

# HOMOLOGOUS RECOMBINATION: INSIGHTS FROM SUPER-RESOLUTION MICROSCOPY

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DNA double strand breaks DSB are induced by multiple factors, e.g. ionizing radiation, chemicals or oxygen free radicals. Left unresolved, constitute serious threat to genomic stability resulting in cancerous mutations. Cells evolved numerous strategies for DSB resolution. Recombinational repair or homologous recombination (HR) involves exchange of genetic material between damaged DNA and unaffected homologous DNA duplex. HR is a complex, multistage process where broken DNA molecule is resected and invades intact template DNA molecule leading to DNA repair synthesis and formation of Holiday Junctions. Here we elucidate kinetics of key repair factors after exposure to ionizing radiation and provide insight for clinical application. Our work exemplifies the power of super-resolution microscopy combined with somatic cell genetics to dissect biochemical reactions, and provides novel insight into the mechanism of homologous DNA recombination.

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