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Hollow-Fiber Cartridges: Model Systems for Virus Removal from Blood FRANK JACOBITZ, University of San Diego, JEEVAN MENON, PAUL DUFFIN, RICHARD TULLIS, Aethlon Medical, Inc. — Aethlon Medical is developing a hollow-fiber hemodialysis device designed to remove viruses and toxins from blood. Possible target viruses include HIV and pox-viruses. The filter could reduce virus and viral toxin concentration in the patients blood, delaying illness so the patients immune system can fight off the virus. In order to optimize the design of such a filter, the fluid mechanics of the device is both modeled analytically and investigated experimentally. The flow configuration of the proposed device is that of Starling flow. Polysulfone hollow-fiber dialysis cartridges were used. The cartridges are charged with water as a model fluid for blood and fluorescent latex beads are used in the experiments as a model for viruses. In the experiments, properties of the flow through the cartridge are determined through pressure and volume flow rate measurements of water. The removal of latex beads, which are captured in the porous walls of the fibers, was measured spectrophotometrically. Experimentally derived coefficients derived from these experiments are used in the analytical model of the flow and removal predictions from the model are compared to those obtained from the experiments.

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