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Spatial movements of chromosomes that facilitate their repairs

DNA damage, especially double strand breaks, challenges the integrity of eukaryotic genome. Previous studies have suggested that local higher order chromatin structure, chromatin dynamics and composition of the DNA within the chromosome determine the susceptibility to DNA damage and efficiency of repair. With the knowledge of discrete spatial chromosome territory organization within interphase nuclei, our current studyinvestigates the effect of DNA damage at the whole chromosome level. DNA damage,in a dose dependent manner,indeed induces a spatial repositioning of chromosomes specifically with higher gene density. Interestingly, these DNA damage sensor dependentchromosome relocations are reversed upon completion of repair. Thus, our report, for the first time highlightsDNA damage dependentspatial reorganization of chromosomes,which might be an integral aspect of cellular damage response. I discuss these results in the context of a non-random organization of chromosome territories in mammalian interphase nuclei.