1 **On-chip Evaluation of Platelet Adhesion and Aggregation upon Exposure to**
2 **Mesoporous Silica Nanoparticles**

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8 Supporting Information (SI) – Experimental Procedures and Supplemental Data
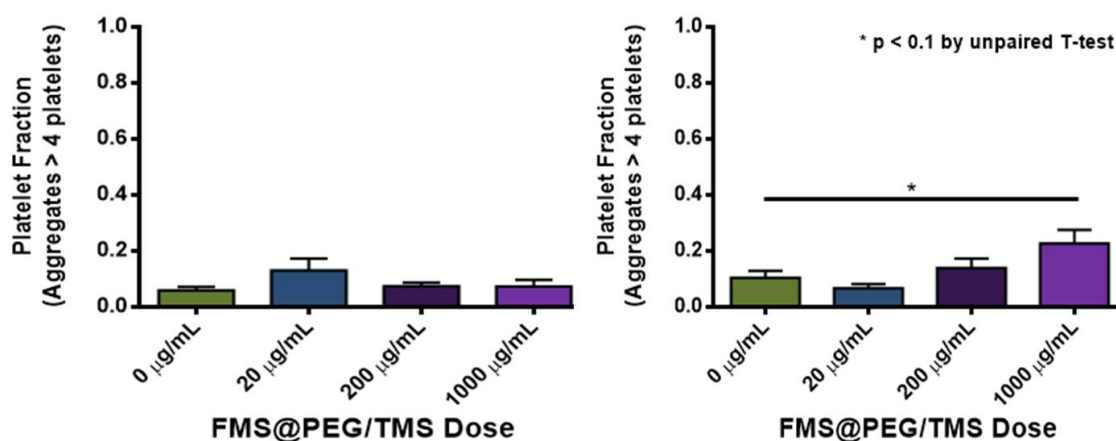
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10 I. Supplemental Data

11   1. S1. Off-chip aggregation assay results by fixed-cell fluorescence imaging

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15 Figure S1. Aggregation of more than 4 platelets. (a) unactivated platelets and (b) ADP-activated
16 platelets obtained from fixed-cell fluorescence imaging.

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18 II. Supplemental Information

19   1. Nanoparticle number density calculation

20   First, with an assumption of nanoparticle shape to be a hexagonal prism, total volume
21   of a single FMS nanoparticle can be obtained by

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$$= 6 \times \frac{\sqrt{3}}{4} \times L^2 \times H$$

where L is the length of a side, and H is the height of the hexagon. From TEM imaging, L and H values are determined to be 24 nm and 48 nm, respectively.

Thus, calculated volume of a single nanoparticle is:

$$= 6 \times \frac{\sqrt{3}}{4} \times (24 \times 10^{-7})^2 \times (48 \times 10^{-7}) = 7.182 \times 10^{-17} \frac{cm^3}{\# \ of \ NP}$$

Density of amorphous silica is 2.2 (g/cm^3) and primary pore volume is 0.81 (cm^3/g); thus, the number density of the FMS nanoparticles per gram (x) can be calculated by:

$$x = \frac{\left[\frac{1}{2.2}\left(\frac{cm^3}{g}\right) + 0.81 \left(\frac{cm^3}{g}\right)\right]}{7.182 \times 10^{-17}\left(\frac{cm^3}{\# \ of \ NP}\right)}$$

$$= 1.761 \times 10^{16} \left(\frac{\# \ of \ NP}{g}\right)$$

Thus, assuming 1 μm as diffusion length of nanoparticles during experiments and 2.5 μm as an average diameter of each platelet, the number density of FMS nanoparticles around a single platelet can be obtained by:

$$\frac{4}{3}\pi \ [(3.5 \times 10^{-6})^3 - (2.5 \times 10^{-6})^3] \times 10^3 \ (L) \times 1000 \times 10^{-3} \left(\frac{g}{L}\right) \times 1.761 \times 10^{16}\left(\frac{\# \ of \ NP}{g}\right)$$

in the case of 1000 μg/mL FMS nanoparticle concentration. Thus, number densities of FMS nanoparticles surrounding individual platelets are 40, 402, and 2009 nanoparticles for 20 μg/mL, 200 μg/mL, and 1000 μg/mL concentrations, respectively.