Tigecycline
PRODUCT DATA SHEET

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Product Name:	Tigecycline
Product Number:	T022
CAS Number:	220620-09-7
Molecular Formula:	$C_{29}H_{39}N_5O_8$
Molecular Weight:	585.65
Form:	Powder
Appearance:	Orange to orange-red colored crystalline powder
Source:	Semi-synthetic
Water Content (Karl Fischer):	Not more than 2.0%
Optical Rotation:	-205° - -230°
Storage Conditions:	-20°C

Description:

Tigecycline is a broad spectrum glycylcycline antibiotic which was developed to combat infections caused by many leading multi-drug resistant organisms and approved by the FDA in June 2005. Tigecycline is a semisynthetic derivative of tetracycline, that is structurally similar to minocycline; however, it contains a large glycylamido group at the D-9 position. This substitution is thought to be the reason behind its broad-spectrum activity.

Tigecycline is a protein synthesis inhibitor, that show bacteriostatic activity against both gram-positive bacteria and gram-negative. It was designed be less affected by the two major tetracycline-resistance mechanisms, ribosomal protection and efflux. Additionally, tigecycline is not affected by resistance mechanisms such as beta-lactamases (including extended spectrum beta-lactamases), target-site modifications, macrolide efflux pumps or enzyme target changes (e.g. gyrase/topoisomerases). However, some ESBL-producing isolates may confer resistance to tigecycline via other resistance mechanisms. Tigecycline resistance in some bacteria (e.g. *Acinetobacter calcoaceticus-Acinetobacter baumannii* complex) is associated with multi-drug resistant (MDR) efflux pumps.

Tigecycline has recently shown anti-tumor properties and is being evaluated for Tigecycline's inhibitory effects on several activating signaling pathways and abnormal mitochondrial function in cancer cells.

Tigecycline is soluble in water (0.45mg/mL) and DMSO (>3 mg/mL).

This product is considered a dangerous good. Quantities above 1 g may be subject to additional shipping fees. Please contact us for specific questions.

Mechanism of Action: Tigecycline inhibits protein translation in bacteria by binding to the 30S ribosomal subunit and blocking entry of amino-acyl tRNA molecules into the A site of the ribosome. This prevents incorporation of amino acid residues into elongating peptide chains. In general, tigecycline is considered bacteriostatic; however, Tigecycline has demonstrated bactericidal activity against isolates of *S. pneumoniae* and *L. pneumophila*.

Spectrum: Tigecycline has broad spectrum activity against most Gram positive and Gram negative bacteria including multi-drug resistant organisms such as MRSA. Tigecycline has also been found to be effective against carbapenem resistant Enterobacteriaceae or CRE. CRE is a "superbug" which possesses NDM-1 or KPC genes which encode New Delhi Metallo-beta-lacamase or Klebsiella pneumoniae cabapenemase respectively; two enzymes which render nearly all beta-lactam antibiotics useless.

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

Staphylococcus aureus (methicillin resistant) 0.03 µg/mL-2 µg/mL

Streptococcus pneumoniae 0.015 µg/mL – 2 µg/mL

For a complete list of tigecycline MIC values, click here.

Cancer Applications An increasing number of studies have emphasized the anti-tumor effects of Tigecycline. The inhibitory effects of tigecycline on cancer depend on activating several signaling pathways and abnormal mitochondrial function in cancer cells. Tigecycline has shown anti-tumor activity against different cancer types, including acute myeloid leukemia (AML), glioma, non-small cell lung cancer (NSCLC), among others.

References:

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