

Abstract Submitted
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A Novel Micromethod for Measuring the Solubility of Sickle Hemoglobin MARK FUGATE, ELI WORTH, FRANK FERRONE, Drexel University — Sickle cell is a genetic disease wherein a point mutation in the hemoglobin amino acid chain allows the protein to polymerize into long fibers in anoxic conditions, deforming red blood cells and causing severe circulatory problems. The search for drug and gene therapeutics which destabilize these fibers is ongoing. Since solubility quantifies the thermodynamic stability of the fiber, measuring sickle hemoglobin solubility is of great importance in this research. Existing techniques for making such measurements are cumbersome and require several hundred milligrams of protein. We have devised a technique for measuring solubility which uses only a few milligrams of protein, prepared as a concentration gradient in a thin (10-20 μm) layer. We have modified an inverted microscope to measure laser light scattering and optical absorption simultaneously along the gradient, deducing the presence of polymers by detecting the light they scatter and measuring concentration by optical absorption spectroscopy. Solubility is inferred by noting the concentration at which scattering disappears. We will present our initial results along with specific details of the devices construction, and discuss future directions.

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