

Abstract Submitted
for the DFD07 Meeting of
The American Physical Society

Measurement of Velocity Profiles of in Vitro Blood Flow Using Micro Particle Image Velocimetry. F.J. DIEZ, M.M. TORREGROSA, J. TORRES, Rutgers, The State University of New Jersey, S. POTHOS, TSI Inc — In vitro blood flow in microchannels was studied using micro-particle image Velocimetry (microPIV). Experimental measurements of blood flow in microvessels with internal diameter 10-1000 μm is a major challenge in biofluids. This is due to the fact that blood flow is composed of many constituents that behave as multiphase suspensions. MicroPIV measurements were taken in different microchannel configurations including straight square channels, T-channels, converging channels and an L channel for three fluid types: (1) de-ionized water as our based fluid, (2) with hematocrit ratio of 10%, and (3) hematocrit ratio of 20%. The hematocrit ratio (HR) is defined as the ratio of the volume of packed red cells to the total blood volume. 2D mean velocity profiles of blood flow at various depths in microchannels were obtained. In order to get the spatial distributions of these mean velocities, 100 instantaneous velocity fields were obtained, and ensemble-averaged for each condition. Typical two-dimensional Poiseuille flow with a parabolic velocity profile for the de-ionized water flow was observed while the profiles became blunter and could not be easily approximated by Poiseuille parabolic solution as we increased the hematocrit ratio.

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Date submitted: 06 Aug 2007

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