Developmentof photo-crosslinkable peptides containing 3-cyanovinylcarbazole-based amino acid

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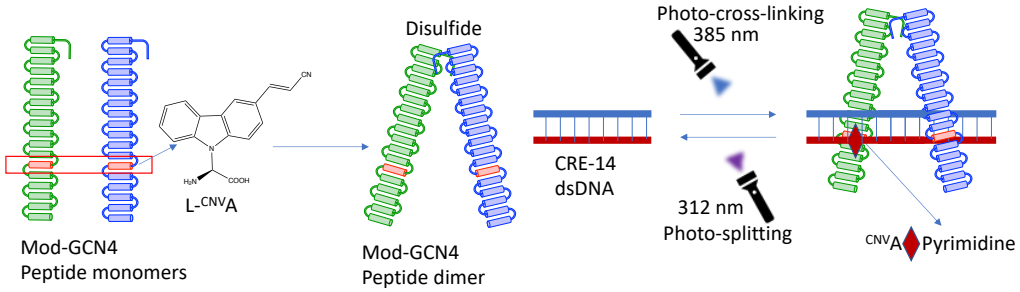
DNA-protein interactions are important for the comprehension of the information contained in the DNA molecules. DNA-protein crosslinks are readily seen in the cells in both natural environment and artificially created conditions. Furthermore, these interactions are important for studying the epigenetic regulations pathways.[1] Therefore, regulation of these crosslinks are useful for studying various biological functions like gene expression and aptamer screening. Although multiple crosslinkers have been developed in the past that can form a covalent bond between DNA and protein, the major drawback was that the covalent bond formed is irreversible.[2] We have previously reported a crosslinker, 3-cyanovinylcarbazole (^{CNV}K) which when incorporated in the oligo-deoxynucleotides (ODN), can crosslink with pyrimidines by irradiation of 366 nm radiation within a few seconds.[3] In this report, we have designed a photo-cross-linkable amino acid, L-3-cyanovinylcarbazole amino acid (L-^{CNV}A), which can be incorporated into a peptide chain and can crosslink with double stranded DNA using 366 nm irradiation and is further capable of reversibility through 312 nm radiation. We are reporting the use of the said photo-cross-linkable GCN4 peptide for crosslinking with CRE14 dsDNA and that can be further reversed using different UV radiation. This is a novel approach for reversible manipulation of photo-cross-linkable peptides and its interaction with dsDNA with high yield and faster reaction rate.



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