Electronic Supplementary Material (ESI) for Lab on a Chip.
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Supplementary Material for *Random Design of Microfluidics*

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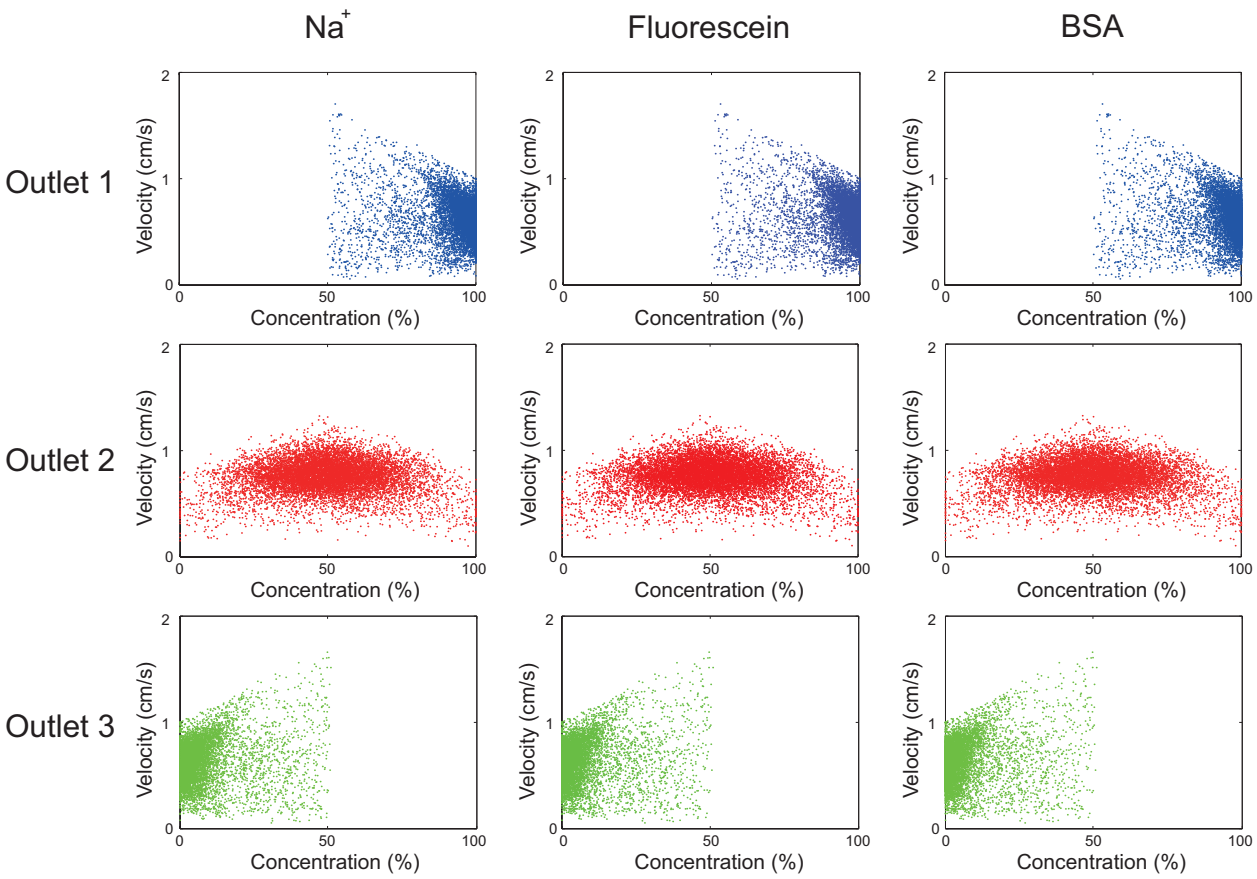
Role of diffusion constant in chip behavior

To determine whether solutes with different diffusion coefficients still behave as predicted in our randomly-designed microfluidic chips, we simulated each of the 10,513 random chip designs using three different model solutes: Na^+ (representative of ions), fluorescein (representative of small molecules), and bovine serum albumin (BSA; representative of proteins). The simulation results from all three solutes are summarized in Supplementary Figure 1. The similarity of the results from each solute confirm that our library of randomly-designed chips can be used to predict the behavior of a wide range of different solutes from ions to proteins.



Supplementary Figure 1: Fluid velocity vs. concentration for each outlet in each of the 10,513 chip designs in our simulation library, using the diffusion coefficients of three different solutes: Na^+ (1.33×10^{-9} m^2/s), fluorescein (4.25×10^{-10} m^2/s), and bovine serum albumin (BSA; 6.38×10^{-11} m^2/s). Each solute behaves similarly in each chip design, meaning that our randomly-designed chips will still function as predicted regardless of the specific solute used.