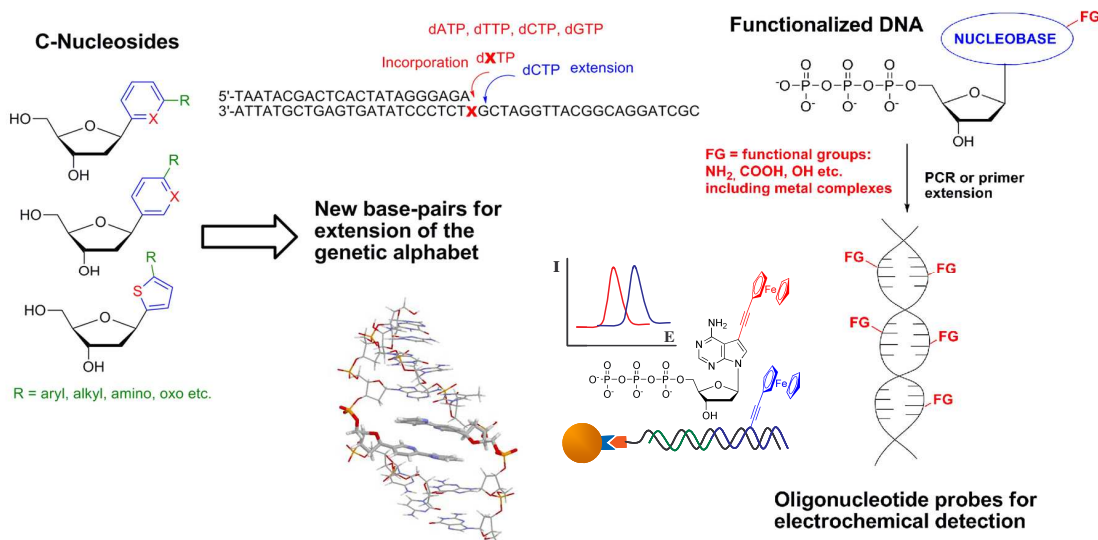


NOVEL MODIFIED NUCLEOSIDES, NUCLEOTIDES AND NUCLEIC ACIDS: SYNTHESIS, BIOLOGICAL ACTIVITY AND APPLICATIONS IN BIOCHEMISTRY, CHEMICAL BIOLOGY AND BIOANALYSIS

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Novel methodologies of synthesis of modified nucleobases, nucleosides, C-nucleosides, nucleotides and oligonucleotides have been developed largely using modern organometal-catalyzed reactions (cross-couplings, C-H activations, alkyne trimerizations etc.). An efficient two-step methodology of construction of functionalized nucleic acids was developed by a novel chemo-enzymatic approach using aqueous-phase cross-coupling reactions of nucleotides followed by incorporation by DNA polymerase. The methods are now applied in the synthesis of derivatives for biological activity screening and for the use in chemical biology or bioanalysis. Recent applications include the use of novel C-nucleosides in studying of specificity of DNA polymerases and in extension of the genetic alphabet and the use of functionalized oligonucleotide probes for electrochemical detection of DNA hybridization.



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