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Use of Optical Tweezers and Trapping Cilia

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Use of Optical Tweezers and Trapping Cilia

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Cilia are microtubule-based sensory organelles that cells use to gather information. These cilia are non-motile and reside in the renal system of humans. Their sensors are used to detect fluid flow and allow epithelial tubes to respond and function normally. Irregularities in these organelles can be linked to many kidney diseases. The goal of our research is to better understand cilia and their sensory outputs. In order to study cilia sensory outputs, optical tweezers are used to view and trap cilia given their ability to elicit and record responses from cilia and plot the given data. Using optical tweezers is one of the most effective ways to gather information about cilia and allows researchers to explore cells methodically. Researchers are able to record data about the position of cilia when they are trapped. The MSD v. time graphs allow the researcher to understand the mechanical properties of individual cilia. This information gives researchers more insight in how cilia behave during fluid flow. Learning more about mechanical properties could lead to more extensive experiments and could ultimately lead to cures for many different kidney diseases.