

Bernd Giese (Basel) - Chemistry at a distance: Electron transport through DNA
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Ribonucleotide reductase, proteins have reaction taking place far away because of electron transfer. We are interested in the radical ion formation to radical ion transition through electron transfer in the DNA. Light generates a radical and we ask if charges stay or migrate. Analyze products where the charge is more stable. Examine gel electrophoresis of ^{32}P labeled oligos.

$$\ln(K) \propto -\beta\Delta r$$

where K is the rate constant, r the length of the electron transfer path, such that the decay constant is on the order of 0.7\AA . The transfer stops because it is easier to go through water. Thus a change of mechanism is required so that distance influence no longer occurs and is likely that electron hopping is happening by some other mechanism. Note that injection point with cations does not have significant electron hopping dependency on length. For anion, how can we detect charge transfer? H trapping through thymine, verified by ESR. $K_{\text{ET}} = N^2$ which is a description of diffusion and is thus electron hopping. Tunneling is governed by $\ln(K)$.