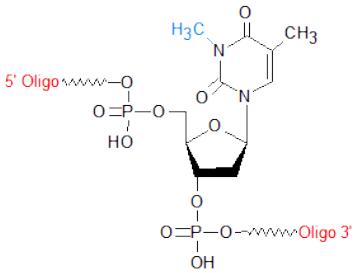
N3-Methyl dT [m3dT]

Category	Structural Studies
Modification Code	m3dT
Reference Catalog Number	26-6558
5 Prime	Y
3 Prime	Y
Internal	Y
Molecular Weight(mw)	357.26



N3-Methyl-Thymidine
[26-6558-XX]

N3-Methyl-deoxythymidine (N3-Me-dT) is classified as an N-alkyl pyrimidine. When incorporated into an oligonucleotide, the N3-methyl group dramatically lowers hydrogen bonding to complementary adenosine bases (1). N3-Me-dT-modified oligonucleotides are primarily used in studies of the effect of the N3-methyl group on binding of antisense oligos to their mRNA targets, in enzyme-nucleic acid binding studies, and in studies into possible enzymatic mechanisms involved in repair of DNA alkylation or UV-based DNA damage. An N3-Me-dT-modified phosphorothiolated antisense oligo was used as a control to confirm that the observed downregulation of HIV-1 viral expression by a phosphorothiolated antisense oligo target to the HIV-1 rev gene was sequence-specific (2). N3-Me-dT-modified oligos were used to better understand how two highly similar mRNA binding proteins, the general splicing factor U2AF and the splicing repressor SXL, differentially recognize the polypyrimidine tract adjacent to 3'-splice sites (3). N3-Me-dT-modified oligos have also been used to better understand the mechanism by which yeast polymerase nu is able to efficiently bypass, in an highly error-free manner, both cis-syn thymine dimers and N3-Me-dT modified bases (4). **References**

1. Kyogoku, Y., Lord, R.C., Rich, A. The Effect of Substituents on the Hydrogen Bonding of Adenine and Uracil Derivatives.*Proc. Natl. Acad. Sci. (USA)* (1967), **57**: 250-257.
2. Matsukura, M., Zon, G., Shinozuka, K., Robert-Guroff, M., Shimada, T., Stein, C.A., Mitsuya, H., Wong-Staal, F., Cohen, J.S., Broder, S. Regulation of viral expression of human immunodeficiency virus in vitro by an antisense phosphorothioate oligodeoxynucleotide against rev (art/trs) in chronically infected cells. *Proc. Natl. Acad. Sci. (USA)* (1989), **86**: 4244-4248.
3. Singh, R., Banerjee, H., Green, M.R. Differential regulation of the polypyrimidine-tract by the general splicing factor U2AF65 and the splicing repressor sex-lethal.*RNA* (2000), **6**: 901-911.
4. Sun, L., Zhang, K., Zhou, L., Hohler, P., Kool, E.T., Yuan, F., Zhigang, W., Taylor, J.S. Yeast Pol nu Holds a Cis-Syn Thymine Dimer Loosely in the Active Site during Elongation Opposite the 3'-T of the Dimer, but Tightly Opposite the 5'-T.*Biochemistry* (2003), **42**: 9431-9437.