Ceftriaxone Sodium, USP
PRODUCT DATA SHEET

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Product Name:	Ceftriaxone Sodium, USP
Product Number:	C022
CAS Number:	104376-79-6 (trihydrate); 74578-69-1 (anhydrous)
Molecular Formula:	$C_{18}H_{16}N_8O_7S_3 \cdot 2Na \cdot 3.5\ H_2O$
Molecular Weight:	661.60 g/mol
Form:	Powder
Appearance:	Off-white to yellow crystalline powder
Solubility:	Freely soluble in aqueous solution (105 mg/mL), sparingly soluble in methanol, and very slightly soluble in ethanol.
Source:	Synthetic
Water Content (Karl Fischer):	8.0-11.0%
pH:	6.0-8.0
Storage Conditions:	-20°C
Description:	Ceftriaxone sodium, USP is a semisynthetic, broad-spectrum, third-generation cephalosporin antibiotic that can be used in proteomics, the study of penicillin-binding proteins, and biosynthetic pathway investigation. It is freely soluble in aqueous solution (105 mg/mL). TOKU-E offers two forms of Ceftriaxone: • Ceftriaxone Sodium, USP (C022) • Ceftriaxone Free Acid (C074) Ceftriaxone sodium, USP conforms to United States Pharmacopeia specifications.
Mechanism of Action:	Like β-lactams, cephalosporins 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 cephalosporins is commonly due to cells containing plasmid encoded β-lactamases. Like many cephalosporins, ceftriaxone is resistant to a number of β-lactamases. Ceftriaxone can be used to study PBPs.
Spectrum:	Ceftriaxone sodium is a broad-spectrum antibiotic targeting a wide variety of Gram-positive and Gram-negative bacteria.

Microbiology Applications Ceftriaxone sodium 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:

- *Streptococcus pneumoniae* 0.03 µg/mL - 8 µg/mL
- *Streptococcus pyogenes* 0.008 µg/mL – 0.5 µg/mL
- For a complete list of ceftriaxone MIC values, click here.

References:

Feng D et al (2014) Ceftriaxone alleviates early brain injury after subarachnoid hemorrhage by increasing excitatory amino acid transporter 2 expression via the P13K/Akt/NF-kB signaling pathway. Neurosci. 268:21-32

Georgopapadakou, NH (1992) Mechanisms of action of cephalosporin 3'-quinolone esters, carbamates, and tertiary amines in *Escherichia coli.* Antimicrob. Agents Chemother. 37(3): 559-565

Lee S et al (2008) Mechanism of ceftriaxone induction of excitatory amino acid transporter-2 expression and glutamate uptake in primary human astrocytes. J. Biol. Chem 283: 13116-13123

Ruzza P et al (2016) Interactions of GFAP with ceftriaxone and phenytoin: SRCD and molecular docking and dynamic simulation. Biochim. Biophys. Acta. 1860(10):2239-2248 PMID 27133445