

**P067** *GEN-1* Holliday Junction resolvase acts in a non-canonical DNA damage checkpoint pathway

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Using *C.elegans* germ line as model system, we performed an unbiased forward genetic screen for mutants defective in DNA damage-induced cell cycle arrest. We isolated a point mutation in *gen-1* (XPG-like endonuclease-1) that introduces a premature stop-codon and removes 82 amino acids, leaving the nuclease domain intact. We found that only the full depletion either by RNAi or by gene knockout leads to hypersensitivity toward genotoxic agents that produce double strand break (ie IR and MMS). We show that *GEN-1* acts as Holliday Junction resolvase *in vitro* and its depletion leads to persistent *RAD-51* foci *in vivo* after IR treatment. Although the cell cycle arrest is fully defective in *gen-1* deletion strain, we found that the *C.elegans* ATR-p53 signalling pathway is still activated in response to DNA damage based on *CEP-1* (*C.elegans*-p53) phosphorylation level and transcription activity. We found that RNAi depletion of *gen-1* in *hus-1* and *mrt-2* mutants leads to synthetic lethality. We show that *gen-1* deletion doesn't affect the meiotic recombination level. Taken together, these data suggest that *GEN-1* is a Holliday Junction resolvase specific for DSB repair and acts in a signalling pathway parallel to the canonical ATR-p53 pathway.