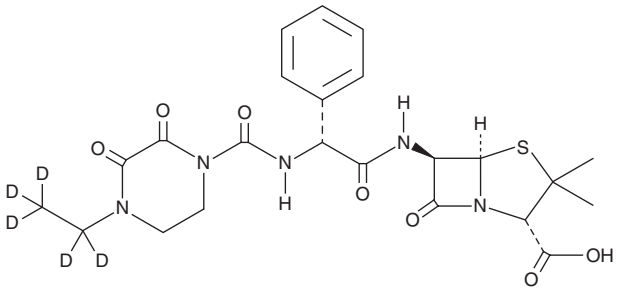
# PRODUCT INFORMATION

## Piperacillin-$d_5$

*Item No. 25431*

**Formal Name:** (2S,5R,6R)-6-((R)-2-(4-(ethyl-$d_5$)-2,3-dioxopiperazine-1-carboxamido)-2-phenylacetamido)-3,3-dimethyl-7-oxo-4-thia-1-azabicyclo[3.2.0]heptane-2-carboxylic acid
**MF:** $C_{23}H_{22}D_5N_5O_7S$
**FW:** 522.6
**Chemical Purity:** ≥90% (Piperacillin)
**Deuterium Incorporation:** ≥99% deuterated forms ($d_1$-$d_5$); ≤1% $d_0$
**Supplied as:** A solid
**Storage:** -20°C
**Stability:** ≥4 years



*Information represents the product specifications. Batch specific analytical results are provided on each certificate of analysis.*

## Laboratory Procedures

Piperacillin-$d_5$ is intended for use as an internal standard for the quantification of piperacillin (Item No. 20766) by GC- or LC-MS. The accuracy of the sample weight in this vial is between 5% over and 2% under the amount shown on the vial. If better precision is required, the deuterated standard should be quantitated against a more precisely weighed unlabeled standard by constructing a standard curve of peak intensity ratios (deuterated *versus* unlabeled).

Piperacillin-$d_5$ is supplied as a solid. A stock solution may be made by dissolving the piperacillin-$d_5$ in the solvent of choice, which should be purged with an inert gas. Piperacillin-$d_5$ is slightly soluble in ethanol, methanol, and DMSO.

## Description

Piperacillin is a broad-spectrum β-lactam antibiotic of the penicillin class.[1,2] It is active against Gram-negative and Gram-positive bacteria, including *Enterococcus* species, *E. coli*, and *P. mirabilis* ($MIC_{50}$s = 0.5-2 µg/ml) as well as gentamicin-susceptible and -resistant strains of *P. aeruginosa* ($MIC_{50}$s = 8 and 125 µg/ml, respectively).[2] In a mouse model of systemic infection, piperacillin is active against *P. aeruginosa* 46220 when used alone or in combination with tazobactam (Item No. 25679; $ED_{50}$s = 1.58 and 1.34 mg/animal, respectively).[3] In the same model, it is less active against *P. aeruginosa* 46220 DR-2, which contains constitutively active β-lactamase, when used alone than when used in combination with tazobactam ($ED_{50}$s = >20 and 4.39 mg/animal, respectively). Formulations containing piperacillin in combination with tazobactam have been used in the treatment of moderate-to-severe bacterial infections.

## References


1. Drawz, S.M. and Bonomo, R.A. Three decades of β-lactamase inhibitors. *Clin. Microbiol. Rev.* **23(1)**, 160-201 (2010).
2. White, G.W., Malow, J.B., Zimelis, V.M., *et al.* Comparative in vitro activity of azlocillin, ampicillin, mezlocillin, piperacillin, and ticarcillin, alone and in combination with an aminoglycoside. *Antimicrob. Agents Chemother.* **15(4)**, 540-543 (1979).
3. Nishida, K., Higashitani, F., and Hyodo, A. Superior effect of tazobactam/piperacillin compared to piperacillin on β-lactamase-producing *Pseudomonas aeruginosa*. *Chemotherapy* **43(3)**, 171-178 (1997).





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