
Product Data Sheet

Product Name: ddGTP
Cat. No.: GB20018

Chemical Properties

Cas. No.

Formula $C_{10}H_{16}N_5O_{12}P_3$ (free acid) M.Wt 491.1 (free acid)

Solubility Storage Store at -20°C or below

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.

Shipping Condition Evaluation sample solution : ship with blue ice All other available size: ship with RT, or blue ice upon request.

Structure

Background

ddGTP (2', 3'-Dideoxyguanosine 5'-triphosphate) is a dideoxynucleotide used as a chain terminator in DNA sequencing^[1]. Unlike dGTP, ddGTP lacks hydroxyl groups at both the 2' and 3' positions of the ribose moiety. This structural feature prevents the formation of a 3', 5'-phosphodiester bond after being incorporated by polymerase into a growing DNA strand, resulting in termination of DNA synthesis^[2]. ddGTP is commonly employed in cycle sequencing, enzymatic mechanism studies, and the generation of RNA or DNA sequences that cannot be extended by polymerases or ligated by DNA ligases^[3].

In vitro, ddGTP ($\square 1\mu M$) strongly inhibits DNA polymerase α activity in the presence of Mn^{2+} by competing with the natural substrate dGTP for the enzyme's binding site, exhibiting an inhibition constant (K_i) of $0.035\mu M$ ^[4]. ddGTP effectively inhibits the reverse transcriptase of human and simian immunodeficiency viruses (HIV and SIV), with K_i values of $0.009\mu M$ and $0.011\mu M$, respectively^[5]. Following incubation with TS30- and TS60-modified biosensors and Jurkat T cells for 3h in the presence of 0.2mM ddGTP, a subsequent 1h incubation in $10\mu M$ thiazole orange (TO) solution was performed. The mean fluorescence intensity (MFI) of the ddGTP-treated sensors (MFI=157) was

Caution: Product has not been fully validated for medical applications. For research use only.

Tel: (909) 407-4943 Fax: (626) 353-8530 E-mail: tech@glpbio.com

Address: 10292 Central Ave. #205, Montclair, CA, USA

Product Data Sheet

significantly lower than that of the positive control group (MFI=261)^[6]. Starch-TEPA/ddGTP complex (containing 1mg/mL starch-TEPA and 0.3mg/mL ddGTP) incubated with A549 cells at 37°C for 4h exhibited high biological activity (99%), significantly surpassing the cell-killing effect of free ddGTP^[7].

References:

- [1] SANGER F, NICKLEN S, COULSON A R. DNA sequencing with chain-terminating inhibitors[J]. Proceedings of the National Academy of Sciences, 1977, 74(12): 5463-5467.
- [2] ALPHEY L. Chain Termination (Sanger Dideoxy) Method[M]// DNA Sequencing. New York: Garland Science, 2023: 15-25.
- [3] EREN K, TAKTAKOĞLU N, PIRIM I. DNA sequencing methods: from past to present[J]. The Eurasian Journal of Medicine, 2022, 54(Suppl 1): S47.
- [4] ONO K, NAKANE H. Utilization of 2', 3'-dideoxyguanosine 5'-triphosphate as an inhibitor and substrate for DNA polymerase α [J]. Biomedicine & Pharmacotherapy, 1990, 44(2): 115-121.
- [5] WU J C, CHERNOW M, BOEHME R E, et al. Kinetics and inhibition of reverse transcriptase from human and simian immunodeficiency viruses[J]. Antimicrobial Agents and Chemotherapy, 1988, 32(12): 1887-1890.
- [6] DÍAZ-CARTAGENA D C, HERNÁNDEZ-CANCEL G, BRACHO-RINCÓN D P, et al. Label-free telomerase activity detection via electrochemical impedance spectroscopy[J]. ACS Omega, 2019, 4(16): 16724-16732.
- [7] KANBER E, YAMADA H, LORETZ B, et al. Design of polyamine-grafted starches for nucleotide analogue delivery: in vitro evaluation of the anticancer activity[J]. Bioconjugate Chemistry, 2016, 27(10): 2431-2440.

Caution: Product has not been fully validated for medical applications. For research use only.

Tel: (909) 407-4943 Fax: (626) 353-8530 E-mail: tech@glpbio.com

Address: 10292 Central Ave. #205, Montclair, CA, USA