

Abstract Submitted
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Isotachophoretic Preconcentration of Cardiac Proteins from Human Serum PRASHANTA DUTTA, MOHAMMAD HOSSAN, TALUKDER JUBERY, DANNY BOTTENUS, CORNELIUS IVORY, Washington State University — Cationic isotachopheresis (ITP) is used to concentrate and detect a cardiac biomarker, cardiac troponin I (cTnI), spiked into depleted human serum in a cascade poly(methyl methacrylate) (PMMA) microfluidic channel. PMMA microchannel was formed using solvent imprinting and temperature-assisted bonding. A 100x reduction in cross-sectional area is implemented by gradually decreasing the channel width and height to increase the sensitivity of ITP. The ITP was performed in peak mode with potassium ion as the leading electrolyte and hydronium ions as the terminating electrolyte. The cross-sectional area reductions in combination with ITP allowed visualization of lower concentrations of fluorescently labeled cTnI. Experimental results show that ITP can detect cTnI at initial concentrations as low as 46 ng/mL in the presence of human serum proteins, and ITP can obtain cTnI concentrations factors as high as 10,000. This demonstrates the detection of cTnI in depleted human serum at clinically relevant concentrations without the use of antibodies and relying solely on ITP in a cascade microchip.

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