Supplementary information

A possible cause of concern with the current microfluidic flow system is the donor variability. It is evident that wall shear rate influences platelet function as well as platelet margination.[7,16,38,55] It has been shown that hematocrit also influences platelet margination.[35,36] Elevated hematocrit enhances platelet concentration near the vessel wall, resulting in increased platelet-surface interactions. In addition to wall shear rate and hematocrit, the concentration and functionality of various coagulation factors found in blood plasma may affect platelet activity. Hence, the variability of hematocrit and coagulation factors among different donors is expected to influence the downstream platelet adhesion following transient exposure to upstream elevated shear forces.

Whole blood was collected from the healthy human donors with 36–41% hematocrit. The expression levels of active GPIIb/IIIa and P-selectin were approximately 2.3% and 2.2%, respectively. In the present study, the effects of donor variability were also assessed by evaluating platelet adhesion to downstream fibrinogen for four different donors (Figure S1). The results demonstrated slight variation in platelet adhesion for upstream wall shear rates of 1620–4860 s^{-1}. The variation in platelet adhesion for 11560 s^{-1} was relatively higher; however, the variation was not statistically significant ($p > 0.05$). The results suggested that the donor variability did not significantly influence the platelet adhesion to downstream capture proteins.

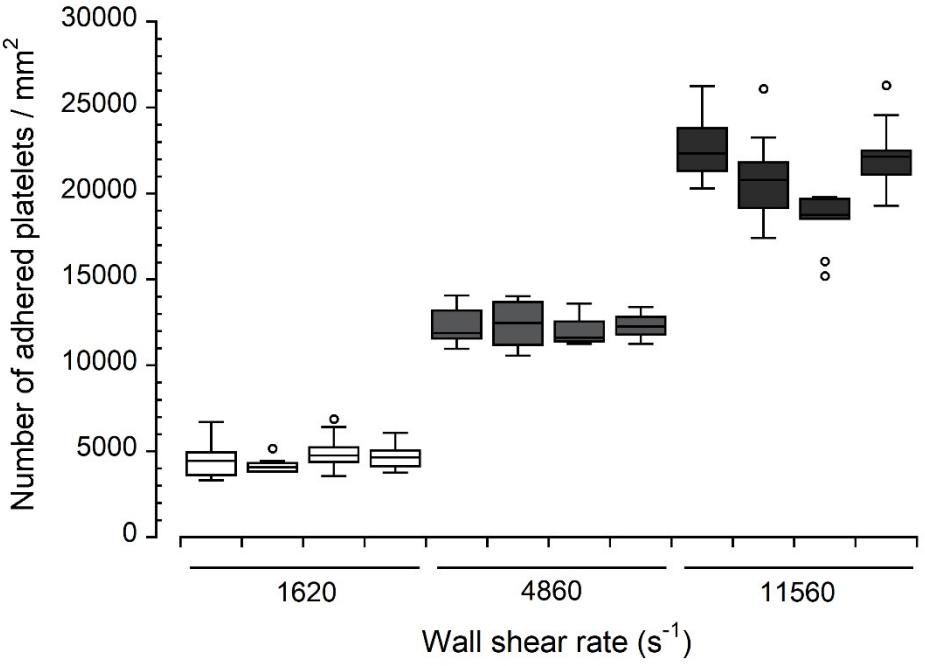

Figure S1. *Effects of donor variability on platelet adhesion to downstream fibrinogen. Platelet adhesion to fibrinogen was quantified for four different donors at each upstream wall shear rate. The donor variability did not have significant effects on platelet adhesion to downstream fibrinogen.*

7 W. Deng, Y. Xu, W. Chen, D. S. Paul, A. K. Syed, M. A. Dragovich, X. Liang, P. Zakas, M. C. Berndt, J. D. Paola, J. Ware, F. Lanza, C. B. Doering, W. Bergmeier, X. F. Zhang and R. Li, Nat. Commun., 2016, 7, 12863.

16 M. Li, D. N. Ku and C. R. Forest, Lab Chip, 2012, 12, 1355–1362.

35 A. W. Tilles and E. C. Eckstein, Microvasc. Res., 1987, 33, 211–223.

36 P. A. Aarts, S. A. van den Broek, G. W. Prins, G. D. Kuiken, J. J. Sixma and R. M. Heethaar, Arteriosclerosis, 1988, 8, 819–824.

38 J. R. O'Brien, Lancet, 1990, 335, 711–713.

55. R. Zhao, M. V. Kameneva and J. F. Antaki, *Biorheology*, 2007, **44**, 161–177.