Helicase and ATPase Activity of *Thermus aquaticus* UvrD

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The mismatch repair mechanism (MMR) plays a critical role in preventing carcinogenesis by correcting errors that occur during DNA replication, so understanding the mechanistic role of proteins involved in the MMR can allow us to treat issues that arise if this crucial pathway were to fail. UvrD helicase has been identified as a critical protein that unwinds mismatched DNA to allow access for repair proteins. While the function of UvrD in *E. Coli* cells have been extensively studied, there exists a gap in our understanding of homologous UvrD helicases in eukaryotic systems. *Thermus aquaticus* UvrD presents a hybrid system to bridge the gap in our knowledge. It plays a similar role to *E. Coli* UvrD, but is not methyl-directed and lacks a MutH homologue, similar to eukaryotic systems. This study will examine the structural properties of *T. aquaticus* UvrD as well as its helicase activity through native gel helicase assays, FRET helicase assays, and ATPase assays. By comparing the protein's relative activity to *E. Coli* UvrD, we can analyze the known mechanism to identify the similarities and differences between these helicases. These results will provide a better understanding of the mechanism of how UvrD interacts with the ends of DNA tails, which is valuable for future work on diagnosis and treatment of MMR errors in more complex systems.