

<b>Product Name:</b>	Meropenem, USP
<b>Product Number:</b>	M002
<b>CAS Number:</b>	119478-56-7
<b>Molecular Formula:</b>	$C_{17}H_{25}N_3O_5S \cdot 3H_2O$
<b>Molecular Weight:</b>	437.52
<b>Form:</b>	Powder
<b>Appearance:</b>	almost white or yellowish crystalline powder
<b>Solubility:</b>	sparingly soluble in aqueous solution (5.63 mg/ml)
<b>Source:</b>	Synthetic
<b>Water Content (Karl Fischer):</b>	11.4-13.4%
<b>pH:</b>	4.0 - 6.0
<b>Optical Rotation:</b>	-17.0° to -21.0°
<b>Storage Conditions:</b>	2-8 °C
<b>Description:</b>	<p>Meropenem is a <math>\beta</math>-lactam antibiotic in the carbapenem class, and targets the bacterial cell wall. It has found utility against extended spectrum <math>\beta</math>-lactamase (ESBL) producing <i>Enterobacteriaceae</i> that are resistant to many first line <math>\beta</math>-lactam antibiotics and certain cephalosporins. Meropenem is sparingly soluble in aqueous solution.</p> <p>We also offer:</p> <ul style="list-style-type: none"><li>• Meropenem with sodium carbonate (<u>M028</u>)</li></ul>
<b>Mechanism of Action:</b>	<p><math>\beta</math>-lactams interfere with PBP (penicillin binding protein) activity involved in the final phase of peptidoglycan synthesis. PBP's are enzymes which catalyze a pentaglycine crosslink between alanine and lysine residues providing additional strength to the cell wall. Without a pentaglycine crosslink, the integrity of the cell wall is severely compromised and ultimately leads to cell lysis and death. Resistance to <math>\beta</math>-lactams is commonly due to cells containing plasmid encoded <math>\beta</math>-lactamases. Like many carbapenems, meropenem is highly resistant to the degradative effects of <math>\beta</math>-lactamases.</p>
<b>Spectrum:</b>	<p>Meropenem is a broad-spectrum antibiotic targeting a wide range of bacteria especially those causing meningitis.</p>

**Microbiology Applications** Meropenem is commonly used in clinical *in vitro* microbiological antimicrobial susceptibility tests (panels, discs, and MIC strips) against Gram-positive and Gram-negative microbial isolates. Meropenem has also shown high potency against high-resistant superbug strains. Medical microbiologists use AST results to recommend antibiotic treatment options. Representative MIC values include:

- *Staphylococcus epidermidis* 0.06 µg/mL - 16 µg/mL
- *Neisseria meningitis* 0.002 µg/mL – 0.03 µg/mL
- For a complete list of Meropenem MIC values, [click here](#).

## Media Supplements

Meropenem can be used as a selective agent in several types of isolation media:

VRE Medium - VRE Selective Supplement

## Plant Biology Applications

Meropenem can be used to suppress the overgrowth of *Agrobacterium* in tobacco, tomato, and rice transformation, with 25 mg/L suppressing outgrowth (Ogawa and Mii, 2007).

Meropenem suppressed growth of *Agrobacterium* during transformation of *Phalaenopsis* at 5 mg/L and had no phytotoxic effect on the cells themselves (Sjahril and Mii, 2005).

## References:

Guzmán F(2008) Beta lactams antibiotics (penicillins and cephalosporins) mechanism of action. *Med. Pharmacol.* Pharmacology Corner, 29 Nov. 2008

Ogawa Ya and Mii M (2007) Meropenem and moxalactam: Novel B-lactam antibiotics for efficient *Agrobacterium*-mediated transformation. 172(3):564-572

Pitout JD, Sanders CC, Sanders WE (1997) Antimicrobial resistance with focus on beta-lactam resistance in gram-negative bacilli. *Am J Med* 103:51

Sjahril R and Masahiro Mii M (2006) High-efficiency *Agrobacterium*-mediated transformation of *Phalaenopsis* using meropenem, a novel antibiotic to eliminate *Agrobacterium*. *J. Hort. Sci and Biotechnol* 8(3):458-464

Yang Y, Bhachech N and Bush K (1995) Biochemical comparison of imipenem, meropenem and biapenem: Permeability, binding to penicillin-binding proteins, and stability to hydrolysis by  $\beta$ -lactamases. *J. Antimicrob. Chemother.* 35(1):75-84