N1-Methyl dA (m1 dA)

Category: Structural Studies
Modification Code: m1 dA
Reference Catalog Number: 26-6559
5' Prime: Y
3' Prime: Y
Internal: Y
Molecular Weight (mw): 328.24

N1-Methyl-deoxyadenosine (N1-Me-dA, m1 dA) is a methylated nucleoside base, and is primarily used in the study of DNA damage and repair mechanisms related to alkylation damage. The N1-Me-dA lesion is primarily generated by SN2 alkylating reagents such as methyl methanesulfonate and dimethylsulfate, which react with the N1 position of adenine (1). In cells, N1-methyl-dA acts as a lethal DNA replication block, but it is not very mutagenic (1% A to T transversion in E. coli), and is repaired by the enzyme AlkB by direct reversal (2,3). Because the N1 position of adenine is involved in hydrogen bonding of A: T Watson-Crick base pairing, methylation of this site was expected to disrupt hydrogen bonding. However, NMR analysis revealed that N1-methylation actually alters the A:T base-pairing interactions from Watson-Crick to (syn)N1-methyl-A: (anti)T Hoogsteen, thus providing insight into why AlkB repair of N1-Methyl-dA lesions is 10X more efficient on ssDNA over dsDNA (4).

References