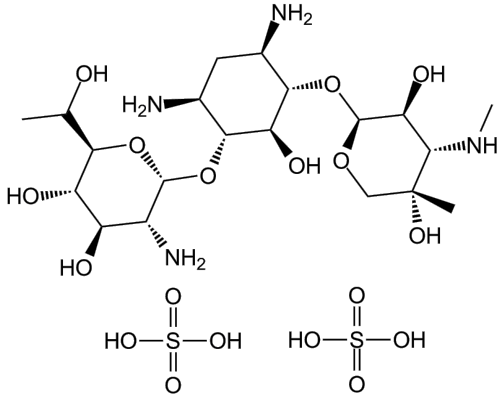
Product Data Sheet

Product Name: Geneticin, G-418 Sulfate
Cat. No.: GC17427

Chemical Properties

Cas. No.	108321-42-2		
Chemical Name	2-[4,6-diamino-3-[3-amino-4,5-dihydroxy-6-(1-hydroxyethyl)oxan-2-yl]oxy-2-hydroxycyclohexyl]oxy-5-methyl-4-(methylamino)oxane-3,5-diol;sulfuric acid		
SMILES	CC(C1C(C(C(C(O1)OC2C(CC(C(C2O)OC3C(C(C(CO3)(C)O)NC)O)N)N)N)O)O)O.OS(=O)(=O)O.OS(=O)(=O)O		
Formula	$C_{20}H_{40}N_4O_{10}.2H_2SO_4$	M.Wt	692.71
Solubility	≥ 240.4 mg/ml in Water	Storage	Store at -20°C, stored under nitrogen
General tips	For obtaining a higher solubility , please warm the tube at 37 ℃ and shake it in the ultrasonic bath for a while.Stock solution can be stored below -20℃ for several months.		
Shipping Condition	Evaluation sample solution : ship with blue ice All other available size: ship with RT , or blue ice upon request.		

Structure



Protocol

Cell experiment [1]:

Cell lines	Sheep skin fibroblasts, SSFs

Tel: (909) 407-4943 Fax: (626) 353-8530 E-mail: tech@glpbio.com
Address: 10292 Central Ave. #205, Montclair, CA, USA

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Preparation Method	The SSFs cultured in vitro were treated with different concentrations of single antibiotic Geneticin, G-418 Sulfate. After 12 days of treatment, the SSFs were digested, and the number of dead and alive cells was counted after placental blue staining to determine the lowest lethal dose of Geneticin, G-418 Sulfate leading to the death of all SSFs.
Reaction Conditions	100-200ug/ml Geneticin, G-418 Sulfate for 1 day
Applications	Treatment with 100 μg/mL Geneticin, G-418 Sulfate for 12 days did not lead to the death of all SSFs, but still (44.7 0.05)% of SSFs survived.Continuous treatment with 200 μg/mL Geneticin, G-418 Sulfate for 12 days can lead to the death of all SSFs. Therefore, the minimum lethal concentration of Geneticin, G-418 Sulfate leading to the death of SSFs is 200 μg/mL.

References:

[1]: Wu Xian, JING Qian-ge, et,al.Study on the resistance of sheep skin fibroblasts to G418 and Blasticidin S [J].Genomics and applied biology,2019,38(03):1006-1011.

Background

Geneticin, G-418 Sulfate is a class of aminoglycoside antibiotics, whose structure is similar to neomycin kanamycin. It can interfere with the function of 80S ribosomes in

eukaryotic cells, thereby blocking protein synthesis and leading to eukaryotic cell death[1,4]. Geneticin, G-418 Sulfate from 1 to 300?μg/ml is often used for clonal selection in prokaryotes and eukaryotes. Antibiotic resistance assay of clinically isolated bacterial strains found that all strains carrying 3' -o-aminoglycoside phosphotransferases were tolerant to Geneticin, G-418 Sulfate [2].

Treatment with 100 μg/mL Geneticin, G-418 Sulfate for 12 days did not lead to the death of all SSFs, but still 44.7% of SSFs survived. Continuous treatment with 200 μg/mL Geneticin, G-418 Sulfate for 12 days can lead to the death of all SSFs. Therefore, the minimum lethal concentration of Geneticin, G-418 Sulfate leading to the death of SSFs is 200 μg/mL[5]. Geneticin, G-418 Sulfate has antiviral activity against bovine viral diarrhea virus (BVDV). Geneticin, G-418 Sulfate can prevent cytopaplasia effect (CPE) caused by DENV-2 infection of BHK cells in a dose-dependent manner, with an EC50 value of 3μg/ml[3].

In vivo, Geneticin, G-418 Sulfate destabilizes mRNAs broadly, in that the majority of mRNAs in mESCs have reduced stability when mESCs are treated with Geneticin, G-418 Sulfate. The mRNAs with half-lives that are most reduced by treatment with Geneticin, G-418 Sulfate are enriched for select optimal codons, containing G/C at the wobble position[7].The expression of antioxidant stress kinase-related genes and apoptotic genes in donor cells treated with different concentrations of Geneticin, G-418 Sulfate significantly changed, but the DNA methylation level did not change.The in vitro development efficiency of nuclear transfer embryos from Geneticin, G-418 Sulfate-treated donor cells was significantly lower than that of controls[6].

References:
[1]: Bar-Nun S, Shneyour Y, et,al. G-418, an elongation inhibitor of 80 S ribosomes. Biochim Biophys Acta. 1983 Oct 13;741(1):123-7. doi: 10.1016/0167-4781(83)90018-0. PMID: 6193810.
[2]: Davies J, Jimenez A. A new selective agent for eukaryotic cloning vectors. Am J Trop Med Hyg. 1980 Sep;29(5 Suppl):1089-92. doi: 10.4269/ajtmh.1980.29.1089. PMID: 7001938.
[3]: Zhang XG, Mason PW, et,al. Antiviral activity of geneticin against dengue virus. Antiviral Res. 2009 Jul;83(1):21-7. doi: 10.1016/j.antiviral.2009.02.204. Epub 2009 Mar 11. PMID: 19501253; PMCID: PMC2694137.

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[4]: Chen B., Shi X.Y., et,al. 2012, Cytoplasm vacuolization of fibroblasts during purification of Schwann cells by geneticin (G418): An optical microscope observation and analysis, Zhongguo Zhuzhi Gongcheng Yanjiu (Journal of Clinical Rehabilitative Tissue Engineering Research), 16 (14): 2593-2596
[5]: Wu Xian, JING Qian-ge, et,al. Study on the resistance of sheep skin fibroblasts to G418 and Blasticidin S [J].Genomics and applied biology,2019,38(03):1006-1011.
[6]: Li Jia-qi, Li Zi-Cong, et,al. Effects of G418 treatment on development efficiency of porcine cloned embryos in vitro [J]. Journal of south China agricultural university,2016,37(05):13-18.
[7]: Durmaz YT, Shatadal A, et,al. Geneticin reduces mRNA stability. PLoS One. 2022 Jul 28;17(7):e0272058. doi: 10.1371/journal.pone.0272058. PMID: 35901009; PMCID: PMC9333311.

Tel: (909) 407-4943 Fax: (626) 353-8530 E-mail: tech@glpbio.com
Address: 10292 Central Ave. #205, Montclair, CA, USA