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Biochemical Investigation into Cadmium-Induced Diminished Function of a Thermal Stable DNA Polymerase

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Abstract

The environmental metal cadmium is a carcinogen that has been shown to increase the rate of mutations by inhibiting DNA mismatch repair, and to replace zinc ions within the active site of certain endonucleases. Here, the mutagenic property of cadmium was further explored with a model DNA polymerase, *Thermus aquaticus* DNA Polymerase I (Taq Pol I). Diminished efficiency of Taq Pol I was observed as a function of cadmium concentration. Using a series of polymerase chain reactions (PCR) and circular dichroism spectroscopic assays with full-length Taq Pol I, structural changes in the presence of low cadmium concentration was a significant factor in the observed change in enzyme efficiency. These structural changes provide new insights into the mutagenic property of cadmium.