

Antibiotic	Accessory gene	Protein Accession	DNA Accession	Core gene	Mutation	Substitution	Reference
Penicillin	<i>blaZ</i>	BLAC_STAAU	CAA27733				
	<i>blaZ-D</i>	Q53699_STAAU	AAA26647				
	<i>blaZ-A</i>	Q60250_STAAU	AAA26644				
	<i>blaZ_{LGA251}</i>	F4NA56_STAAU	CBZ41939				
Methicillin	<i>mecA</i>	O54286_STAAU	AAQ75792				
	<i>mecC</i>	F4NA57_STAAU	AKP21265				
Ciprofloxacin				<i>grlA</i>	S80F	[1]	
				<i>grlA & gyrA</i>	S80F, S84L	[1]	
				<i>grlA & gyrA</i>	S80Y, S84L	[1]	
				<i>grlA & gyrA</i>	S80F, E88K	[1]	
				<i>grlA</i>	S80Y	[1]	
Moxifloxacin				<i>grlA & gyrA</i>	S80F, S84L	[1]	
				<i>grlA & gyrA</i>	S80Y, S84L	[1]	
Gentamicin	<i>aacA-aphD</i>	AACA_STAAM	BAB47534				
Amikacin	<i>aphA-3</i>	A8J4N5_STAAU	BAF82029				
	<i>aadD</i>	KANU_STAAU	CAA27142				
Tobramycin	<i>aadD</i>	KANU_STAAU	CAA27142				
	<i>aacA-aphD</i>	AACA_STAAM	BAB47534				
Streptomycin	<i>str</i>	STR_STAAU	CAA29839				
	<i>aad9</i>	S3AD_STAAN	BAA82204				
	<i>aadE</i>	A8J4N2_STAAU	BAF82028				
Erythromycin				23S rRNA	A2058T/G	[2]	
					A2059G	[2]	
				<i>ermA</i>	ERMA_STAAN	BAA82205	
				<i>ermA-like</i>	A1E139_STAEP	ABK81677	
				<i>ermB</i>	Q799N2_STAAU	ABQ00061	
				<i>ermC</i>	ERMC3_STAAU	AAA20192	
				<i>erm33</i>	Q8KLN5_STASC	CAC86410	
				<i>ermT</i>	D3GMR8_STAA5	CAY48681	
				<i>mefA</i>	Q79RU3_STAAU	AAL58635	
				<i>mefE</i>	Q8DPW8_STRR6	AAK99775	
				<i>msrA</i>	A0A068LCQ4_STAAU	AIE40079	
				<i>ereA</i>	EREA_ECOLX	AAO38247	
				<i>ereB</i>	ERE _B _ECOLX	CAA27626	
Clindamycin	<i>linA</i>	Q6QHH8_STAAU	AAS50177				
	<i>ermA</i>	ERMA_STAAN	BAA82205				
	<i>ermC</i>	ERMC3_STAAU	AAA20192				
Tetracycline	<i>tetK</i>	TCR_STAAU	AAB07712				
	<i>tetM</i>	TETM_STAAM	BAB56560				
	<i>tetL</i>	C7C2U6_STAA5	CAY33088				
	<i>tetO</i>	TETO_STRMU	AAA26679				
Fusidic acid				<i>fusA</i>	V90I	[3]	
					E444K	[4]	
					G451V	[4]	
					M453I	[4]	

			H457Y	[4]
			L461K	[4]
			L461S	[4]
			P478S	[4]
			M651I	[4]
			P404L	[4]
			G452S	[5]
			H457Q	[6]
<i>fusB</i>	Q8GNY5_STAAU	AAL12234		
<i>fusC</i>	A0A0P0YP43_STAH0	BAT22900		
Linezolid			23S rRNA	G2447T [7]
				T2500A [8]
				A2503G [9]
				T2504C [9]
				G2505A [10]
				G2576T [11]
			<i>rplD</i>	K68Q [7]
			<i>rplC</i>	G155R [7]
				ΔF127-H146 [7]
<i>cfr</i>	CFR_STASC	CAC04525		
Chloramphenicol				
<i>catA1</i>	CAT2_STAAU	AAA72572		
<i>catA2</i>	Q6V0Y2_STAAU	AAQ55242		
<i>catA3</i>	CAT1_STAAU	CAA24586		
Mupirocin			<i>lleS-1</i>	V588F [12]
				G593V [12]
				V631F [12]
<i>lleS-2</i>	SYI2_STAAU	CAA53189		
Rifampicin			<i>rpoB</i>	S464P [13]
				Q468R [13]
				D471Y [13]
				A477V [13]
				A477D [13]
				H481Y [13]
				R484H [13]
				D550G [13]
Trimethoprim			<i>dfrA</i>	L41F [14]
				F99S [14]
				F99Y [14]
				H150R [14]
<i>dfrK</i>	C7C2U7_STAA5	CAY33090		
<i>dfrB</i>	DYR_STAAM	BAB57588		
<i>dfrG</i>	Q4H3Y3_STAAU	AQR07665		
Disinfectants				
<i>qacA</i>	QACA_STAAM	BAB47540		
<i>qacC</i>	QACC_STAAU	AAA26666		
<i>qacG</i>	QACG_STAS9	CAA76542		
<i>qacH</i>	QACH_STASA	CAA76544		

References

1. Griggs DJ, Marona H, Piddock LJV. Selection of moxifloxacin-resistant *Staphylococcus aureus* compared with five other fluoroquinolones. *J. Antimicrob. Chemother.* Oxford University Press; 2003;51:1403–7.
2. Prunier A-L, Malbruny B, Laurans M, Brouard J, Duhamel J-F, Leclercq R. High rate of macrolide resistance in *Staphylococcus aureus* strains from patients with cystic fibrosis reveals high proportions of hypermutable strains. *J. Infect. Dis.* Oxford University Press; 2003;187:1709–16.
3. Lannergård J, Norström T, Hughes D. Genetic determinants of resistance to fusidic acid among clinical bacteremia isolates of *Staphylococcus aureus*. *Antimicrob. Agents Chemother.* American Society for Microbiology; 2009;53:2059–65.
4. Chen H-J, Hung W-C, Tseng S-P, Tsai J-C, Hsueh P-R, Teng L-J. Fusidic acid resistance determinants in *Staphylococcus aureus* clinical isolates. *Antimicrob. Agents Chemother.* American Society for Microbiology; 2010;54:4985–91.
5. Besier S, Ludwig A, Brade V, Wichelhaus TA. Molecular analysis of fusidic acid resistance in *Staphylococcus aureus*. *Mol. Microbiol.* 2003;47:463–9.
6. Castanheira M, Watters AA, Mendes RE, Farrell DJ, Jones RN. Occurrence and molecular characterization of fusidic acid resistance mechanisms among *Staphylococcus* spp. from European countries (2008). *J. Antimicrob. Chemother.* Oxford University Press; 2010;65:1353–8.
7. Locke JB, Hilgers M, Shaw KJ. Novel ribosomal mutations in *Staphylococcus aureus* strains identified through selection with the oxazolidinones linezolid and torezolid (TR-700). *Antimicrob. Agents Chemother.* American Society for Microbiology; 2009;53:5265–74.
8. Meka VG, Pillai SK, Sakoulas G, Wennersten C, Venkataraman L, DeGirolami PC, et al. Linezolid resistance in sequential *Staphylococcus aureus* isolates associated with a T2500A mutation in the 23S rRNA gene and loss of a single copy of rRNA. *J. Infect. Dis.* Oxford University Press; 2004;190:311–7.
9. Livermore DM, Warner M, Mushtaq S, North S, Woodford N. *In vitro* activity of the oxazolidinone RWJ-416457 against linezolid-resistant and -susceptible staphylococci and enterococci. *Antimicrob. Agents Chemother.* American Society for Microbiology; 2007;51:1112–4.
10. Bourgeois-Nicolaos N, Massias L, Couson B, Butel M-J, Andremont A, Doucet-Populaire F. Dose dependence of emergence of resistance to linezolid in *Enterococcus faecalis* *in vivo*. *J. Infect. Dis.* 2007;195:1480–8.
11. Tsiodras S, Gold HS, Sakoulas G, Eliopoulos GM, Wennersten C, Venkataraman L, et al. Linezolid resistance in a clinical isolate of *Staphylococcus aureus*. *Lancet.* 2001;358:207–8.
12. Hurdle JG, O'Neill AJ, Ingham E, Fishwick CWG, Chopra I. Analysis of mupirocin resistance and fitness in *Staphylococcus aureus* by molecular genetic and structural modeling techniques. *Antimicrob. Agents Chemother.* American Society for Microbiology; 2004;48:4366–76.
13. Aubry-Damon H, Soussy CJ, Courvalin P. Characterization of mutations in the *rpoB* gene that confer rifampin resistance in *Staphylococcus aureus*. *Antimicrob. Agents Chemother.* 1998;42:2590–4.
14. Vickers AA, Potter NJ, Fishwick CWG, Chopra I, O'Neill AJ. Analysis of mutational resistance to trimethoprim in *Staphylococcus aureus* by genetic and structural modelling techniques. *J. Antimicrob. Chemother.* Oxford University Press; 2009;63:1112–7.