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How to get through a nanopore and across a bilayer: The difference between linear and folded DNA

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Translocation of DNA through lipid bilayers is essential to cell function for the transcription of RNA and proteins. Alpha hemolysin is the biological nanopore used to translocate DNA across this phospholipid bilayer. There are several variables that affect the translocation of DNA through biological nanopores, these include; cations, applied voltage and the type of DNA being used. For our experiment we are testing the affect of Potassium, Sodium, and Barium cations through a spectrum of 90mV to 180mV on the translocation of two separate types of DNA; Ctrl-2 (linear) and TBA (folding/linear). Through this testing we are trying to determine the correlation between linear DNA (Ctrl-2) and a mixture of folded and linear strands (TBA). Both voltage and cations directly determine the frequency of translocation events of the DNA. If both types of DNA are affected proportionally, we can conclude that the affects of these variables are universal regardless of the differences in structure between the two strands. Preliminary results from the Potassium cation confirm our hypothesis that the results for each DNA (Ctrl-2 and TBA) are very similar with respect to the frequency of translocation events due to the Potassium cation and various voltages. Studies for the Barium and Sodium cations are ongoing.