New Nucleoside Derivatives for Hybridization-Assisted Catalysis of Site-Selective Acetylation of 2‘-OH of RNA

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Abstract

New nucleoside derivatives containing the imidazole (Imd), pyridine or pyrimidine catalytic group were designed for site-specific acetylation of 2’-OH of the RNA ribose moiety. When the RNA substrate was acetylated in the presence of acetic anhydride under alkaline conditions, Probe (Imd) containing the imidazole catalytic group acetylated with a high selectivity to the 2’-OH of the uridine opposite the catalytic nucleotide. Probe (Py-4N) containing the pyridine group showed a higher catalytic activity under neutral conditions with a high selectivity for the 2’-OH group of the 5’ side of the uridine opposite the catalytic nucleotide in about 80% modification yield within 10 min. This study has shown that the oligodeoxynucleotide incorporating the new nucleotide derivative with the catalytic group can be a useful tool for site-selective acetylation of RNA 2’-OH.