Cyrusbioscience

Actinomycin D

Product No.: 101-50-76-0

Product Description

Actinomycin D is an antineoplastic antibiotic that inhibits cell proliferation. It is a cytotoxic inducer of apoptosis against tumor cells. The compound inhibits the proliferation of cells in a nonspecific way by forming a stable complex with double-stranded DNA (via deoxyguanosine residues), thus inhibiting DNA-primed RNA synthesis. It also causes single-strand breaks in DNA.

Actinomycin D has been shown to be an inhibitor of the minus-strand transfer step in reverse transcription and therefore is used in studying and suppressing HIV-replication. It has also been shown to suppress programmed cell death of PC12 cells induced by etoposide, an inhibitor of topoisomerase II. It is used in cell culture as a selection agent. Actinomycin D binding to yeast in ribosomal RNA has been studied. The sensitivity of various strains of E.coli to Actinomycin D and the mechanism of binding has been studied. The structure was determined by atomic structure and amino acid sequence.

Actinomycin D is an antibiotic used for its antineoplastic properties in the treatment of various malignant neoplasms including Wilm's tumor, and the sarcomas. Adverse effects include bone marrow depression and gastrointestinal toxicity; it is extremely irritating and extravasation produces severe tissue damage.

Preparation Instructions

Actinomycin D is sold as red shiny crystals and in solution it is a clear liquid. We test solubility in acetonitrile or acetone at 10 mg/mL. It is soluble in DMSO at a minimum of 1 mg/mL. Several references claim slight solubility in water (about 0.5 mg/mL). Recommended working concentration: 1μg/ml in DMSO.

Prevents RNA transcription by binding DNA at transcription initiation sites. Actinomycin D intercalates into DNA and thereby inhibits the transcription. It binds preferentially to guanine and blocks the RNA polymerase during the elongation step. A high dose (2 μg/ml ≡ 1.59 μM) inhibits the transcription of all RNA species, lower concentrations (40 ng/ml ≡ 32 nM) inhibit the synthesis of rRNA. At very high concentrations (30 μM) the activity of the HIV-1 reverse transcriptase, Klenow fragment or Vent polymerase are inhibited. In case of single-stranded DNA, Actinomycin D binds to guanine nucleotides and the GpC motive, respectively. A concentration of 5 μg/ml (3.97 μM) is sufficient to induce the apoptosis in a human leukemia cell line. The activity of actinomycin D is not restricted to the binding to double- or single-stranded DNA. A competitive inhibition of the bacterial serine protease subtilisin DY, proteinase K and thermitase has been shown.

Storage/Stability

The powder is hygroscopic and sensitive to light. When stored sealed and protected from light and moisture, at 2-8 °C, Actinomycin D remains unchanged (as tested by HPLC) for at least 15 months.

Dilute solutions of Actinomycin D are very sensitive to light. This product tends to adsorb to plastic and glass on standing in solution. For these reasons, unused dilute solutions should be discarded and not stored for further use. However, frozen aliquots of a concentrated stock solution are expected to be stable for at least a month at –20 °C.