

Product Information

Valinomycin Ready Made Solution

Catalog Number **V3639**
Storage Temperature 2–8 °C

CAS RN 2001-95-8
Synonym: Cyclo(L-Val-D-Hylva-D-Val-L-Lac-)₃
Hylva = α -hydroxyisovaleric acid, Lac = lactic acid

Product Description

Molecular Formula: C₅₄H₉₀N₆O₁₈
Molecular Weight: 1111.32

Valinomycin is a cyclopeptide neutral ionophore synthesized by *Streptomyces fulvissimus*. It contains three repeats of the sequence: D-valine, L-lactate, L-valine, and D-hydroxyisovalerate. This ionophore is extremely selective for K⁺ and renders both artificial and biological membranes permeable to this cation.¹⁻⁵ The high affinity for potassium gives this compound utility as an antibiotic, an insecticide, a nematodicide, and an ionophore in K⁺-specific electrodes.⁶ Valinomycin is used as a research tool in various biochemical studies. It can induce K⁺ conductivity in cell membranes, uncouple oxidative phosphorylation, induce apoptosis,^{7,8} inhibit NGF-induced neuronal differentiation,⁹ and antagonizes endothelin-induced vasoconstriction.¹⁰

Valinomycin Ready Made Solution is provided as an ~1 mg/ml 0.2 μ filtered solution in DMSO. It is a ready-to-use solution, thus, reducing the risk of contact with this toxic compound.

Purity: \geq 90% (HPLC)

Precautions and Disclaimer

This product is for R&D use only, not for drug, household, or other uses. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.

Storage/Stability

The product ships on wet ice and storage at 2–8 °C is recommended. Purity and potency remain unchanged after 7 days at 50 °C.

References

1. Neupert-Laves, K., and Dobler M., The crystal structure of a K⁺ complex of valinomycin. *Helv. Chim. Acta*, **58**, 432-442 (1975).
2. Pressman, B.C., Biological applications of ionophores. *Annu. Rev. Biochem.*, **45**, 501-530 (1976).
3. Dua, W.L., et al., Molecular structure and mechanisms of action of cyclic and linear ion transport antibiotics. *Biopolymers*, **40**, 141-155 (1996).
4. Ahmed, S., and Booth, I.R., The use of valinomycin, nigericin and trichlorocarbanilide in control of the protonmotive force in *Escherichia coli* cells. *Biochem. J.*, **212**, 105-112 (1983).
5. Davidson, G.A., and Berma, M.C., Interaction of valinomycin and monovalent cations with the (Ca²⁺, Mg²⁺)-ATPase of skeletal muscle sarcoplasmic reticulum. *J. Biol. Chem.*, **260**, 7325-7329 (1985).
6. Moody, G.J., et al., Studies on bis(crown ether)-based ion-selective electrodes for the potentiometric determination of sodium and potassium in serum. *Analyst*, **114**, 15-20 (1989).
7. Inai, Y., et al., Valinomycin Induces apoptosis of ascites hepatoma cells (AH-130) in relation to mitochondrial membrane potential. *Cell Struct. Funct.*, **22**, 555-563 (1997).
8. Furlong, I.J., et al., Induction of apoptosis by valinomycin: mitochondrial permeability transition causes intracellular acidification. *Cell Death Differ.*, **5**, 214-221 (1998).
9. Harada, H., et al., K⁺ ionophores inhibit nerve growth factor-induced neuronal differentiation in rat adrenal pheochromocytoma PC12 cells. *Biochim. Biophys. Acta*, **1220**, 310-314 (1994).
10. Kim, S, et al., Comparison of effects of a potassium channel opener BRL34915, a specific potassium ionophore valinomycin and calcium channel blockers on endothelin-induced vascular contraction, *Biochem. Biophys. Res. Commun.*, **164**, 1003-1008 (1989).

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