P062 Novel protein complexes involved in genomic maintenance from a hyperthermophilic archaeon

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Archaea, and hyperthermophiles in particular, are well suited for studying DNA repair mechanisms given that DNA exposed to high temperature is subject to ongoing damage during normal growth under extreme conditions. Yet, the mutation rates of model hyperthermophiles are quite close to norms for bacteria, indicating that their replication/repair processes are operating with high fidelity at elevated temperatures. In addition, using comparative genomic analysis and the genome sequence of several hyperthermophilic archaea, homologs of conserved eukaryotic and bacterial DNA repair proteins have been identified. However, many highly conserved repair genes are missing in some or in all of the archaeal genomes.

Using a combinatorial approach of pull-down analyses coupled with mass spectrometry, we have identified, in *Pyrococcus abyssi*, a preliminary network involved in genome maintenance mechanisms. This interaction network consists of at least two distinct functional modules required for DNA replication and/or repair of nucleic acid damage and is not only composed of novel protein complexes but also unsuspected interactions between already well characterized components of the DNA replication complex. Biochemical and structural experiments addressing functions of the complexes should provide a more precise and global understanding of how DNA damage is actively restored during the main archaeal replication process.