Facile Synthesis of Thymidine Derivatives by Cross-Coupling of 5-Halogenouridine Derivatives with Trimethylaluminum.

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An efficient method for the introduction of a methyl group in the 5-position of uracil derivatives is described. This method involves three steps: protection of 5-halogenouridines with hexamethyldisilazane, a palladium-catalyzed cross-coupling of the pertrimethylsilylated nucleosides with trimethylaluminum, and subsequent deprotection to afford the corresponding thymidine derivatives in high overall yields. This method was applied to synthesis of 5-(trans-1-octenyl)uridine by the reaction of 5-bromouridine with diisobutyl-trans-octenyluridine.

Distinct Solvent-dependence in the Photoreactions of Purine Nucleosides with Pyrimido[5,4-g]pteridinetetrone N-Oxide : Possible Generation of Hydroxyl Radical from the Excited N-Oxide in Alcohols.

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Photoreaction of 2',3',5'-tri-O-acetyladenosine (2) with pyrimido[5,4-g]pteridinetetrones N-Oxide (1) in acetonitrile gave N''-cyanoethylene-2',3',5'-tri-O-acetyladenosine via coupling of adenosyl radical with cyanomethyl radical generated by the mediation of 1. Under the analogous conditions, N''-benzoyl-2',3',5'-tri-O-acetylguanosine (3) underwent oxidative degradation of the guanine skeleton by 1. In sharp contrast, photoreaction of 2 and 3 with 1 in tert-butanol resulted in the formation of the corresponding 8-hydroxypurine nucleosides, respectively. These facts and other observations suggest that 1 could generate hydroxyl radical upon irradiation in alcohols.

Facile Generation of Hydroxyl Radical by Photolysis of Pyrimido[5,4-g]pteridinetetrone N-Oxides in Aqueous Solution. A New Efficient DNA-photocleaving Agent.

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Photolysis of 1,9-di-(methoxymethyl)-3,7-dimethylpyrimido[5,4-g]pteridine-2,4,6,8 (1H,3H,7H, 9H)-tetrones 5-oxide (1) in water with UV-VIS light (>355 nm) provides a convenient and efficient method for the clean generation of hydroxyl radicals, which are useful as DNA-cleaving agents. Synthesis of "O-labeled N-oxide (1) resulting in the generation of "O-labeled hydroxyl radical was achieved by using a 6-amino-5."O-labeled nitrosouracil derivative as starting material, prepared by the nitrosation of the corresponding 6-aminouracil derivative with nitrosonium tetrafluoroborate pretreated with "O-labeled water in dry acetonitrile.