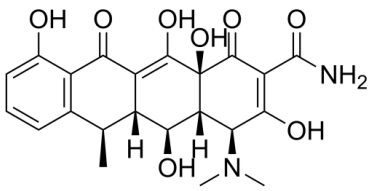
Data Sheet

Product Name:	Doxycycline
Cat. No.:	CS-0009105
CAS No.:	564-25-0
Molecular Formula:	$C_{22}H_{24}N_2O_8$
Molecular Weight:	444.43
Target:	Antibiotic; Bacterial; MMP; Parasite
Pathway:	Anti-infection; Metabolic Enzyme/Protease
Solubility:	DMSO : 100 mg/mL (ultrasonic);H_2O : < 0.1 mg/mL (ultrasonic;warming;heat to 60°C)



BIOLOGICAL ACTIVITY:

Doxycycline, an antibiotic, is an orally active and broad-spectrum metalloproteinase (**MMP**) inhibitor[1]. Doxycycline shows antibacterial activity and anti-cancer cell proliferation activity[1][2][3][4][5]. ***In Vitro:*** Doxycycline (0.01-10 μg/mL, 4 d) affects growth of glioma cells only under high concentrations[2].

Doxycycline (0.01-10 μg/mL, 24 h) decreases MT-CO1 protein content with concentrations of 1 μg/mL and higher in SVG cells[2].

Doxycycline (100 ng/mL, 1 μg/mL; 24 h) reduces proliferation of human cell lines[4].

Doxycycline (0-250 μM, 72 h) inhibits cell viability of breast cancer cells [5].

In Vivo: Doxycycline (oral gavage; 200 or 800 mg/kg; once daily; 3 months) reduces MMP-9 activity in untreated HT mice in a dose-dependent manner[3].

Doxycycline and Tetracycline (HY-A0107), act systemically after absorption from the upper gastrointestinal tract. The main advantage of Doxycycline over Tetracycline is its longer activity, and it can be taken twice or once a day. The peak concentration of both drugs is similar, but in the case of Doxycycline the time to peak concentration is shorter, and half life is significantly longer[6].

Doxycycline (Dox) is often used as an inducer in molecular biology studies to induce gene expression. In cells or model animals that have constructed tetracycline induced expression systems (Tet-On/Tet-Off systems), the expression of target genes can be precisely controlled by adding or removing Dox[7][8][9][10].

Dose reference for Dox induction[7][8]:

(1) Model animal: male Sprague–Dawley rats

Tet regulatory system：20-3000 ppm of Dox is supplied in diet

(2) Model animal: Cags mice

Tet regulatory system：625 ppm of Dox is supplied in diet

References:

[1]. Eusebio Manchado, et al. A combinatorial strategy for treating KRAS-mutant lung cancer. Nature. 2016 Jun 30;534(7609):647-51.

[2]. Anna-Luisa Luger, et al. Doxycycline Impairs Mitochondrial Function and Protects Human Glioma Cells from Hypoxia-Induced Cell Death: Implications of Using Tet-Inducible Systems. Int J Mol Sci. 2018 May 17;19(5):1504.

[3]. Wilfried Briest, et al. Doxycycline ameliorates the susceptibility to aortic lesions in a mouse model for the vascular type of Ehlers-Danlos syndrome. J

Pharmacol Exp Ther. 2011 Jun;337(3):621-7.

[4]. Ethan Ahler, et al. Doxycycline alters metabolism and proliferation of human cell lines. PLoS One. 2013 May 31;8(5):e64561.

[5]. Le Zhang, et al. Doxycycline inhibits the cancer stem cell phenotype and epithelial-to-mesenchymal transition in breast cancer. Cell Cycle. 2017 Apr 18;16(8):737-745.

[6]. Niv Y. Doxycycline in Eradication Therapy of Helicobacter pylori--a Systematic Review and Meta-Analysis. Digestion. 2016;93(2):167-73.

[7]. Manfredsson FP, et al. Tight Long-term dynamic doxycycline responsive nigrostriatal GDNF using a single rAAV vector. Mol Ther. 2009 Nov;17(11):1857-67.

[8]. Redelsperger IM, et al. Stability of Doxycycline in Feed and Water and Minimal Effective Doses in Tetracycline-Inducible Systems. J Am Assoc Lab Anim Sci. 2016;55(4):467-74.

[9]. Konopka W, et al. Tet system in the brain: transgenic rats and lentiviral vectors approach. Genesis. 2009 Apr;47(4):274-80.

[10]. Kistner A, et al. Doxycycline-mediated quantitative and tissue-specific control of gene expression in transgenic mice. Proc Natl Acad Sci U S A. 1996 Oct 1;93(20):10933-8.

CAIndexNames:

2-Naphthacenecarboxamide, 4-(dimethylamino)-1,4,4a,5,5a,6,11,12a-octahydro-3,5,10,12,12a-pentahydroxy-6-methyl-1,11-dioxo-, (4S,4aR,5S,5aR,6R,12aS)-

SMILES:

O=C(N)C(C1=O)=C([C@H]([C@@]2([C@H]([C@@]3([C@H](C4=C(C(O)=CC=C4)C(C3=C([C@@]21O)O)=O)C)[H])O)[H])N(C)C)O

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