

P065 Intrinsic properties of the two replicative DNA polymerases of *Pyrococcus abyssi* opposite abasic sites: control of genome stability?

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Spontaneous and induced abasic sites in hyperthermophiles DNA have long been suspected to occur at high frequency. Here, *P. abyssi* was used as an attractive model to analyse the impact of such lesions onto the maintenance of genome integrity. First, we show that endogenous AP sites persisted in exponential growing cells. Then, the two replicative DNA polymerases, *PabpolB* and *PabpolD*, were characterized in presence of DNA containing abasic sites. Both DNA polymerases had abortive DNA synthesis upon encountering AP sites. Under running start conditions, *PabpolB* could incorporate and even replicate to the full-length oligonucleotide DNA template containing a specific AP site but only when present at a molar excess. Conversely, bypassing activity of *PabpolD* was strictly inhibited. The tight regulation of nucleotide incorporation opposite the AP site was assigned to the efficiency of the proofreading function, because exonuclease-deficient enzymes exhibited effective TLS. Steady-state kinetics reinforced that *Pabpols* are high-fidelity DNA polymerases onto undamaged DNA. Moreover, *Pabpols* preferentially inserted dAMP opposite an AP site, albeit inefficiently. Neither the template sequence nor the topology of the oligonucleotides DNA was influencing the nucleotide insertion. Together, our results are interpreted within the maintenance of the genome stability.