Spectinomycin dihydrochloride pentahydrate
PRODUCT DATA SHEET

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Product Name:	Spectinomycin dihydrochloride pentahydrate
Product Number:	S006
CAS Number:	22189-32-8
Molecular Formula:	$C_{14}H_{24}N_2O_7$ •2HCl •5H_2O
Molecular Weight:	495.35
Form:	Powder
Appearance:	White to off-white crystalline powder
Solubility:	(50mg/mL in H_2O) Clear and colorless or light yellow solution
Source:	*Streptomyces spectabilis*
Water Content (Karl Fischer):	Not more than 21.0%
pH:	4.0 - 5.0
Optical Rotation:	+15.0° to +21.0°
Storage Conditions:	2 - 8°C
Description:	Spectinomycin dihydrochloride pentahydrate is an aminocyclitol antibiotic that is isolated from *Streptomyces spectabilis*. Spectinomycin was discovered in culture broth by researchers at the Upjohn company in 1961. Spectinomycin dihydrochloride pentahydrate shows activity against gram-positive, gram-negative bacteria, and Mycoplasma. Spectinomycin dihydrochloride pentahydrate is a protein synthesis inhibitor. It acts by inhibiting protein synthesis and elongation by binding to the bacterial 30S ribosomal subunit and interfering with peptidyl tRNA translocation. This eventually leads to bacterial cell death. Spectinomycin is commonly used as a selective agent to isolate cells that contain aadA spectinomycin resistance genes. It also has various uses in plant biology applications. TOKU-E offers two forms of spectinomycin: Spectinomycin dihydrochloride pentahydrate (S006) and spectinomycin sulfate (S016). In aqueous solution, spectinomycin DiHCl is freely soluble, and spectinomycin sulfate is sparingly soluble (0.150 mg/mL).

Mechanism of Action:	The aminocyclitol antibiotic spectinomycin, often considered alongside the aminoglycosides, binds in reversible fashion (hence the bacteriostatic activity) to the 16S rRNA of the ribosomal 30S subunit. There it interrupts the translocation event that occurs as the next codon of mRNA is aligned with the A site in readiness for the incoming aminoacyl-tRNA. Structural studies reveal that the antibiotic binds to an area of the 30S subunit known as the head region which needs to move during translocation. Binding of the rigid spectinomycin molecule appears to prevent the movement required for translocation.
Spectrum:	Spectinomycin dihydrochloride pentahydrate is an antibiotic that is active against a variety of aerobic gram-negative and gram-positive organisms as well as Mycoplasma species. Spectinomycin is used clinically, primarily for its activity against gram-negative organisms; some gram-positive organisms may also be susceptible to this agent. Anaerobic organisms are generally resistant. Spectinomycin is usually bacteriostatic at therapeutic doses.
Microbiology Applications	Spectinomycin is commonly as a selective agent to isolate cells that contain *aadA* spectinomycin resistance genes. Spectinomycin is typically used at concentrations between 50 - 100 µg/mL.
Plant Biology Applications	Spectinomycin sulfate has been used to mark cell layers to monitor cell fate during leaf development, as a selection marker in plant related transformation systems for plant cells containing the marker gene Spcr, and to generate plants deficient for the plastid-encoded RNA polymerase on MS-agar media.
References:	Davis, Bernard D. "Mechanism of Bactericidal Action of Aminoglycosides."*Microbiological Reviews* 51.3 (1987): 341-50. Wishart, David. "Sulfamethazine." DrugBank. Web. 10 Sept. 2012.