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Crystallographic studies of DNA ligase from *Thermococcus gammatolerans*.

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Abstract content

DNA ligases are ubiquitous proteins involved in cellular processes such as replication, repair and recombination of DNA. These enzymes catalyze the formation of a phosphodiester bond between adjacent 5'-phosphate and 3'-hydroxyl termini at single-stranded breaks in double-stranded DNA. DNA ligases from thermophilic and hyperthermophilic archaea have been used as model systems in structural and mechanistic studies of DNA ligation. In this project we worked with the radioresistant archaeon, *Thermococcus gammatolerans*, which was isolated after an exposure to a gamma irradiation dose of 30 kGy from enriched culture of microorganisms collected at the Guaymas, Sonora basin. As its name suggests, this organism can withstand a dose of 3000 Gy without apparent lethality and an exposure to higher doses only slightly reduces its viability. These data indicate that *T. gammatolerans* is the most radioresistant archeon isolated thus far, offering the chance to determine how archaeal species recover from extensive DNA damage after exposure to a massive radiation dose. The most widely used technique to elucidate the structure of a protein is X-ray diffraction. Therefore experiments of purification, crystallization and structural determination of *T. gammatolerans* is an appropriate strategy for atomically describe this enzyme. This project is framed in the search of DNA repair factors that must exist in *T. gammatolerans*. DNA ligase from the archeon *T. gammatolerans* was overexpressed, purified and crystallized.

Summary

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