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Worldwide Appraisal and Update (2010) of Telavancin Activity Tested against a Collection of Gram-Positive Clinical Pathogens from Five Continents

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A total of 15,480 Gram-positive pathogens were collected from 89 sites in the United States, Europe, the Asia-Pacific region, and Latin America in 2010. Telavancin was active against indicated *Staphylococcus aureus* ($MIC_{50/90}$, 0.12/0.25 μg/ml), vancomycin-susceptible *Enterococcus faecalis* ($MIC_{50/90}$, 0.5/0.5 μg/ml), and beta-hemolytic ($MIC_{50/90}$, 0.06/0.12 μg/ml) and viridans group streptococcus ($MIC_{50/90}$, 0.03/0.06 μg/ml) isolates. These MIC results showed potency for telavancin equal to or greater than that of comparators. These *in vitro* data confirm a continued potent activity of telavancin when tested against contemporary Gram-positive clinical isolates.

Several agents directed against Gram-positive pathogens have been developed for the treatment of complicated infections in the last decade. However, only linezolid and daptomycin, and more recently ceftaroline and telavancin, have been approved for clinical use (7). The latter was approved (2009) in the United States and Canada for the treatment of adults with complicated skin and skin structure infections (cSSSI) caused by susceptible organisms (16). In addition, telavancin was recently approved (2011) in all member states of the European Union, Norway, and Iceland for the treatment of adults with nosocomial pneumonia (NP), including ventilator-associated pneumonia (VAP), known or suspected to be caused by methicillin-resistant *Staphylococcus aureus* (MRSA).

Similarly to vancomycin, telavancin inhibits bacterial cell wall peptidoglycan biosynthesis through binding to the acyl-D-alanyl-D-alanine (D-Ala-D-Ala) terminus of peptidoglycan precursors, consequently inhibiting cell wall extension (transglycosylation) (8). A second mechanism of action comprises the interaction of telavancin with the cell wall precursor (lipid II), causing membrane depolarization and increased membrane permeability. The induced depolarization was shown to be time and concentration dependent (10). This unique dual mechanism of action is likely to be responsible for the documented telavancin *in vitro* activity against MRSA, heterogeneous vancomycin-intermediate *S. aureus* (hVISA), and VISA strains (10), which have been demonstrated to be susceptible to membrane depolarization (12).

(The results included in this study have been partially presented at the 2011 Interscience Conference on Antimicrobial Agents and Chemotherapy.)

The overall objective of this study was to provide an updated evaluation of the potency and spectrum of activity of telavancin against contemporary (2010) Gram-positive isolates from a global surveillance program. A total of 15,480 Gram-positive, nonduplicated clinical isolates were collected from 89 medical sites in the United States (26 hospitals; 6,719 isolates), Europe (31 hospitals; 4,647 isolates), Latin America (10 hospitals; 1,814 isolates), and the Asia-Pacific region (22 hospitals; 2,300 isolates). Isolates were primarily recovered from patients with bacteremia (39%), SSSIs (28%), and respiratory tract infections (21%) and were submitted to a central monitoring laboratory (JMI Laboratories, North Liberty, IA) according to established protocols as part of the SENTRY Antimicrobial Surveillance Program. Each participating medical center provided species identifications, which were confirmed by the monitoring laboratory using standard algorithms and the automated Vitek 2 system (bioMérieux, Hazelwood, MO), as required. The species included were as follows: *S. aureus* (7,653 isolates; 49.4%), coagulase-negative staphylococci (CoNS; 1,278 isolates; 8.3%), *Enterococcus faecalis* (1,459 isolates; 9.4%), *Enterococcus faecium* (805 isolates; 5.2%), *Streptococcus pneumoniae* (2,150 isolates; 13.9%), beta-hemolytic streptococci (BHS; 1,472 isolates; 9.5%), viridans group streptococci (VGS; 551 isolates; 3.6%), and *Streptococcus anginosus* (97 isolates; 0.6%) and *Streptococcus bovis* (32 isolates; 0.2%) groups.

Isolates were tested for susceptibility by the broth microdilution method according to the Clinical and Laboratory Standards Institute (CLSI; M07-A8, 2009) recommendations (1). Susceptibility testing was performed using customized and validated dry-form panels (Thermo Fisher Scientific, Cleveland, OH). Quality assurance was performed by concurrent testing of the CLSI-recommended (M100-S21, 2011) strains: *E. faecalis* ATCC 29212, *S. aureus* ATCC 29213, and *S. pneumoniae* ATCC 49619 (2). The Food and Drug Administration (FDA)-approved breakpoints for telavancin for *S. aureus* (≤1 μg/ml), vancomycin-susceptible *E. faecalis* (≤1 μg/ml), VGS (≤0.12 μg/ml), and BHS (≤0.12 μg/ml) were applied (16). Interpretation of comparator MIC results was in accordance with published CLSI and European Committee on Antimicrobial Susceptibility Testing (EUCAST) criteria (2, 5).

Telavancin ($MIC_{50/90}$, 0.12/0.25 μg/ml) exhibited potent activity when tested against all *S. aureus* and CoNS clinical isolates as well as across different resistance subsets (methicillin susceptibility; Table 1). Some variation in the MIC_{50} values was noted for telavancin when tested against MRSA strains from different geo-

Received 9 January 2012 Returned for modification 13 March 2012
Accepted 6 April 2012
Published ahead of print 16 April 2012
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doi:10.1128/AAC.00011-12

TABLE 1 Antimicrobial activity of telavancin tested against a worldwide collection of Gram-positive clinical isolates (2010)

Organism/group and resistant subset (no. of isolates tested)	MIC (μg/ml)		No. (cumulative %) of isolates inhibited at each telavancin MIC (μg/ml):							
	50%	90%	≤0.015	0.03	0.06	0.12	0.25	0.5	1	2
Staphylococcus aureus (7,653)	0.12	0.25	1 (0.0)	7 (0.1)	232 (3.1)	4,155 (57.4)	2,962 (96.1)	296 (100.0)		
Oxacillin susceptible (4,565)	0.12	0.25	0 (0.0)	7 (0.2)	172 (3.9)	2,572 (60.3)	1,660 (96.6)	154 (100.0)		
Oxacillin resistant (3,088)	0.12	0.25	1 (0.0)	0 (0.0)	60 (2.0)	1,583 (53.2)	1,302 (95.4)	142 (100.0)		
Coagulase-negative staphylococci (1,278)	0.12	0.25	6 (0.5)	14 (1.6)	88 (8.5)	659 (60.0)	473 (97.0)	37 (99.9)	1 (100.0)	
Oxacillin susceptible (332)	0.12	0.25	0 (0.0)	9 (2.7)	36 (13.6)	166 (63.6)	115 (98.2)	6 (100.0)		
Oxacillin resistant (946)	0.12	0.25	6 (0.6)	5 (1.2)	52 (6.7)	493 (58.8)	358 (96.6)	31 (99.9)	1 (100.0)	
Enterococcus faecalis (1,459)[a]	0.5	0.5	0 (0.0)	2 (0.1)	8 (0.7)	157 (11.4)	461 (43.0)	761 (95.2)	38 (97.8)	2 (97.9)
Vancomycin susceptible (1,421)	0.5	0.5	0 (0.0)	2 (0.1)	8 (0.7)	157 (11.8)	460 (44.1)	758 (97.5)	36 (100.0)	
VanA type (32)[a]	>2	>2	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	2 (6.3)
VanB type (6)	0.5		0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (16.7)	3 (66.7)	2 (100.0)	
Enterococcus faecium (805)[b]	0.25	>2	10 (1.2)	86 (11.9)	117 (26.5)	164 (46.8)	33 (50.9)	11 (52.3)	33 (56.4)	156 (75.8)
Vancomycin susceptible (386)	0.06	0.12	9 (2.3)	82 (23.6)	114 (53.1)	152 (92.5)	29 (100.0)			
VanA type (392)[b]	2	>2	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.3)	9 (2.6)	31 (10.5)	156 (50.3)
VanB type (27)	0.12	0.5	1 (3.7)	4 (18.5)	3 (29.6)	12 (74.1)	3 (85.2)	2 (92.6)	2 (100.0)	
Streptococcus pneumoniae (2,150)	≤0.015	0.03	1,811 (84.2)	329 (99.5)	8 (99.9)	2 (100.0)				
Penicillin susceptible (1,330)	≤0.015	0.03	1,103 (82.9)	222 (99.6)	3 (99.8)	2 (100.0)				
Penicillin nonsusceptible (820)	≤0.015	0.03	708 (86.3)	107 (99.4)	5 (100.0)					
Beta-hemolytic streptococci (1,472)	0.06	0.12	101 (6.9)	564 (45.2)	541 (81.9)	263 (99.8)	3 (100.0)			
Group A (521)	0.03	0.06	95 (18.2)	346 (84.6)	60 (96.2)	20 (100.0)				
Group B (669)	0.06	0.12	0 (0.0)	51 (7.6)	399 (67.3)	216 (99.6)	3 (100.0)			
Group C (91)	0.03	0.06	2 (2.2)	54 (61.5)	27 (91.2)	8 (100.0)				
Group F (8)	0.03		0 (0.0)	6 (75.0)	2 (100.0)					
Group G (154)	0.03	0.12	3 (1.9)	87 (58.4)	47 (89.0)	17 (100.0)				
Viridans group streptococci (551)	0.03	0.06	78 (14.2)	333 (74.6)	112 (94.9)	28 (100.0)				
S. anginosus group (97)	0.03	0.06	7 (7.2)	68 (77.3)	19 (96.9)	3 (100.0)				
S. bovis group (32)	0.03	0.06	4 (12.5)	19 (71.9)	6 (90.6)	3 (100.0)				
Penicillin susceptible (416)	0.03	0.06	66 (15.9)	254 (76.9)	80 (96.2)	16 (100.0)				
Penicillin nonsusceptible (135)	0.03	0.06	12 (8.9)	79 (67.4)	32 (91.1)	12 (100.0)				

[a] A total of 30 VanA-type *E. faecalis* strains displayed telavancin MICs of >2 μg/ml.

[b] A total of 195 VanA-type *E. faecium* strains displayed telavancin MICs of >2 μg/ml.

TABLE 2 Antimicrobial activity of telavancin tested against indicated Gram-positive bacteria listed by geographic region of origin

Region[a]	Organism	No. of isolates	MIC (μg/ml)		
			MIC_{50}	MIC_{90}	Range
North America	*S. aureus*	3,488	0.12	0.25	0.03–0.5
	MRSA	1,768	0.12	0.25	0.06–0.5
	E. faecalis[b]	571	0.5	0.5	0.06–1
	S. pneumoniae	926	≤0.015	0.03	≤0.015–0.12
	BHS	648	0.06	0.12	≤0.015–0.12
	VGS	229	0.03	0.06	≤0.015–0.12
Europe	*S. aureus*	2,136	0.12	0.25	≤0.015–0.5
	MRSA	497	0.12	0.25	≤0.015–0.5
	E. faecalis[b]	426	0.5	0.5	0.03–1
	S. pneumoniae	629	≤0.015	0.03	≤0.015–0.06
	BHS	503	0.06	0.12	≤0.015–0.25
	VGS	186	0.03	0.06	≤0.015–0.12
Latin America	*S. aureus*	914	0.12	0.25	0.03–0.5
	MRSA	400	0.25	0.25	0.06–0.5
	E. faecalis[b]	239	0.25	0.5	0.03–1
	S. pneumoniae	140	≤0.015	0.03	≤0.015–0.03
	BHS	101	0.06	0.12	≤0.015–0.25
	VGS	32	0.03	0.06	≤0.015–0.12
Asia-Pacific	*S. aureus*	1,115	0.25	0.5	0.06–0.5
	MRSA	423	0.25	0.25	0.06–0.5
	E. faecalis[b]	185	0.5	0.5	0.12–1
	S. pneumoniae	455	≤0.015	0.03	≤0.015–0.12
	BHS	220	0.06	0.12	≤0.015–0.25
	VGS	72	0.03	0.06	≤0.015–0.12

[a] Regions and countries surveyed were as follows: North America, United States; Europe, Belgium, France, Germany, Ireland, Italy, Poland, Spain, Sweden, United Kingdom, Israel, and Turkey; Latin America, Argentina, Brazil, Chile, and Mexico; Asia-Pacific, Australia, Hong Kong, Japan, Korea, New Zealand, China, Singapore, and Taiwan.

[b] All vancomycin susceptible.

graphic regions. The telavancin MIC_{50} values for strains (0.12 μg/ml) obtained from the United States (56.7% of strains inhibited at 0.12 μg/ml) and Europe (66.2% of strains inhibited at 0.12 μg/ml) were 2-fold lower than the MIC_{50} values (0.25 μg/ml) obtained for Asia-Pacific (40.0% of strains inhibited at 0.12 μg/ml) and Latin American (36.0% of strains inhibited at 0.12 μg/ml) clinical isolates (Table 2). However, similar MIC_{90} and MIC_{100} values (0.25 and 0.5 μg/ml, respectively) were observed for telavancin when tested against each of these subsets (Tables 1 and 2). Overall, telavancin ($MIC_{50/90}$, 0.12/0.25 μg/ml) was 2-fold more potent than daptomycin ($MIC_{50/90}$, 0.25/0.5 μg/ml) and 4- to 8-fold more active than vancomycin and linezolid ($MIC_{50/90}$ for both, 1/1 μg/ml) against MRSA (Table 3).

When tested against vancomycin-susceptible ($MIC_{50/90}$, 0.5/0.5 μg/ml) and -nonsusceptible VanB (MIC_{50}, 0.5 μg/ml) *E. faecalis* isolates, telavancin inhibited these strains at the FDA breakpoint for susceptibility (≤1 μg/ml; Tables 1 and 3). In addition, no variations in the telavancin MIC_{50} and MIC_{90} values (0.5 μg/ml for both) were observed among *E. faecalis* strains from different regions, except for Latin American strains that exhibited lower MIC_{50} results (0.25 μg/ml; Table 2). All *E. faecalis* strains exhibiting higher telavancin MIC results (≥2 μg/ml) displayed a VanA phenotype (Tables 1 and 3). Based on the MIC_{90} values, telavancin ($MIC_{50/90}$, 0.5/0.5 μg/ml) was 2- to 4-fold more potent than daptomycin ($MIC_{50/90}$, 1/1 μg/ml), ampicillin ($MIC_{50/90}$, ≤1/2 μg/ml), vancomycin ($MIC_{50/90}$, 1/2 μg/ml), and linezolid ($MIC_{50/90}$, 1/2 μg/ml) when tested against vancomycin-susceptible *E. faecalis* (Table 3). Ampicillin ($MIC_{50/90}$, ≤1/2 μg/ml), daptomycin ($MIC_{50/90}$, 1/1 μg/ml), and linezolid ($MIC_{50/90}$, 1/2 μg/ml) showed similar coverage (all 100.0% susceptible) against VanA-type *E. faecalis*, while telavancin was less active ($MIC_{50/90}$, >2/>2 μg/ml). Moreover, telavancin (MIC_{50}, 0.5 μg/ml), daptomycin (MIC_{50}, 0.5 μg/ml), and linezolid (MIC_{50}, 1 μg/ml) showed comparable MIC_{50} results when tested against VanB-type *E. faecalis* (Table 3). Vancomycin-susceptible *E. faecium* isolates were highly susceptible to telavancin ($MIC_{50/90}$, 0.06/0.12 μg/ml; highest MIC value, 0.25 μg/ml; Table 1), which was 8- to 16-fold more potent than vancomycin ($MIC_{50/90}$, 1/1 μg/ml) and linezolid ($MIC_{50/90}$, 1/2 μg/ml) and 16- to 32-fold more active than daptomycin ($MIC_{50/90}$, 2/2 μg/ml) against vancomycin-susceptible *E. faecium* (Table 3). VanB- and VanA-type *E. faecium* demonstrated telavancin MIC_{50} values 2- and 32-fold greater than those for the wild-type strains, respectively (Tables 1 and 3).

Overall, telavancin ($MIC_{50/90}$, ≤0.015/0.03 μg/ml) demonstrated similar highly potent activities when tested against penicillin-susceptible and -nonsusceptible *S. pneumoniae* isolates collected during 2010, and equivalent results were noted for telavancin ($MIC_{50/90}$, ≤0.015/0.03 μg/ml) across all sampled regions (Tables 1 and 2). Telavancin ($MIC_{50/90}$, ≤0.015/0.03 μg/ml) showed MIC_{50} and MIC_{90} results at least 16-fold more potent than those of vancomycin ($MIC_{50/90}$, 0.25/0.5 μg/ml; 100.0% susceptible), levofloxacin ($MIC_{50/90}$, 1/1 μg/ml; 98.8% susceptible), and linezolid ($MIC_{50/90}$, 1/1 μg/ml; >99.9% susceptible) when tested against *S. pneumoniae* (Table 3). While the penicillin and telavancin MIC_{50} results (≤0.03 and ≤0.015 μg/ml, respectively) obtained against *S. pneumoniae* were comparable, the telavancin MIC_{90} result (0.03 μg/ml) was 128-fold lower than that for penicillin ($MIC_{50/90}$, ≤0.03/4 μg/ml; Table 3). Telavancin MIC_{50} results when tested against BHS serogroup B (MIC_{50}, 0.06 μg/ml) were slightly higher (2-fold) than those noted against all other serogroups tested (MIC_{50}, 0.03 μg/ml; Table 1). Consistent $MIC_{50/90}$ results (0.06/0.12 μg/ml) were noted for telavancin against BHS from all sampled geographic regions (Table 2). Furthermore, telavancin ($MIC_{50/90}$, 0.06/0.12 μg/ml) and penicillin ($MIC_{50/90}$, ≤0.03/0.06 μg/ml) showed the lowest MIC_{90} values among tested agents against BHS (Table 3).

VGS isolates were highly susceptible to telavancin ($MIC_{50/90}$, 0.03/0.06 μg/ml), as were the *S. anginosus* ($MIC_{50/90}$, 0.03/0.06 μg/ml) and *S. bovis* ($MIC_{50/90}$, 0.03/0.06 μg/ml; Table 1) groups. In addition, penicillin susceptibility did not affect the telavancin MIC_{50} and MIC_{90} results ($MIC_{50/90}$, 0.03/0.06 μg/ml), which were 2- and 16-fold more potent than those noted for penicillin ($MIC_{50/90}$, 0.06/1 μg/ml) against VGS, respectively. Furthermore, telavancin was 8- to 32-fold more active than vancomycin ($MIC_{50/90}$, 0.5/0.5 μg/ml), daptomycin ($MIC_{50/90}$, 0.25/0.5 μg/ml), linezolid ($MIC_{50/90}$, 1/1 μg/ml), and levofloxacin ($MIC_{50/90}$, 1/2 μg/ml) against VGS (Table 3).

The telavancin spectrum of activity has been monitored against clinical organisms since 2007 via the SENTRY Program (13–15) and elsewhere (3, 4, 6, 9, 11), from which consistent and potent *in vitro* activity against important Gram-positive isolates has been documented. This study reports the activity of telavancin tested against a worldwide contemporary (2010) collection of clinical pathogens. The results described here demonstrate continued activity of telavancin when tested against indicated Gram-positive isolates (16), regardless of susceptibility phenotype or geo-

TABLE 3 Antimicrobial activities of telavancin and comparator antimicrobial agents tested against a worldwide collection of Gram-positive clinical isolates (2010)

Organism (no. tested) and antimicrobial agent[f]	MIC (μg/ml)			% susceptible/resistant[a]	
	Range	50%	90%	CLSI	EUCAST
MSSA (4,565)					
Telavancin[b]	0.03–0.5	0.12	0.25	100.0/−[c]	100.0/−
Vancomycin	0.25–2	1	1	100.0/0.0	100.0/0.0
Teicoplanin	≤1–4	≤1	≤1	100.0/0.0	>99.9/<0.1
Daptomycin	≤0.06–1	0.25	0.5	100.0/−	100.0/0.0
Linezolid	≤0.12–2	1	2	100.0/0.0	100.0/0.0
Levofloxacin	≤0.5–>4	≤0.5	≤0.5	91.7/7.6	91.7/7.6
Erythromycin	≤0.25–>4	≤0.25	>4	76.4/21.7	76.4/22.7
Clindamycin	≤0.25–>2	≤0.25	≤0.25	95.1/4.6	94.5/4.9
Quinupristin-dalfopristin	≤0.5–4	≤0.5	≤0.5	99.9/0.1	99.9/0.1
Gentamicin	≤1–>8	≤1	≤1	97.5/2.1	96.6/3.4
Tetracycline	≤0.25–>8	≤0.25	0.5	94.3/5.0	93.6/6.1
Trimethoprim-sulfamethoxazole	≤0.5–>4	≤0.5	≤0.5	99.1/0.9	99.1/0.7
MRSA (3,088)					
Telavancin	≤0.015–0.5	0.12	0.25	100.0/−	
Vancomycin	0.25–2	1	1	100.0/0.0	100.0/0.0
Teicoplanin	≤1–4	≤1	≤1	100.0/0.0	99.5/0.5
Daptomycin	≤0.06–2	0.25	0.5	99.9/−	99.9/0.1
Linezolid	≤0.12–8	1	1	>99.9/<0.1	>99.9/<0.1
Levofloxacin	≤0.5–>4	>4	>4	24.1/74.1	24.1/74.1
Erythromycin	≤0.25–>4	>4	>4	16.4/82.9	16.4/83.2
Clindamycin	≤0.25–>2	≤0.25	>2	59.2/40.7	58.9/40.8
Quinupristin-dalfopristin	≤0.5–>4	≤0.5	≤0.5	99.7/0.1	99.7/0.1
Gentamicin	≤1–>8	≤1	>8	83.0/16.5	82.3/17.7
Tetracycline	≤0.25–>8	≤0.25	>8	87.6/12.1	84.3/12.7
Trimethoprim-sulfamethoxazole	≤0.5–>4	≤0.5	≤0.5	95.0/5.0	95.0/4.7
CoNS (1,278)					
Telavancin	≤0.015–1	0.12	0.25	−/−	−/−
Vancomycin	0.25–4	1	2	100.0/0.0	99.3/0.7
Teicoplanin	≤1–>8	2	4	99.1/0.0	90.8/9.2
Daptomycin	≤0.06–2	0.25	0.5	99.8/−	99.8/0.2
Linezolid	≤0.12–>8	0.5	1	99.4/0.6	99.4/0.6
Oxacillin	≤0.25–>2	>2	>2	26.0/74.0	26.0/74.0
Levofloxacin	≤0.5–>4	2	>4	46.2/48.8	46.2/48.8
Erythromycin	≤0.25–>4	>4	>4	36.1/62.6	36.1/63.2
Clindamycin	≤0.25–>2	≤0.25	>2	65.5/33.0	64.2/34.5
Quinupristin-dalfopristin	≤0.5–>4	≤0.5	≤0.5	99.1/0.4	99.1/0.4
Gentamicin	≤1–>8	≤1	>8	67.5/23.0	57.8/42.2
Tetracycline	≤0.25–>8	1	>8	85.2/13.4	72.0/16.1
Trimethoprim-sulfamethoxazole	≤0.5–>4	≤0.5	>4	63.7/36.3	63.7/20.8
E. faecalis (1,459)					
Vancomycin-susceptible (1,421)					
Telavancin	0.03–1	0.5	0.5	100.0/−	
Ampicillin	≤1–8	≤1	2	100.0/0.0	99.6/0.0
Vancomycin	0.25–4	1	2	100.0/0.0	100.0/0.0
Teicoplanin	≤1–2	≤1	≤1	100.0/0.0	100.0/0.0
Daptomycin	≤0.06–4	1	1	100.0/−	−/−
Linezolid	0.25–>8	1	2	99.9/0.1	99.9/0.1
Levofloxacin	≤0.5–>4	1	>4	69.2/30.2	−/−
VanA-type *E. faecalis* (32)					
Telavancin	2–>2	>2	>2	−/−	−/−
Ampicillin	≤1–2	≤1	2	100.0/0.0	100.0/0.0
Teicoplanin	>8	>8	>8	0.0/100.0	0.0/100.0
Daptomycin	0.5–2	1	1	100.0/−	−/−
Linezolid	0.5–2	1	1	100.0/0.0	100.0/0.0
Levofloxacin	1–>4	>4	>4	6.3/93.8	−/−

(Continued on following page)

TABLE 3 (Continued)

Organism (no. tested) and antimicrobial agent[f]	MIC (μg/ml)			% susceptible/resistant[a]	
	Range	50%	90%	CLSI	EUCAST
VanB-type *E. faecalis* (6)					
Telavancin	0.25–1	0.5	−	−/−	−/−
Ampicillin	≤1–2	≤1	−	100.0/0.0	100.0/0.0
Teicoplanin	≤1–2	≤1	−	100.0/0.0	100.0/0.0
Daptomycin	0.5–2	0.5	−	100.0/−	−/−
Linezolid	0.5–1	1	−	100.0/0.0	100.0/0.0
Levofloxacin	>4	>4	−	0.0/100.0	−/−
E. faecium					
Vancomycin-susceptible (386)					
Telavancin	≤0.015–0.25	0.06	0.12	−/−	−/−
Ampicillin	≤1–>8	>8	>8	14.2/85.8	13.7/85.8
Vancomycin	0.25–4	1	1	100.0/0.0	100.0/0.0
Teicoplanin	≤1–4	≤1	≤1	100.0/0.0	99.7/0.3
Daptomycin	≤0.06–4	2	2	100.0/−	−/−
Linezolid	0.5–8	1	2	99.2/0.8	99.2/0.8
Levofloxacin	≤0.5–>4	>4	>4	12.7/82.9	−/−
Quinupristin-dalfopristin	≤0.5–>4	≤0.5	4	71.8/11.9	71.8/1.0
VanA-type *E. faecium* (392)					
Telavancin	0.25–>2	2	>2	−/−	−/−
Ampicillin	≤1–>8	>8	>8	0.3/99.7	0.3/99.7
Teicoplanin	>8	>8	>8	0.0/100.0	0.0/100.0
Daptomycin	0.12–8	2	2	99.5/−	−/−
Linezolid	0.5–>8	1	1	98.7/0.3	99.7/0.3
Levofloxacin	>4	>4	>4	0.0/100.0	−/−
Quinupristin-dalfopristin	≤0.5–>4	≤0.5	1	97.2/1.0	97.2/1.0
VanB-type *E. faecium* (27)					
Telavancin	≤0.015–1	0.12	0.5	−/−	−/−
Ampicillin	>8	>8	>8	0.0/100.0	0.0/100.0
Teicoplanin	≤1–8	≤1	8	100.0/0.0	77.8/22.2
Daptomycin	0.12–2	2	2	100.0/−	−/−
Linezolid	0.5–4	1	2	96.3/0.0	100.0/0.0
Levofloxacin	4–>4	>4	>4	0.0/100.0	−/−
Quinupristin-dalfopristin	≤0.5–4	≤0.5	1	88.9/7.4	88.9/0.0
S. pneumoniae (2,150)					
Telavancin	≤0.015–0.12	≤0.015	0.03	−/−	−/−
Vancomycin	≤0.12–1	0.25	0.5	100.0/−	100.0/0.0
Teicoplanin	≤1	≤1	≤1	−/−	100.0/0.0
Linezolid	≤0.12–4	1	1	>99.9/−	100.0/0.0
Penicillin	≤0.03–>4	≤0.03	4	87.6/0.6[d]/61.9/22.4[e]	61.9/12.4
Levofloxacin	≤0.5–>4	1	1	98.8/1.1	98.8/1.2
Erythromycin	≤0.25–>4	≤0.25	>4	59.2/40.0	59.2/40.0
Clindamycin	≤0.25–>1	≤0.25	>1	72.3/27.3	72.7/27.3
Tetracycline	≤0.25–>8	0.5	>8	67.7/32.0	67.3/32.3
Beta-hemolytic streptococci (1,472)					
Telavancin	≤0.015–0.25	0.06	0.12	99.8/−	
Penicillin	≤0.03–0.12	≤0.03	0.06	100.0/−	100.0/0.0
Vancomycin	≤0.12–1	0.5	0.5	100.0/−	100.0/0.0
Teicoplanin	≤1	≤1	≤1	−/−	100.0/0.0
Daptomycin	≤0.06–0.5	≤0.06	0.25	100.0/−	100.0/0.0
Linezolid	≤0.12–2	1	1	100.0/−	100.0/0.0
Levofloxacin	≤0.5–>4	≤0.5	1	98.4/1.3	94.7/1.6
Erythromycin	≤0.25–>4	≤0.25	>4	75.3/23.6	75.3/23.6
Clindamycin	≤0.25–>2	≤0.25	>2	87.5/12.0	88.0/12.0
Viridans group streptococci (519)					
All (519)					
Telavancin	≤0.015–0.12	0.03	0.06	100.0/−	100.0/−

(Continued on following page)

TABLE 3 (Continued)

Organism (no. tested) and antimicrobial agent[f]	MIC (μg/ml)			% susceptible/resistant[a]	
	Range	50%	90%	CLSI	EUCAST
Penicillin	≤0.03–>4	0.06	1	74.0/5.4	84.0/5.4
Vancomycin	≤0.12–1	0.5	0.5	100.0/−	100.0/0.0
Teicoplanin	≤1	≤1	≤1	−/−	100.0/0.0
Daptomycin	≤0.06–2	0.25	0.5	99.6/−	−/−
Linezolid	≤0.12–2	1	1	100.0/−	−/−
Levofloxacin	≤0.5–>4	1	2	92.5/6.2	−/−
Erythromycin	≤0.25–>4	≤0.25	>4	52.2/45.1	−/−
Clindamycin	≤0.25–>2	≤0.25	>2	86.9/12.1	87.9/12.1
S. bovis group (32)					
Telavancin	≤0.015–0.12	0.03	0.06	100.0/−	100.0/−
Penicillin	≤0.03–0.12	≤0.03	0.06	100.0/0.0	100.0/0.0
Vancomycin	0.25–0.5	0.25	0.5	100.0/−	100.0/0.0
Teicoplanin	≤1	≤1	≤1	−/−	100.0/0.0
Daptomycin	≤0.06–0.12	≤0.06	≤0.06	100.0/−	−/−
Linezolid	0.5–2	1	1	100.0/−	−/−
Levofloxacin	≤0.5–2	1	2	100.0/0.0	−/−
Erythromycin	≤0.25–>4	≤0.25	>4	59.4/37.5	−/−
Clindamycin	≤0.25–>2	≤0.25	>2	75.0/25.0	75.0/25.0

[a] Criteria for susceptibility as published by the Clinical and Laboratory Standards Institute (M100-S21, 2011) and the European Committee on Antimicrobial Susceptibility Testing (2011).
[b] For telavancin, the FDA-approved susceptible breakpoints for *S. aureus* (≤1 μg/ml), vancomycin-susceptible *E. faecalis* (≤1 μg/ml), viridans group streptococci (≤0.12 μg/ml), and beta-hemolytic streptococci (≤0.12 μg/ml) were applied.
[c] −, no breakpoint available.
[d] Penicillin, parenteral (nonmeningitis).
[e] Penicillin (oral penicillin V).
[f] Abbreviations: MSSA, methicillin-susceptible *S. aureus*; MRSA, methicillin-resistant *S. aureus*; CoNS, coagulase-negative staphylococci.

graphic region. In addition, telavancin demonstrated potency at least 2-fold greater than that of comparators when tested against staphylococci, including MRSA strains. As previously reported, telavancin was less active against vancomycin-resistant enterococcal species; however, these pathogens are not included in the FDA-approved prescribing information listing of susceptible organisms (16).

ACKNOWLEDGMENTS

Expert technical and information support was kindly provided by the following staff members at JMI Laboratories: R. Flamm, M. Castanheira, P. Rhomberg, G. Moet, D. Biedenbach, S. Benning, and M. Janechek.

The study and publication process were funded by Astellas Pharma Global Development, Inc. Circulation of the draft manuscript for scientific review by Astellas Pharma Global Development, Inc., and Theravance, Inc., and collation of comments was conducted by Emily Hutchinson, an employee of Envision Scientific Solutions funded by Astellas Pharma Global Development, Inc.

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