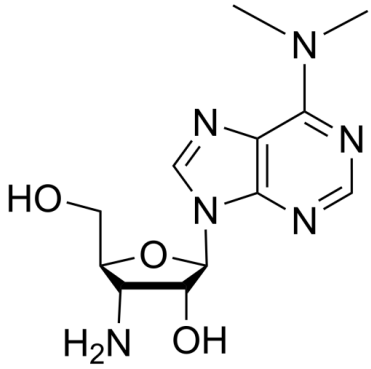
Data Sheet

Product Name:	Puromycin aminonucleoside
Cat. No.:	CS-1551
CAS No.:	58-60-6
Molecular Formula:	$C_{12}H_{18}N_6O_3$
Molecular Weight:	294.31
Target:	Aminopeptidase; Antibiotic; Apoptosis; Bacterial; Dipeptidyl Peptidase
Pathway:	Anti-infection; Apoptosis; Metabolic Enzyme/Protease
Solubility:	DMSO : 25 mg/mL (ultrasonic;warming;heat to 60°C);H_2O : 40 mg/mL (ultrasonic;warming;heat to 50°C)



BIOLOGICAL ACTIVITY:

Puromycin aminonucleoside (NSC 3056) is the aminonucleoside portion of the antibiotic puromycin, and used in nephrosis animal models[1]. Puromycin aminonucleoside induces **apoptosis**[2]. Puromycin aminonucleoside is a reversible inhibitor of **dipeptidyl peptidase II** and cytosol alanyl **aminopeptidase**[3]. Puromycin aminonucleoside induces secretion of cell migrasome[4]. ***In Vitro:*** Puromycin aminonucleoside (NSC 3056) (30 μg/mL) markedly increases p53 protein levels in podocytes. Puromycin aminonucleoside (NSC 3056)-induced podocyte apoptosis is p53 dependent. Puromycin aminonucleoside (NSC 3056) induces podocyte apoptosis in a time-dependent manner[2]. The IC_{50} values for PMAT-expressing and vector-transfected cells are 48.9 and 122.1 μM, respectively, suggesting expression of PMAT-enhanced cell sensitivity to Puromycin aminonucleoside. Puromycin aminonucleoside (NSC 3056) (250 μM) is toxic to both PMAT-expressing and vector-transfected cells. Puromycin aminonucleoside (NSC 3056) uptake in PMAT-expressing cells is fourfold higher at pH 6.6 than that at pH 7.4[5]. ***In Vivo:*** The number of podocytes per glomerulus is 95.5±17.6 in the control rats, 90.7 on Day 4 in Puromycin aminonucleoside (NSC 3056) (8 mg/100 g, i.v.)-treated nephrosis rats. The amount of nephrin per glomerulus in control rats is 1.02±0.11 fmol and those in Puromycin aminonucleoside (NSC 3056) nephrosis rats are reduced to 0.46±0.06 fmol and 0.35±0.04 fmol on Day 4 and Day 7. The nephrin amount per podocyte is significantly decreased association with the development of proteinuria in Puromycin aminonucleoside (NSC 3056) nephrosis rats [5]. Rats given Puromycin aminonucleoside (NSC 3056) (100 mg/kg, s.c.) gain less weight and their serum creatinine levels are higher than the control rats[7].

PROTOCOL (Extracted from published papers and Only for reference)

Cell Assay: [4]Cells are seeded in MEM with 10% FBS on 96-well plates at a density of 5,000 cells/well. After appr 48-h incubation (appr 40-50% confluence), cells are changed to fresh growth medium containing Puromycin aminonucleoside (NSC 3056) at various concentrations. For the protection experiment, cells are incubated in medium containing 250 μM Puromycin aminonucleoside (NSC 3056) with or without the PMAT inhibitor decynium-22 (2 μM). After a total of 72-h incubation in a 95% O_2 incubator at 37°C, cells are washed and the plates. The IC_{50} values are determined by fitting the cell growth data to the following model using nonlinear regression (WinNonLin version 3.2): $S=S_{max} - [S_{max} - S_0] \times [C_\gamma/(C_\gamma + IC_{50\gamma})]$, where S is the cell survival expressed as percentage of the optical density to untreated control cells, S_{max} is the maximal cell survival, S_0 is the lowest residual cell survival at the high drug concentration, C is Puromycin aminonucleoside concentration, γ is the Hill coefficient, and IC_{50} is the Puromycin aminonucleoside concentration leading to half-maximal cell survival. Five to six determinations are carried out within each experiment, and four independent experiments are performed. **Animal Administration:** [5]Male F344 rats at 11 weeks of age are purchased from JaPuromycin aminonucleoside SLC. Normal rats and a Puromycin aminonucleoside nephrosis model are used in the present study. Puromycin aminonucleoside (NSC 3056) nephrosis is induced in rats by a single intravenous injection of Puromycin aminonucleoside

at a dose of 8 mg/100 g body weight in saline. Control animals receive an identical volume of saline. Nephrotic rats (n=6 per group) are studied at Days 4 and 7 after the Puromycin aminonucleoside injection.

References:

[1]. Wada T, et al. Prevents podocyte apoptosis induced by puromycin aminonucleoside: role of p53 and Bcl-2-related family proteins. J Am Soc Nephrol. 2005 Sep;16(9):2615-25.

[2]. Xia L, et al. Podocyte-specific expression of organic cation transporter PMAT: implication in puromycin aminonucleosidenephrotoxicity. Am J Physiol Renal Physiol. 2009 Jun;296(6):F1307-13.

[3]. Kawakami H, et al. Dynamics of absolute amount of nephrin in a single podocyte in puromycin aminonucleoside nephrosis rats calculated by quantitative glomerular proteomics approach with selected reaction monitoring mode. Nephrol Dial Transplant. 2012 Apr;

[4]. Nosaka K, et al. An adenosine deaminase inhibitor prevents puromycin aminonucleoside nephrotoxicity. Free Radic Biol Med 1997 ;22 (4): 597-605.

[5]. Lacalle RA, et al. Cloning of the complete biosynthetic gene cluster for an aminonucleoside antibiotic, puromycin, and its regulated expression in heterologous hosts. EMBO J. 1992 Feb;11(2):785-92.

[6]. Gong W, et al. Estrogen-related receptor-α mediates puromycin aminonucleoside-induced mesangial cell apoptosis and inflammatory injury. Am J Physiol Renal Physiol. 2019 May 1;316(5):F906-F913.

[7]. Ying Liu, et al. Podocyte-Released Migrasomes in Urine Serve as an Indicator for Early Podocyte Injury. Kidney Dis (Basel). 2020 Nov;6(6):422-433.

CAIndexNames:

Adenosine, 3'-amino-3'-deoxy-N,N-dimethyl-

SMILES:

N[C@H]1[C@@H](O)[C@H](N(C=N2)C3=C2C(N(C)C)=NC=N3)O[C@@H]1CO

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