

Table 4. Location of the various genes
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 Originally modified from AAC 1999 43:2823-30 with permission from ASM Journals

Gene	Number	Genera
METHYLASES		
<i>erm</i> (A)	13	<i>Aggregatibacter</i> ^{L,1} , <i>Bacteroides</i> , <i>Enterococcus</i> ^e , <i>Escherichia</i> ^{cz} , <i>Haemophilus</i> ^r , <i>Helcococcus</i> , <i>Klebsiella</i> , <i>Listeria</i> , <i>Nocardia</i> ^{cu} , <i>Peptostreptococcus</i> ^a , <i>Prevotella</i> ^a , <i>Staphylococcus</i> , <i>Streptococcus</i>
<i>erm</i> (B)	44	<i>Acinetobacter</i> , <i>Aggregatibacter</i> ¹ , <i>Aerococcus</i> , <i>Bacillus</i> , <i>Bacteroides</i> ^a , <i>Campylobacter</i> ^{af} , <i>Citrobacter</i> , <i>Corynebacterium</i> , <i>Clostridium</i> ^a , <i>Clostridioides</i> ^a , <i>Enterobacter</i> , <i>Escherichia</i> , <i>Eubacterium</i> ^a , <i>Enterococcus</i> , <i>Fusobacterium</i> ^a , <i>Gallibacterium</i> ^{cp} , <i>Gemella</i> , <i>Haemophilus</i> , <i>Klebsiella</i> , <i>Lactobacillus</i> , <i>Listeria</i> ^{cc} , <i>Macrococcus</i> ^{da} , <i>Mammalilcoccus</i> ^{cv} , <i>Micrococcus</i> , <i>Neisseria</i> , <i>Nocardia</i> ^{cu} , <i>Pantoea</i> , <i>Pediococcus</i> , <i>Peptostreptococcus</i> ^a , <i>Porphyromonas</i> ^a , <i>Proteus</i> , <i>Prevotella</i> ^{a,db} , <i>Pseudomonas</i> , <i>Rothia</i> , <i>Ruminococcus</i> ^a , <i>Salmonella</i> ^{cn} , <i>Serratia</i> , <i>Shigella</i> ^{ag} , <i>Staphylococcus</i> , <i>Streptococcus</i> , <i>Ureaplasma</i> ^o , <i>Wollinella</i> ^a , <i>Treponema</i> ^b , <i>Trueperella</i> ¹
<i>erm</i> (C)	38	<i>Aeromonas</i> ^y , <i>Aggregatibacter</i> ^L , <i>Actinomyces</i> , <i>Bacillus</i> , <i>Bacteroides</i> ^a , <i>Brevundimonas</i> ^y , <i>Burkholderia</i> ^y , <i>Campylobacter</i> , <i>Capnocytophaga</i> ^{a,ca} , <i>Chryseomonas</i> ^y , <i>Corynebacterium</i> , <i>Clostridium</i> ^{a,n} , <i>Escherichia</i> ⁿ , <i>Eubacterium</i> ^a , <i>Enterococcus</i> , <i>Fusobacterium</i> ^{a,br} , <i>Haemophilus</i> ^r , <i>Lactobacillus</i> , <i>Listeria</i> , <i>Macrococcus</i> , <i>Micrococcus</i> , <i>Neisseria</i> , <i>Paenibacillus</i> ^y , <i>Pasteurella</i> ^y , <i>Prevotella</i> ^a , <i>Peptostreptococcus</i> ^a , <i>Pseudomonas</i> ^y , <i>Pseudoramibacter</i> ^{a,br} , <i>Rhizobium</i> ^y , <i>Salmonella</i> , <i>Serratia</i> , <i>Sinorhizobium</i> ^y , <i>Sphingomonas</i> ^y , <i>Stenotrophomans</i> ^y , <i>Staphylococcus</i> , <i>Streptococcus</i> , <i>Trueperella</i> ⁿ , <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)	30	<i>Aggregatibacter</i> ^L , <i>Actinomyces</i> , <i>Bacteroides</i> ^a , <i>Campylocater</i> , <i>Capnocytophaga</i> ^{a,ca} , <i>Clostridium</i> ^a , <i>Corynebacterium</i> , <i>Eubacterium</i> ^a , <i>Enterococcus</i> , <i>Escherichia</i> , <i>Fusobacterium</i> ^a , <i>Gardnerella</i> , <i>Haemophilus</i> ^r , <i>Lactobacillus</i> , <i>Mobiluncus</i> ^a , <i>Neisseria</i> , <i>Peptostreptococcus</i> ^a , <i>Porphyromonas</i> ^a , <i>Prevotella</i> ^a , <i>Pyramidobacter</i> ^{ci} , <i>Riemerella</i> ^{am} , <i>Ruminococcus</i> ^a , <i>Salmonella</i> , <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)	9	<i>Bacillus</i> , <i>Bacteroides</i> ^a , <i>Catenibacterium</i> ^a , <i>Clostridioides</i> ^{a,by} , <i>Listeria</i> , <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</i> (N)	1	<i>Streptomyces</i>
<i>erm</i> (O)	1	<i>Streptomyces</i>
<i>erm</i> (Q)	6	<i>Aggregatibacter</i> ^L , <i>Bacteroides</i> ^a , <i>Clostridioides</i> ^{a,by} , <i>Staphylococcus</i> , <i>Streptococcus</i> <i>Wolinella</i> ^a
<i>erm</i> (R)	2	<i>Arthrobacter</i> , <i>Aeromicrobium</i> ⁿ
<i>erm</i> (S)	1	<i>Streptomyces</i>
<i>erm</i> (T)	12	<i>Acinetobacter</i> , <i>Bacillus</i> ^{dd} , <i>Enterococcus</i> , <i>Escherichia</i> , <i>Erysipelothrix</i> ^{aj} , <i>Glaesserella</i> ^{ai dc} [formerly <i>Haemophilus parasuis</i>], <i>Limosilactobacillus</i> [formerly <i>Lactobacillus reuteri</i>], <i>Lactobacillus</i> , <i>Listeria</i> , <i>Streptococcus</i> , <i>Salmonella</i> , <i>Staphylococcus</i> ^m
<i>erm</i> (U)	1	<i>Streptomyces</i>
<i>erm</i> (V)	11	<i>Brevundimonas</i> ^y , <i>Chryseomonas</i> ^y , <i>Eubacterium</i> ^a , <i>Fusobacterium</i> ^a , <i>Leifsonia</i> ^y , <i>Mesorhizobium</i> ^y , <i>Paenibacillus</i> ^y , <i>Pseudomonas</i> ^y , <i>Rhizobium</i> ^y , <i>Shewanella</i> ^y , <i>Streptomyces</i>
<i>erm</i> (W)	1	<i>Micromonospora</i>
<i>erm</i> (X)	28	<i>Abiotrophia</i> ^{ci} , <i>Actinotignum</i> (<i>Actinobaculum</i>) ^{ae} , <i>Actinobacillus</i> ^{bp} , <i>Actinomyces</i> ^{ci} , <i>Alloprevotella</i> ^{ci} <i>Bifidobacterium</i> ^a , <i>Burkholderia</i> ^y , <i>Brevundimonas</i> ^y , <i>Capnocytophaga</i> ^{ci} , <i>Corynebacterium</i> ^{ci} , <i>Cutibacterium</i> ^{a, bp} (<i>Propionibacterium</i>), <i>Eubacterium</i> ^{ci} , <i>Granulicatella</i> ^{ci} , <i>Klebsiella</i> ^{ci} , <i>Lautropia</i> ^{ci} , <i>Leifsonia</i> ^y , <i>Leptotrichia</i> ^{ci} , <i>Mobiluncus</i> ^{cj} , <i>Neisseria</i> ^{ci} , <i>Paenibacillus</i> ^y , <i>Pseudomonas</i> ^y , <i>Rhizobium</i> ^y , <i>Shewanella</i> ^y , <i>Sphingomonas</i> ^y , <i>Stenotrophomanas</i> , <i>Streptococcus</i> ^{ci} , <i>Trueperella</i> (<i>Arcanobacterium</i>), <i>Veillonella</i> ^{ci}
<i>erm</i> (Y)	1	<i>Staphylococcus</i>
<i>erm</i> (Z)	1	<i>Streptomyces</i>
<i>erm</i> (30)	1	<i>Streptomyces</i>
<i>erm</i> (31)	1	<i>Streptomyces</i>
<i>erm</i> (32)	1	<i>Streptomyces</i>
<i>erm</i> (33)	1	<i>Staphylococcus</i>
<i>erm</i> (34)	1	<i>Bacillus</i>
<i>erm</i> (35)	1	<i>Bacteroides</i> ^a
<i>erm</i> (36)	1	<i>Micrococcus</i>
<i>erm</i> (37)	1	<i>Mycobacterium</i>

<i>erm</i> (38)	1	<i>Mycobacterium</i>
<i>erm</i> (39)	1	<i>Mycobacterium</i>
<i>erm</i> (40)	1	<i>Mycobacterium</i>
<i>erm</i> (41) ^{bi}	1	<i>Mycobacterium</i>
<i>erm</i> (42)	8	<i>Escherichia, Enterobacter, Klebsiella, Mannheimia, Morganella, Pasteurella, Photobacterium, Salmonella</i>
<i>erm</i> (43)	1	<i>Staphylococcus</i>
<i>erm</i> (44)	1	<i>Staphylococcus</i>
<i>erm</i> (44) _v	1	<i>Staphylococcus</i>
<i>erm</i> (45)	1	<i>Staphylococcus</i>
<i>erm</i> (46)	2	<i>Rhodococcus, Listeria</i>
<i>erm</i> (47)	1	<i>Helcococcus</i>
<i>erm</i> (48) ^{as}	1	<i>Staphylococcus</i>
<i>erm</i> (49) ^{bd}	1	<i>Bifidobacterium</i> ^a
<i>erm</i> (50) ^{br}	1	<i>Cutibacterium</i> ^a (<i>Propionibacterium</i>) ^{bp}
<i>erm</i> (51) ^{bw}	1	<i>Rhodococcus</i>
<i>erm</i> (52) ^{cf}	1	<i>Clostridioides</i>
<i>erm</i> (53) ^{cm}	1	<i>Campylobacter</i>
<i>erm</i>(54)^{cm}	1	<i>Staphylococcus</i>
<i>erm</i>(55)^{cm}	1	<i>Mycobacterium</i>

S-ADENYOSYLMETHIONINE rRNA METHYLASES PhLOPS_A^q

<i>cfr</i>	11	<i>Bacillus, Enterococcus, Escherichia</i> ^{ab} , <i>Jeotgalicoccus</i> ^c , <i>Macrococcus</i> ^c , <i>Mammaliicooccus</i> ^{cv} , <i>Proteus</i> ^x , <i>Providencia, Salmonella, Staphylococcus, Streptococcus</i> ^{az}
<i>cfr</i> (B) ^{ak}	2	<i>Clostridioides</i> ^{a,by} , <i>Enterococcus</i> ,
<i>cfr</i> (C) ^{at}	3	<i>Campylobacter, Clostridioides</i> ^{a,by} , <i>Clostridium</i> ^a
<i>cfr</i> (D) ^{bh}	1	<i>Enterococcus</i>
<i>cfr</i> (E) ^{bu}	1	<i>Clostridioides</i> ^{a,by}

ATP-F PROTEIN RIBOSOMAL PROTECTION^{bj}

<i>lsa</i> (A)	4	<i>Clostridioides</i> ^a . <i>Clostridium</i> ^a , <i>Enterococcus, Listeria</i>
<i>lsa</i> (B)	1	<i>Staphylococcus</i>
<i>lsa</i> (C)	2	<i>Gardnerella, Streptococcus</i> ^p

<i>lsa(D)</i> ^{bv}	1	<i>Lactococcus</i>
<i>lsa(E)</i>	5	<i>Enterococcus, Erysipelothrix</i> ^{aq} , <i>Listeria</i> ^{cc} , <i>Staphylococcus, Streptococcus</i> ^{av}
<i>lsa(E)</i> _v ^{aa}	2	<i>Stenotrophomonas, Ureaplasma</i> ^o
<i>msr(A)</i>	17	<i>Bacteroides</i> ^{av} , <i>Brevundimonas</i> ^y , <i>Burkholderia</i> ^y , <i>Chryseomonas</i> ^y , <i>Corynebacterium, Enterobacter, Enterococcus, Gemella, Listeria, Lysinibacillus</i> ^y , <i>Photobacterium</i> ^y , <i>Pseudomonas, Shewanella</i> ^y , <i>Staphylococcus, Streptococcus, Streptomyces</i> ^y , <i>Ureaplasma</i> ^o
<i>msr(C)</i>	3	<i>Enterococcus, Pediococcus</i> ^{cq} , <i>Staphylococcus</i>
<i>msr(D)</i> ^c	28	<i>Acinetobacter, Bacteroides</i> ^a , <i>Citrobacter, Clostridioides</i> ^{a,by} , <i>Corynebacterium, Enterococcus, Enterobacter, Escherichia, Erysipelothrix</i> ^{bb} , <i>Gemella, Fusobacterium</i> ^a , <i>Haemophilus, Klebsiella, Listeria, Morganella, Morococcus</i> ^{ci} , <i>Neisseria, Pantoea, Proteus, Providencia, Pseudomonas, Ralstonia, Salmonella, Staphylococcus, Streptococcus, Serratia, Stenotrophomonas, Ureaplasma</i> ^o
<i>msr(E)</i> ^{s,bj}	11	<i>Acinetobacter, Citrobacter, Escherichia, Gallibacterium</i> ^{cp} , <i>Klebsiella, Mannheimia</i> ^{ck} , <i>Morganella, Pasteurella, Pseudomonas</i> ^{bq} , <i>Salmonella, Serratia</i>
<i>msr(F)</i> ^{bx}	2	<i>Macrococcus, Staphylococcus</i>
<i>msr(G)</i> ^{cd}	2	<i>Macrococcus, Staphylococcus</i>
<i>msr(H)</i> ^{bx}	1	<i>Macrococcus</i>
<i>msr(I)</i> ^{ce}	1	<i>Streptococcus</i>
<i>vga(A)</i>	5	<i>Leifsonia</i> ^y , <i>Listeria, Paenibacillus</i> ^y , <i>Salmonella</i> ^{cl} , <i>Staphylococcus</i>
<i>vga(A)</i> _{LC}	1	<i>Staphylococcus</i>
<i>vga(A)</i> _v	1	<i>Staphylococcus</i>
<i>vga(B)</i>	2	<i>Enterococcus, Staphylococcus</i>
<i>vga(C)</i> ^k	1	<i>Staphylococcus</i>
<i>vga(D)</i> ^t	1	<i>Enterococcus</i>
<i>vga(E)</i> ^y	1	<i>Staphylococcus</i>
<i>vga(F)</i> ^{ce}	1	<i>Streptococcus</i>
<i>vga(G)</i>^{cy}	1	<i>Listeria</i>
<i>optrA</i> ^{ax}	3	<i>Enterococcus, Lactococcus</i> ^{ct} , <i>Staphylococcus</i>
<i>poxA</i> ^{cb}	3	<i>Enterococcus, Pediococcus, Staphylococcus</i>
<i>eat(A)</i> _v	1	<i>Enterococcus</i>
<i>sal(A)</i> ^{ar}	1	<i>Staphylococcus</i>
<i>varM</i>	1	<i>Streptomyces</i>

<i>vlmR</i> ^{bm}	1	<i>Bacillus</i>
ATP-F Protein [Mechanism not tested]^{bk}		
<i>car</i> (A)	1	<i>Streptomyces</i>
<i>lmr</i> (C)	1	<i>Streptomyces</i>
<i>ole</i> (B)	1	<i>Streptomyces</i>
<i>ole</i> (C)	1	<i>Streptomyces</i>
<i>srm</i> (B)	1	<i>Streptomyces</i>
<i>tlr</i> (C)	1	<i>Streptomyces</i>
MAJOR FACILITATORS [Efflux]		
<i>lmr</i> (A)	1	<i>Streptomyces</i> ^{bc}
<i>mef</i> (A)	33	<i>Acinetobacter</i> , <i>Bacteroides</i> ^a , <i>Citrobacter</i> , <i>Clostridioides</i> ^{a,by} , <i>Corynebacterium</i> , <i>Enterococcus</i> , <i>Enterobacter</i> , <i>Escherichia</i> , <i>Erysipelothrix</i> ^{bb} , <i>Fusobacterium</i> ^a , <i>Gemella</i> , <i>Haemophilus</i> ^r , <i>Klebsiella</i> , <i>Lactobacillus</i> , <i>Listeria</i> , <i>Micrococcus</i> , <i>Morganella</i> , <i>Neisseria</i> , <i>Nocardia</i> ^{cu} , <i>Pantoea</i> , <i>Pediococcus</i> ^{ad} , <i>Providencia</i> , <i>Proteus</i> , <i>Ralstonia</i> , <i>Rothia</i> ⁱ , <i>Pseudomonas</i> , <i>Salmonella</i> , <i>Serratia</i> , <i>Staphylococcus</i> , <i>Listeria</i> , <i>Streptococcus</i> , <i>Stenotrophomonas</i> , <i>Weissella</i> ^{ad}
<i>mef</i> (B)	3	<i>Escherichia</i> , <i>Klebsiella</i> , <i>Salmonella</i>
<i>mef</i> (C)	5	<i>Citrobacter</i> ^{cg} , <i>Pseudoalteromonas</i> ^{cg} , <i>Photobacterium</i> , <i>Shewanella</i> ^{cg} , <i>Vibrio</i>
<i>mef</i> (D) ^{bx}	2	<i>Macrococcus</i> , <i>Staphylococcus</i> ^{cd}
<i>mef</i> (F) ^{cd}	2	<i>Macrococcus</i> , <i>Staphylococcus</i>
<i>mef</i> (H) ^{cf}	1	<i>Clostridioides</i>
<i>mef</i> (J) ^{ch}	1	<i>Streptococcus</i>
ESTERASES		
<i>ere</i> (A)	16	<i>Achromobacter</i> , <i>Aermonas</i> , <i>Citrobacter</i> , <i>Enterobacter</i> , <i>Escherichia</i> , <i>Klebsiella</i> , <i>Laribacter</i> , <i>Morganella</i> , <i>Pantoeae</i> , <i>Providencia</i> , <i>Pseudomonas</i> , <i>Salmonella</i> , <i>Serratia</i> , <i>Staphylococcus</i> , <i>Stenotrophomonas</i> , <i>Vibrio</i>
<i>ere</i> (B)	9	<i>Acinetobacter</i> , <i>Citrobacter</i> , <i>Enterobacter</i> , <i>Escherichia</i> , <i>Klebsiella</i> , <i>Morganella</i> , <i>Proteus</i> , <i>Pseudomonas</i> , <i>Staphylococcus</i>
<i>ere</i> (C)	3	<i>Escherichia</i> , <i>Klebsiella</i> , <i>Riemerella</i>
<i>ere</i> (D) ^{ba}	3	<i>Elizabethkingia</i> , <i>Riemerella</i> , <i>Salmonella</i>
LYASES		
<i>vgb</i> (A)	2	<i>Enterococcus</i> , <i>Staphylococcus</i>
<i>vgb</i> (B)	1	<i>Staphylococcus</i>

TRANSFERASES

<i>lnu(A)</i>	6	<i>Staphylococcus</i> , <i>Bacteroides</i> ^{av} , <i>Clostridium</i> ^a , <i>Listeria</i> , <i>Lactobacillus</i> ^g , <i>Pediococcus</i> ^{ad}
<i>lnu(B)</i>	7	<i>Clostridium</i> ^a , <i>Enterococcus</i> , <i>Erysipelothrix</i> ^{aq} , <i>Listeria</i> ^{cc} , <i>Staphylococcus</i> , <i>Streptococcus</i> ^h , <i>Virgibacillus</i>
<i>lnu(C)</i>	9	<i>Brachyspira</i> ^{bd,be} , <i>Campylobacter</i> , <i>Streptococcus</i> , <i>Haemophilus</i> ^L , <i>Bifidobacterium</i> ^{bf} , <i>Cloacibacillus</i> ^{a,bf} , <i>Enterococcus</i> ^{bf} , <i>Megasphaera</i> ^{bf} , <i>Veillonella</i> ^{bf}
<i>lnu(D)</i>	1	<i>Streptococcus</i>
<i>lnu(E)</i>	2	<i>Enterococcus</i> , <i>Streptococcus</i>
<i>lnu(F)</i>	9	<i>Aeromonas</i> , <i>Comamonas</i> , <i>Desulfobacterium</i> , <i>Escherichia</i> , <i>Leclercia</i> , <i>Morganella</i> , <i>Proteus</i> , <i>Providencia</i> , <i>Salmonella</i>
<i>lnu(G)</i> ^{ao}	2	<i>Enterococcus</i> , <i>Virgibacillus</i>
<i>lnu(H)</i> ^{ay}	1	<i>Riemerella</i>
<i>lnu(P)</i> ^{ap}	1	<i>Clostridium</i>
<i>vat(A)</i>	1	<i>Staphylococcus</i>
<i>vat(B)</i>	2	<i>Enterococcus</i> , <i>Staphylococcus</i>
<i>vat(C)</i>	1	<i>Staphylococcus</i>
<i>vat(D)</i>	2	<i>Clostridium</i> ^a , <i>Enterococcus</i>
<i>vat(E)</i>	4	<i>Bacteroides</i> ^{aw} , <i>Enterococcus</i> , <i>Lactobacillus</i> , <i>Limosilactobacillus</i> ^{cs}
<i>vat(F)</i>	1	<i>Yersinia</i>
<i>vat(G)</i> ^f	1	<i>Enterococcus</i>

PHOSPHORYLASES

<i>mph(A)</i>	12	<i>Aeromonas</i> , <i>Escherichia</i> , <i>Citrobacter</i> , <i>Enterobacter</i> , <i>Klebsiella</i> , <i>Pantoea</i> , <i>Pseudomonas</i> , <i>Proteus</i> , <i>Salmonella</i> ^{co} , <i>Serratia</i> , <i>Shigella</i> ^{i,ag} , <i>Stenotrophomonas</i>
<i>mph(B)</i>	7	<i>Escherichia</i> , <i>Enterobacter</i> , <i>Klebsiella</i> , <i>Pseudomonas</i> , <i>Proteus</i> , <i>Salmonella</i> , <i>Streptococcus</i> ^{ct}
<i>mph(C)</i>	4	<i>Listeria</i> , <i>Staphylococcus</i> , <i>Streptococcus</i> , <i>Stenotrophomonas</i>
<i>mph(D)</i>	6	<i>Escherichia</i> , <i>Klebsiella</i> , <i>Pantoea</i> , <i>Proteus</i> , <i>Pseudomonas</i> , <i>Stenotrophomonas</i>
<i>mph(E)</i> ^{s,bo}	12	<i>Acinetobacter</i> , <i>Citrobacter</i> , <i>Escherichia</i> , <i>Gallibacterium</i> ^{cp} , <i>Klebsiella</i> , <i>Mannheimia</i> ^{ck} , <i>Morganella</i> , <i>Pasteurella</i> , <i>Providencia</i> , <i>Pseudomonas</i> , <i>Salmonella</i> , <i>Serratia</i>
<i>mph(F)</i> ^u	2	<i>Pseudomonas</i> , <i>Vibrio</i>
<i>mph(G)</i>	7	<i>Citrobacter</i> ^{cg} , <i>Escherichia</i> , <i>Photobacterium</i> , <i>Pseudoalteromonas</i> ^{cg} , <i>Salmonella</i> , <i>Shewanella</i> ^{cg} , <i>Vibrio</i>
<i>mph(H)</i> ^{bn}	1	<i>Brachybacterium</i>

<i>mph(I)</i> ^{bn}	1	<i>Paenibacillus</i>
<i>mph(J)</i> ^{bn}	3	<i>Brevibacillus, Paenibacillus, Scytonema</i>
<i>mph(K)</i> ^{bn}	2	<i>Bacillus, Vibrio</i>
<i>mph(L)</i> ^{bn}	1	<i>Bacillus</i>
<i>mph(M)</i> ^{bn}	1	<i>Bacillus</i>
<i>mph(N)</i> ^{bn}	1	<i>Exiguobacterium</i>
<i>mph(O)</i> ^{bn}	1	<i>Brachybacterium</i>

Blue indicates new since last update.

Some genera are not listed in this table but are found in Pathogen Detection Microbial Browser for Identification of Genetic and Genomic Elements (MicroBIGG-E)[<https://www.ncbi.nlm.nih.gov/pathogens/microbigge/>] The reason is that they have only been determined by WGS and it is not clear if these hosts are resistant to the gene they may carry and thus unknown if they are functional

^l*Actinobacillus actinomycetemcomitans* is now *Aggregatibacter actinomycetemcomitans*; *Arcanobacterium* is now *Trueperella*-

^a Anaerobic genus; ^b *T. denticola* anaerobic but not all species in genus are anaerobes; ^c *msr(D)* normally linked to *mef(A)*;

^e Schwaiger, & Bauer, 2008, AAC 52:2994;

^g Rosander, Connolly & Roos AEM 74:6032, 2008; ^h Achard et al., AAC, 49:2716, 2005; ^l Boumghar-Bourtchai, Emg Infect Dis 14:1297, 2008;

^j Villedieu et al., AAC, 51:2195, 2007; ^k Kadlec, AAC 53:3589, 2009; ^L Chen et al, JAC 65:2256, 2010; ^m Kadlec & Schwarz. AAC 54:915, 2010 ;

ⁿ Koike et al., Microbiol Ecol 3:487, 2009; ^o Lu et al., Curr Microbiol 61:44, 2010, The authors did not test for *mef(A)* but *msr(D)* has always been associated with *mef(A)* in a single element and thus the ureaplasma with *msr(D)* most likely carries the *mef(A)* gene; Malbruny et al. AAC 55:1470, 2011;

^q resistance to phenicols, lincosamides, oxazolidinones, pleuromutilins, and streptogramin A **but not macrolides**; Long et al., AAC 50:2500, 2006; ^r Roberts et al., J. Antimicrob. Chemother. 66:100-104, 2011; ^s *msr(E)* and *mph(E)* usually linked;

^t Jeong J-W et al., AAC 54:5359, 2010, please note the *vat* gene had been renamed *vat(H)*; ^u Szczepanowski et al., AAC 51:673, 2007 named *mph(E)* but this was not an officially approved name, and was changed to *mph(F)* because another set of unrelated genes were already labeled *mph(E)*;

^x Proteus JAC 66:2521, 2011; ^y Popwska et al, AAC 56:1434, 2012; ^z Wang et al, JAC 67:1824-1827, 2012;

^{aa} Si et al., AAC 59:7113, 2015 and Li et al., JAC 69:919, 2014, variant confers resistance to lincosamides, streptogramin A & pleuromutilins;

^{ab} Wang et al, JAC 67:1094-1098; ^{ad} Munoz-Atienza et al., BMC Microbiol. 13:15, 2013; ^{ae} Hays, Lienhard, Auzou et al, JAC 69:2056, 2014;

^{af} Qin et al., JAC 69:964, 2014; ^{ag} MMWR 63:132, Feb 14, 2014; ^{ai} Yang et al., JAC 68:1930-32, 2013; ^{aj} Xu et al, AAC 59:2462, 2015;

^{ak} Deshpande et al., AAC 2015, 59:6256-6261; Marín et al. 2015, AAC 59:586-589;

- ^{al} Vergen et al., Eur J Clin Micro Infec Dis, July 2015 doi 10.1007/s10096-015-2451-5; ^{am} Luo et al., Avian Pathology 2015, 44:162;
- ^{an} confers resistance to macrolides and lincosamides by not streptogramins V. Perreten ASM 2016; ^{ao} Zhu, Wang, Li et al., JAC doi:10.1093/jac/dkw549;
- ^{ap} Lyras et al., J Bacteriology 191:6345, 2009; ^{aq} Zhang et al., Vet Microb. 177:162, 2015; ^{ar} Hot et al., AAC58:3335, 2014;
- ^{as} Wilpf et al., 2017, AAC e00066-17 1-6. doi: 10.1128/AAC.00066-17 ;
- ^{at} Candela et al., 2017 Intern J Antimicrob Agents 50:496; Tang et al., 2017, JAC, 72:1581, ^{av} Bojarska et al., Eur J. Clin Microbiol Infec Dis 35:917, 2016;
- ^{aw} Szekely, Eitel, Molnar et al., Anaerobe 31:11, 2015; ^{ax} Wang et al., JAC 2015, 70:2182-90; ^{ax} Cavaco, Bernal, Zankari et al., JAC doi:10.1093/jac/dkw490, 2016, **Data shows it does not confer an efflux protein Schwarz & Yang personnel communication;**
- ^{ay} Luo et al., 2018, 51:136 International J Antimicrob Agents; ^{az} Wang et al., AAC 2013, 57:4061;
- ^{ba} Xing et al., PloSOne 2015 doi:10.1371/journal.pone.0131078; ^{bb} Gu, Li, Xu et al. 2020 J Global Antimicrob Res <https://doi.org/10.1016/j.jgar.2020.02.017>;
- ^{bc} Zhang, Schmidt, Plepersberg, Mol Microbiol 6:2147, 1992; ^{bd} Marinez et al., AEM 2018 e02888-17;
- ^{be} De Luca et al., Vet Microbiol 214:51, 2018; ^{bf} genera with the same *lnu(C)* transposon from WGS but unknown if it confers resistance to the isolates identified in De Luca et al., Vet Microbiol 214:51, 2018; ^{bh} Guerin et al., JAC 2020 doi:10.1093/jac/dkaa125 ;
- ^{bi} Christianson et al., PloS One 2016 11:e0158723 doi: 10.1371/journal.pone.0158723;
- ^{bj} Sharkey, Edwards, O' Neill, MBio 2016; e01975-15 1-15; Sharkey, O'Neill, 2018 ACS Inf Dis 4:239-246 and Wilson MBio 2016; e00598-16. Demonstrated that *lsa(A)*, and *vga(A)* are ABC-F proteins that confer resistance by ribosomal **protection** rather than efflux has been shown in the first paper. Four genes have been shown to be ribosomal protection from this group;
- ^{bk} These genes have been suggested to be ribosomal protection genes but no data to support the mechanism has been done and thus not clear of the mechanism of action [Sharkey, O'Neill, 2018 ACS Inf Dis 4:239-24].
- ^{bl} Su, Kumar, Ding et al., 2018, PNAS, May 15, 2018. 115:5157-5162, www.pnas.org/cgi/doi/10.1073/pnas.1803313115 *msr(E)*;
- ^{bm} Ero et al., 2019 Protein Science 28:684; ^{bn} Not named by the nomenclature center. Dr. Wright lab named these most come from WGS sequences from a variety of bacteria [Pawlowski et al. 2018 7:13803, Nature Communications]; ^{bo} multiple different genes labeled *mph(E)* in literature;
- ^{bp} *Cutibacterium* is the new genus name, Aoki et al., J Medical Microbio 2019 68:26; ^{bq} Ding et al., Communications Biol 2018, doi:10.1038/s42003-018-0064-0;
- ^{br} Aoli, Nakase, Nakaminami et al, AAC2020 <https://aac.asm.org/content/aac/64/3/e01810-19.full.pdf>; ^{bu} Stojkovic AAC2019 doi 10.1128/AAC.01074-19;
- ^{bv} Shi, Yoshida, Fujlwara, Nishiki Microbial Drug Resist, 2021 <https://doi.org/10.1089/mdr.2020.0218>;
- ^{bw} Huber, Giguere, Slovis et al., Environ Microb 2020 doi:10.1111/1462-2920.15020;
- ^{bx} Schwendener, Dona, Perreten AAC 2020 DOI:10.1128/AAC.00160; *mef(F)* and *msr(G)* linked plasmid, *mef(D)-msr(G)* linked on chromosome;
- ^{by} *Clostridium difficile* is now known as *Clostridiodes difficile* other species are still the genus *Clostridium*;
- ^{ca} Ehrmann et al., 2014. JAC 69:381-83 doi:10.1093/jac/dkt350;

- ^{cb}Alberto et al., 2018. JAC 73:1763-69 doi:10.1093/jac/dky088;
- ^{cc}Yan et al., 2020. JAC 75:868-872 doi:10.1093/jac/dkz545;
- ^{cd}Fernandez, Perrenten, Schwendener JAC 76: 48–54, <https://doi.org/10.1093/jac/dkaa405> , low to moderate resistance *msr(F)-mef(D)* in *Staphylococcus*;
- ^{ce} Chang Beijing, China; ^{cf} Imwattana et al. 2021 Microbial Drug Res. <https://doi.org/10.1089/mdr.2020.0603>
- ^{cg} Sugimoto, Suzuki, Nonaka et al., J Global Antimicrob Resis. 2017 10:47-53. doi: 10.1016/j.jgar.2017.03.015;
- ^{ch} Guglielmino et al manuscript in preparation;
- ^{ci} Mac Aogain, Lau, Cai et al., Am J Respir Crit Care Med. 2020 202:433-447 doi: 10.1164/rccm.201911-22020C;
- ^{cj} Zhang, Bai, Zhang et al., AAC 2020 64 e00780-20;
- ^{ck} Alexander, Cook, Klima et al., Frontiers in Microbiol 2013 4 doi:10.3389/fmicb.2013.00297;
- ^{cl} Jovic, Novovic Filipic et al., Antibiotics 2020 9:886 doi:10.3390/antibiotics9120886;
- ^{cm} Greninger, Addetia, Starr et al., CID 2020: 71 DOI: 10:1093/cid/ciz1060;
- ^{cn} Ahsan, Rahman Microbial Drug Res 2019 25:8-13 <https://doi.org/10.1089/mdr.2018.0109>;
- ^{co} Nair, Ashto, Doumith et al., JAC 2016 71:3400-3408 doi:10.1093/jac/dkw318;
- ^{cp} Van Driessche, Vanneste, Bogaerts et al., 2020 Emerging Infect Dis 26:721-730. doi: 10.3201/eid2604.190962.
- ^{cq} Thumu, Halami. Indian J Med Res 2019 149:270-5 doi:10.4103/ijmr.IJMR_2055_17
- ^{cr} Cai, Chen, Schwarz et al., Clin Micro Inf., 2021 doi:10.1016/j.cmi.2021.04.027
- ^{cs} *Lactobacillus fermentum* has been renamed as *Limosilactobacillus fermentum*, other *Lactobacillus* carry the *vatE* gene
- ^{ct} Achard, Guérin-Faubleé , Pichereau, Villers, Leclercq. Antimicrob Agents Chemoth. 2008 doi:10.1128/AAC.00481-08 Resistance only to spiramycin and not to other macrolides like erythromycin
- ^{cu} Valdezate, Garrido, Carrasco et al. Frontiers in Microbiol. 2015. <https://doi.org/10.3389/fmicb.2015.00376>
- ^{cv} *Mammalilcoccus* is the new genus name for staphylococcal species *S. fluerettii* and *S. stepanovicii* both of which carry *cfr* genes. Schwarz, Zhang, Du et al. Clin Microbiol Rev 2021 34:3 e00188-20; Madhalyan, Wirth, Saravanan. 2020. Int J Syst Evol Microbiol 70:5926-36. <https://doi.org/10.1099/ijsem.0.004498>
- ^{cw} **Kruger, Ji, Hanke et al. JAC accepted for publication ;**
- ^{cx} **Alexander, Brown-Elliott, Wallace Jr. in preparation**
- ^{cy} **Oswaldi, Luth, Dzierzon et al. Microorganisms 2022 10, 512. <https://doi.org/10.3390/microorganisms10030512>**
- ^{cz} **Gomes, C., et al. Sci Rep 9(1):6089 2019 Apr 15;9(1):6089 doi: 10.1038/s41598-019-42423-3**
- ^{da} **Baba, Kuwahara-arai, et al. J. Bacteriol. 2009 191, 1180-1190 doi: 10.1128/JB.01058-088**

^{db} **Arredondo, Blanc, Mor et al, Oral Dis 2019 25, 860-867 doi:10.1111/odi.13043**

^{dc} **Mahmmod, Correa-Fiz, Aragon. Vet Res. 2020; 51: 7. doi: 10.1186/s13567-020-0738-8**

^{dd} **Barbosa, Phelan, Leong et al., PLoS One 2014 doi:10.1371/journal.pone.0115583**