

Supplementary Table S1. Genes existing in 6 syntrophic Clostridia but lost in *Symbiobacterium*

Gene name	Function
<i>aroH</i>	Chorismate mutase
<i>patA</i>	Aminotransferase class I and II
<i>CoxS</i>	Xanthine dehydrogenase family protein, iron-sulfur binding subunit
<i>pyrF</i>	Orotidine 5'-phosphate decarboxylase
<i>accB</i>	Acetyl-CoA carboxylase, biotin carboxyl carrier protein
<i>CysG</i>	Precorrin-2 dehydrogenase
<i>hemB</i>	Delta-aminolevulinic acid dehydratase
<i>hemC</i>	Porphobilinogen deaminase
<i>hemD</i>	Uroporphyrinogen-III synthase / uroporphyrinogen-III C-methyltransferase
<i>panB</i>	3-methyl-2-oxobutanoate hydroxymethyltransferase
<i>panC</i>	Pantoate/beta-alanine ligase
<i>panD</i>	Aspartate 1-decarboxylase
<i>ribA</i>	Bifunctional 3,4-dihydroxy-2-butanone 4-phosphate synthase/GTP cyclohydrolase II protein
<i>ribD</i>	Riboflavin biosynthesis protein RibD
<i>ribE</i>	Riboflavin synthase, alpha subunit
<i>ribH</i>	6,7-dimethyl-8-ribityllumazine synthase
<i>thiC</i>	Thiamine biosynthesis protein ThiC
<i>arsR</i>	Transcriptional regulator, ArsR family
<i>GntR</i>	Transcriptional regulator, GntR family
<i>Lrp</i>	Transcriptional regulator, AsnC family
<i>entB</i>	NLP/P60 family protein

<i>arsB</i>	Arsenical-resistance protein
<i>CcmA</i>	ABC transporter ATP-binding protein
<i>DctP</i>	TRAP dicarboxylate transporter, DctP subunit
<i>PitA</i>	Phosphate transporter
<i>SNZ1</i>	Pyridoxal biosynthesis lyase PdxS
<i>Tar</i>	Methyl-accepting chemotaxis sensory transducer
<i>bofA</i>	Sigma-K factor processing regulatory protein BofA
<i>spo0B</i>	Signal transduction histidine kinase regulating citrate/malate metabolism
<i>hslU</i>	ATP-dependent protease ATP-binding subunit HslU
<i>HslV</i>	ATP-dependent protease peptidase subunit
<i>XerC3</i>	Phage integrase family protein
<i>MiaB</i>	MiaB-like tRNA modifying enzyme
<i>yabA</i>	Protein of unknown function DUF972
<i>yflK</i>	MOSC domain containing protein
<i>ymxH</i>	PRC-barrel domain-containing protein
<i>ypmA</i>	Hypothetical protein
<i>yqzB</i>	CBS domain containing protein
<i>yrvM</i>	UBA/THIF-type NAD/FAD binding protein
<i>yrzE</i>	Membrane protein
<i>yshA</i>	Protein of unknown function DUF710
<i>ywlD</i>	Protein of unknown function DUF204
<i>AcrA</i>	Secretion protein HlyD family protein
<i>AcuC</i>	Histone deacetylase superfamily protein

<i>aksA</i>	Trans-homoaconitate synthase
<i>cas2</i>	CRISPR-associated Cas2 family protein
<i>cas4</i>	CRISPR-associated Cas4 family protein
<i>cbiT</i>	Precorrin-6Y C5,15-methyltransferase (decarboxylating), CbiT subunit
<i>CDA1</i>	Polysaccharide deacetylase
<i>cobO</i>	ATP:corrinoid adenosyltransferase
<i>cobT</i>	Nicotinate-nucleotide/dimethylbenzimidazole phosphoribosyltransferase
<i>comFB</i>	Putative ComF operon protein
<i>CspR</i>	TRNA/rRNA methyltransferase (SpoU)
<i>Dgt</i>	Deoxyguanosinetriphosphate triphosphohydrolase-like protein
<i>divA</i>	Septum formation initiator protein
<i>FimT</i>	Pilin assembly protein, putative
<i>FixC</i>	FAD dependent oxidoreductase
<i>GppA</i>	Ppx/GppA phosphatase protein
<i>HdrA</i>	4Fe-4S ferredoxin iron-sulfur binding domain-containing protein
<i>hgdC</i>	Putative putative R-2-hydroxyglutaryl-CoA dehydratase/ R-2-hydroxyglutaryl-CoA dehydratase activase
<i>HyuA</i>	Hydantoinase/oxoprolinase
<i>kamA</i>	Lysine 2,3-aminomutase YodO family protein
<i>nrdD</i>	Anaerobic ribonucleoside-triphosphate reductase
<i>pfk</i>	6-phosphofructokinase
<i>PflA</i>	Radical SAM domain-containing protein
<i>pilC</i>	Type II secretion system protein F
<i>PilM</i>	Type IV pilus assembly protein PilM

<i>pilT</i>	Twitching motility protein PilT
<i>PulE</i>	Type II secretion system protein E
<i>SirA</i>	SirA family protein
<i>tldD</i>	Peptidase U62 modulator of DNA gyrase
<i>YSH1</i>	RNA-metabolising metallo-beta-lactamase
	Diguanylate cyclase and metal dependent phosphohydrolase
	Metal dependent phosphohydrolase
	Putative R-2-hydroxyglutaryl-CoA dehydratase subunit
	Putative CoA-substrate-specific enzyme activase
	Peptidase, U32 family
	Protein of unknown function DUF2229, CoA enzyme activase
	Geranylgeranyl pyrophosphate synthase-like protein
	Protein of unknown function DUF955
	Fe-S oxidoreductase
	DNA-binding protein
	HutP family protein
	Fis family transcriptional regulator
	Diguanylate cyclase with PAS/PAC sensor
	MazG nucleotide pyrophosphohydrolase
	Extradiol ring-cleavage dioxygenase class III protein subunit B
	NADP oxidoreductase, coenzyme F420-dependent
	HEPN domain-containing protein
	Hypothetical protein

Hypothetical protein

Hypothetical protein
