

Product Name:	Imipenem mixture w/cilastatin
Product Number:	I005
CAS Number:	74431-23-5; 82009-34-5
Molecular Formula:	$C_{12}H_{17}N_3O_4S \cdot H_2O$ and $C_{16}H_{26}N_2O_5S$
Molecular Weight:	317.36 and 358.45
Form:	Powder
Solubility:	Aqueous solution (5 mg/ml).
pH:	6.5 - 8.5
Storage Conditions:	2-8°C
Description:	<p>Imipenem is a broad-spectrum β-lactam antimicrobial, a carbapenem effective against extended spectrum beta-lactamase (ESBL) producing <i>Enterobacteriaceae</i>, a group of pathogenic microbes resistant to many first line beta-lactam antibiotics and certain cephalosporins. It is soluble in aqueous solution.</p> <p>Cilastatin is a chemical substance which inhibits dehydropeptidase, an human enzyme that degrades Imipenem.</p> <p>TOKU-E offers two forms of Imipenem:</p> <ul style="list-style-type: none">• Imipenem mixture w/ cilastatin (I005)• Imipenem (<u>I001</u>)
Mechanism of Action:	<p>β-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 β-lactams is commonly due to cells containing plasmid encoded β-lactamases. Like many members of the carbapenem subgroup, imipenem is highly resistant to β-lactamase activity.</p>
Spectrum:	Imipenem is a broad spectrum antibiotic targeting a wide range of aerobic and anaerobic Gram-positive and Gram-negative bacteria.

Microbiology Applications Imipenem is commonly used in clinical *in vitro* microbiological antimicrobial susceptibility tests (panels, discs, and MIC strips) against gram positive and gram negative microbial isolates. Medical microbiologists use AST results to recommend antibiotic treatment options for infected patients. Representative MIC values include:

- *Pseudomonas aeruginosa* 0.25 µg/mL – 12 µg/mL
- *Bacteroides fragilis* 0.008 µg/mL – 1 µg/mL
- For a complete list of imipenem MIC values, [click here](#).

Plant Biology Applications

Imipenem has been shown to be effective against bacteria from the genus *Burkholderia*, a well described plant pathogen, and was shown to be effective for sour skin (onions), slippery skin (bulbs), and cavity disease (mushrooms)(Sojanova et al, 2007).

References:

Berg PH, Voit EO and White RL (1996) A pharmacodynamic model for the action of the antibiotic imipenem on *Pseudomonas aeruginosa* populations in vitro. *Bltn. Mathcal. Biol.* 58(5):923-938

Chen P et al (2014) Activity of Imipenem against *Klebsiella pneumoniae* Biofilms In Vitro and In Vivo. *Antimicrob. Agents Chemother.* 58(2):1208-1213

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

Stoyanova M, Pavlina I, Moncheva P and Bogatzevska N (2014) Biodiversity and incidence of *Burkholderia* species. *Biotechnol. & Biotechnologic. Equip* 21(3):306-310