

The Role of the Telomere/ telomerase System in the Bystander EffectO. Nuta^a, F. Darroudi^b and K.-R. Trott^c

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Bystander responses and genomic instability are both non-targeted effects of irradiation. There have been suggestions that the telomerase system is involved in radiation induced genomic instability and therefore may also play a role in bystander mechanisms. The aim of this study was to investigate the possible relationship between the bystander effect and the telomere/ telomerase system as well as the involvement of telomerase in the development of chromosomal damage and its repair in G2 phase. We examined the relationship between several response criteria, including cell survival, chromosomal damage (using micronuclei, breaks and exchanges in prematurely condensed chromosomes, G2 induced chromatid aberrations) and double strand breaks of the DNA (using γ -H2AX and Rad 51) in two cell lines, BJ human foreskin fibroblasts and BJ1-hTERT- a telomerase-immortalised BJ cell line after direct irradiation and bystander exposure.

Our findings suggest that telomerase does not play any major role in the bystander effect. However, telomerase appears to be involved in the development of chromosomal damage and its repair in G2 phase and may play a role in the control of DSB repair.

The data, taken overall, reinforce the idea that telomerase or other elements of the telomere/telomerase system may defend the chromosomes from breakage, but breaks which occur in cells which do not have telomerase activity are more easily repaired.