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The relationship between NER and TCR in the repair of DNA adducts

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Exposure to Polycyclic Aromatic Hydrocarbons (PAHs) can give rise to DNA adducts that alter essential cellular functions such as replication and transcription and induce genome instability. DNA repair mitigates the deleterious effects of DNA damage. Nucleotide Excision Repair (NER) detects and removes bulky DNA adducts that disrupt base pairing and distort the DNA helix whereas Transcription-Coupled DNA Repair (TCR) removes DNA adducts that impede RNA polymerase elongation during gene expression. Site-specific DNA lesions were used to examine the relationship between NER and TCR in the repair of PAH-induced adducts. In addition, the consequences to gene expression and mRNA integrity of damage that escapes repair or is repaired slowly was also studied. The results indicate that TCR slowly repairs DNA adducts that block transcription but escape removal by NER. Furthermore, the absence of NER or TCR in cells defective in either or both pathways results in decreased gene expression and alterations to the sequence of the mRNA produced. These findings enhance our understanding of DNA repair and its role in processing DNA damage that impedes gene expression in human cells.

Biography

Aditi Nadkarni is an Associate Research Scientist at New York University's Department of Biology where she conducts research in the fields of carcinogenesis, DNA repair and genomics using human cells. Her previous work includes preclinical analysis of DNA repair inhibitors in glioma cells during a Post-doctoral Fellowship at Mayo Clinic and characterization of a breast cancer genetic mutant during her PhD research at University of Toledo.

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