Minireview Prologue

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Eukaryotic DNA Repair Minireview Series*

I. Robert Lehman

From the Department of Biochemistry, Beckman Center, Stanford University, Stanford, California 94305-5307

This issue presents the first of a four-part minireview series on the repair of DNA damage in eukaryotes. Studies of molecular mechanisms in DNA repair have, in the past, focused largely on prokaryotes, in particular *Escherichia coli*. Recently, however, with the cloning of DNA repair genes in *Saccharomyces cerevisiae* and their counterparts in metazoans, including humans, and the application of "reverse genetics," there has been a veritable explosion of information about DNA repair in eukaryotes. As might have been anticipated, the proteins and mechanisms that have emerged from these studies are highly homologous with those that had been found earlier in bacteria. These processes have obviously been highly conserved in evolution, but as always, there are important and fascinating differences. Inasmuch as the majority of human cancers result from unrepaired damage to DNA, it was to be anticipated that defects in repair systems, *i.e.* mutations in the enzymes involved in these processes, would be associated with heritable forms of cancer. A notable example is the finding that nonpolyposal colorectal cancer results from a defect in mismatch repair. However, it is clear that some sporadic forms of cancer can also be traced to defects in repair. Thus, what began some 40 years ago as the investigation of a rather esoteric subject, the radiation sensitivity of bacteria, has led to major insights into an exceedingly important public health problem, human cancer.

The first of the four minireviews, "Nucleotide Excision Repair in Mammalian Cells" by Richard D. Wood, appears in this issue. The other three minireviews which will appear in succeeding issues are: "Double Strand Break Repair" by Gilbert Chu, "Strand-specific Mismatch Repair in Mammalian Cells" by Paul Modrich, and "Repair of Oxidative Damage to Nuclear and Mitochondrial DNA in Mammalian Cells" by Deborah L. Croteau and Vilhelm A. Bohr.

* These minireviews will be reprinted in the 1997 Minireview Compendium, which will be available in December, 1997.