

**Table A-3: Peptidoglycan-related genes**

The loci and the validation sets of the peptidoglycan-related genes in Case study 1.

Gene	Gene product	Validation set	Genomes	
			SA-2603	EC-K12
Peptidoglycan biosynthesis and associated pathways				
<i>murA</i>	UDP- <i>N</i> -acetylglucosamine 1-carboxyvinyltransferase	C, B, M	SAG0843 SAG0866	b3189
<i>murB</i>	UDP- <i>N</i> -acetylmuramate dehydrogenase	C, B, M	SAG1112	b3972
<i>murC</i>	UDP- <i>N</i> -acetylmuramate-alanine ligase	C, B, M	SAG1615	b0091
<i>murD</i>	UDP- <i>N</i> -acetylmuramoylalanine-D-glutamate ligase	C, B, M	SAG0475	b0088
<i>murE</i>	UDP- <i>N</i> -acetylmuramoylalanyl-D-glutamate-2,6-diaminopimelate ligase	C, B, M	SAG1391	b0085
<i>murF</i>	UDP- <i>N</i> -acetylmuramoylalanyl-D-glutamyl-2,6-diaminopimelate-D-alanyl-D-alanine ligase	C, B, M	SAG0768	b0086
<i>mraY</i>	phospho- <i>N</i> -acetylmuramoyl-pentapeptide-transferase	C, B, M	SAG0288	b0087
<i>murG</i>	UDP- <i>N</i> -acetylglucosamine- <i>N</i> -acetylmuramyl-(pentapeptide)-pyrophosphoryl-undecaprenol <i>N</i> -acetylglucosamine transferase	C, B, M	SAG0476	b0090
UDP- <i>N</i> -acetylmuramate biosynthesis				
<i>glmU</i>	glucosamine-1-phosphate N-acetyltransferase	UDP- <i>N</i> -	B, M	SAG1538 b3730
<i>glmM</i>	acetylglucosamine pyrophosphorylase			
<i>glmM</i>	phosphoglucomutase / phosphomannomutase		B, M	SAG0887 b3176
<i>glmS</i>	glucosamine-fructose-6-phosphate aminotransferase (isomerizing)		B, M	SAG0944 b3729
Undecaprenyl biosynthesis and recycling				
<i>uppP/bacA</i>	undecaprenyl pyrophosphate phosphatase		B, M	SAG0138 b3057

*(Continue on next page)*

Table 1: Peptidoglycan-related genes (continued)

Gene	Gene product	Validation set	Genomes	
			SA-2603	EC-K12
<i>uppS/ispU</i>	undecaprenyl diphosphate synthase	B, M	SAG1916	b0174
D-alanyl-D-alanine metabolism				
<i>ddl</i>	D-alanine-D-alanine ligase	B, M	SAG0767	b0381 b0092
<i>alr/dadX</i>	alanine racemase	B, M	SAG1684	b1190 b1190
D-glutamate metabolism				
<i>murI</i>	glutamate racemase	B, M	SAG1600	b3967
meso-diaminopimelate biosynthesis				
<i>dapF</i>	diaminopimelate epimerase	B, M		b3809
<i>dapE</i>	N-succinyl-diaminopimelate deacylase	B, M		b2472
<i>dapC</i>	acetylornithine delta-aminotransferase	B, M		b3359
<i>dapD</i>	2,3,4,5-tetrahydropyridine-2-carboxylate N-succinyltransferase	B, M		b0166
<i>dapB</i>	dihydrodipicolinate reductase	B, M		b0031
<i>dapA</i>	dihydrodipicolinate synthase	B, M		b2478
<i>asd</i>	aspartate-semialdehyde dehydrogenase	B, M		b3433
<i>lysC</i>	aspartokinase	B, M		b4024
Peptidoglycan modification				
<i>ami</i>	<i>N</i> -acetylmuramoyl-L-alanine amidase	M	SAG0094	

*(Continue on next page)*

Table 1: Peptidoglycan-related genes (continued)

Gene	Gene product	Validation set	Genomes	
			SA-2603	EC-K12
<i>amiA</i>	<i>N</i> -acetylmuramoyl-L-alanine amidase	M		b2435
<i>amiB</i>	<i>N</i> -acetylmuramoyl-L-alanine amidase	M		b4169
<i>amiC</i>	<i>N</i> -acetylmuramoyl-L-alanine amidase	M		b2817
<i>ybjR</i>	<i>N</i> -acetylmuramoyl-L-alanine amidase	M		b0867
<i>ampD</i>	<i>N</i> -acetyl-anhydromuranmyl-L-alanine amidase	M		b0110
<i>ampG</i>	muropeptide transporter	M		b0433
<i>mltA</i>	membrane-bound lytic murein transglycosylase A	M		b2813
<i>mltB</i>	membrane-bound lytic murein transglycosylase B	M		b2701
<i>mltC</i>	membrane-bound lytic murein transglycosylase C	M		b2963
<i>mltD</i>	membrane-bound lytic murein transglycosylase D (predicted)	M		b0211
<i>slt</i>	lytic murein transglycosylase, soluble	M		b4392
<i>mepA</i>	murein DD-endopeptidase	M		b2328
<i>glnA</i>	glutamine synthetase	M	SAG1763	b3870
<i>mpl</i>	UDP- <i>N</i> -acetylmuramate:L-alanyl-gamma-D-glutamyl-diaminopimelate ligase	M		b4233
Penicillin-binding proteins				
<i>pbp1A</i>	penicillin-binding protein 1A	M	SAG0298	b3396
<i>pbp1B</i>	penicillin-binding protein 1B	M	SAG0159	
<i>pbp2/mrdA</i>	penicillin-binding protein 2	M		b0635
<i>pbp2A</i>	penicillin binding protein 2A	M	SAG2066	
<i>pbp2B</i>	penicillin binding protein 2B	M	SAG0765	
<i>pbp2X</i>	penicillin binding protein 2X	M	SAG0287	

(Continue on next page)

Table 1: Peptidoglycan-related genes (continued)

Gene	Gene product	Validation set	Genomes	
			SA-2603	EC-K12
<i>pbp3/pbpB</i>	penicillin binding protein 3	M		b0084
<i>ftsI</i>	carboxy-terminal protease for penicillin-binding protein 3 (EC-K12)	M		b1830
<i>mrcB</i>	fused glycosyl transferase and transpeptidase	M		b0149
<i>pbp4</i>	penicillin-binding protein 4	M	SAG0146	
<i>pbp5/dacA</i>	penicillin-binding protein 5: D-alanyl-D-alanine carboxypeptidase	M		b0632
<i>dacC</i>	penicillin-binding protein 6a/b: D-alanyl-D-alanine carboxypeptidase	M		b0839
<i>dacD</i>	penicillin-binding protein 6a/b: D-alanyl-D-alanine carboxypeptidase	M		b2010
<i>pbpG</i>	D-alanyl-D-alanine endopeptidase	M		b2134
<i>pbpC</i>	transglycosylase/transpeptidase	M		b2519
<i>mtgA</i>	biosynthetic peptidoglycan transglycosylase	M		b3208

*(End of table)*