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One-pot synthesis of nucleotides and conjugates

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Given the importance of nucleotides and their derivatives in biological processes, numerous methods have been developed to access these compounds and their structural analogues. Their scope ranges from mechanistic probes to versatile chemical tools for assay development and biomedical applications. For example, nucleoside 5'-triphosphates are the cornerstone of genome analysis and medical diagnostics. Methods for the chemical synthesis of these derivatives are based either on P(III) or P(V) chemistry. Phosphoramidites, in general, and phosphorimidazolides in particular, have been extensively used as intermediates for pyrophosphate bond formation in anhydrous organic solvents. We have recently developed a one-pot approach, in a mixture of water-acetonitrile, to obtain nucleoside 5'-di- and 5'-triphosphates, dinucleoside 5',5'-polyphosphates as well as some nucleotide analogues modified either on the nucleoside or on the phosphate moieties. The attractive features of this strategy include absence of protecting groups on the starting material and convenient set-up (i.e., use of water, non-dry solvent and reagents, starting materials as their commercially available sodium or potassium salts). The experimental results demonstrated the applicability of the reported method for the synthesis of a variety of nucleotides.

Biography

Béatrice Roy has graduated in 1989 from the Ecole Européenne des Hautes Industries Chimiques de Strasbourg. In 1993, she was awarded a PhD in Organic Chemistry from the University Joseph Fourier (Grenoble, France), where she worked under the supervision of Professor Marc Fontecave on the design of new inhibitors of the ribonucleotide reductase. She pursued Post-doctoral studies first at the UJF and then at the University Paris Sud (Orsay, France). In 1997, she held a position of Assistant Professor in Professor G Lemaire's group at the University Paris Sud. In 2002, she joined the Professor C Périgaud's research group (Montpellier, France) and was appointed by the University of Montpellier in 2007. She was a Visiting Faculty Member in 2011 and 2012 at the University of Canterbury in Christchurch, New Zealand. Her research interests focus on the synthesis and analysis of nucleoside analogs and their poly-phosphorylated entities.

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