

The *Drosophila melanogaster* Gen endonuclease is known to cleave flap DNA, which plays an important role in the process of DNA repair. To better characterize the endonuclease-DNA interaction, it is necessary to determine the rate at which the endonuclease cleaves flap DNA. Because of its high efficiency and resolution, capillary electrophoresis (CE) is a powerful analytical technique that can be used to quantify low concentrations of fluorescently labeled DNA. For this project, CE was utilized both to determine the annealing efficiency of the flap substrate (an alternative method to running a gel) and to determine the cleavage rate of a flap substrate in complex with Gen. It was found that the modification of capillary conditions can increase the separation efficiency of longer DNA substrates. In addition, the cleavage rate for samples with more concentrated Gen was found to be faster than the rate for samples with less concentrated Gen; the cleavage rate for DNA with a longer flap was also found to be faster than the rate for DNA with a shorter flap. As an effective tool to study biochemical interactions on the scale of proteins and DNA, CE offers a method not only to test annealing efficiency but also to determine the rate of protein-DNA interactions with quantities near the limit of detection.