Synthesis and Anti-human Immunodeficiency Virus Type 1 (HIV-1) Activity of 3-Substituted Derivatives of 3'-Azido-3'-deoxythymidine (AZT), and Inhibition of HIV-1 Reverse Transcriptase by Their 5'-Phosphates.

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Various 3-substituted 3'-azido-3'-deoxythymidine analogs were prepared by the reaction of 3'-azido-3'-deoxythymidine (AZT) with N,N'-dimethylformamide dialkylacetals or alkyl bromides in the presence of base and their activities against human-immunodeficiency virus type-1 (HIV-1) were evaluated. The corresponding 5'-triphosphate analogs were also synthesized in order to examine inhibition of HIV-1 reverse transcriptase activity. Among the compounds obtained, 3'-allyl-AZT was the most active against HIV-1 replication in the MT-4 cells in vitro with an EC_{50} value of 0.9 \mu M.

The Dimroth Rearrangement of 6-Aminouracil Derivatives.

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The reaction of 6-amino-5-formyl (or acetyl) uracils possessing a phenyl group at the 1-position with caustic alkali resulted in Dimroth rearrangement to give 6'-anilino-5-formyl (or acetyl) uracils. This is the first example of Dimroth rearrangement observed in the uracil ring system. The presence of both the N1-phenyl group and the 5-formyl (or acetyl) group on the uracil ring is requisite for the occurrence of the rearrangement.

Oxidative Cyclization of 2',3'-O-Isopropyldenedenosines into 5'-O,8-Cycloadenosines with Lead Tetraacetate : Remarkable Effect of N^6-Substituents of the Oxidation.

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Oxidation of 2',3'-O-isopropyldenedenosines with lead tetraacetate in dry benzene resulted in the formation of the corresponding 5'-O,8-cyclo-2',3'-O-isopropyldenedenosines, which has a new methodological implication for the chemical modification of adenosines. The occurrence of the oxidative cyclization was remarkably affected by the nature of N^6-substituents: N^6-benzoyl substitution prominently accelerated the oxidative cyclization in comparison with none and dimethyl substitutions. In the oxidation of N^6,N^6-dimethyladenosine, an intriguing oxidative demethylation was observed.