Revision 1

Store at -20C

Thapsigargin

#12758

1 mg

Cell Signaling TECHNOLOGY®

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Background

Thapsigargin is a cell-permeable sesquiterpene lactone derived from the plant *Thapsia garganica* that acts as a tumor promoter in mammalian cells (1,2). Studies show that thapsagargin causes a rapid increase in cytosolic Ca^{2+} concentrations via discharge of intracellular Ca^{2+} stores. Research indicates that this increase in cytosolic calcium results from the specific inhibition of endoplasmic reticulum Ca^{2+}-ATPases (IC_{50} = ~30 nM), and does not involve the hydrolysis of inositol phospholipids or protein kinase C (1,2). This disruption of calcium homeostasis is widely used in research studies to induce ER stress. Conflicting information regarding the role of thapsigargin in autophagy has been reported, but recent evidence points to thapsigargin inhibiting autophagy by blocking autophagosome fusion with lysosomes (3-5).

Molecular Formula

$C_{34}H_{50}O_{12}$

Molecular Weight

650.8 g/mol

Purity

>98%

CAS

67526-95-8

Solubility

Soluble in DMSO at 65mg/ml and EtOH at 20mg/ml.

Storage

Store lyophilized or in solution at -20ºC, dessicated. Protect from light. In lyophilized form, the chemical is stable for 24 months. Once reconstituted, chemical is stable for 1 week when stored at -20C. Aliquot to avoid multiple freeze/thaw cycles.

Directions for Use

Thapsigargin is supplied as a lyophilized powder. For a 1.25 mM stock, reconstitute the 1 mg in 1.23 ml DMSO. Working concentrations and length of treatments vary depending on the desired effect, but it is typically used at 2-2000 nM for 0.5-24 hours.

Background References

1. Jackson, T.R. et al. (1988) *Biochem J* 253, 81-6.
2. Thastrup, O. et al. (1990) *Proc Natl Acad Sci U S A* 87, 2466-70.
3. Ding, W.X. et al. (2007) *J Biol Chem* 282, 4702-10.
4. Grotemeier, A. et al. (2010) *Cell Signal* 22, 914-25.
5. Ganley, I.G. et al. (2011) *Mol Cell* 42, 731-43.

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