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## BACKGROUND

- Periprosthetic joint infections (PJIs)- difficult to treat and costly
- Commonly caused by *Staphylococcus aureus* or *Staphylococcus epidermidis*<sup>1</sup>
- Treatment often involves multiple surgeries, long term antibiotic therapy
- Eravacycline - new tetracycline
  - Improved anti-staphylococcal activity compared to tigecycline<sup>2</sup>
  - Approved by the United States Food and Drug Administration (FDA) for complicated intra-abdominal infection
- **Aim:** Determine *in vitro* activity of eravacycline against *S. aureus* and *S. epidermidis* isolated from PJI in the planktonic and biofilm states

## METHODS

- 185 staphylococci isolated from patients with PJI, 1996-2018
  - 38 methicillin-resistant *S. aureus* (MRSA)
  - 64 methicillin-susceptible *S. aureus* (MSSA)
  - 62 methicillin-resistant *S. epidermidis* (MRSE) and
  - 21 methicillin-susceptible *S. epidermidis* (MSSE)
- Minimum inhibitory concentration (MIC) determined by broth micro dilution (range tested 0.06-64 µg/ml) according to CLSI guidelines<sup>4,5</sup>
- Minimum biofilm bactericidal concentrations (MBBCs) determined with modification of Calgary biofilm method<sup>6</sup>
  - Biofilms formed on pegged lids in trypticase soy broth
  - Pegged lids rinsed in phosphate buffered saline (PBS); transferred to plates containing dilutions of eravacycline in cation-adjusted Mueller Hinton broth (CAMHB); incubated for 20-24h
  - Pegged lids rinsed again in PBS and transferred to plates containing CAMHB and incubated for 24h
- MBBC recorded as lowest concentration with no visible growth

## RESULTS

- MIC<sub>50/90</sub> (range) in µg/ml for MRSA, MSSA, MRSE, and MSSE: 0.125/0.125 (≤0.06-0.25), ≤0.06/0.125 (≤0.06-0.25), 0.125/1 (≤0.06-2), and 0.25/1 (≤0.06-1), respectively (Table)
- MBBC<sub>50/90</sub> (range) in µg/ml for MRSA and MSSA both 8/16 (4-16); for MRSE and MSSE, values were 4/16 (2-32) and 8/16 (2-32), respectively (Table)

## DISCUSSION

- Using the EUCAST susceptible breakpoint of 0.25 µg/ml, 100% of isolates would be considered susceptible
- 54% would be considered susceptible using the FDA susceptible breakpoint of 0.06 µg/ml

## CONCLUSIONS

- Eravacycline has low anti-staphylococcal biofilm activity

## REFERENCES

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TABLE. MIC and MBBC values of *Staphylococcus aureus* and *Staphylococcus epidermidis* isolates studied.

		Number of isolates with the following MICs and cumulative percent (%)												MIC <sub>50</sub>	MIC <sub>90</sub>
	Methicillin susceptibility	≤0.06	0.125	0.25	0.5	1	2	4	8	16	32				
<i>S. aureus</i>	Resistant	14 (37)	20 (90)	4 (100)									0.125	0.125	
	Susceptible	41 (64)	21 (97)	2 (100)									≤0.06	0.125	
<i>S. epidermidis</i>	Resistant	14 (23)	19 (53)	11 (71)	11 (89)	5 (97)	2 (100)						0.125	1	
	Susceptible	1 (5)	7 (38)	4 (57)	6 (86)	3 (100)							0.25	1	
		Number of isolates with the following MBBC and cumulative percent (%)												MBBC <sub>50</sub>	MBBC <sub>90</sub>
		≤0.06	0.125	0.25	0.5	1	2	4	8	16	32				
<i>S. aureus</i>	Resistant							2 (5)	25 (71)	11 (100)		8	16		
	Susceptible							10 (16)	41 (80)	13 (100)		8	16		
<i>S. epidermidis</i>	Resistant						1 (2)	31 (62)	12 (71)	14 (94)	4 (100)	4	16		
	Susceptible						1 (5)	5 (29)	5 (52)	8 (91)	2 (100)	8	16		

Eravacycline

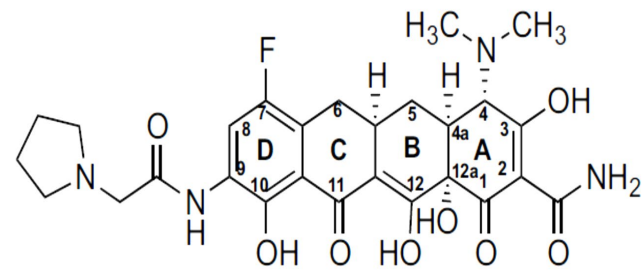


Figure. Chemical structure of eravacycline.<sup>3</sup>