Blasticidin S
PRODUCT DATA SHEET

issue date 01/06/2020

Product Name:	Blasticidin S
Product Number:	B052
CAS Number:	2079-00-7
Molecular Formula:	$C_{17}H_{26}N_8O_5$
Molecular Weight:	422.4
Appearance:	White solid
Storage Conditions:	-20°C
Description:	Blasticidin S is a peptidyl nucleoside produced by several species of *Streptomyces* that was first isolated from *S. griseochromogenes* in 1958. Blasticidin S inhibits protein synthesis and is active against bacteria, fungi, nematodes, and tumor cells. The compound is used as a selection antibiotic for both eukaryotic and prokaryotic cells, and a marker for strain manipulation.

TOKU-E carries three forms of Blasticidin S:

- Blasticidin S (B052)
- Blasticidin S HCl (B001)
- Blasticidin S HCl Solution (10 mg/ml in 20 mM HEPES)(B006-B007)

Blasticidin S is soluble in water, methanol, DMF or DMSO.

Mechanism of Action: Blasticidin S inhibits protein synthesis in prokaryotic and eukaryotic cells by binding to the ribosomal P-site which strengthens tRNA binding and slows down and prevents subsequent peptide synthesis.

Mechanisms of resistance

Resistance to Blasticidin S is conferred by bsr, BSD, and bls resistance genes isolated from *Bacillus cereus* K55-S1, *Aspergillus terreus*, and *Streptoverticillum* spp, respectively.

The **bsr resistance gene** is a 420 bp fragment and encodes a 15 kDa Blasticidin S deaminase which catalyzes the reaction of Blasticidin S to deaminohydroxyblasticidin S. Deaminohydroxyblasticidin S is a biologically inactive derivative of Blasticidin S and does not interact with or inhibit prokaryotic or eukaryotic ribosomes.

The **bsd resistance gene** is a 393 bp fragment and also encodes a Blasticidin S deaminase enzyme which catalyzes a similar reaction to the BSR deaminase. A study by Kimura et al. found the transfection frequency with bsd to be 80X greater than with bsr when using FM3A cells.

The **bls gene resistance gene** encodes an acetyltransferase which interacts with acetyl-coenzyme A and prevents Blasticidin S from inhibiting protein synthesis.

Spectrum: Blasticidin S is active against mammalian and prokaryotic cells.

Microbiology Applications Blasticidin S can be used as a selection agent after transformation of prokaryotic cells such as E. coli.

Plant Biology Applications Blasticidin S is an antifungal agent with particularly potent activity against the rice pathogen, *Piricularia oryzae*, for which it was used commercially in Japan.

References:

Adachi H, Hasebe T, Yoshinaga K , Ohta T and Sutoh K (1994) Isolation of *Dictyostelium discoideum* cytokinesis mutants by restriction enzyme-mediated integration of the Blasticidin S resistance marker. Biochem. Biophys. Res. Comm. 205(3):1808-1814

Bento, FM (2004) Over Expression of the Selectable Marker Blasticidin S Deaminase Gene Is Toxic to Human Keratinocytes and Murine BALB/MK Cells." BMC Biotechnol. 4 (29):1-10 PMID 15575952.

Izumi M. et al., 1991. Blasticidin S-resistance gene (bsr): A novel selectable marker for mammalian cells. Exp.Cell Res.197:229-33

Kimura M, Takatsuki A, Yamaguchi I (1994) Blasticidin S deaminase gene from *Aspergillus terreus*(BSD): A new drug resistance gene for transfection of mammalian cells. Biochim. Biophys. Acta. 1219(3):653-65 PMID 7948022

Lu K-T et al (2016) Ovatodiolide inhibits breast cancer stem/progenitor cells through SMURF2-mediated downregulation of Hsp27. Toxins 8(5):127

Svidritskiy E, Ling C, Ermolenko DN, Korostelev AA (2013) Blasticidin S Inhibits Translation by Trapping Deformed TRNA on the Ribosome. PNAS 110(30):12283-12288 PMID 23824292

Takeuchi S, Hirayama K, Ueda K, Sakai H and Yonehara H (1958) Blasticidin S, a new antibiotic. J. Antibiot. 11(1):1-5 PMID 13525246

Yamaguchi I et al (1990) Expression of the Blasticidin S Deaminase Gene (bsr) in Tobacco: Fungicide Tolerance and a New Selective Marker for Transgenic Plants. Mol. Gen. Genet (2):332-334 PMID 2250657