

Evidence for DNA Charge Transport in the Nucleus†

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Abstract:

Oxidative damage to DNA bases in isolated *HeLa* nuclei occurs upon treatment with rhodium intercalators and photoactivation. Oxidation occurs preferentially at the 5'-guanine of 5'-GG-3' sites, indicative of base damage by DNA-mediated charge transfer chemistry. Moreover, oxidative damage occurs at protein-bound sites which are inaccessible to rhodium. Thus, on transcriptionally active DNA within the cell nucleus, DNA-mediated charge transport leads to base damage from a distance, and direct interaction of an oxidant is not necessary to generate a base lesion at a specific site. These observations require consideration in designing new chemotherapeutics and in understanding cellular mechanisms for DNA damage and repair.

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