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Advanced RNA synthesis as a key tool in RNA biology research

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Conventional method of RNA synthesis by 3'→ 5' direction is now well established and currently in use for synthesis and development of vast variety of therapeutic grade RNA and si RNA etc. A number of such synthetic RNA requires a modification or labeling of 3'- end of an oligonucleotide. The synthesis of 3'- end modified RNA requires lipophilic, long chain ligands or chromophores, using 3'→5' synthesis methodology is challenging, requires corresponding solid support and generally results in low coupling efficiency and lower purity of the final oligonucleotide in general because of large amount of truncated sequences containing desired hydrophobic modification. We have approached this problem by developing reverse RNA monomer phosphoramidites for RNA synthesis in 5'→ 3'- direction. We demonstrated that a number of lipophilic modifications such as cholesterol, PEG-2000 and PEG 4500 can be introduced at 3'-end with high efficiency. Highly pure desired oligonucleotides have been isolated using reverse-phase HPLC purification. We developed novel solid support that along with reverse RNA and DNA synthesis technology offers convenient synthesis of 5'–adenylated oligonucleotides without any post-synthetic steps.

Biography

Andrei Laikhter graduated from Bioorganic Chemistry Department Moscow Institute of Fine Chemical Technology in 1982. He received his PhD degree in 1987 at the age of 27 years, from Zelinsky Institute of Organic Chemistry, Russian Academy of Sciences. He worked at University of Delaware in 1993 and University of Virginia 1994-1996. Since 1999 he worked at Integrated DNA Technology, Inc., he became the Vice President of chemistry research in 2004. From 2007 until beginning of 2014, he was working as Chief Scientific Officer at Chemgenes Corporation. Currently he is working as Chief Scientific Officer at Biosynthesis, Inc. Till now he has published over 40 papers and patents.

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