

P060 Recombination/repair in hyperthermophilic archaea: the Rad50–Mre11–NurA–HerA pathway

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The ubiquitous Rad50 and Mre11 proteins (SbcC and SbcD in Bacteria) play key roles in many processes involved in the maintenance of chromosome integrity both in Bacteria and Eucarya but their roles in the Archaea are still unknown. We have shown previously that in *Sulfolobus acidocaldarius*, *rad50* and *mre11* genes are co-transcribed with *nurA*, a 5' to 3' nuclease encoding gene (Constantinesco *et al.* *EMBO Rep.*, 2002), and *herA* which encodes a bipolar DNA helicase (Constantinesco *et al.*, *Nucleic Acids Res.* 2004). Furthermore, we and others have shown that the synteny of the four genes is conserved in most hyperthermophilic archaea. These findings strongly suggest that NurA and HerA could play a key role in DNA ends processing at the initiation step of homologous recombination. We have utilized immuno-detection approaches to get the first *in vivo* data on the role(s) of these proteins in *Sulfolobus acidocaldarius*. These analyses show that the Mre11 protein is recruited to DNA following gamma irradiation and that Mre11, Rad50 and HerA interact altogether (Quaiser *et al.*, *BMC Mol. Biol.*, 2008). Furthermore, our data strongly suggest that each protein is associated with several functions and plays different roles when acting on its own or in association with its partners.