Comparison of the Global Genomic and Transcription-Coupled Repair Rates of Different Lesions in Human Cells

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There are two subclasses of nucleotide excision repair (NER). One is the global genomic repair (GGR) which removes lesions throughout the genome regardless of whether any specific sequence is transcribed or not. The other is the transcription-coupled repair (TCR), which removes lesions only from the transcribed DNA sequences. There are data that GGR rates depend on the chemical nature of the lesions in a manner that the lesions inflicting larger distortion on the DNA double helix are repaired at higher rate. It is not known whether the TCR repair rates depend on the type of lesions and in what way. To address this question human cells were transfected with pEGFP and pEYFP plasmids treated with UV light, *cis*-diamminedichloroplatinum(II) (cisplatin) and angelicin and 24 h later the restored fluorescence was measured and used to calculate the respective NER rates. In a parallel series of experiments the same plasmids were incubated in repair-competent protein extracts to determine GGR rates in the absence of transcription. From the two sets of data, the TCR rates were calculated. We found out that cisplatin, UV light and angelicin lesions were repaired by GGR with different efficiency, which corresponded to the degree of DNA helix distortion induced by these agents. On the other hand the three lesions were repaired by TCR at very similar rates which showed that TCR efficiency was not directly connected with the chemical nature of the lesions.

Key words: Transcription-Coupled Repair, Global Genomic Repair, Host-Cell Reactivation