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Simulation of Magnetic Particles in the Bloodstream for Magnetic Drug Targeting Applications ERICA CHERRY, Student at Stanford University, JOHN EATON, Professor at Stanford University — Magnetic Drug Targeting (MDT) is a promising new idea for treatment of cancer and other well-localized diseases. An ideal MDT treatment would involve chemically binding the drug particles to magnetic particles, injecting them into the body, and using external magnetic fields to steer the particles towards or hold them near areas of diseased tissue not accessible via injection. However, it would be difficult to implement efficient MDT treatments because we know little about how magnetic particles interact with blood flow. With the goal of understanding these dynamics, a simulation of blood flow containing magnetic particles was performed. The particles were subject to a variety of forces such as gravity, externally-applied magnetic force, and inter-particle magnetic force. A separate simulation was performed to determine how the magnetic particle dispersion coefficient varied with flow properties such as shear and erythrocyte content, and the results of the dispersion simulation were used in the main simulation. Results from these simulations will be presented and used to draw conclusions about the technology required for a successful MDT treatment.

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