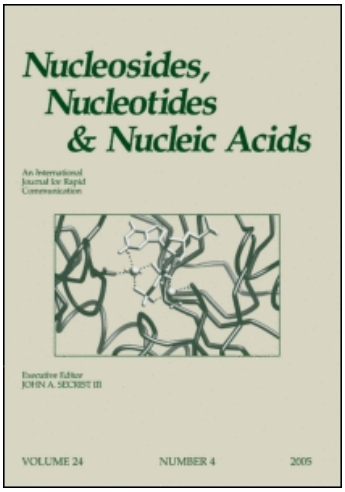

Nucleosides, Nucleotides and Nucleic Acids
Publication details, including instructions for authors and subscription information:
http://www.informaworld.com/smpp/title~content=t713597286

Visible Light Activatable Binary System of Oligonucleotide Conjugates for Nucleic Acids Modification

M. I. Dobrikov[a]; T. I. Gainutdinov[a]; V. V. Vlassov[a]
[a] Institute of Bioorganic Chemistry, Russian Academy of Sciences, Novosibirsk, Russia

To cite this Article Dobrikov, M. I. , Gainutdinov, T. I. and Vlassov, V. V.(1999) 'Visible Light Activatable Binary System of Oligonucleotide Conjugates for Nucleic Acids Modification', Nucleosides, Nucleotides and Nucleic Acids, 18: 6, 1517 — 1518
To link to this Article: DOI: 10.1080/07328319908044773
URL: http://dx.doi.org/10.1080/07328319908044773

NUCLEOSIDES & NUCLEOTIDES, 18(6&7), 1517–1518 (1999)

VISIBLE LIGHT ACTIVATABLE BINARY SYSTEM OF OLIGONUCLEOTIDE CONJUGATES FOR NUCLEIC ACIDS MODIFICATION

M. I. Dobrikov*, T. I. Gainutdinov, V. V. Vlassov.

Institute of Bioorganic Chemistry, Russian Academy of Sciences,
8, Lavrentiev Ave., Novosibirsk 630090, Russia.

ABSTRACT: A binary system of oligonucleotides conjugated to perfluoroarylazide and perylene for sequence-specific photomodification of nucleic acids has been developed. The system can be activated by visible light (450-580 nm), reacts 300000 times faster than azide in the absence of perylene and provides highly efficient (up to 99%) photomodification of target ssDNA.

Recently we have proposed [1, 2] an approach to superspecific photomodification of nucleic acids by binary systems of oligonucleotides conjugated to precursor groups capable of assembling into photoactivatable structure upon simultaneous binding of the conjugates to the target (FIG. 1). One of the groups is a sensitizer (S) which absorbs long wavelength light and transfers the absorbed energy to juxtaposed photoreagent (R), triggering crosslinks of the latter to the target nucleic acid. The advantage of the binary systems is their enhanced specificity which is determined by independent recognition of the target sequence by two oligonucleotides.

Here we describe a new binary system activatable by visible light with 3-perylenylmethylamine as a sensitizer and *p*-azidoperfluorobenzalhydrazone as a photoreagent.

The oligonucleotide conjugates were synthesized as described in [1].

It was found that the sensitized photomodification of a 25-mer ssDNA by the binary system occurs with very high yield - 98-99% and 300000 times faster than the direct photoreaction in the absence of the sensitizer (FIG. 2). The crosslinks are formed with

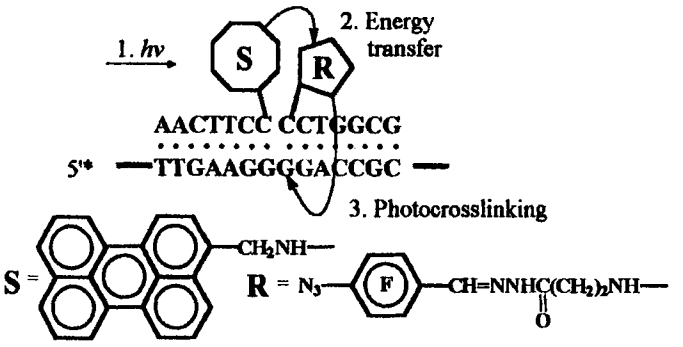

FIG. 1: The binary system of oligonucleotide conjugates and the target sequence.

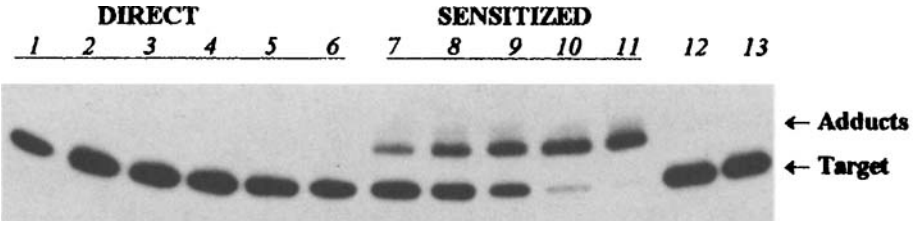

FIG. 2: Autoradiograph of a denaturing 13% PAAG. Photomodification of the 5'-^{32}P labeled ssDNA target shown in FIG. 1 by arylazide conjugate alone (direct reaction, lanes *1-6*) and by the binary system of conjugates (sensitized reaction, lanes *7-11*). The complexes were irradiated at 25°C by visible light (450-580 nm, W = 1 mWt·cm^{-2}). Concentrations of oligonucleotides were following: target - 1 μM, conjugates - 10 μM each. Lane *12* - target alone, lane *13* - target with the perylene conjugate. Irradiation time (min): *1, 12* - 0; *2, 7* - 0.1; *3, 8* -0.5; *4, 9* - 3; *5, 10* - 15; *6, 11, 13* - 75.

gua-nosine residues of the tetraguanylate sequence located within the conjugates binding site.

This work was supported by the Interscience grant of Siberian Division of RAS.

REFERENCES

1. Dobrikov, M. I.; Gaidamakov, S. A.; Koshkin, A. A.; Gainutdinov, T. I.; Luk'yan-chuk, N. P.; Shishkin, G. V.; Vlassov, V. V. *Russian J. Bioorgan. Chem.* **1996**, 22, 166-173.

2. Dobrikov, M. I.; Gaidamakov, S. A.; Gainutdinov, T. I.; Koshkin, A. A.; Vlassov, V. V. *Antisense Nucl. Acid Drug. Develop.* **1997**, 7, 309-317.