

Table 4. Location of the various genes Modified
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Gene	Number	Genera
METHYLASES		
<i>erm</i> (A)	8	<i>Aggregatibacter</i> ^L , <i>Bacteriodes</i> , <i>Enterococcus</i> ^e , <i>Peptostreptococcus</i> ^a , <i>Prevotella</i> ^a , <i>Staphylococcus</i> , <i>Streptococcus</i> , <i>Helcococcus</i>
<i>erm</i> (B)	33	<i>Aggregatibacter</i> ¹ , <i>Acinetobacter</i> , <i>Aerococcus</i> , <i>Arcanobacterium</i> , <i>Bacillus</i> , <i>Bacteriodes</i> ^a , <i>Citrobacter</i> , <i>Corynebacterium</i> , <i>Clostridium</i> ^a , <i>Enterobacter</i> , <i>Escherichia</i> , <i>Eubacterium</i> ^a , <i>Enterococcus</i> , <i>Fusobacterium</i> ^a , <i>Gemella</i> , <i>Haemophilus</i> , <i>Klebsiella</i> , <i>Lactobacillus</i> , <i>Micrococcus</i> , <i>Neisseria</i> , <i>Pantoeae</i> , <i>Pediococcus</i> , <i>Peptostreptococcus</i> ^a , <i>Porphyromonas</i> ^a , <i>Proteus</i> , <i>Pseudomonas</i> , <i>Ruminococcus</i> ^a , <i>Rothia</i> , <i>Serratia</i> , <i>Staphylococcus</i> , <i>Streptococcus</i> , <i>Wolinella</i> ^a , <i>Treponema</i> ^b
<i>erm</i> (C)	16	<i>Aggregatibacter</i> ^L , <i>Actinomyces</i> , <i>Bacillus</i> , <i>Bacteriodes</i> ^a , <i>Corynebacterium</i> , <i>Eubacterium</i> ^a , <i>Enterococcus</i> , <i>Haemophilus</i> , <i>Lactobacillus</i> , <i>Micrococcus</i> , <i>Neisseria</i> , <i>Prevotella</i> ^a , <i>Peptostreptococcus</i> ^a , <i>Staphylococcus</i> , <i>Streptococcus</i> , <i>Wolinella</i> ^a
<i>erm</i> (D)	2	<i>Bacillus</i> , <i>Salmonella</i>
<i>erm</i> (E)	7	<i>Bacteroides</i> ^a , <i>Eubacterium</i> ^a , <i>Fusobacterium</i> ^a , <i>Ruminococcus</i> ^a , <i>Saccharopolyspora</i> ⁿ , <i>Shigella</i> , <i>Streptomyces</i>
<i>erm</i> (F)	24	<i>Aggregatibacter</i> ^L , <i>Actinomyces</i> , <i>Bacteroides</i> ^a , <i>Clostridium</i> ^a , <i>Corynebacterium</i> , <i>Eubacterium</i> ^a , <i>Enterococcus</i> , <i>Fusobacterium</i> ^a , <i>Gardnerella</i> , <i>Haemophilus</i> , <i>Lactobacillus</i> , <i>Mobiluncus</i> ^a , <i>Neisseria</i> , <i>Porphyromonas</i> ^a , <i>Prevotella</i> ^a , <i>Peptostreptococcus</i> ^a , <i>Ruminococcus</i> ^a , <i>Shigella</i> , <i>Selenomonas</i> ^a , <i>Staphylococcus</i> , <i>Streptococcus</i> , <i>Treponema</i> ^b , <i>Veillonella</i> ^a , <i>Wolinella</i> ^a
<i>erm</i> (G)	7	<i>Bacillus</i> , <i>Bacteroides</i> ^a , <i>Catenibacterium</i> ^a , <i>Lactobacillus</i> , <i>Prevotella</i> ^a , <i>Porphyromonas</i> ^a , <i>Staphylococcus</i>
<i>erm</i> (H)	1	<i>Streptomyces</i>

<i>erm(I)</i>	1	<i>Streptomyces</i>
<i>erm(N)</i>	1	<i>Streptomyces</i>
<i>erm(O)</i>	1	<i>Streptomyces</i>
<i>erm(Q)</i>	6	<i>Aggregatibacter</i> ^L , <i>Bacteroides</i> ^a , <i>Clostridium</i> ^a , <i>Staphylococcus</i> , <i>Streptococcus</i> <i>Wolinella</i> ^a
<i>erm(R)</i>	2	<i>Arthrobacter</i> , <i>Aeromicrobium</i> ⁿ
<i>erm(S)</i>	1	<i>Streptomyces</i>
<i>erm(T)</i>	4	<i>Enterococcus</i> , <i>Lactobacillus</i> , <i>Streptococcus</i> , <i>Staphylococcus</i> ^m
<i>erm(U)</i>	1	<i>Streptomyces</i>
<i>erm(V)</i>	3	<i>Eubacterium</i> ^a , <i>Fusobacterium</i> ^a , <i>Streptomyces</i>
<i>erm(W)</i>	1	<i>Micromonospora</i>
<i>erm(X)</i>	4	<i>Arcanobacterium</i> , <i>Bifidobacterium</i> ^a , <i>Corynebacterium</i> , <i>Propionibacterium</i> ^a
<i>erm(Y)</i>	1	<i>Staphylococcus</i>
<i>erm(Z)</i>	1	<i>Streptomyces</i>
<i>erm(30)</i>	1	<i>Streptomyces</i>
<i>erm(31)</i>	1	<i>Streptomyces</i>
<i>erm(32)</i>	1	<i>Streptomyces</i>
<i>erm(33)</i>	1	<i>Staphylococcus</i>
<i>erm(34)</i>	1	<i>Bacillus</i>
<i>erm(35)</i>	1	<i>Bacteriodes</i> ^a
<i>erm(36)</i>	1	<i>Micrococcus</i>
<i>erm(37)</i>	1	<i>Mycobacterium</i>
<i>erm(38)</i>	1	<i>Mycobacterium</i>
<i>erm(39)</i>	1	<i>Mycobacterium</i>
<i>erm(40)</i>	1	<i>Mycobacterium</i>
<i>erm(41)</i>	1	<i>Mycobacterium</i>

ATP-BINDING TRANSPORTERS

<i>car(A)</i>	1	<i>Streptomyces</i>
<i>msr(A)</i>	7	<i>Corynebacterium</i> , <i>Enterobacter</i> , <i>Enterococcus</i> , <i>Gemella</i> , <i>Pseudomonas</i> , <i>Staphylococcus</i> , <i>Streptococcus</i>

<i>msr(C)</i>	1	<i>Enterococcus</i>
<i>msr(D)</i> ^c	21	<i>Acinetobacter, Bacteroides</i> ^{a,d} , <i>Citrobacter, Clostridium</i> ^a , <i>Corynebacterium, Enterococcus, Enterobacter, Escherichia, Gemella, Fusobacterium</i> ^a , <i>Klebsiella, Morganella, Neisseria, Proteus, Providencia, Pseudomonas, Ralstonia, Staphylococcus, Streptococcus, Serratia, Stenotrophomonas</i>
<i>lsa(A)</i>	1	<i>Enterococcus</i>
<i>lsa(B)</i>	1	<i>Staphylococcus</i>
<i>ole(B)</i>	1	<i>Streptomyces</i>
<i>ole(C)</i>	1	<i>Streptomyces</i>
<i>srm(B)</i>	1	<i>Streptomyces</i>
<i>tlr(C)</i>	1	<i>Streptomyces</i>
<i>vga(A)</i>	1	<i>Staphylococcus</i>
<i>vga(A)</i> _{LC}	1	<i>Staphylococcus</i>
<i>vga(B)</i>	2	<i>Staphylococcus, Enterococcus</i>
<i>vga(C)</i> ^k	1	<i>Staphylococcus</i>

MAJOR FACILITATORS

<i>lmr(A)</i>	1	<i>Streptomyces</i>
<i>mef(A)</i>	26	<i>Acinetobacter, Bacteroides</i> ^a , <i>Citrobacter, Clostridium</i> ^a , <i>Corynebacterium, Enterococcus, Enterobacter, Escherichia, Fusobacterium</i> ^a , <i>Gemella, Klebsiella, Lactobacillus, Micrococcus, Morganella, Neisseria, Pantoeae, Providencia, Proteus, Ralstonia, Rothia</i> ¹ , <i>Pseudomonas, Salmonella, Serratia, Staphylococcus, Streptococcus, Stenotrophomonas</i>
<i>mef(B)</i>	1	<i>Escherichia</i>

ESTERASES

<i>ere(A)</i>	11	<i>Citrobacter, Enterobacter, Escherichia, Klebsiella, Pantoeae, Providencia, Pseudomonas, Serratia, Staphylococcus, Stenotrophomonas, Vibrio</i>
<i>ere(B)</i>	8	<i>Acinetobacter, Citrobacter, Enterobacter, Escherichia, Klebsiella, Proteus, Pseudomonas, Staphylococcus</i>

LYASES

<i>vgb(A)</i>	2	<i>Enterococcus, Staphylococcus</i>
<i>vgb(B)</i>	1	<i>Staphylococcus</i>

TRANSFERASES

<i>lnu(A)</i>	3	<i>Staphylococcus, Clostridium</i> ^a , <i>Lactobacillus</i> ^g
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<i>lnu</i> (B)	4	<i>Enterococcus, Staphylococcus, Clostridium</i> ^a , <i>Streptococcus</i> ^h
<i>lnu</i> (C)	2	<i>Streptococcus, Haemophilus</i> ^L
<i>lnu</i> (D)	1	<i>Streptococcus</i>
<i>lnu</i> (F)	2	<i>Escherichia, Salmonella</i>
<i>vat</i> (A)	1	<i>Staphylococcus</i>
<i>vat</i> (B)	2	<i>Enterococcus, Staphylococcus</i>
<i>vat</i> (C)	1	<i>Staphylococcus</i>
<i>vat</i> (D)	1	<i>Enterococcus</i>
<i>vat</i> (E)	2	<i>Enterococcus, Lactobacillus</i>
<i>vat</i> (F)	1	<i>Yersinia</i>

PHOSPHORYLASES

<i>mph</i> (A)	11	<i>Aeromonas, Escherichia, Citrobacter, Enterobacter, Klebsiella, Pantoeae, Pseudomonas, Proteus Serratia, Shigella</i> ⁱ , <i>Stenotrophomonas</i>
<i>mph</i> (B)	4	<i>Escherichia, Enterobacter, Pseudomonas, Proteus</i>
<i>mph</i> (C)	2	<i>Staphylococcus, Stenotrophomonas</i>
<i>mph</i> (D)	6	<i>Escherichia, Klebsiella, Pantoeae, Proteus, Pseudomonas, Stenotrophomonas</i>

Blue indicates new since last update.

¹*Actinobacillus actinomycetemcomitans* is now *Aggregatibacter actinomycetemcomitans*

^a Anaerobic genus; ^b *T. denticola* anaerobic but not all species in genus are anaerobes; ^c *msr*(D) linked to *mef*(A); ^d the *msr*(D) may not be functional in the *Bacteroides* isolated described (Wang et al., App Env Microb. 2003); ^e Schwaiger, & Bauer, 2008, AAC 52:2994; ^g Rosander, Connolly & Roos AEM in press; ^h Achard et al., AAC, 49:2716; ⁱ Boumghar-Bourtchai, 2008 Emg Infect Dis 14:1297; ^j Villedieu et al., AAC, 51:2195; ^k Kadlec, AAC 53:3589, 2009; ^LChen et al, AAC manuscript, ^mKadlec & Schwarz 2009 ICAAC abstract C1-1351; ⁿKoike et al., Env Microb. 2009:doi 10.1007/s00248-009-9610-0