

Development of the chemical reactions for regulation of biological function

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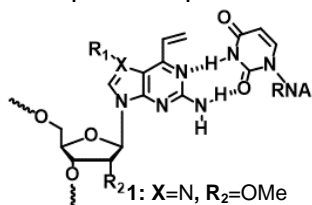
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The selective chemical reactions to biological molecules are very useful tools for controlling and elucidating the functions of biomolecules. In particular, selective chemical reactions on nucleic acids such as DNA and RNA have the potential to control the target gene expression. We have developed the selective alkylation to the target RNA with sequence selectively using the oligonucleotides containing the crosslinkable base (Fig.1).¹ We have also applied these reactive oligonucleotides to inhibit the miRNA function.² In addition, the higher-order structure of nucleic acids, especially RNA, has the important role for the control of gene expression and is one of the candidates for therapeutic targets. Due to the therapeutic potentials, efforts on the

development of small molecule binders to specifically target the higher-order structures of nucleic acids have been intensely carried out. The selective alkylation using small molecules targeting the higher-order structures of nucleic acids have also been pursued. However, most of the alkylating agents have drawbacks of their efficiency under physiological conditions. We have developed reactive OFF-ON type alkylating agents, vinyl-quinazolinone (VQ) precursors (Fig.2).³

In this presentation, we summarize the selective alkylation to the target RNA. In addition, we found the novel photo-cyclization to produce the N-hetero aromatic ring in cells⁴ and would like introduce about these results (Fig.3).



2: X=C, R₁= —≡ R₂=OMe
3: X=C, R₁= —≡ R₂=H

Fig. 1 The reactive oligonucleotides containing the crosslinkable base

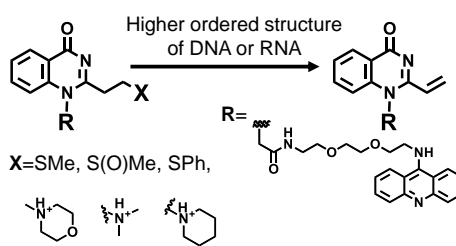


Fig. 2 The reactive OFF-ON type alkylating agents

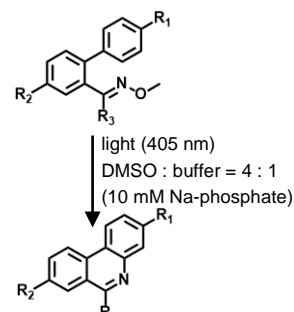


Fig.3 Novel Photo-cyclization

References

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