

Antimicrobial Resistance Series | Part 2 of 3

In Vitro Activity of Selected Antibiotics Against β -Lactam–Resistant Gram-Negative Pathogens

β -LACTAM RESISTANCE MECHANISMS AFFECT CHOICE OF THERAPY

- In Part 1, we established that carbapenem-resistant Gram-negative pathogens can simultaneously exploit β -lactamase/carbapenemase expression, porin channel loss, and efflux pump upregulation to render β -lactam therapies ineffective^{1,2}
- When treating infections caused by a β -lactam–resistant Gram-negative pathogen, selecting an effective agent requires knowing which antibiotics retain activity in this setting
- Here, in Part 2, we map the in vitro susceptibility profiles of selected β -lactam–based antibiotics across β -lactam–resistant Gram-negative pathogens, stratified by resistance mechanisms

IN VITRO ACTIVITY OF CEFIDEROCOL AND β -LACTAM/ β -LACTAMASE INHIBITOR COMBINATIONS BY β -LACTAM RESISTANCE MECHANISMS BASED ON US PRESCRIBING INFORMATION

	β -lactamase/carbapenemase expression							Other resistance mechanisms	
	Enterobacterales			<i>Pseudomonas aeruginosa</i>		<i>Acinetobacter baumannii</i>	<i>Stenotrophomonas maltophilia</i>	All pathogens	
	ESBLs and/or AmpC	Serine carbapenemases	Metallo- β -lactamases	Serine β -lactamases (including AmpC)	Metallo- β -lactamases	Serine carbapenemases (OXA) and/or AmpC	Intrinsic resistance due to L1 metallo- β -lactamases ^a	Porin channel mutations	Efflux pump upregulation
Cefiderocol ³ Siderophore cephalosporin	✓	✓	✓	✓	✓	✓	✓	✓	✓
Aztreonam/avibactam ⁴ Monobactam + β -lactamase inhibitor	✓	✓	✓				✓		
Ceftazidime/avibactam ⁵ Cephalosporin + β -lactamase inhibitor	✓	✓		✓				✓	+/–
Ceftolozane/tazobactam ⁶ Cephalosporin + β -lactamase inhibitor	✓			✓				✓	✓
Imipenem/cilastatin/relebactam ⁷ Carbapenem + β -lactamase inhibitor	✓	✓		✓				✓	✓
Meropenem/vaborbactam ⁸ Carbapenem + β -lactamase inhibitor	✓	✓						+/–	+/–
Sulbactam/durlobactam ⁹ β -lactam + β -lactamase inhibitor						✓ ^b			

Legend: ✓ Active +/- Limited Activity Inactive or No Data

KEY CONSIDERATIONS



Susceptibility data are derived from US prescribing information and reflect in vitro activity against specific resistance mechanisms. **This information should not be used to make efficacy or safety comparisons between or among mentioned products.**



In vitro susceptibility does not necessarily correlate with clinical efficacy. Agent selection should account for local epidemiology, PK/PD parameters, and individual patient factors.

^a*S. maltophilia* produces an inducible L1 enzyme, a metallo- β -lactamase, conferring an intrinsic resistance to all carbapenems.^{10,11}

^bDoes not include AmpC.

ESBL=extended-spectrum β -lactamase; PD=pharmacodynamic; PK=pharmacokinetic; OXA=oxacillinase.

References

1. Fernández L, Hancock REW. *Clin Microbiol Rev.* 2012;25(4):661-681. 2. Bush K. *Antimicrob Agents Chemother.* 2018;62:e01076-18. 3. Fetroja® (cefiderocol). Florham Park, NJ: Shionogi Inc. 4. Emblaveo® (aztreonam-avibactam). North Chicago, IL: AbbVie Inc.; 2025. 5. Avycaz® (ceftazidime-avibactam). North Chicago, IL: AbbVie, Inc; 2025. 6. Zerbaxa® (ceftolozane-tazobactam). Rahway, NJ: Merck Sharp & Dohme LLC; 2022. 7. Recarbrio® (imipenem-cilastatin-relebactam). Rahway, NJ: Merck Sharp & Dohme LLC; 2025. 8. Vabomere® (meropenem-vaborbactam). Parsippany, NJ: Melinta Therapeutics, LLC; 2024. 9. Xacduro® (sulbactam-durlobactam) Prescribing Information. Entasis Therapeutics Ltd.; May 2023. 10. Ruppé É, Woerther P-L, Barbier F. *Ann Intensive Care.* 2015;5(1):1-15. 11. Sánchez MB. *Front Microbiol.* 2015;6:1-7.

© 2026 Shionogi Inc. Florham Park, NJ 07932. All Rights Reserved.
Fetroja is a registered trademark of Shionogi & Co., Ltd. Osaka, Japan.
All other trademarks are the property of their respective owners.
MED-US--2600721 v1 07/26

