

Supplementary Table 4 Functional classification of *C. novyi-NT* genes

Manatee functional class	Predicted function within its class	Distribution of genes						
		Common	Unique to <i>C. novyi-NT</i>	Shared with <i>C. acetobutylicum</i>	Shared with <i>C. difficile</i>	Shared with <i>C. perfringens</i>	Shared with <i>C. tetani</i>	Total in <i>C. novyi-NT</i> genome
Amino acid biosynthesis		24	7	64	59	44	44	83
	Aromatic amino acid family	5	2	10	9	7	6	14
	Aspartate family	9	2	20	20	14	18	25
	Glutamate family	6		14	14	13	11	17
	Histidine family	1		9	8	2	2	9
	Other			1	1	1	1	2
	Pyruvate family	1	2	6	4	3	3	9
	Serine family	3	1	6	5	5	5	7
Biosynthesis of cofactors, prosthetic groups, and carriers		54	4	85	73	82	70	102
Biotin	2		5	2	4	4	5	
Folic acid	3		10	9	11	4	11	
Glutathione			1		2		2	
Heme, porphyrin, and cobalamin	19		28	26	28	30	33	
Menaquinone and ubiquinone	1		1	1	1	1	1	
Other	8		10	9	9	9	11	
Pantothenate and coenzyme A	4	1	8	7	5	4	9	
Pyridine nucleotides	4		8	7	8	5	9	
Pyridoxine	1	1	2	1	1	1	3	
Riboflavin, FMN, and FAD	4		4	4	4	4	4	
Thiamine	11	2	12	11	12	12	14	
Cell envelope		47	48	112	82	116	128	219
Biosynthesis and degradation of murein sacculus and peptidoglycan			1		2	1	1	3
Biosynthesis and degradation of surface polysaccharides and lipopolysaccharides	10	10	36	19	32	35	55	
Biosynthesis of murein sacculus and peptidoglycan	21	3	36	24	37	39	43	
Other	11	31	27	27	32	36	84	
Surface structures	5	3	16	11	18	20	29	
Cellular processes		61	26	156	115	89	159	226
Adaptations to atypical conditions	17	3	31	21	26	34	38	
Cell division	16	1	22	18	20	23	24	
Chemotaxis and motility	2	14	51	36	3	52	72	
Detoxification	1	1	4	2	3	3	7	
DNA transformation	2		2	2	3	3	3	
Other	4		7	5	5	6	7	
Pathogenesis	2	6	6	2	2	6	14	
Sporulation and germination	14		23	17	18	22	23	
Toxin production and resistance	11	5	24	22	20	24	38	
Central intermediary metabolism		21	7	36	32	36	36	55
Amino sugars	2		3	3	3	2	3	
Nitrogen fixation				2	2	2	2	
Nitrogen metabolism	2		2	3	5	4	5	
Other	16	7	30	22	23	27	42	
Phosphorus compounds	1		1	2	2	1	2	
Sulfur metabolism					1		1	
DNA metabolism		60	17	77	68	70	78	110
Chromosome-associated proteins	3		3	3	3	3	3	
Degradation of DNA	2	1	3	3	2	3	5	
DNA replication, recombination, and repair	56	12	72	62	66	73	91	
Other	1		1	1	1	1	1	
Restriction/modification	2	6	4	4	2	4	10	
Energy metabolism		60	28	134	131	139	139	247
Aerobic				1		1	1	
Amino acids and amines	2		3	4	5	6	6	
Anaerobic	2		4	3	4	5	5	
ATP-proton motive force interconversion	1	2	12	14	16	13	23	
Biosynthesis and degradation of polysaccharides	2	2	13	8	11	2	17	
Chemoautotrophy			1	1		1	1	
Electron transport	24	15	41	37	49	48	77	
Entner-Doudoroff		1	1	1	1		2	
Fermentation	5	3	16	17	14	20	33	
Glycolysis/gluconeogenesis	13	1	19	19	16	21	26	
Methanogenesis	1		1	1	1	1	1	
Other	3	1	7	9	10	9	13	
Pentose phosphate pathway	4	1	5	6	5	5	7	
Photosynthesis	2	1	5	4	4	4	8	
Pyruvate dehydrogenase							3	
Sugars	5	1	10	8	12	10	17	
TCA cycle	1	1	5	6	2	4	7	
Fatty acid and phospholipid metabolism		20	4	32	26	30	36	48
Biosynthesis	17	1	25	21	25	28	32	
Degradation	3	3	8	6	7	10	15	
Other						1	1	

Hypothetical proteins		32	267	69	49	68	79	377
	Conserved	32	128	69	49	68	79	238
	Unknown		139					139
Mobile and extrachromosomal element functions		3	48	8	9	7	13	66
	Other	1	4	2	3	1	6	10
	Prophage functions	2	10	5	6	4	7	20
	Transposon functions		34	1		2		36
Protein fate		41	13	74	59	75	79	115
	Degradation of proteins, peptides, and glycopeptides	22	6	47	34	49	48	69
	Protein and peptide secretion and trafficking	5	4	11	7	8	11	16
	Protein folding and stabilization	11	3	13	13	12	14	19
	Protein modification and repair	4	2	4	6	7	7	11
Protein synthesis		110	5	135	123	140	137	157
	tRNA aminoacylation	1		1	1	1	1	1
	Nucleoproteins	1		1	1	1	1	1
	Other	2		2	2	2	2	2
	Ribosomal proteins: synthesis and modification	51	4	65	58	68	65	78
	Translation factors	13	1	15	15	17	15	18
	tRNA aminoacylation	19		26	22	24	26	29
	tRNA and rRNA base modification	23		25	24	27	27	28
Purines, pyrimidines, nucleosides, and nucleotides		36	1	50	51	56	48	61
	2'-Deoxyribonucleotide metabolism	1		4	5	6	4	7
	Nucleotide and nucleoside interconversions	3	1	3	3	5	4	6
	Other	3		3	3	3	3	3
	Purine ribonucleotide biosynthesis	13		16	16	16	13	16
	Pyrimidine ribonucleotide biosynthesis	5		11	9	11	9	12
	Salvage of nucleosides and nucleotides	10		12	14	14	14	16
	Sugar-nucleotide biosynthesis and conversions	1		1	1	1	1	1
Regulatory functions		30	15	76	59	67	78	137
	DNA interactions	11	5	25	17	21	21	35
	Other	15	11	46	35	43	50	85
	Protein interactions	2	2	4	6	3	5	9
	RNA interactions	3		7	5	5	5	7
	Small molecule interactions			1		1	1	1
Signal transduction		1	5	5	7	7	8	18
	PTS		1					1
	Two-component systems	1	4	5	7	7	8	17
Transcription		35	9	44	44	42	45	63
	Degradation of RNA	6		6	6	6	6	6
	DNA-dependent RNA polymerase	7	1	7	7	7	8	9
	Other			2	1		2	2
	RNA processing	8		11	10	10	11	12
	Transcription factors	15	8	19	21	20	19	34
Transport and binding proteins		43	35	108	115	135	130	256
	Amino acids, peptides and amines	12	8	33	34	40	39	62
	Anions	1	1	2	3	4	3	6
	Carbohydrates, organic alcohols, and acids	4	6	13	14	23	17	32
	Cations and iron carrying compounds	11	5	23	31	36	37	51
	Nucleosides, purines and pyrimidines	1		2	2	4	2	5
	Other	4	7	13	9	13	13	28
	Unknown substrate	15	14	37	37	36	39	72
Unknown function		92	53	210	130	182	217	329
	Enzymes of unknown specificity	26	12	45	33	45	33	65
	General	66	41	164	97	137	184	262
Total		704	551	1338	1127	1262	1380	2325