

Abstract Submitted
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Reversible Dialysis in a Microfluidic Formulator. SEILA SELIMOVIC, JUNG-UK SHIM, SETH FRADEN, Brandeis University — In order to facilitate the screening of conditions for protein crystallization, we have been using the Microfluidic Formulator chip (Stephen Quake, PNAS Vol. 101, 40). This PDMS device allows us to mix up to 40 different reagents and protein solutions. We use this combinatorial approach along with a “drop-on-demand” method whereby we employ on-chip positive displacement pumps to form aqueous droplets containing protein and separate them by plugs of oil. Subsequently, the aqueous drops containing protein are guided by surface tension forces into storage chambers. To control the chemical potential of these sub-nanoliter protein samples, we fabricate reservoirs underneath the storage compartments. A thin PDMS membrane that is permeable to water, but not to protein or salt, separates the reservoirs from the storage chambers. Water can permeate into or out of the stored samples until the chemical potentials of the reservoir and the protein solution are equal leading to protein crystallization in some chambers.

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