### Chemical Properties

**Product Name:** Actinomycin D  
**Cas No.:** 50-76-0  
**M.Wt:** 1255.43  
**Formula:** C62H86N12O16  
**Synonyms:** ActD  
**Chemical Name:** 2-amino-4,6-dimethyl-3-oxo-1-N,9-N-bis[7,11,14-trimethyl-2,5,9,12,15-pentaoxo-3,10-di(propan-2-yl)-8-oxa-1,4,11,14-tetrazabicyclo[14.3.0]nonadecan-6-yl]phenoxazine-1,9-dicarboxamide  
**Canonical SMILES:** `CC1C(C(=O)NC(C(=O)N2CCCC2C(=O)N(CC(=O)N(C(C(=O)O1)C(C)C)C)C(C)C)NC(=O)C3=C4C(C=C3C)OC5=C(C(=O)C(=C(C5=N4)C(=O)N6C(OC(=O)C(N(C(=O)CN(C(=O)C7CCCN7C(=O)C(NC6=O)C(C)C)C)C(C)C)N)C

**Solubility:**  
≥62.75 mg/mL in DMSO, <6.33 mg/mL in EtOH, <6.28 mg/mL in H2O  
**Storage:** Desiccate at 4°C  
**General tips:** For obtaining a higher solubility, please warm the tube at 37°C and shake it in the ultrasonic bath for a while. Stock solution can be stored below -20°C for several months.  
**Shopping Condition:** Evaluation sample solution: ship with blue ice  
All other available size: ship with RT, or blue ice upon request

### Biological Activity

**Targets:** Apoptosis  
**Pathways:** Apoptosis Inducers  
**Description:** IC50: Actinomycin D showed a concentration-dependent decrease of DNA repair activity with the
IC50 of 0.42 μM [1].

Actinomycin D (dactinomycin), a member of actinomycines, which are a class of polypeptide antibiotics isolated from soil bacteria of the genus Streptomyces. Have been used for many years as an older chemotherapy, actinomycin D binds to double- and single-stranded DNA to inhibit DNA and RNA synthesis by binding DNA at the transcription initiation complex and preventing elongation of RNA chain by RNA polymerase.

In vitro: A previous study was designed to determine the effects of actinomycin D on leptin release by isolated rat adipocytes during primary culture for 24 hr. Results showed that both actinomycin D and dexamethasone reduced the loss of leptin mRNA seen over the 24-hr incubation. Maximal effects on leptin release and leptin mRNA accumulation required only 0.1 μM of actinomycin D, a concentration that had no significant effect on the 18S RNA content of adipocytes at the end of a 24-hr incubation. In contrast to the reduced loss of leptin mRNA seen at 24 hr, the loss of glyceraldehyde-3-phosphate dehydrogenase messenger ribonucleic acid (GAPDH mRNA) was enhanced in the presence of 0.1 μM of actinomycin D. These results demonstrated a unique regulation of leptin release and leptin mRNA levels by actinomycin D [2].

In vivo: A rat in vivo study showed that the effect of actinomycin D on the time course of the population spike potentiation was more pronounced than the effect on the time course of the EPSP component, suggesting different mechanisms for the two forms of potentiation. Moreover, both intrahippocampal and intracerebroventricular injection of actinomycin D prevented a late stage of LTP in the dentate gyrus in vivo measured as the population spike amplitude [3].

Clinical trial: Actinomycin is intravenously administered and most commonly used in the treatment of a variety of cancers, including gestational trophoblastic neoplasia, wilms' tumor, rhabdomyosarcoma, ewing's sarcoma and malignant hydatidiform mole. Combined with other drugs in chemotherapy regimens, such as the VAC regimen, it will be used for treating rhabdomyosarcoma and Ewing's Sarcoma. In addition, it is also used as a radiosensitizer in adjunct to radiotherapies, as it increases the tumor cells radiosensitivity.

Reference:

Protocol

Cell experiment:

Cell lines
Rat adipocytes

Preparation method
The solubility of this compound in DMSO is &gt; 10 mM. General tips for obtaining a higher concentration: Please warm the tube at 37 °C for 10 minutes and/or shake it in the ultrasonic bath for a
Reacting conditions: 0, 0.1, 1 or 10 μM; 24 hrs

Applications: Actinomycin D reduced the loss of leptin mRNA accumulation over the 24-hr incubation, exhibiting maximal inhibition at the concentration of 0.1 μM.

Animal experiment [3]:

Animal models: Wistar rats

Dosage form: 6 μg/μL; intrahippocampally or intracerebroventricularly

Applications: Both intrahippocampal and intracerebroventricular injection of Actinomycin D prevented a late stage of LTP in the dentate gyrus in vivo.

Other notes: Please test the solubility of all compounds indoor, and the actual solubility may slightly differ with the theoretical value. This is caused by an experimental system error and it is normal.

Reference:


Product Citations


5. WEICHENG PAN, JINHUI PANG, et al. "RNA binding protein HuR promotes osteosarcoma cell
progression via suppressing the miR-142-3p/HMGA1 axis." ONCOLOGY LETTERS. 2018 May 31.

Caution

FOR RESEARCH PURPOSES ONLY.

NOT FOR HUMAN, VETERINARY DIAGNOSTIC OR THERAPEUTIC USE.

Specific storage and handling information for each product is indicated on the product datasheet. Most ApexBio products are stable under the recommended conditions. Products are sometimes shipped at a temperature that differs from the recommended storage temperature. Shortterm storage of many products are stable in the short-term at temperatures that differ from that required for long-term storage. We ensure that the product is shipped under conditions that will maintain the quality of the reagents. Upon receipt of the product, follow the storage recommendations on the product data sheet.