

Macromolecular machines in genome maintenance

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UV-exposure of the skin result in the covalent cross-links of neighboring DNA nucleotides, introducing mutations in the genome if left unrepaired. Patients suffering from Xeroderma pigmentosum (XP) fail to effectively repair these DNA lesions, resulting in heightened propensity to develop skin cancers (melanomas, squamous cell, & basal cell carcinomas). My lab has solved the structures of these protein complexes and delineated their mode of action. We provided the mechanism by which this molecular sunscreen works, and how it is lost in XP cancer patients. In the presence of this DNA repair machine skin cancer rates are suppressed by more 1000-fold providing a major means of safeguarding the genome.