

Abstract Submitted  
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**Diffusion Based Chemical Extraction from Cell Suspensions in Microchannels**<sup>1</sup> ELLEN LONGMIRE, CLARA MATA, KATIE FLEMING, AL-LISON HUBEL, University of Minnesota — Diffusion-based extraction of the cryoprotective agent dimethyl sulfoxide (DMSO) from blood suspensions offers distinct advantages over centrifugation, the conventional method of DMSO removal, most importantly, potential reductions in cell losses. To demonstrate diffusion-based extraction, laminar flows of two parallel streams, a cell suspension containing DMSO and a wash stream, were characterized experimentally. The streams entered a rectangular channel ( $500\ \mu\text{m} \times 25\ \text{mm} \times 125\ \text{mm}$ ) through opposing ports, and the transport of DMSO across the depth was studied as a function of cell suspension flow rate fraction and Peclet number (Pe). Visualization and concentration measurements were performed in the range  $1000 < \text{Pe} < 10000$  ( $1 < \text{Re} < 10$ ). Measured concentration values in the outlet cell and wash streams matched closely with predictions from continuum simulations. Further, for appropriate suspension flow rates and flow rate fractions, cell recovery rates were very high,  $\sim 95\%$ . The results suggest that diffusion methods are viable for processing of clinical-scale suspension volumes.

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