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A *Coxiella* mutualist symbiont is essential to the development of *Rhipicephalus microplus*

Authors:

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Feature	CERM	CRt	CLEAA	Cb
Genome Size (Mbp)	1.19	1.7	0.66	1.99
GC (%)	32.66	38.2	34.6	42.6
Protein coding (%)	56.4	48.5	83.9	89.1
Genes	836	912	551	2,094
Single copy genes	104/111	102/111	101/111	106/111

Table S1: Genomes of *Coxiella* endosymbionts of ticks. CERM – *Coxiella* endosymbiont from *R. microplus*; CRt – *Coxiella* endosymbiont from *R. turanicus*; *Coxiella* endosymbiont from *A. americanum*; Cb – *Coxiella burnetii* RSA 493.

Biosynthetic pathway	CERM	CRt	CLEAA
Vitamins			
Biotin (B7)			
bioC	CLERM_746	WP_048875477.1	WP_084588734.1
bioH	CLERM_627	WP_048875315.1	WP_039670095
bioF	CLERM_628	WP_048875316.1	WP_039670096
bioA	CLERM_630	WP_048875318	WP_039670098.1
bioD	CLERM_625	WP_048875796.1	WP_052246377.1
bioB	CLERM_629	WP_048875317.1	WP_039670097.1
Riboflavin (B2)			
ribA	CLERM_180	WP_048875046.1	WP_039669871.1
ribD	CLERM_586	WP_048875044.1	WP_039669869.1

ribH	CLERM_181	WP_048875047.1	WP_039669872.1
ribE	CLERM_179	WP_048875045.1	WP_039669870.1
Pyridoxine (B6)			
GAPDH	CLERM_412	WP_048874822.1	WP_039669757.1
pdxB	CLERM_445	WP_048874810.1	WP_039669763
serC	CLERM_670	WP_048875157.1	WP_039670132.1
pdxA	CLERM_535	WP_048875681.1	WP_039669901.1
pdxJ	CLERM_654	WP_048874958.1	WP_039669818.1
pdxH	CLERM_431	WP_048875231.1	WP_039670071.1
Folic Acid (B9)			
folE	CLERM_473	WP_048875401.1	WP_039670042.1
folB	CLERM_275	WP_048875676.1	WP_039669906.1
folK	CLERM_084	WP_048875541.1	WP_052246374.1
folP	CLERM_217	WP_048875417.1	WP_039670037.1
folC	CLERM_566	WP_048875798.1	WP_039670066.1
folA	CLERM_231	WP_048875685.1	WP_052246324.1
Pantothenate (B5)			
panB	CLERM_765	WP_048875491.1	WP_039670235.1
panC	CLERM_766	WP_048875492.1	WP_039670003.1
Thiamine (B1)			
thiC	Absent	Absent	WP_052246335.1
thiCDE	Absent	Absent	WP_084588732.1
nifS	CLERM_515	WP_048875792.1	WP_039670083.1
ThiF	Absent	Absent	WP_039669760.1
thiFG	Absent	Absent	WP_039669989.1
Nicotinate (B3)			
nadB	Absent	Absent	WP_039669917.1
nadA	Absent	Absent	WP_039670112.1
nadC	Absent	Absent	WP_039669915.1
Cofactors			
Flavin adenine dinucleotide (FAD)			
ribF	CLERM_259	WP_048875815.1	WP_052246375.1
Coenzyme A (CoA)			
coaA	CLERM_270	WP_048875600.1	WP_052246330.1
coaBC	CLERM_569	WP_048875349.1	WP_039670064.1
coaD	CLERM_083	WP_048875540.1	WP_039669974.1
coaE	CLERM_091	WP_048875620.1	WP_039669930.1
Nicotinamide adenine dinucleotide phosphate (NADP+)			
nadB	Absent	Absent	WP_039669917.1
nadA	Absent	Absent	WP_039670112.1
nadC	Absent	Absent	WP_039669915.1
nadD	CLERM_522	WP_048875184.1	WP_039670121.1
nadE	CLERM_583	WP_048875362.1	WP_039670054.1
ppnK	CLERM_641	WP_048875461.1	WP_039670015.1

Table S2: Biosynthetic pathways for the synthesis of vitamins and cofactors in *Coxiella* endosymbionts genomes. CERM – *Coxiella* endosymbiont from *R. microplus*; CRt – *Coxiella* endosymbiont from *R. turanicus*; CLEAA - *Coxiella* endosymbiont from *A. americanum*.

Biosynthetic pathway	CERM	CRt	CLEAA
Biosynthesis of essential aminoacids			
Phenylalanine and tryptophan			
pyridoxal phosphate-dependent aminotransferase	CLERM_664	WP_048875152	WP_084588741.1
5-Enolpyruvylshikimate-3-phosphate synthase	CLERM_803	WP_048875158.1	WP_039670281.1
3-dehydroquinate dehydratase I	CLERM_806	WP_048875721.1	WP_039670147.1
2-keto-3-deoxy-D-arabino-heptulosonate-7-phosphate synthase I alpha	CLERM_133	WP_048875304.1	WP_039670078.1
Chorismate synthase	CLERM_574	WP_048875353.1	WP_039670062.1
Shikimate 5-dehydrogenase I alpha	CLERM_662	WP_048875740.1	WP_039669745.1
3-dehydroquinate synthase	CLERM_063	WP_048874781.1	WP_039669746.1
Shikimate kinase I	CLERM_064	WP_082160486.1	WP_052246297.1
Threonine			
Phosphoserine aminotransferase	CLERM_670	WP_048875157.1	WP_039670132.1
2-amino-3-ketobutyrate coenzyme A ligase	CLERM_836	WP_048875640.1	Absent
Serine hydroxymethyltransferase	CLERM_416	WP_048875001.1	WP_039669841.1
Valine, leucine and isoleucine			
Leucine dehydrogenase	CLERM_280	WP_048875043.1	WP_039670196.1
Dihydrolipoamide acyltransferase component of branched-chain alpha-keto acid dehydrogenase complex	CLERM_653	WP_048875040.1	WP_039669867.1
Branched-chain alpha-keto acid dehydrogenase, E1 component, alpha subunit	CLERM_651	WP_048875042.1	WP_084588725.1

Table S3: Enzymes involved in the synthesis of different essential amino acids in *Coxiella* endosymbionts genomes. CERM – *Coxiella* endosymbiont from *R. microplus*;

CRT – *Coxiella* endosymbiont strain from *R. turanicus*; *Coxiella* endosymbiont of *A. americanum*.