	----- N --QLQ-A--S-----AR-L--E-T-VL
	Borrelia duttonii	203284410	----- N --QLQ-A--S-----R-L-----T--L
	Borrelia turicatae	119953289	----- N --QLQ-A--S-----AR-L--R-TD-L
	Borrelia afzelii	216263668	----S----- S --QL--A--S-----TR-L-V-N--D-S
	Borrelia garinii	51598755	----S----- S --QL--A--S-----TR-L-V-N-SS-S
	Borrelia burgdorferi	221218102	----S----- N --QL--A--S-----TR-L-V-N-SS-S
	Borrelia spielmanii	224534712	----S----- S --QLR-A--S-----TR-L-V-NR-S-S
	Borrelia valaisiana	224531523	----S----- N --QL--A--S-----TR-L-V-NRSN-S
	Brachyspira murdochii	296126888	---LM-VEIR N --RIE-A--D-----TL-HV--D--N--
	Brachyspira pilosicoli	300870625	---LM-VEIR N --RIE-A--D-----TL-HV--D--N--
	Turneriella parva	392404107	---E----- N Q-RVV-G-----DKV-HD-VT---P
	Leptonema illini	488862859	----S-V--- K D-RIV-G-----DTR-R--L-A---
	Leptospira biflexa	183221325	-----V--- S --RIV-G---F---KT-SQN-L-----
	Leptospira vanthielii	489072990	-----V--- S --RIV-G---VF---KT-SQS-L-----
	Leptospira weilii	488704326	----- R E-RIV-G---F---N-LSRV-L-----
	Leptospira licherasiae	495870971	----- R E-RIVVG-----TSRKLLA---V-
Other Bacteria (0/>250)	Ammonifex degensii	260893347	-----V--- K D-RVE-A-----KK-LE-T-VN
	Eubacterium siraeum	167749413	----- K E-RVE-G---V-----KT-ND-LA---VN
	Dorea longicatena	153854995	-----V--- R D-RVE-G-----T--TR-LTE--VN
	Parvimonas micra	160947675	----V-V--- R E-RVE-G-----KTSND-LRN---N
	Oribacterium sinus	227871777	-----V--- R E-RIE-G-----P--DK-LAET-VN
	Pseudomonas putida	170723884	-----VNI- D --H-V-----V--TT-QK--AD--VN
	Olsenella uli	302336356	----N-V--- R E-RVEVG---L---QT--TKV-AET-VN
	Lactobacillus gasseri	300362366	-----V--- R --RVVVA-----E-T-KK---D---S
	Chitinophaga pinensis	256420683	----- K --RGE-G---F-----T-QY-LE-S---
	Thermobaculum terrenum	269925856	-----V--- R D-RVEVA-----PT-SKK-LE-T-VN

Supplemental Figure 15: Partial sequence alignment of conserved region of 30S ribosomal protein S13 showing a one amino acid deletion that is common to *Treponema*, *Spirochaeta*, and *Sphaerochaeta*.

			103		136
<i>Borrelia</i> (12/12)	<i>Borrelia spielmanii</i>	224534698	KVKRLAFKSVLSLRAADESS	F	KVVENFNIESGKT
	<i>Borrelia garinii</i>	386853883	-----NN	-	-----
	<i>Borrelia valaisiana</i>	224532312	-----NN	-	--I-----
	<i>Borrelia bissettii</i>	343127786	---K-----N-	-	--I-----
	<i>Borrelia burgdorferi</i>	15594824	---K-----N-	-	--I---V----
	<i>Borrelia afzelii</i>	111115308	-----S--NN	-	--I-----
	<i>Borrelia hermsii</i>	187918345	-----R----C-SA-DR	L	-I---T-----
	<i>Borrelia duttonii</i>	203284389	-----C-SVDDR	L	-----T-D----
	<i>Borrelia crocidurae</i>	386859711	-----C-SVDDR	L	-----T-D----
	<i>Borrelia turicatae</i>	119953268	-----R----CVSV-DR	L	-I---T-----
Other Spirochaetes (0/36)	<i>Treponema pallidum</i>	378972695	-----M--L---K-QGDAL		T-I-D-TV-----
	<i>Treponema paraluisicuniculi</i>	338706164	-----M--L---K-QGDAL		T-I-D-TV-----
	<i>Treponema succinifaciens</i>	328949276	-E---M--I---Q-QADRL		T---D-T-----
	<i>Treponema primitia</i>	333998888	-A---L-TI---K-QSDDL		-----D-S-D----
	<i>Treponema denticola</i>	42526280	-A---M--I---K-QNDRL		V---D-TV-----
	<i>Treponema brennaborens</i>	332298912	-----M--I---K-QGDRL		T-I-D-TV-----
	<i>Treponema phagedenis</i>	320538164	-A---M--L---MK-Q-DRL		T---D-T-----
	<i>Treponema vincentii</i>	257456893	-A---M--I---K-Q-DRL		V-I-D-TV-T---
	<i>Treponema saccharophilum</i>	381181199	TA---M--I---Q-QADRL		T---D-T-----
	<i>Treponema azotonutricium</i>	333996164	-A-Q--I-TI---KVQSDML		-I---D-TV-----
	<i>Treponema sp. JC4</i>	384108302	-E---M-TI---SH-QGDRL		TI---D-TV-----
	<i>Treponema caldaria</i>	339499023	-A---L--I---K-QSDIL		-----D-TV-----
	<i>Spirochaeta smaragdinae</i>	302337478	-M---M-----K-KEDAI		-----D-TV-----
	<i>Spirochaeta thermophila</i>	307718207	-----YR---KLRENAP		R---D-VV-----
	<i>Spirochaeta africana</i>	383789789	-L---Y--I---QKVQQ-DI		V---D-AL-----
	<i>Sphaerochaeta globosa</i>	325972660	-M---M--L---GVKE-RL		V---D-S-D----
	<i>Sphaerochaeta pleomorpha</i>	374316493	-----M--L---GIQE-RL		V---D-SP-----
	<i>Sphaerochaeta coccoides</i>	330837654	-----M--L---SVQE-RL		V---D-TA-----
	<i>Brachyspira pilosicoli</i>	00870646	-M--K-LL----KYGNVNL		--F-D-TFDAP--
	<i>Brachyspira hyodysenteriae</i>	225621029	-M--K-LL----KYGSNVL		--F-D-TFDAP--
Other Bacteria (0/>250)	<i>Bacteroides ovatus</i>	160883063	---T--R--A--YK-QNDAI		V---D-TF-AP--
	<i>Prevotella buccalis</i>	282878760	---N--RR-A--YK-QENAI		VI---D-TLDAP--
	<i>Microscilla marina</i>	124003663	---S--R--A--TYK-KENNI		T---D--L-AP--
	<i>Psychroflexus torquis</i>	91216909	-L---R-T---QKLKNNQL		MI---D-GF-AP--
	<i>Bacteroides plebeius</i>	198274002	---V--R--A--AYK-QTNNI		V---D-TF-AP--
	<i>Dokdonia donghaensis</i>	86132545	GL---RR-A--TMK-N-NAI		T-I-D--FDAP--
	<i>Gramella forsetii</i>	120437173	NL---R--A--IK-N-KAI		M-I-D-SFDTF--
	<i>Prevotella tanneriae</i>	258648158	-L-A--RR-A--YK-KEN-I		V-L-D-TM-TP--
	<i>Kordia algicida</i>	163752916	N----R--A-T-K-KS--I		I-I-D-DFDAP--
	<i>Rhodothermus marinus</i>	268316409	-TQ---RR-A--TYK-QA-AI		R---D-TF-QPS-
	<i>Croceibacter atlanticus</i>	298207728	-Q-Q--RR-A--QK-Q-NAI		VI---SFDAP--
	<i>Persephonella marina</i>	225850736	--RKK-L-G---MKLR-GEL		T-I-D-TFDEP-
	<i>Eubacterium siraeum</i>	291532094	-----L--A--AKVQ-G-M		I--DSITADEF--
	<i>Veillonella dispar</i>	238018624	-AR--V--A--DKVNNSEL		Y-L-EITLAAP--
	<i>Haliangium ochraceum</i>	262197187	--RKK-LR-A----KEQKL		V-LDA-PV-G---
	<i>Staphylococcus aureus</i>	15925239	-MR---LR-A--FK-QENGL		T--DA--F-AP--
	<i>Pediococcus pentosaceus</i>	116493162	-MR---L-----QKVL---L		V--DE-KF-TP--
	<i>Listeria monocytogenes</i>	47094373	--R---I--I--SKVNE-KL		V-L-GLTFDAP--
	<i>Aerococcus viridans</i>	295398289	--R---LR-A--TKV-ENN		I--DELAF-TP--

Supplemental Figure 16: A partial sequence alignment of conserved region of 50S ribosomal protein L4 showing a one amino acid insertion specific for the genus *Borrelia*. Homologs for this sequence were not found in members of the *Leptospiraceae* in our BLAST search.

			143		178
Borrelia (12/12)	Borrelia duttonii	203284699	INIYDIEILDYNIDF	RI	LKLKIKCSKGYTVRSIARD
	Borrelia crocidurae	386860042	-----	--	-----
	Borrelia recurrentis	203288231	-----	C-	-----
	Borrelia turicatae	119953580	V----Q--N--V-S	--	---Q-----
	Borrelia hermsii	187918657	V----Q--N--V-S	--	---Q-----
	Borrelia valaisiana	224532106	V-V---Q--N-DFNS	SL	-S---S-----I-----
	Borrelia spielmanii	224534135	V-V-N-Q--S-DFNS	SL	-S---S-----I-----
	Borrelia burgdorferi	226320850	VTV-N-QR-S-DFSS	FL	-S---S-----I-----
	Borrelia bissettii	343128100	VTV-S-QR-N-DFSS	SV	-S-----I-----
	Borrelia garinii	219685675	V-V---QR-S-DFSS	SS	-S---T-----I-----
Other Spirochaetes (0/36)	Treponema saccharophilum	381179451	-T--S-K-V-FMDKY		AL-EVR-----I--L---
	Treponema azotonutricium	333994686	VTV-E--LSSWDPL		AG--VR--A---I--L---
	Treponema caldaria	339499975	-R-HEL-V-H-EEPR		-T-RVH-----I-AL---
	Spirochaeta smaragdinae	302338540	VT-HNL--TAFDGEK		AVIRVT-----I--L---
	Spirochaeta thermophila	307718802	VE--ALSL-EWRPPY		ATVRVS--G---I-AL---
	Sphaerochaeta coccoides	330836565	VT--SF-PVSFDGCN		-VADVHV-----I--L---
	Brachyspira hyodysenteriae	225619559	VC-EK--L-E-DYPY		F-I-TSV-----I---I--
	Brachyspira intermedia	384209155	VC-EK--L-E-DYPY		F-I-TSV-----I---I--
	Leptospira interrogans	488071099	-K--RY-LGEFSPES		ISFQ-RV-A---I-K-VM-
	Leptospira inadai	498103995	-K--EF-VRNFEESG		-TIRT-V-G---I-KLVM-
Leptospira broomii	498255112	-K--EF-VRNFEETG		-TIRT-V-G---I-KLVM-	
Other Bacteria (0/>250)	Hahella chejuensis	83644103	-I-HEL-L---TPP-		-R-RVL-----I-NLVE-
	Alteromonas macleodii	239997159	-EV-ELDV-RIELP-		VEMR-----I---VD-
	Haemophilus somnus	113460966	-S-FELKFI--Q-PY		-T-EVH-----I-TLVD-
	Alcanivorax borkumensis	110833192	VT---LR--RIDG-E		-EFEVD-----I-LVE-
	Haemophilus influenzae	260581411	-T-FELNFIE--AP-		-T-EVH-----I-TLVD-
	Pasteurella multocida	15602621	-T-F-LQFIA-DAPY		-T-EVH-----I-TLVD-
	Pasteurella dagmatis	260914251	-M-FELNFIE--APY		-T-D-H-----I-TLVD-
	Xanthomonas fuscans	294665175	VDVQA--V-G-GAPR		-R-RVT-GS---I--L---
	Sodalis glossinidius	85058357	-HV--LQLHRWDLTK		VE-E-H-----I-T-ID-
	Dichelobacter nodosus	146329574	-H-ASCSVIAB-K-Y		AQ-R-R---S-I-AF---
	Vibrio splendidus	218710443	-TV-S--L-RFEG-E		VEMEVH-----I-T-TD-
	Anaerococcus vaginalis	256544701	-KV--F---FDFPY		ARF--T-----I--LVN-
	Clostridium botulinum	253682681	VT-----IS-PY		I-FMV-----I--LCY-
	Anaerococcus tetradius	227499291	V-----FAFPQ		ARILV-----I-TLID-
	Oribacterium sinus	227872008	-E-FAL---S-DCPK		-RFR-H-----I-TLCK-
	Anaerococcus prevotii	257066119	VK---LKLI-FDFPY		A-ISVT-----I-TLVD-
	Halothermothrix orenii	220931631	VE-KK-N---IDLPK		V--FVL--P---I-----
	Dorea formicigenerans	166030870	VQ-F-----SIALPR		VTM-VH-----I-TLCH-
	Coprococcus comes	226323224	-T-HE-R--EI-LPE		V--EVT-----I-TLCH-
	Veillonella parvula	282848833	-H-KN--LIA-GFP-		FTVRVT--G---I--LL--
	Alistipes putredinis	167752309	---EM-LME-DLPR		IRIRVR-----I--L-
	Psychroflexus torquis	91217024	V--DSFD-IQN-FPK		-NF--Q-----I--L-Y-
	Planctomyces maris	149174741	VDV-E--L--FSFPR		FQ-R-V-GS---I---G--
	Methylobacterium mobilis	253995586	V--HN--V-SFAG-V		AEITVT-----I-TL-E-
	Eikenella corrodens	225024511	-H-H--Q--RFQFPE		AQISVQ-----I-TL-E-
	Simonsiella muelleri	294788179	-T--Q-D-IEF-FPK		AVIDVR-----I-TLSE-
	Dechloromonas aromatica	71908068	VT-FA-DC--FSG-L		-T-RVA-----I-VL-A-
	Neisseria flavescens	225075531	-T--S-D-TEF-APK		AVIDVR-----I-TLSE-

Supplemental Figure 17: Partial sequence alignment of conserve region of tRNA pseudouridine 55 synthase showing a two amino acid insertion specific for the genus *Borrelia*.

			330	369
			PQFFFRITDVTGMVSLE	GKEMVMPGDNDIVVELISSIAM
<i>Borrelia</i> (12/12)	<i>Borrelia duttonii</i>	203284386	-----	-----
	<i>Borrelia crocidurae</i>	386859708	-----	-----
	<i>Borrelia bissettii</i>	343127783	-----V-A--	-----I-----
	<i>Borrelia turicatae</i>	119953265	-----	-----
	<i>Borrelia lonestari</i>	145652262	-----N--	-----
	<i>Borrelia hermsii</i>	187918342	-----	-----L--
	<i>Borrelia afzelii</i>	111115305	-----V-A--	-----
	<i>Borrelia spielmanii</i>	224534799	-----V-A--	-----
	<i>Borrelia garinii</i>	219684436	-----V-A--	-----
	<i>Borrelia valaisiana</i>	224532207	-----V-A--	-----
	<i>Borrelia burgdorferi</i>	2688415	-----V-A--	-----I-----
Other Spirochetes (0/36)	<i>Treponema primitia</i>	333998891	--Y-----I--TI--P	E -VD--K---TK-IG---HP---
	<i>Treponema pallidum</i>	161579586	--Y-----I--TI--P	E -VD--K---TK-IG---HP---
	<i>Treponema caldaria</i>	339499020	--Y-----I--T-K-P	E -----TE-FG---HP---
	<i>Spirochaeta thermophila</i>	386346264	--Y-----S-Y-P	D D-Q-----AE-T---TPV--
	<i>Spirochaeta smaragdinae</i>	302337475	--Y-----I--T-N-P	A D-Q-----AELEI---HP---
	<i>Sphaerochaeta coccoides</i>	330837657	--Y-----I--T-L--	E GK--L---HTELE---HPV--
	<i>Brachyspira intermedia</i>	384210014	--MY-----VIN-A	E -AQ-I-----ANLTI---TP---
	<i>Brachyspira murdochii</i>	296126863	--MY-----VIN-Q	E -SQ-I-----ANLTI---TP---
	<i>Turneriella parva</i>	392404081	--Y-----T-N-P	T -V--N-----T-TA---P---
	<i>Leptonema illini</i>	488862824	--Y-----TIM-P	A --V-I-----TVD---TP---
	<i>Leptospira interrogans</i>	24213437	--Y-----VCN-P	N -V-----SLT-----P---
	<i>Leptospira borgpetersenii</i>	116327222	--Y-----VCN-P	N -V-----SLT-----P---
	<i>Rhodospirillum centenum</i>	209964023	--Y-----T-P	E -T-----R-R---AP---
	<i>Acidiphilium cryptum</i>	148260941	--Y-----V-T-P	E -V-----TVS---AP---
	<i>Gluconobacter oxydans</i>	58038857	--Y-----V-T-P	E -T-----AMD---AP---
	<i>Agrobacterium vitis</i>	222148347	--Y-----I--P	E -T-----TVQ---VP---
	<i>Hyphomonas neptunium</i>	114799205	--Y-----I-K-P	E D----L-----KMD---NP---
	<i>Rhizobium leguminosarum</i>	209548918	--Y-----I-T-P	E -T-----TVA---VP---
Other Bacteria (0/>250)	<i>Stappia aggregata</i>	118591186	--Y-----V--P	E -T-----SVE---VP---
	<i>Roseomonas cervicalis</i>	296537446	--Y-----V-Q-P	E -V-----AMD---AP---
	<i>Methylocella silvestris</i>	217976769	--Y-----V-T-P	E -T-----TMD---AP---
	<i>Oceanicaulis alexandrii</i>	83858568	--Y-----V-I-K	E -T-----EVS---QP---
	<i>Rhodospirillum rubrum</i>	83594034	--Y-----TIE-P	E -T-----IGMT-Q--AP---
	<i>Moraxella catarrhalis</i>	296112456	--Y-----AIT-Q	E -T-----EMS---HP---
	<i>Vibrio vulnificus</i>	27364738	--Y-----DI--P	E -V-----IQM---P---
	<i>Proteus mirabilis</i>	197287064	--Y-----TIE-P	E -V-----NMI---HP---
	<i>Enhydrobacter aerosaccus</i>	257455971	--Y-----AIQ-P	E -T-----EMN---HP---
	<i>Psychrobacter arcticus</i>	71064958	--Y-----AIQ-Q	D -T-----EMG---HP---
	<i>Grimontia hollisae</i>	262273383	--Y-----TIE-P	E -V-----IKMI---AP---
	<i>Aliivibrio salmonicida</i>	209693919	--Y-----DIT-P	E -V-----QMT---AP---
	<i>Yersinia pestis</i>	22124392	--Y-----TIE-P	E -V-----NM--N--AP---
	<i>Xenorhabdus bovienii</i>	290477024	--Y-----TIE-P	E -V-----INMI-T--AP---
	<i>Luticola nitroferum</i>	224827264	--Y-----A--A	E -V-----E-T---AP---
	<i>Comamonas testosteroni</i>	264676487	--Y-----SIE-P	E -----S-T-K--P---
	<i>Ralstonia pickettii</i>	187930366	--Y-----SIA-P	E -----S-T-K--AP---
	<i>Neisseria gonorrhoeae</i>	293398222	--Y-----A-T--	K -V-----E--T-T---AP---
	<i>Kingella oralis</i>	238023037	--Y-----A-T-S	E -V-----E--T-T---AP---
	<i>Simonsiella muelleri</i>	294789160	--Y-----A-T-S	E -V-----E--K-T---AP---
	<i>Taxeobacter ocellatus</i>	1169497	--Y-----II--A	E -V-----T-S---NAV--
	<i>Pedobacter heparinus</i>	255530754	--Y-----EI--A	E -T-----T-T-K--NA---
	<i>Bacteroides capillosus</i>	154499816	--Y-----IIT-P	E -T--C-----MD---TP--I
	<i>Kribbella flavida</i>	284034004	--Y-----V-T-P	E -T-----T-MS---QP---
	<i>Salinispora arenicola</i>	159039836	--Y-----V-T-P	E -T-----TTMT-K--QP---
	<i>Solibacter usitatus</i>	116624204	--Y-----VAQ-P	E -T-----SLE---TPV--
	<i>Eubacterium dolichum</i>	160914563	--Y-----VIT-P	E -T-----EMT---AP--I
	<i>Clostridium botulinum</i>	148381423	--Y-----SIN-P	E -V-----HI-MA---TPV--

Supplemental Figure 18: A partial sequence alignment of conserved region of Translation elongation factor TU showing a one amino acid deletion specific for the genus *Borrelia*.

			273	301
<i>Borrelia</i> (12/12)	<i>Borrelia hermsii</i>	187918014	RGLDYTYTGLVFEAEMMGI	NMGSI CS GG RY
	<i>Borrelia duttonii</i>	203284061	-----L-V	-----
	<i>Borrelia recurrentis</i>	203287600	-----L-V	-----
	<i>Borrelia crocidurae</i>	386859366	-----L-V	-----
	<i>Borrelia turicatae</i>	119952938	-----I-----I--	-----
	<i>Borrelia garinii</i>	219685912	-----I---S-IF-S	----V-----
	<i>Borrelia burgdorferi</i>	195942375	-----I---S-VF-S	----V-----
	<i>Borrelia valaisiana</i>	224531959	-----I---S-VF-S	----V-----
	<i>Borrelia bissettii</i>	343127457	-----I---S-VF-S	----V-----
	<i>Borrelia spielmanii</i>	224534329	-----I---S-VF-S	----V-----
	<i>Borrelia</i> sp. SV1	225551966	-----I---S-VF-S	----V-----
	<i>Borrelia afzelii</i>	111114958	-----I---S-VFDS	----V-----
Other Spirochaetes (0/36)	<i>Treponema saccharophilum</i>	381180018	-----V-Y-TFLN-C	P EI--V-----
	<i>Treponema denticola</i>	42526950	-----V---TFLNDL	P SI--V-----
	<i>Treponema phagedenis</i>	320536997	-----V---TFLTEL	P EI--V-----
	<i>Treponema azotonutricium</i>	333994759	-----I-Y-TLLKEM	P EL--V-----
	<i>Treponema succinifaciens</i>	328948006	-----I-Y-TFLEKL	P SI--V-----
	<i>Treponema brennaborensis</i>	332297974	-----V-Y-TFLNAL	P SI--V-----
	<i>Treponema vincentii</i>	257456490	-----I-Y-TFLTDL	P QL--V-----
	<i>Treponema caldaria</i>	339499953	-----V-Y-TFLNDL	P EI--V-----
	<i>Spirochaeta thermophila</i>	386347361	-----V---TFLSDL	P DI--V-----
	<i>Sphaerochaeta pleomorpha</i>	374314911	-----I-Y-TFLTDL	P -F--V-----
	<i>Sphaerochaeta globosa</i>	325971158	-----I-Y-TFLTDL	P -F--V-----
	<i>Brachyspira pilosicoli</i>	404475790	-----KTA--VQTNAL	G SQSA-LG----
	<i>Brachyspira murdochii</i>	296125535	-----KTA--VQTNAL	G AQSA-LG----
	<i>Turneriella parva</i>	392401903	--F----M---VFDTHP	E -RR-LFG----
	<i>Leptonema illini</i>	488863069	--F-----IYDTNP	E -RRA-FG----
	<i>Leptospira santarosai</i>	490626428	--F----CI--VFDTNS	E -KR-LYG----
Other Bacteria (0/>250)	<i>Leptospira wolbachii</i>	505588704	--F----FI--IFDTSP	Q -KR-LYG----
	<i>Leptospira yanagawae</i>	505584542	--F----FI--IFDTSP	Q -KR-LYG----
	<i>Planctomyces maris</i>	149177824	-----TIY-TFLNQL	P GI--V-----
	<i>Gemmata obscuriglobus</i>	168702989	-----TIY-TFLTDL	P GI--V-----
	<i>Finegoldia magna</i>	302380644	-----S---TFFKDY	P EI-----
	<i>Parvimonas micra</i>	160946147	-----T-Y-TFLENY	R QL--V-----
	<i>Xylella fastidiosa</i>	28199156	-----T-Y-TALINH	P QI-----
	<i>Wolinella succinogenes</i>	34557793	---G----I-Y-TTLDAL	P SI--V-----
	<i>Mobiluncus curtisii</i>	298346863	-----M-Y-TFIT-A	E SY-----
	<i>Kytococcus sedentarius</i>	256824814	-----T-Y-TFLDEH	P EL-----
	<i>Scardovia inopinata</i>	294790955	-----S-Y-TFLD-A	E SL--V-----
	<i>Bifidobacterium longum</i>	312132333	-----S-Y-TFLD-A	A SL-----
	<i>Micrococcus luteus</i>	289706220	-----T-Y-TVLV-H	E QL-----
	<i>Kocuria rhizophila</i>	184201003	-----T-Y-TVLV-H	E KL--V-----
	<i>Rothia dentocariosa</i>	300741588	-----T-Y-TVLV-H	E SL-----
	<i>Beutenbergia cavernae</i>	229820494	-----S-Y-TVLV-H	E DL-----
	<i>Sanguibacter keddiei</i>	269795067	-----S-Y-TVLV-H	E EL-----
	<i>Bacteroides capillosus</i>	154496106	-----T-Y-TV-LDH	P EV-----
	<i>Lentisphaera araneosa</i>	149199644	-----S-Y-CVIN-L	E SY--V-----
	<i>Nodularia spumigena</i>	119512876	-----T-Y-TTLL-H	E AL-----
	<i>Nostoc punctiforme</i>	186685474	-----T-Y-TTLL-H	E AL-----
	<i>Raphidiopsis brookii</i>	282895590	---N----T-Y-TTLL-H	E SL-----
	<i>Anabaena variabilis</i>	75908477	---N----T-Y-TTLL-H	E AL-----

Supplemental Figure 19: Partial sequence alignment of conserved region of Histidyl-tRNA synthetase showing a one amino acid deletion specific for the genus *Borrelia*.

			231	264
<i>Borrelia</i> (12/12)	<i>Borrelia hermsii</i>	187918098	EITLGGYYNTILD LKS	PLRMAGLSHC FRKEAG
	<i>Borrelia crocidurae</i>	386859451	-----	--K-----
	<i>Borrelia turicatae</i>	119953022	-----	--K-----
	<i>Borrelia duttonii</i>	203284145	-----	--K-----
	<i>Borrelia recurrentis</i>	203287683	-----	--K-----
	<i>Borrelia burgdorferi</i>	226321201	-----K-I--TL	--R--F-----
	<i>Borrelia afzelii</i>	216263748	-----K-I--TL	--IK--F-----
	<i>Borrelia spielmanii</i>	224534318	-----K-I--T-	--IK--F-----
	<i>Borrelia valaisiana</i>	224531827	-----K-I--LT	--IK--F-----
	<i>Borrelia bissettii</i>	343127544	-----K-I--TL	--IR--F-----
	<i>Borrelia sp. SV1</i>	225552155	-----K-I--TL	--IR--F-----
	<i>Borrelia garinii</i>	386853634	-----K-I--TL	--I---F-----
Other Spirochaetes (0/36)	<i>Treponema primitia</i>	374815548	-----S----SREK	L--R-----R---
	<i>Treponema azotonutricium</i>	333995154	-----S-M--PKEK	L--R-----R---
	<i>Treponema sp. JC4</i>	384108580	-----HKDE---KA-	L--LYG-----R---
	<i>Treponema succinifaciens</i>	328948174	-----HSGE---KSK	L--MYC-----R---
	<i>Treponema brennaborensense</i>	332297813	-----HSGE---KSK	L--LYC-----R---
	<i>Treponema phagedenis</i>	320535443	-----HADE---SQTK	L--LYC-----R---
	<i>Treponema saccharophilum</i>	381181448	-----FHSGE---AKEA	L--YYC-----R---
	<i>Treponema paraluis-cuniculi</i>	338706601	-----A-HAGEV-EER-	L--RLY-----R---
	<i>Treponema pallidum</i>	15639634	-----A-HAGEV-EER-	L--PRLY-----R---
	<i>Treponema vincentii</i>	257457271	-----HSDE---KAK	L--MYC-----R---
	<i>Treponema denticola</i>	42527809	-----HSDE-IKKE-	L--KYC-----R---
	<i>Treponema caldaria</i>	339499194	-----SG---SKDK	L--R-----R---
	<i>Spirochaeta africana</i>	383790986	-----HAGKM-TASE	L--IRL-----R---
	<i>Spirochaeta thermophila</i>	386347714	-----M-ADE-IPGQA	L--RF-----R---
	<i>Spirochaeta smaragdinae</i>	302339395	-----HAGELIDGQR	L--IKL-----R---
	<i>Sphaerochaeta pleomorpha</i>	374317524	-----A-Q---QSQ	L--I--T-----R---
	<i>Sphaerochaeta globosa</i>	325971623	-----ADQ---REQ	L--I-----R---
	<i>Sphaerochaeta coccoides</i>	330836880	-----SGE---KAN	L--L-----R---
	<i>Brachyspira pilosicoli</i>	300870425	-VP-TNI-REE-IPENM	L--YCTAYTP---S---
	<i>Brachyspira murdochii</i>	296126531	-VP-TNI-REE-IPENM	L--IYATAYTP---S---
	<i>Turneriella parva</i>	392402053	-VP-TNL-ADE--NAAE	L--IKLTAFTP---R---
	<i>Leptonema illini</i>	488863018	-VP-VNL--DELIKEEE	L--VAVTAA-S---R---
	<i>Leptospira wolbachii</i>	505589699	-VP-TN--RDE-ISE-E	L--ISVCAHTP---R---
	<i>Leptospira meyeri</i>	463323142	-VP-TN--RDE-ISE-E	L--ISVCAHTS---R---
Other Bacteria (0/>250)	<i>Blastopirellula marina</i>	87310730	-----MNANKV-EAED	L--KLYC-M---Y-T---
	<i>Gemmata obscuriglobus</i>	168700966	-----MHRDR-F-EAE	L--K-YV-----T---
	<i>Pirellula staleyi</i>	283780181	-----M-ADQTV--EQ	L--IKL--I-----T---
	<i>Planctomyces maris</i>	149179060	-----SMKDQ-M-RET	L--YKI-----T---
	<i>Plesiocystis pacifica</i>	149919214	-----MVADE---PEQ	L--LV-----T---
	<i>Campylobacter hominis</i>	154149298	-V-ATNF-NGE--SEDE	L--VKFTSY-----
	<i>Desulfo. retbaense</i>	258405089	-VP-TNLHAGEV--EQD	L--RGY-AFTP---S---
	<i>Conexibacter woesei</i>	284042611	-VA-ASLHQGE--AEEE	L--R-Y--F-P---R---
	<i>Rhodococcus equi</i>	296038806	-VP-A--HSGE----SK	G--K-Y--W-S---R---
	<i>Nocardia farcinica</i>	54022104	-VP-A--HADE----SA	G--K-Y--W-S---R---
	<i>Thermobifida fusca</i>	72160435	-VP-A--HANE--PADA	L--T-YI-W-S---R---
	<i>Eggerthella lenta</i>	257792717	-VQ-TNIHAGE---AGQ	L--KYCAFTP---E---
	<i>Ferroglobus placidus</i>	288930586	-HP-AAMHM-ET-GEDE	L--LY--V-P-----
	<i>Naegleria gruberi</i>	291002089	--G-AALHC-EFMPNFK	G--KY-----T---
	<i>Veillonella dispar</i>	238019657	-V--TN-HSGE--SEEE	L--KYTAFTA---A---
	<i>Bacillus tusciae</i>	295695170	-VP-VS--ADEV-SEEE	L--K-ML-I-N---R-V-
	<i>Theileria annulata</i>	85000409	-QPIAALHRGEVYQK-Q	L--I-Y--I-T---R---
	<i>Plasmodium chabaudi</i>	70941484	-QP-CALHRDET-ESEY	L--KYV-I-S-----
	<i>Trypanosoma cruzi</i>	71421977	-MPIAA-HRGKWFTELK	E--KY--M-S-----

Supplemental Figure 20: A partial sequence alignment of conserved region of Seryl-tRNA synthetase showing a one amino acid deletion specific for the genus *Borrelia*.

			114		154
			LIGREGKNLDSLQLLTNVYTSK	LIG	ENGsfNRVVDIGDYR
			-----A--	---	-A---I-----
			-----R---	---	-T-A---I-----
			-----A--	---	-T-A---I-----
			-----	---	-TST---I-----
			-----R--A--A--V-R	---	D--N---II---E---
			-----R--A--A--M-R	---	D--I---I---E---
			-----R--A--A-I-I-R	---	DT-N---I---E---
			-----A--	---	-A---I-----
			-----A--	---	-T---I-----
			-----R--A--A-I-I-R	---	DT-N---I---E---
			---KK-----A--A--FFT-		IGAKGVK----CEN--
			---K-----AI---A--MGH		LGREDL-----EN--
			---K-----A--A--AGR		LGREDV--I--TEN--
			---K-----A--A-I-AGR		LGHEEV--I--TEN--
			---K-----AM--IV--AGH		LGREDL-II--TEN--
			---KK-----A--A-I-AGR		QGREDM--I--SEN--
			---KK-----A--A-I-AGR		QGREDM--I--SEN--
			---KK-----A--A--FFT-		IGAKGVK----CEN--
			---KK-----A--IA--AG-		I-ISE-IM--CEN--
			---KK-----I--A--AGT		IGHAYA--SV-CES--
			---KK-----A--A-IFA--		LGYYDT-II--AEN--
			I--KH-RT-EA--FM--LIVE-		IT-EQPKIL---EN--
			I--K-----A--V-V--VSNR		LA--DFK---TEN--
			---KK-----A--V-A--IA-R		DG--SV-----AEN--
			---KK-----A--V--CG-		LHEGR--IV-AEN--
			I--K-----A--MMA--FIG-		FD-DRK--I-SE---
			I--K-----AI--A--AGQ		IDPDLK-II-SEN--
			I--K-----AI--A--FAGQ		IDPDQKI-V-SEN--
			---KR-QT-----Y-VSLVIN-		-CEK---K--TEN--
			---KH-QT--A--Y--SLFVN-		-SEA-IK-K--TEN--
			---KR-QT-----Y--LAVN-		NAE--VK-KI-TE---
			I--R-ET--A--Y-SSLVANR		-E-DYI--TI-S-N--
			---KR-QT-----YIISLVVN-		-SD-YI-IVK-TEN--
			V--KR-TT---I-YILSLIIN-		HSD--V--IV-SSG--
			---KR-EH-AQF-Y-V--LVNR		RLP-WT--II-VEG--
			---KR-QT-----Y-V-LVAN-		-E-E-I-IK--AEN--
			---R-QT--A--Y--IVANR		YSDK-I-I---AEQF-
			F--K--RT-K-VEF-A--MA-		QF-GEY-----AAG--
			F--K--RT-KAVEY-AG-VLA-		HF-GAY-----AAG--
			M--G-QT-A--Y-SSRIL-R		IMS-SI-IQFN-----
			---KR-QT---I-Y-VSLVVN-		--EKYM--KV-TE---
			-V--G-EV-EA--E--RLAVHR		RT-ERS-LM--V-G--
			-V--D-EV-EA--E--RLAVHR		-T-DRS-LM--AG--
			-V-DH-EV--A--E--RLAAMA		-T-QRS-LM--AG--

Supplemental Figure 21: Partial sequence alignment of conserved region of Spoiii-associated protein showing a three amino acid insert specific for the genus *Borrelia*.

			134	159
Borrelia (12/12)	Borrelia hermsii	187918492	LIATKTARIKEA	GATNLAEFGLRRAQ
	Borrelia spielmanii	224534534	-----S-----S	--KI---L-----
	Borrelia duttonii	203284534	-----S-----S	--K---L-----
	Borrelia recurrentis	203288068	-----S-----S	--Q---L-----
	Borrelia burgdorferi	218249472	-----S-----S	--KI---L-----
	Borrelia garinii	219684323	-----S-----S	--KI---L-----
	Borrelia valaisiana	224532144	-----S-----S	--KI---L-----
	Borrelia afzelii	111115467	-----S-----S	--KI---L-----
	Borrelia turicatae	119953414	-----S-----S	--K-----
	Borrelia lonestari	145652231	-----S-----S	--K-----
	Borrelia crocidurae	386859869	-----S-----S	--Q---L-----
	Borrelia sp. SV1	225551865	-----S-----S	--KI---L-----
Borrelia bissettii	343127936	-----S-----S	--KI---L-----	
Other Spirochaetes (0/19)	Treponema brennaborense	332297432	-----VWL-----S	-KGHIM-----
	Treponema azotonutricium	333994371	-----VWL-----S	-KGSVM-----
	Treponema primitia	374813305	-----VWL-----T	-KGSVM-----
	Treponema sp. JC4	384108767	-----WL-----S	-KKAPIM-----
	Treponema paraluisuniculi	338706584	-----MWR-----S	-EGV-M-----
	Treponema succinifaciens	328947918	-----VWLS-----S	-KKG-VM-----
	Treponema phagedenis	320538187	-----WL-----S	-NKSSIM-----
	Treponema pallidum	15639616	-----MWR-----S	-EGV-M-----
	Treponema vincentii	257457678	-----WL-----S	-KSSIM-----
	Treponema denticola	42525692	-----WL-----S	-KKG SIM-----
	Treponema caldaria	339500499	-----VYL-----S	-KGTIM-----
	Spirochaeta africana	383790326	-V---A---MR---A	-AGGPIL-----
	Spirochaeta smaragdinae	302339397	-----VYN-----S	-RGGLIL-----
	Sphaerochaeta coccoides	330836881	-----A---MSL---A	-SGGPIM---Y---
	Sphaerochaeta globosa	325971624	-----AS-MAL---S	-NRGS-M-----
	Sphaerochaeta pleomorpha	374317523	-----AS-MAL---A	-NRGL-M-----
	Anaerococcus tetradius	227500763	-V---N---VR---A	-NRLVM---A---
	Dorea longicatena	153853960	-----S---VF---A	-NGDGIM-----
	Filifactor alocis	291171126	-----SS---CQV A	-KDDVVM-----S
Other Bacteria (0/>250)	Blautia hansenii	260588774	-----AS-VVY---A	-KGDGIM-----
	Ruminococcus obeum	295110720	-----A---VCY---A	-RGDGIM-----
	Anaerostipes caccae	167748377	-----AS-VVY---A	-GSGVM-----
	Coprococcus comes	226323559	-----SS---VY---A	-D-GVM-----
	Planctomyces maris	149175181	-----S---CA---A	-SDPVL-----
	Plesiocystis pacifica	149919902	-----A---VA---A	-EGDPVL-----
	Campylobacter jejuni	284925506	-----N---VR---A	-KDSKIL---S---
	Microscilla marina	124002542	-V---A---MNL---T	-KGEPVL-----
	Chthoniobacter flavus	196229944	-----A---VCL---A	-QDDPVL-----
	Opitutus terrae	182415477	-----A---CLV---A	--DPVI-----
	Atopobium vaginae	227516151	-L-----VVS---A	-QGRP VF-----
	Bacillus cereus	152974344	-----A---M-H---A	-NDE-L---T---H
	Lactococcus lactis	125624279	-----A---SV---I	-EDP-L---T---
	Brevibacillus brevis	226310438	-----AS---NV---A	-NDV-M---T---
	Waddlia chondrophila	297620776	-----AS-CA-A---D	-GD-VL-----

		86	110
<i>Borrelia</i> (12/12)	<i>Borrelia turicatae</i> 91E135	119953435	DGADEILLETK A LIKGGGAHLMEK
	<i>Borrelia hermsii</i> DAH	187918513	-----K- -
	<i>Borrelia recurrentis</i> A1	203288089	-----V--DK- -
	<i>Borrelia crocidurae</i> str. Achen	386859891	-----V--DK- -
	<i>Borrelia duttonii</i> Ly	203284555	-----V--DK- -
	<i>Borrelia garinii</i> PB1	51598912	-----K- S ---M-G----
	<i>Borrelia afzelii</i> ACA-1	216263505	-----K- S ---M-G----
	<i>Borrelia burgdorferi</i> 80a	195941477	-----K- S ---M-G----
	<i>Borrelia valaisiana</i> VS116	224531804	-----K- S ---M-G----
	<i>Borrelia spielmanii</i> A14S	224534514	-----K- S ---M-G----
	<i>Borrelia bissettii</i> DN127	343127958	-----K- S ---M-G----
	<i>Borrelia</i> sp. SV1	225551838	-----GK- S ---M-G----
Other Spirochaetes (0/18)	<i>Treponema phagedenis</i> F0421	320536897	-----DSKKN -----L-R--
	<i>Treponema vincentii</i> ATCC 35580	257457570	-----DSKKN -----L-R--
	<i>Treponema denticola</i> ATCC 35405	42527149	-----DPDKN -----L-K--
	<i>Treponema saccharophilum</i> DSM 23811	79076	-----DG-NN -----L-L--
	<i>Treponema paraluisicuniculi</i>	133712453	-----DTQNF V-----L-Q--
	<i>Treponema succinifaciens</i> DSM 23289	49354	-----DPDNN -----L-R--
	<i>Treponema pallidum</i> subsp. pall	15639604	-----DTQNF V-----L-Q--
	<i>Treponema brennaborensense</i> DSM 12	332298818	-----SP-GY -----L-R--
	<i>Treponema</i> sp. JC4	384107651	-----VDPDCN -----VR--
	<i>Spirochaeta africana</i> DSM 8902	383789693	----AVDPQLA -----T--
	<i>Leptonema illini</i> DSM 21528	374587785	----VDPQLR -----TR--
	<i>Spirochaeta thermophila</i>	307719346	----VDPTLH -V----G-LFR--
Other Bacteria (0/>250)	<i>Oceanobacillus iheyensis</i>	23100064	----VDANNH -----LFR--
	<i>Bacillus cereus</i>	52142718	----DSNLQ -----G-L-R--
	<i>Leuconostoc citreum</i>	170016933	----VDT-LN G-----F----
	<i>Fulvimarina pelagi</i>	114707094	----DGDLR -----G-L-R--
	<i>Hoeflea phototrophica</i>	163759649	----DGALT -V----G-L-R--
	<i>Pelagibaca bermudensis</i>	114766781	----FDS-LN -----G-L-Q--
	<i>Sagittula stellata</i>	126729285	----FDE-LS -----G-L-Q--
	<i>Stappia aggregata</i>	118588076	----LDPHLS -----G-L-R--
	<i>Oceanicola granulosus</i>	89069151	----YDSNLN -----G-L-Q--
	<i>Ruegeria pomeroyi</i>	56696213	----FDGDLN -----G-L-Q--
	<i>Ochrobactrum anthropi</i>	153009422	----VDTNLS -----G-L-R--
	<i>Hirschia baltica</i>	254294211	----FDP-LR -----L-R--
	<i>Picrophilus torridus</i>	48477637	----FDPYGN -----G-LVR--
	<i>Haemophilus somnus</i>	170718309	-----NPQKM M-----LTR--
	<i>Pasteurella multocida</i>	15603535	-----NPQKM M-----LTR--
	<i>Variovorax paradoxus</i>	239815147	-----DPRGF MV-----LTR--
	<i>Delftia acidovorans</i>	160899421	-----DGRGY MV-----LTR--
	<i>Scardovia inopinata</i>	294791458	-----VDKNFD G-----L-W--
	<i>Haemophilus somnus</i>	113460269	-----NPQKM M-----LTR--
	<i>Gardnerella vaginalis</i>	283782797	--S--VDKNFN G-----L-W--
	<i>Monosiga brevicollis</i>	167526415	----VSAQLD C-----GCL-Q--
	<i>Nostoc punctiforme</i>	186681596	----VDPQKN -----TR--
	<i>Nodularia spumigena</i>	119510229	----VDPQKN -----TR--
	<i>Plasmodium chabaudi</i>	70953348	----VSDLN ---R-G-LVR--

Supplemental Figure 23: A partial sequence alignment of ribose Ribose 5-phosphate isomerase showing a one amino acid insert specific for the genus *Borrelia*. Homologs for this sequence were not found in members of the *Brachyspiraceae*, *Sphaerochaeta*, *Turneriella*, or *Leptospira* in our BLAST search.

			64	94
			HADHITGLLGIVMLMSQS	GE TRKEPLIIAGP
<i>Borrelia</i> (12/12)	<i>Borrelia burgdorferi</i>	195941574	-----	-----
	<i>Borrelia</i> sp. SV1	225551828	-----	-----
	<i>Borrelia garinii</i>	219684248	-----	-----
	<i>Borrelia spielmanii</i>	224534454	-----I-----	-----
	<i>Borrelia bissettii</i>	343128051	-----	---D-----
	<i>Borrelia afzelii</i>	111115584	-----	---D-----
	<i>Borrelia valaisiana</i>	224531528	-----I-----	---D-----
	<i>Borrelia crocidurae</i>	386859992	-----A--	-D-----T-I--
	<i>Borrelia recurrentis</i>	203288182	-----A--	-D-----T-I--
	<i>Borrelia duttonii</i>	203284649	-----A--	-D-----T-I--
	<i>Borrelia turicatae</i>	119953531	-----A--	-N-----T-I--
	<i>Borrelia hermsii</i>	187918610	-----A--	-D-----T-I--
Other Spirochetes (0/19)	<i>Treponema denticola</i>	325473715	-----P-LL--S--V	D-E---Y-I--
	<i>Treponema saccharophilum</i>	381180848	---V---P--M--S--V	D-T---Y-Y--
	<i>Treponema pallidum</i>	15639805	-----P-LL--S--V	A-S---Y-I--
	<i>Treponema paraluis-cuniculi</i>	338706768	-----P-LL--S--V	A-S---Y-I--
	<i>Treponema vincentii</i>	257457947	---V---P--L--SA-V	D-D---Y-I--
	<i>Treponema succinifaciens</i>	328948129	---V---P--L--S--V	D-T---Y-F--
	<i>Treponema phagedenis</i>	320536508	---V---P-LL--S--V	D-DD--Y-I--
	<i>Treponema</i> sp. JC4	384110060	---V---P--L--SA-V	D-T---Y-Y--
	<i>Treponema azotonutricium</i>	333994820	---V--IP-LL--S--V	D-DD--Y-I--
	<i>Treponema primitia</i>	333997962	---V--IP-LL--S--V	D-DD--Y-I--
	<i>Treponema brennaborense</i>	332297926	---V--IP-LM--SA-V	D-DD--Y-Y--
	<i>Treponema caldaria</i>	339499904	---V---P--L--S--V	D-DD--T-I--
	<i>Spirochaeta thermophila</i>	386347399	---V---P--L--S--V	D-S---Y-Y--
	<i>Spirochaeta smaragdinae</i>	302338444	---V---P--M--S--V	D-E---T-I--
	<i>Spirochaeta africana</i>	383790621	---V---P--L--S--V	D-DT--Y-Y--
	<i>Sphaerochaeta globosa</i>	325971176	---V---P--L--S--V	D-N---T-Y--
	<i>Sphaerochaeta pleomorpha</i>	374314894	---V---P--L--S--V	D-DD--T-Y--
	<i>Sphaerochaeta coccoides</i>	330836512	---V---P--L--S--V	E-DT--Y-Y--
	<i>Eubacterium rectale</i>	291524005	----S--P-LLLT-GNA	E-T---T-I--
Other Bacteria (0/>250)	<i>Ruminococcus lactaris</i>	197303575	-G---S--P-LLLT-GNA	D-----TLI--
	<i>Roseburia intestinalis</i>	257414083	----S--P-LLLS-GNA	E-T---TMI--
	<i>Coproccoccus comes</i>	226322516	-G---S--P-LLLT-GNA	D-----TLI--
	<i>Dorea formicigenerans</i>	166031523	-G---S--P-LLLT-GNA	D-T---TLI--
	<i>Butyrivibrio crossotus</i>	260438115	---VS--P-FLLT-GNA	D-R-D-L----
	<i>Alkaliphilus oremlandii</i>	158320712	-G---F-IP-LLST-GN-	Q-LD-VT-V--
	<i>Catonella morbi</i>	229824063	-G---F--P-FLSSR-FQ	GGDQ--TLY--
	<i>Rhodothermus marinus</i>	268315990	-G--FF--F-LLATLAML	N-T--V-VV--
	<i>Dokdonia donghaensis</i>	86130530	-G--FF--M-VITTF-LL	K-TA--T-Y--
	<i>Bulleidia extructa</i>	283768806	---TA--P-LLLT-AKN	N-L--IR-Y--
	<i>Lactobacillus antri</i>	259503099	-G--F--P-LLSSR-FQ	GGN---T-Y--
	<i>Enterococcus faecalis</i>	257416213	-G--F--P-LLSSR-FQ	GGT---E-Y--
	<i>Geobac. kaustophilus</i>	56420868	-G--LF--P-LLGSR-FQ	SGET--TVF--
	<i>Bacillus halodurans</i>	15614276	-G--F--P-LLGSR-FQ	GGEN--FLY--
	<i>Enterococcus faecium</i>	257878181	-G--F--P-LISSR-FQ	GGDT--E-Y--
	<i>Pediococcus pentosaceus</i>	116492893	-G--F--P-FLSSR-NQ	GGG-E-T-F--
	<i>Hyperthermus butylicus</i>	124027542	-G--FF--P-LLQS-GML	G--T--LV--
	<i>Ignicoccus hospitalis</i>	156937827	-G--VL--P-LLQT-AMA	S-RDE-LVI--
	<i>Metallosphaera sedula</i>	146304551	---VL--PSLIQT-GMY	D---R-Y-L--
	<i>Vibrio harveyi</i>	153832098	-G--CY--P-LLASAGMN	N--D--T-IA--
	<i>Providencia stuartii</i>	188026419	-G--F--P-LLCSR-MG	GSTD--TLY--
	<i>Pyrococcus abyssi</i>	14521306	-G--YL--PALIQT-NLW	K-----H-Y--

Supplemental Figure 24: Partial sequence alignment of conserved region of Ribonuclease Z showing a two aa insert specific for the genus *Borrelia*. Homologs for this sequence were not found in members of the *Leptospiraceae* or *Brachyspiraceae* in our BLAST search.

		206	236
<i>Borrelia</i> (12/12)	<i>Borrelia crocidurae</i>	386859948	GCHMILPVEFANKVR R EPDDIKFCPYCSRIL
	<i>Borrelia duttonii</i>	203284608	-----
	<i>Borrelia turicatae</i>	119953490	-----V-----
	<i>Borrelia hermsii</i>	187918568	-----
	<i>Borrelia bissettii</i>	343128011	-----N-----
	<i>Borrelia valaisiana</i>	224531577	-----N-----
	<i>Borrelia garinii</i>	51598965	-----N-----
	<i>Borrelia burgdorferi</i>	224532401	-----I-----
	<i>Borrelia afzelii</i>	216263491	-----I-----
	<i>Borrelia sp. SV1</i>	225551819	-----I-----
	<i>Borrelia spielmanii</i>	224534561	-----I-----
Other Spirochaetes (0/23)	<i>Treponema denticola</i>	325473908	-----AQ-V-E-- SDQ-----
	<i>Treponema primitia</i>	374814114	-----AQ--M-- KREE-V-----
	<i>Treponema sp. JC4</i>	384109888	-----AQ--I-- VG-N-N-----
	<i>Treponema pallidum</i>	15639485	-----AQ-STG-- -GNS-VY-----
	<i>Treponema azotonutricium</i>	333994742	-----AQ--DI- VGKE-V-----
	<i>Treponema saccharophilum</i>	381180808	-----AQ--E-- GGEK-L-----
	<i>Treponema brennaborensense</i>	332297994	-----AQ--E-H NG-K-V-----
	<i>Treponema succinifaciens</i>	328948112	-----AQ--E-H HGEK-L-----
	<i>Treponema vincentii</i>	257457794	-----SAQ--IE-- -GKN-MY-----
	<i>Treponema medium</i>	15022435	-----SAQ--IE-- -GKN-MY-----
	<i>Treponema phagedenis</i>	320537363	-----AQ--IE-H KGKS-MY-----
	<i>Treponema caldaria</i>	339500010	-----AQ--Q-- MGEE-I-----
	<i>Spirochaeta smaragdinae</i>	302338587	---M--AQ-E-D-- SGEN-L-----
	<i>Spirochaeta thermophila</i>	307718769	--F-L--R--V-RI- RGEE-I--H----
	<i>Spirochaeta africana</i>	383790694	---M--NQLV-D-- SGEH-HN-----
	<i>Sphaerochaeta coccoides</i>	330836586	---T--Q-V-T-- KNEE-E-----
	<i>Sphaerochaeta globosa</i>	325971192	---IV--IQ-V-D-- SAK--E-----
	<i>Sphaerochaeta pleomorpha</i>	374314883	---IV--IQ-V-D-- SQTQ-D-----
	<i>Brachyspira intermedia</i>	384209704	A-NVAI-KMTV-E-- RQNQ-IM-FH-G--
	<i>Brachyspira pilosicoli</i>	300870319	A-NVAI-KMTV-E-- RQNQ-IM-FH-G--
	<i>Brachyspira murdochii</i>	296125762	A-NVAI-KMTV-E-- RQNQ-IM-FH-G--
	<i>Brachyspira hyodysenteriae</i>	225621328	A-NVAI-KMTV-E-- RQNQ-IM-FH-G--
Other Bacteria (0/>250)	<i>Chlamydophila abortus</i>	62184859	---IV--PQHE-L-- KKDRLI--EH----
	<i>Waddlia chondrophila</i>	297621674	---IT-TAQHE-L-- KGERLV--EH----H
	<i>Chlamydia trachomatis</i>	296435919	---IA-TPQHE-L-- KQDHLV--EH----
	<i>Haliangium ochraceum</i>	262195662	---A--PQLN-TLA AGATVE--R-N--V
	<i>Desulfovibrio vulgaris</i>	218885362	---ISI-PQSYIELQ KGTQ-LS--N-Q-LI
	<i>Nautilia profundicola</i>	224373474	--N-KINDKIFSE-I KGEE-VT--H-G-V-
	<i>Helicobacter hepaticus</i>	32266138	--FIK-NDTIYSEIL KG--IN--H-G--
	<i>Campylobacter gracilis</i>	257461317	--F-RISDKTYSA-I KSD--VT---G---
	<i>Geobacter bemidjiensis</i>	197116877	--N-H--PQLY-TLF RAD-VIT--H-Q---
	<i>Campylobacter hominis</i>	154148691	--F-KINDKTYSA-V KSD--VT---G---
	<i>Myxococcus xanthus</i>	108759984	--N-NV-PQLY-QL- TGLGTDI--S-N--I
	<i>Sorangium cellulosum</i>	162452055	---LSV-PMMFQ-M- RQEEFER--N-N---
	<i>Stigmatella aurantiaca</i>	310823613	--N-NV-PQLY-QL- TSLGTDV--S-N--I
	<i>Chthoniobacter flavus</i>	196231449	---KVTQTQTVVR-K GNRE-VH-EQ-G---
	<i>Alistipes shahii</i>	291514606	--FNRI-PQRQVDI- QGKK-II-E--G---
	<i>Dyadobacter fermentans</i>	255038890	--FS-V-PQRQADI- -RKKLIV-EH-G---
	<i>Microscilla marina</i>	124004509	--FNVV-PQRQAEI- -RKK-IV-EH-G---
	<i>Cytophaga hutchinsonii</i>	110638206	--FNTV-PQRQGEI- -RKK-IV-EH-G---
	<i>Solibacter usitatus</i>	116619945	A--IV-RLQYFQDLK RGES-LP-ES-Q---
	<i>Persephonella marina</i>	225850570	--F--I-PKVYSELV KSKKLLT--H-G-F-
	<i>Meiothermus ruber</i>	291294467	A-NVQ--MHV-QQ-H QASKVVR--S-G---

Supplemental Figure 25: A partial sequence alignment of conserved region of Hypothetical protein BDU_716 showing a one amino acid insert specific for the genus *Borrelia*. Homologs for this sequence were not found in members of the *Leptospiraceae* in our BLAST search.

		374	412
<i>Borrelia</i> (12/12)	<i>Borrelia turicatae</i>	119953471	EAILSMTKKERLNPVILN S PSRKKRIALGSGTTTFEVN
	<i>Borrelia hermsii</i>	187918549	-----V-----
	<i>Borrelia lonestari</i>	145652229	----F-----
	<i>Borrelia spielmanii</i>	224534518	-----I-----
	<i>Borrelia bissetti</i>	343127994	-----I-----
	<i>Borrelia valaisiana</i>	224532274	-----I-----
	<i>Borrelia garinii</i>	386854096	-----I-----
	<i>Borrelia</i> sp. SV1	225551839	-----I-----
	<i>Borrelia burgdorferi</i>	365992395	-----I-----
	<i>Borrelia duttonii</i>	203284591	-----QR--R-----
	<i>Borrelia afzelii</i>	216263608	-----T-----
	<i>Borrelia crocidurae</i>	386859927	-----QR--R-----
Other Spirochetes (0/23)	<i>Borrelia recurrentis</i>	203288125	-----QR--R-----
	<i>Spirochaeta thermophila</i>	386346818	-----PA--R--R-IG
	<i>Spirochaeta smaragdinae</i>	302338385	-----IV--R-HR-IG
	<i>Sphaerochaeta coccoides</i>	330836478	K---Q---YT--E-CH-IG
	<i>Treponema brennaborens</i>	332297535	-----A-HL-IG
	<i>Treponema</i> sp. JC4	384107750	---Q---Y---HL-IG
	<i>Brachyspira hyodysenteriae</i>	225620952	K---Q-----ALFPVI
Other Bacteria (0/>250)	<i>Brachyspira indermedia</i>	384210112	K---Q-----ALFPVI
	<i>Buchnera aphidicola</i>	21672654	---Y---H---MH-I-IK
	<i>Thermocrinis albus</i>	289548587	-----E--K--A-I-
	<i>Aquifex aeolicus</i>	15606801	---N---PE--R--K-I-
	<i>Buchnera aphidicola</i>	21672654	---Y---H---MH-I-IK
	<i>Veillonella parvula</i>	282850086	---T---AA--E--S---
	<i>Filifactor alocis</i>	291171833	---R---L---R--D-I-
	<i>Eubacterium yurii</i>	304551351	---Q---Q---D-S-I-
	<i>Ruminococcus obeum</i>	295109860	-----P--S--G---
	<i>Coprococcus comes</i>	226325149	---Y---I---Q--D-IT
	<i>Brevibacillus brevis</i>	226313205	---AK---Q--A--DL--
	<i>Meiothermus ruber</i>	291295393	---V---P---RD-R---
	<i>Thermus aquaticus</i>	218295520	---V---PE--KD-R---
	<i>Rickettsia bellii</i>	157826674	-----P--R--D-I-
	<i>Starkeya novella</i>	298292734	K---D-----R--KL-D
	<i>Maricaulis maris</i>	114571433	-----Q--AK-E--K
	<i>Acidiphilium cryptum</i>	148261145	---S---A--A--D-MK
	<i>Kingella oralis</i>	238021560	---N---P---A--A-IK
	<i>Eikenella corrodens</i>	225025490	---N---P---A--AL-K
	<i>Kosmotoga olearia</i>	239617834	---S---RE--R--K-I-
	<i>Fusobacterium varium</i>	253581989	---Q---E--KK-D--K

Supplemental Figure 26: A partial sequence alignment of conserved region of Signal recognition particle, subunit FFH/SRP54 showing a one amino acid insertion specific for the genus *Borrelia*. Homologs for this sequence were not found in members of the *Leptospiraceae* in our BLAST search.

<i>Borrelia</i> (12/12)	<i>Borrelia burgdorferi</i>	15594416	GGMPSSHSSTVTALSTSIALTEGID	TNFIIALAFALITIRDSFGVR
	<i>Borrelia</i> sp. SV1	225552245	-----	-----
	<i>Borrelia bissettii</i>	343127392	-----N	-----
	<i>Borrelia valaisiana</i>	224532242	-----G	-----
	<i>Borrelia garinii</i>	386853478	-----G	-----
	<i>Borrelia spielmanii</i>	224534874	-----VG	-----
	<i>Borrelia afzelii</i>	111114892	-----A-----G	-----
	<i>Borrelia turicatae</i>	119952873	-----A---LI----	-----
	<i>Borrelia hermsii</i>	187917949	-----A---LI----N	-----
Other Spirochaetes (0/19)	<i>Borrelia duttonii</i>	203283996	-----A---LIK---N	-H-----
	<i>Spirochaeta africana</i>	383790271	-----M--S-AL-TG--Y-FN	T GL-MF-FFYGGLVV--AM---
	<i>Spirochaeta thermophila</i>	386346208	-----AL---A---GFHD-A-	S SL-FLSVFY-A-I---AV---
	<i>Sphaerochaeta globosa</i>	325971017	-----TAG-I--V-----Q--G	T VY-A--AT--AVV-H-AM-I-
	<i>Sphaerochaeta pleomorpha</i>	374315103	-S-----TAG-I--L-G-GM---G	T VD-A-SMT--A-V-H-AM---
	<i>Treponema caldaria</i>	339499894	-----L---A--V-FK---G	S -L--VT-CL---V---M---
	<i>Treponema brennaborens</i>	332298018	-----ALMCT-C---GFRS---	S DI--LSFC---VV---AV---
	<i>Treponema</i> sp. JC4	384109473	-----AL--S-CVT-GFRH---	S DI-VFS-M-FFVV---A---
	<i>Treponema primitia</i>	333998644	-----A-M-S-MT---II--VR	S NL-AVSFFMS--VM--AM---
	<i>Treponema phagedenis</i>	320536264	-----AL-SS-A---GIK----	S -I--F-FFSSI-V---AL---
	<i>Treponema vincentii</i>	257456862	-----AL-----T-GFKQ-VS	S DL--FSIFS-M-V---AM---
	<i>Treponema denticola</i>	42526896	-----AL-AS-TV--GIRQ-F-	S DL--F-CFM---V---AV---
	<i>Treponema saccharophilum</i>	381180874	-----AV-SCVA-CVG-RS-L-	S DV--VSFVLF--AL---
	<i>Treponema succinifaciens</i>	328948214	-S-----AL-AT-C-T-GFRS-VN	S DV--LS-G-Y-V---AV---
	<i>Treponema azotonutricium</i>	333994927	-----AAV-CSMA-AVGVD--G	S NL-AVCFF--MVAM--AM---
	<i>Treponema pallidum</i>	15639146	-----AL-S--TL-F--KC-LH	S DL--FSFFS-I-VV--AL---
	<i>Treponema paraluis-cuniculi</i>	338706131	-----AL-S--TL-F--KC-LH	S DL--FSFFS-I-VV--AL---
	<i>Turicibacter sanguinis</i>	293375096	-----AF-S--A-AVGVD--H	S TT-A-SFC--AVV-F-AM-I-
	<i>Clostridium leptum</i>	160932238	-----AF-CSIAMG-GFR--FA	S SF-AL-FMI-MVVMY-AM---
Other Bacteria (0/>250)	<i>Catonella morbi</i>	229824325	-----AA-SS-I--LV-EY-FE	S PLVA--TI-GV-VMF--M---
	<i>Ammonifex degensii</i>	260892548	-----A--AM-S--AVAVG-CL-F-	S AE-AM--V---VWH-AM---
	<i>Haloferox volcanii</i>	220932274	-----A-F-ST---TVG-NY-F-	S DL-A-VTV-S--I-Y-AG---
	<i>Eubacterium siraeum</i>	167750991	-----A-A--C-TAITTCRVC--C	S PE-AL-MIL-MVVMY-AM---
	<i>Filifactor alocis</i>	291171532	-----F-IG-AN-VG---Y-	S TI-ALS-V---VVMY-AA---
	<i>Bacillus halodurans</i>	15615964	-----AA---A-A---ED-L-	S PL-A-SAV-GI-VMF-AT---
	<i>Listeria monocytogenes</i>	16804424	-----AA---M-TL-IEY-L-	S PY-A-SVV-GI-VMF-AT---
	<i>Brevibacillus brevis</i>	226314334	-----A-----AVG-R--FG	S -M-A-SAILGV-VMF-AA---
	<i>Lactococcus lactis</i>	116511824	-----L-V--A-ATG-RQ-FE	S PL-A--TVL-FVVLV-AQ-I-
	<i>Abiotrophia defectiva</i>	229825745	-----A---SVALMTG--T-F-	S P--G--FIL-IVVMH-AS---
	<i>Geobacillus kaustophilus</i>	56419884	-----AG-S--A-F---ER-VR	- ID-AL-AL-G--VMY-AQ---
	<i>Lactococcus lactis</i>	281491493	-----L-V--A-ATG-IQ-F-	S SL-A--TVL-FVVLV-AQ-I-
	<i>Oceanobacillus iheyensis</i>	23099802	-----AA---T-A-GI---VT	S SV-AL-CI-SV--MF-AS---
	<i>Bacillus mycoides</i>	228998316	-----A-GVGMV---T	S AV-A--VI--I-VMY-AS---
	<i>Exiguobacterium sibiricum</i>	172058214	-----V--AVV-GFQ--FS	S SL-AL-AI--V-IMY-AT---
	<i>Deinococcus geothermalis</i>	94984807	-----AM-A--T-GV---Q-MG	S PL-AA-SAV---VMY-AT---
	<i>Thermus thermophilus</i>	46199060	-----T--A--S--AV-VG-R--F-	- SL-AV-AV---VMY-AA-I-
	<i>Meiothermus ruber</i>	291296743	-----A--A--A-GVGI---VG	S AF-A--VVL-I-VMY-AT-I-
	<i>Crocospira watsonii</i>	67924906	-----A--AL-G--A-GVG--K-WE	S PE-A--CL--V-VMY-AA---
	<i>Microcystis aeruginosa</i>	166364197	-----A--AL-G--A-GVG-QM-WS	S PE-A--AL--V-VMY-AA---
	<i>Fusobacterium ulcerans</i>	257467716	-----SC-T-C--IRY--R	S DI-A-TII-SG-VMY--A-I-
	<i>Arthrospira maxima</i>	209526716	-----AF-G--AA-VGQVI-WG	S PE-A--VV--I-VMY-AA---
	<i>Raphidiopsis brookii</i>	282895576	-----A--AL---AAGVGQ-I-WS	S PD-AL-AVV-I-VMY-AT---
	<i>Nostoc punctiforme</i>	186683903	-----A--AL---AAGVGQ-L-WA	S PD-AV-MI--I-VMY-AA---
	<i>Nodularia spumigena</i>	119509102	-----A--AL---AAGVGQSL-WA	S PD-AL-TV--I-VMY-AA---
	<i>Anabaena variabilis</i>	75908917	-----A--AL--S-AAGVGQ-L-WA	S PD-AL-TV--I-VMY-AA---
	<i>Prochlorococcus marinus</i>	123966394	-----ALI-GATSG-G-QL-F-	S PI-AL-I-IS--VMY-AS---

Supplemental Figure 27: A partial sequence alignment for conserved region of Hypothetical protein BSV1_0075 showing a one amino acid deletion specific for the genus *Borrelia*. Homologs for this sequence were not found in members of the *Leptospiraceae* or *Brachyspiraceae* in our BLAST search.

			364		402
	Borrelia turicatae	119953137	LSEGYDLQYYVKACKIVE	N	VLIPKFNEIFNNYSYIITP
	Borrelia recurrentis	203287796	-----E--T-----I-	-	-----D-----
	Borrelia duttonii	203284259	-----E--T-----I-	-	-----D-----
	Borrelia hermsii	187918212	-----A-----I-	-	--V--S-----C-----
	Borrelia crocidurae	386859575	-----E--T-----I-	-	-----D-----
	Borrelia bissettii	343127657	-----VK--S---E-LQ	-	-I-----KL-ESCDF----
	Borrelia garinii	219684617	-----AK-----E-LQ	-	LI-----KL-ESCDF----
	Borrelia valaisiana	224531998	-----AK--A---E-LQ	-	LI-----KL-ESCDF----
	Borrelia spielmanii	224534264	-----AK--A---E-LQ	-	LI-----KL-ESCDF----
	Borrelia afzelii	216264000	-----SK--A---E-LQ	-	LI-----KL-ESCDF----
	Borrelia burgdorferi	221217739	-----SK--A---E-LQ	-	LI-----KL-ESCDF----
	Borrelia sp. SV1	225552009	-----SK--A---E-LQ	-	LI-----KL-ESCDF----
	Brevibacillus brevis	226310281	--S--YDA--K--QQVRT		LI-QD--S--AD-DV-LH-
	Paenibacillus polymyxa	305859990	--S--YDA--L--Q-VRT		L IKQD-DRV-EQ-DV--G-
	Lactobacillus plantarum	28377926	--A--YDA-FH--GQVRT		MI-ND--KV-ED-DL-MG-
	Bacillus coahuilensis	205372469	--S-FYDA--K--QQART		L IKKD-EDV-EK-DV--G-
	Pediococcus acidilactici	270291085	--A-SYDAFFK--AQVRT		LI-DD--KV-E--DL--G-
	Eubacterium siraeum	291531793	--S--YDA--L--LALKQ		QI-KEY----E-ADV-L--
	Acetohalobium arabaticum	302392790	--S--YDA--L--Q-VRT		L IKQD-E-A-AD-DVL-S-
	Desulfotomaculum reducens	134300180	--A--YDA--L--L-VRT		L IKQD-DRA-EK-DALLS-
	Coproccoccus catus	291520975	--S--YDA--I--LQVKA		L IKKG-DDA-AK-DI-LG-
	Gemmata obscuriglobus	168704720	--S--KDA--L--L-VRR		LVKKD-D-A-KTCDVVMG-
	Geobacter sulfurreducens	298507414	--S--YDA--L--Q-VRT		LIMQD-MKA-EQVDALL--
	Pelobacter propionicus	118581491	--S--YDA--L--Q-VRT		LIMAD-IQA-EGVDL-L--
	Ignisphaera aggregans	305663461	--I--REM--IR-LRFRR		M-RD-----KRFDAVVS-
	Sulfolobus islandicus	229584745	--A--YEEF-L--L-VRN		L IKKSLD-L-TK-DILVS-
	Dictyoglomus turgidum	217967553	--A--YDA--L--T-VRR		LIRME-E-A-KKVDI-AS-
	Acetobacter pasteurianus	258543589	--A--YDA--L--Q-VRT		L IKRD-EQA-E-VDVLL--
	Acidiphilium cryptum	148259882	--A--YDA--L--Q-VRA		LILRD-Q-A-GKVDALL--
	Methanocella paludicola	282165110	----YGK--L--L-VRT		L IKQD-EKV-KGVDVLAA-
	Chlorobium tepidum	21673107	--A--YDT--K--QQVRR		-FQD-YR-A-EKVDV-FG-
	Chlorobium limicola	189345875	--A--YDT--K--QQVRR		-FQDRYR-ALEKVDV-AG-
	Chitinophaga pinensis	256420379	--A--YDA-FA--QQVRR		MVVD-L---LSE-DA-VM-
	Pedobacter heparinus	255533716	--A--YDA--Q--QQVRR		LIRE-ME-LLTRFDV--S-
	Aquifex aeolicus	15605793	--A--YDA--L--Q-VRR		LITND-LKA-EEVDV-AS-
	Persephonella marina	225851021	--S--YDA--L--Q-VRT		L IYQD-MKA-ESVDI-L--
	Gardnerella vaginalis	298253223	--A--YDAW-GS-Q-VRT		LI-RD-E-A-KKVDVL-S-

Supplemental Figure 28: Partial sequence alignment of Aspartyl/glutamyl-tRNA amidotransferase subunit A showing a one amino acid insertion specific for the genus *Borrelia*.

			15	48
Borrelia (12/12)	Borrelia duttonii	203284234	EGYLARSVYKLEIDKKFSLSFS	SGNILDIGASPG
	Borrelia crociduræ	386859549	-----	-----
	Borrelia hermsii	187918187	-----QR-----	-----
	Borrelia turicatae	119953113	-----R-----	-----V-----
	Borrelia bissettii	343127630	-----NE-----	---V-----
	Borrelia garinii	51598573	-----NE-----	---V-----
	Borrelia burgdorferi	387827228	-----NE-----	---V-----
	Borrelia sp. SV1	225552371	-----NE-----	---V-----
	Borrelia valaisiana	224532294	-----NE-----	---V-----A--
	Borrelia spielmanii	224534384	-----NE-----	Y--V-----
Borrelia afzelii	111115138	-----NE-----	Y--V-----	
Other Spirochetes (0/36)	Treponema phagedenis	320535785	---P-----E--N---K---	P--DK---L--A--
	Treponema azotonutricium	333995984	---P-----K-M-E---L-K	R--GMKV--L--A--
	Treponema saccharophilum	381178935	---P-----K--E--GMIK	K--GYTV--L--A--
	Treponema pallidum	15639669	A--R-----AAL---Y--L-	R--ASRV--L--A--
	Treponema vincentii	257456100	---P-----E-MQ---N--G	K--TDSV--L--A--
	Treponema denticola	42527473	-N-P-----E-MN---N---	P--NDKV--L--A--
	Treponema succinifaciens	328949039	---P-----Q---E--GMLK	K--SI---L--A--
	Treponema brennaborensense	332297375	---P-----K--E--GMIR	K--NYRV--L-----
	Treponema sp. JC4	384108523	---P-----K--E--GMIK	K--NYTV--L-SA--
	Spirochaeta thermophila	307719842	---P-----M--QQ-YRIV-	P--GDRV--L--A--
	Spirochaeta africana	383789324	Q--F-----E--NN--G-LK	R--RY--M--A--
	Spirochaeta smaragdinae	302336841	---P---I---E--E-R-GVIN	T--ELP---V--A--
	Sphaerochaeta globosa	325972772	---P-----E-LQQS-N-IK	S--GDTV--V--A--
	Sphaerochaeta coccoides	330836075	---P-----E--Q-V-RIIR	P--GAKV--V--A--
	Sphaerochaeta pleomorpha	374316396	---P-----E--QNT-K-VK	P--GDSV--V--A--
	Brachyspira pilosicoli	300869923	-N-K---F--E-AQN--KFIK	S--D-V--V-C---
	Brachyspira hyodysenteriae	225619180	-N-K---F--E-AQN--KFIK	A--D-V--V-C---
	Brachyspira murdochii	296127776	-N-K---F--E-AQN--KFIK	S--DTV--V-C---
	Brachyspira intermedia	384208684	-N-K---F--E-AQN--KFIK	A--DTV--V-C---
	Leptospira weilii	489091975	E-VS-GA---LKA FEV-PFQV	D--KLCV-L---T-
Leptospira alstoni	463329184	E-VS-GA---LKVFDV-P-KV	D--KLCV-L---T-	
Leptospira inadai	498101585	K-VS-GAF--K-ALT--NISV	D--KLCI-W---T-	
Other Bacteria (0/>250)	Sorangium cellulosum	162450262	Q--P---F--E---RRVR-LR	P--GQRV--L--A--
	Desulfovibrio piger	212704983	-N-P-----K-L-A--K--R	Q--GMRV--L--A--
	Legionella drancourtii	254496115	---RS-A---K-V-E-E-LK	P--GMTVV-L--A--
	Acinetobacter baumannii	126642713	---R--AA---L--QE-YK-IK	P--GMTVV-L--A--
	Zymomonas mobilis	56551298	---RS-AAF---L-ER---LK	N--ARR-I-L-IA--
	Maricaulis maris	114569722	---RS-AA---LQL-ER-K-LK	P--GMRVV-L-SA--
	Oceanicola granulosus	89068308	D--RG-AA--IL-L-D-YRFLV	P--GARVV-L-CA--
	Sagittula stellata	126729852	---RG-AAF-IL---E-YRFLV	P--GARVV-L-CA--
	Methylobacterium populi	188582866	---RS-AAF-----ER-K-LK	P--AQR-V-L--A--
	Stappia aggregata	118589174	D--RS-AA-----D-HK-LK	P--GYRVV-L-CA--
	Neorickettsia sennetsu	88608723	-Q-RS-AA---L---E--N-IR	K--GFVV-EL-SA--
	Caulobacter segnis	295689972	L--RS-AAF-IS---E--HF-R	K--GARVI-L-CA--
	Methanosaeta thermophila	116754447	---R---A---KQ-ND--HIIR	R--GSRVV-L--A--
	Cryptosporidium hominis	67608071	--FR---A---Q--E-YNI-D	K--VTRAV-LC-A--
	Plasmodium berghei strain	68074303	A--R---AF---Q-AR-YNI-K	N--ANILI-LC-A--
	Halalkalicoccus jeotgali	300709773	Q--RS-AA---QQL-EMED-L-	H--GDRVV-L--A--

Supplemental Figure 29: Partial sequence alignment of conserved region of Ribosomal RNA methyltransferase showing a one amino acid deletion specific for the genus *Borrelia*.

		320	365
<i>Borrelia</i> 12/12	<i>Borrelia spielmanii</i>	224534310	GIDIANLANTPIRAAREGIVVTGVFNAG G YGKYIVISHSNFGFTLY
	<i>Borrelia garinii</i>	219685977	-----K----- -I-----
	<i>Borrelia afzelii</i>	111115087	-----K----- ------
	<i>Borrelia valaisiana</i>	224531978	-----K-S----- ------
	<i>Borrelia bissettii</i>	343127580	-----K-S----- ------
	<i>Borrelia</i> sp. SV1	225552006	-----K-S-----A----- ------
	<i>Borrelia burgdorferi</i>	387827178	-----K-S---V---A----- ------
	<i>Borrelia hermsii</i>	187918136	-----A-----F-TK-----SV- ------N-----
	<i>Borrelia turicatae</i>	119953061	-----V-----F-TK-----A--SV- ------I--N-----
	<i>Borrelia crocidurae</i>	386859491	-----V---VV-TK-----A--SV- ------A-N-----
Other Spirochaetes (0/36)	<i>Borrelia duttonii</i>	203284183	-----V---VV-TK-----A--SV- ------A-N-----
	<i>Borrelia recurrentis</i>	203287722	-----V---VV-TK-----A--SV- ------A-N-----
	<i>Turneriella parva</i>	392401646	-V-L-DATG---Y--AD-R-IGC-YSG- --LAVK---PF-----
	<i>Treponema azotonutricium</i>	333995248	AV-L-APIG-LV---SD-K-S---ST F--F-VLG-A-S---M--
	<i>Treponema pallidum</i>	15639148	-L-MVSRRG--VYS-LG---R---YS-V --N-LIVG-HA-Y---
	<i>Treponema denticola</i>	42527820	---L-TYRGA--Y--LP-TIAAT-YSNV --N-VI-R-HS-Y---
	<i>Treponema vincentii</i>	257456803	---M-APKG-SVY--LN-Q-IAT-YSTV --N-VM-R-HS-Y---
	<i>Treponema primitia</i>	374813996	AL-L-AGLG--VK-SLD-K-A---L-SV -----IL--G-----
	<i>Treponema</i> sp. JC4	384108522	---M-TGSG---Y--LD-K-T-T---T --N-VI-T-HS-YK---
	<i>Treponema succinifaciens</i>	328949038	---M-CAKG---Y--LP-V-SVC-D--I ---V-V--HS-YK---
	<i>Treponema brennaborensense</i>	332298566	---M-IAQG-----MS-KIIAA-YTNV --N-V--D-E--Y---
	<i>Treponema caldaria</i>	339499484	-L-L-APLG--VY-C-----SNT-Y-EV --N---A-DG-WTS--
	<i>Spirochaeta africana</i>	373483417	-----APG-R-N-S-G-R-AVA-SHPT --N-V---DG-----
	<i>Spirochaeta smaragdinae</i>	302338245	---L-VPEG--VMP--S---EQT-YDSV L-N-VIL--EG-YE-V-
	<i>Spirochaeta thermophila</i>	307718438	---PGDVG--VY--LG-R--QT-THPI -----VIL--PD-----
	<i>Leptospira noguchii</i>	359722224	-V-F-SAEG---Y-TAP---ES-QSS- -L--N-K-N-L--IF-V-
	<i>Leptospira weilii</i>	359726098	-V-F-SAEG---Y-TAP---ES-QSS- -L--N-R-N-L--IF-V-
	<i>Leptospira interrogans</i>	45659184	-L-M-AEEG--VY-SAD-E-YFSDKKG- --NL-ILG-KL-YE---
Other Bacteria (0/>250)	<i>Leptospira borgpetersenii</i>	116327063	-L---AEEG--VY-SAD-E-YFSDKKG- --NL--LG-KL-YE---
	<i>Leptonema illini</i>	374585366	-L-M-GARG--VE-TA--E---MNWDA - --NAV--K-GF-----
	<i>Brachyspira murdochii</i>	296125657	-V--PGRL---VY---K-K-IFA-YSG- --NLVIVR-DK-YT-Y-
	<i>Brevibacillus brevis</i>	226314868	-V-M-ARKG---L--AD---LFA-Y-G- F-NTVM-K-NAEYT---
	<i>Enterococcus gallinarum</i>	257868949	---FTGSSG---Y-IQG-K--EA-YGPS T-N-VI-K-P--IYSY-
	<i>Clostridium hylemonae</i>	225570772	-M-F-AATG---Y--AA-T--SA-YSGN A-NL-I-N-G--L--Y-
	<i>Alkaliphilus oremlandii</i>	158321812	-----SSKG-TVT--DA-R-SFA-RQGS --NLVI-D-E--Y--Y-
	<i>Dorea formicigenerans</i>	166032791	-V-F-ASTG---Y--AA-T-TSA-YSGK A-NL-I-N-G--LL-Y-
	<i>Eubacterium yurii</i>	306820490	-V-F-DS-G---Y--E--Q-IYA-PKGT --NAVM-D-GA-IV---
	<i>Herb. seropedicae</i>	300309747	-V-F-APTG---H--AD-V-DF--KQN- --NIV--K-WS-YS-A-
	<i>Bordetella avium</i>	187479434	-V-Y-APSG---HSTAD-T-DF--WQN- --NVVI-K-HGQYS---
	<i>Meiothermus silvanus</i>	297564670	-L-L-APPG--VY--AS-T--SA-W-GV F-QAVE-D-GY-YR---
	<i>Campylobacter showae</i>	255321542	-V-YGAPKG---K--G--T-KF--TKS- ---VVILG-TS-YE---
	<i>Lawsonia intracellularis</i>	94986820	-L-L-ST--A--P--ND---YT-DLGI --NIVI-D-GL-L----
	<i>Wolbachia endosymbiont</i>	42520351	-V-Y-AKLG---Y--A--VIEYI-K-G- --N--K-K-K-EYS-C-
	<i>Brucella ovis</i>	148559209	-V-W-APRG---I--GN-V-EKA-WSN- --NQTL-R-A--YV-S-
	<i>Maricaulis maris</i>	114569207	-T-F-APRG--VM--GN-V-ERADRYGS F-N-VR-R-A--Y--A-
	<i>Fulvimarina pelagi</i>	114706933	-V-W-APRG---L--AG-T-LEA-WKS- --RH-K-K-A--YV-S-
	<i>Cellvibrio japonicus</i>	192359426	-T-Y-AARG-----TGD-K-SFA-RKG- --NC-I-N-GS-YE---
	<i>Selenomonas noxia</i>	292670319	----GGDYGD--Y--QA-T-EYA-WIS- --NAVI-N-GG-IS---

Supplemental Figure 30: Partial sequence alignment of LysM domain/M23/M37 peptidase domain protein showing a one amino acid insertion specific for the genus *Borrelia*.