

DNA Charge Transport Leading to Disulfide Bond Formation

Tadao Takada and Jacqueline K. Barton*

*Division of Chemistry and Chemical Engineering, California Institute of Technology,
Pasadena, California 91125*

jkbarton@caltech.edu

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Abstract:

Here, we show that DNA-mediated charge transport (CT) can lead to the oxidation of thiols to form disulfide bonds in DNA. DNA assemblies were prepared possessing anthraquinone (AQ) as a photooxidant spatially separated on the duplex from two SH groups incorporated into the DNA backbone. Upon AQ irradiation, HPLC analysis reveals DNA ligated through a disulfide. The reaction efficiency is seen to vary in assemblies containing intervening DNA mismatches, confirming that the reaction is DNA-mediated. Interestingly, one intervening mismatch near the thiols promotes an increase in efficiency, which we attribute to increased base dynamics. Hence, here, where the reaction is on the backbone rather than within the base stack, stacking perturbations do not necessarily lead to an inhibitory effect on DNA CT.

Full Text (Subscription May Be Required):

<http://pubs.acs.org/cgi-bin/abstract.cgi/jacsat/2005/127/i35/abs/ja054306n.html>