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# RATE AND YIELD OF OH-INDUCED STRAND BREAK FORMATION OF POLYNUCLEOTIDES AND DNA

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Radiation-induced strand breaks in the DNA backbone are known to constitute a quite severe type of damage. Under conditions which favour the indirect effect, the strand breaks are formed predominantly by OH radicals.

In recent studies with the model system poly(U),[1,2] it has been found that with this polymer OH radical-induced strand breakage is much higher than found with DNA. These high yields have been interpreted as indicating a radical transfer reaction from the base moiety to the ribose moiety of poly(U). Such types of reactions evidently occur to a much smaller extent, if at all, in DNA. Therefore, it seemed useful to investigate whether the structure, the type of base, the presence of the OH group in the C(2') position or a combination of the above are responsible for the differences in the yields of strand break formation in poly(U) and in DNA.

Combining conductivity measurements and molecular weight determination by means of low-angle laser light scattering, we found for the polyribonucleotides poly(U), poly(A) and poly(C) and for single-stranded DNA that, in presence and absence of oxygen, on average 8.5 counterions per single-strand break are liberated under salt-free conditions. This relationship allowed us to estimate, from conductivity measurements alone, the following G-values of single-strand break formation (in μmol/J) for polydeoxyribonucleotides under anoxic conditions: poly(dA), 0.23: poly(dC). 0.14; poly(dT), 0.06 and poly(dU), 0.046.

By time-resolved conductivity measurements in pulse radiolysis we have measured also the rate of strand break formation. The rate has been found to be similar for poly(dA) and ssDNA over a range of pH values. Poly(dC) and poly(dU) exhibit conductivity increase components with half lives similar to those of poly(dA) and ssDNA at corresponding pH values. The implications of these results are discussed.

## *References*

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