

# Small Molecules

## Doxycycline

Antibiotic; Used in Tet-inducible gene expression systems

Catalog # 72742

1 g



Scientists Helping Scientists™ | WWW.STEMCELL.COM

TOLL FREE PHONE 1 800 667 0322 • PHONE +1 604 877 0713

INFO@STEMCELL.COM • TECHSUPPORT@STEMCELL.COM

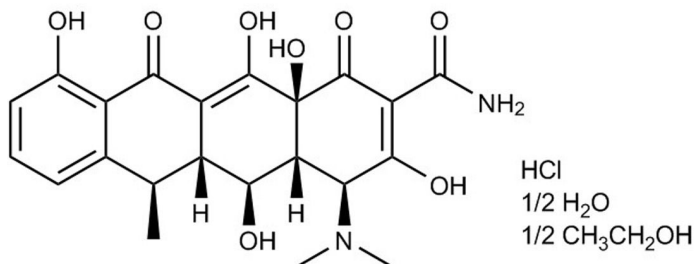
FOR GLOBAL CONTACT DETAILS VISIT OUR WEBSITE

## Product Description

Doxycycline (hyclate) is a tetracycline-like antibiotic (Hicks et al.; Nau et al.; Solís García del Pozo and Solera; Steinhardt et al.). In genetic engineering, doxycycline is used as the regulator for inducible gene expression systems, whereby expression depends on either the presence (Tet-On) or absence (Tet-Off) of doxycycline (Gould et al.; Li et al.). Also, doxycycline inhibits certain matrix metalloproteinases (MMP), such as MMP-8 (Ki = 36 μM; Griffin et al.; Smith et al.). It only poorly inhibits MMP-1 and MMP-13 (Ki > 100 μM; Smith et al.).

<b>Molecular Name:</b>	Doxycycline (Hyclate)
<b>Alternative Names:</b>	WC 2031
<b>CAS Number:</b>	24390-14-5
<b>Chemical Formula:</b>	$C_{22}H_{24}N_2O_8 \cdot HCl \cdot 0.5H_2O \cdot 0.5C_2H_6O$
<b>Molecular Weight:</b>	512.9 g/mol
<b>Purity:</b>	≥ 98%
<b>Chemical Name:</b>	(4S,4aR,5S,5aR,6R,12aR)4(dimethylamino)-1,5,10,11,12a-pentahydroxy-6-methyl-3,12-dioxo-4a,5,5a,6-tetrahydro-4H-tetracene-2-carboxamide;ethanol;hydrate;hydrochloride

Structure:



## Properties

<b>Physical Appearance:</b>	A crystalline solid
<b>Storage:</b>	Product stable at -20°C as supplied. Protect from prolonged exposure to light. For product expiry date, please contact techsupport@stemcell.com.
<b>Solubility:</b>	· PBS (pH 7.2) ≤ 5.8 mM · DMSO ≤ 1.9 mM For example, to prepare a 2 mM stock solution in PBS, resuspend 100 mg in 97.5 mL of PBS (pH 7.2).

Prepare stock solution fresh before use. Information regarding stability of small molecules in solution has rarely been reported, however, as a general guide we recommend storage in DMSO at -20°C. Aliquot into working volumes to avoid repeated freeze-thaw cycles. The effect of storage of stock solution on compound performance should be tested for each application.

For use as a cell culture supplement, stock solution should be diluted into culture medium immediately before use. Avoid final DMSO concentration above 0.1% due to potential cell toxicity.

## Published Applications

### CELL LINE DEVELOPMENT

· Used as the regulator for inducible gene expression in lentiviral infection and transgenic mouse models using the Tet-On or Tet-Off systems (Brambrink et al.; Carey et al.; Haenebalcke et al.; Hanna et al.; Hockemeyer et al.; Maherali et al.; Markoulaki et al.; Stadtfeld et al. 2008, 2010; Wernig et al.).

## References

- Brambrink T et al. (2008) Sequential expression of pluripotency markers during direct reprogramming of mouse somatic cells. *Cell Stem Cell* 2(2): 151–9.
- Carey BW et al. (2010) Single-gene transgenic mouse strains for reprogramming adult somatic cells. *Nat Methods* 7(1): 56–9.
- Gould DJ et al. (2000) A novel doxycycline inducible autoregulatory plasmid which displays “on”/“off” regulation suited to gene therapy applications. *Gene Ther* 7(24): 2061–70.
- Griffin MO et al. (2011) Tetracycline compounds with non-antimicrobial organ protective properties: possible mechanisms of action. *Pharmacol Res* 63(2): 102–7.
- Haenebalcke L et al. (2013) The ROSA26-iPSC mouse: a conditional, inducible, and exchangeable resource for studying cellular (De)differentiation. *Cell Rep* 3(2): 335–41.
- Hanna J et al. (2008) Direct reprogramming of terminally differentiated mature B lymphocytes to pluripotency. *Cell* 133(2): 250–64.
- Hicks CW et al. (2012) An overview of anthrax infection including the recently identified form of disease in injection drug users. *Intensive Care Med* 38(7): 1092–104.
- Hockemeyer D et al. (2008) A drug-inducible system for direct reprogramming of human somatic cells to pluripotency. *Cell Stem Cell* 3(3): 346–53.
- Li Z et al. (2013) Simple piggyBac transposon-based mammalian cell expression system for inducible protein production. *Proc Natl Acad Sci U S A* 110(13): 5004–9.
- Maherali N et al. (2008) A high-efficiency system for the generation and study of human induced pluripotent stem cells. *Cell Stem Cell* 3(3): 340–5.
- Markoulaki S et al. (2009) Transgenic mice with defined combinations of drug-inducible reprogramming factors. *Nat Biotechnol* 27(2): 169–71.
- Nau R et al. (2009) Lyme disease--current state of knowledge. *Dtsch Arztebl Int* 106(5): 72–81; quiz 82, I.
- Smith GN et al. (1999) Specificity of inhibition of matrix metalloproteinase activity by doxycycline: relationship to structure of the enzyme. *Arthritis Rheum* 42(6): 1140–6.
- Solis García del Pozo J & Solera J. (2012) Systematic review and meta-analysis of randomized clinical trials in the treatment of human brucellosis. *PLoS One* 7(2): e32090.
- Stadtfeld M et al. (2010) A reprogrammable mouse strain from gene-targeted embryonic stem cells. *Nat Methods* 7(1): 53–5.
- Stadtfeld M et al. (2008) Defining molecular cornerstones during fibroblast to iPS cell reprogramming in mouse. *Cell Stem Cell* 2(3): 230–40.
- Steinhardt LC et al. (2011) Review: Malaria chemoprophylaxis for travelers to Latin America. *Am J Trop Med Hyg* 85(6): 1015–24.
- Wernig M et al. (2008) A drug-inducible transgenic system for direct reprogramming of multiple somatic cell types. *Nat Biotechnol* 26(8): 916–24.

## Related Small Molecules

For a complete list of small molecules available from STEMCELL Technologies, please visit our website at [www.stemcell.com/smallmolecules](http://www.stemcell.com/smallmolecules) or contact us at [techsupport@stemcell.com](mailto:techsupport@stemcell.com).

This product is hazardous. Please refer to the Safety Data Sheet (SDS).

STEMCELL TECHNOLOGIES INC.'S QUALITY MANAGEMENT SYSTEM IS CERTIFIED TO ISO 13485. PRODUCTS ARE FOR RESEARCH USE ONLY AND NOT INTENDED FOR HUMAN OR ANIMAL DIAGNOSTIC OR THERAPEUTIC USES UNLESS OTHERWISE STATED.

Copyright © 2015 by STEMCELL Technologies Inc. All rights reserved including graphics and images. STEMCELL Technologies & Design, STEMCELL Shield Design and Scientists Helping Scientists are trademarks of STEMCELL Technologies Inc. While STEMCELL has made all reasonable efforts to ensure that the information provided by STEMCELL and its suppliers is correct, it makes no warranties or representations as to the accuracy or completeness of such information.