

# Small Molecules

## Rapamycin

Antibiotic; mTOR pathway inhibitor;  
Inhibits FKBP-12

Catalog # 73362  
73364

1 mg  
10 mg



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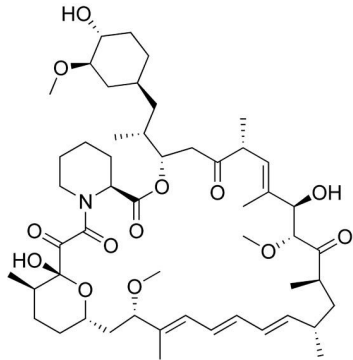
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## Product Description

Rapamycin is a macrolide antibiotic and immunosuppressive compound that inhibits mammalian target of rapamycin (mTOR) signaling. It acts through formation of a complex with cytosolic FK-binding protein 12 (FKBP-12), which directly binds to mTOR complex 1 (mTORC1). Its immunosuppressive effects are mediated through inhibition of IL-2 signaling that is critical for T-cell proliferation and activation (Gibbons et al.; Kay et al.). Rapamycin shows antifungal activity against *Candida albicans* and other fungi (Vézina et al.).

**Molecular Name:** Rapamycin  
**Alternative Names:** AY 22989, Cypher, NSC 226080, Sirolimus  
**CAS Number:** 53123-88-9  
**Chemical Formula:** C<sub>51</sub>H<sub>79</sub>NO<sub>13</sub>  
**Molecular Weight:** 914.2 g/mol  
**Purity:** ≥ 95%  
**Chemical Name:** (3S,6R,7E,9R,10R,12R,14S,15E,17E,19E,21S,23S,26R,27R,34aS)-9,10,12,13,14,21,22,23,24,25,26,27,32,33,34,34a-Hexadecahydro-9,27-dihydroxy-3-[(1R)-2-[(1S,3R,4R)-4-hydroxy-3-methoxycyclohexyl]-1-methylethyl]-10,21-dimethoxy-6,8,12,14,20,26-hexamethyl-23,27-ep

**Structure:**



## Properties

**Physical Appearance:** A crystalline solid  
**Storage:** Product stable at -20°C as supplied. Protect from prolonged exposure to light. For product expiry date, please contact techsupport@stemcell.com.  
**Solubility:** · DMSO ≤ 10 mM  
· Absolute ethanol ≤ 0.25 mM  
For example, to prepare a 5 mM stock solution in DMSO, resuspend 1 mg in 219 µL of DMSO.

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.

Compound has low solubility in aqueous media. 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

### CANCER

- Inhibits growth of MDA-MB-468 human breast cancer cells in vitro, and inhibits tumor growth in a mouse xenograft model in vivo (Akcakanat et al.).
- Induces autophagy in malignant glioma cells (Takeuchi et al.).

## References

- Akcakanat A et al. (2009) The rapamycin-regulated gene expression signature determines prognosis for breast cancer. *Mol Cancer* 8(1): 75.
- Gibbons et al. (2009) Mammalian target of rapamycin: Discovery of rapamycin reveals a signaling pathway important for normal and cancer cell growth. *Semin Oncol* 36(s3): s3-s17.
- Kay JE et al. (1991) Inhibition of T and B lymphocyte proliferation by rapamycin. *Immunology* 72(4): 544–9.
- Takeuchi H et al. (2005) Synergistic augmentation of rapamycin-induced autophagy in malignant glioma cells by phosphatidylinositol 3-kinase/protein kinase B inhibitors. *Cancer Res* 65(8): 3336–46.
- Vézina C et al. (1975) Rapamycin (AY-22,989), a new antifungal antibiotic. I. Taxonomy of the producing streptomycete and isolation of the active principle. *J Antibiot (Tokyo)* 28(10): 721–726.

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