Electronic Supplementary Material (ESI) for Lab on a Chip.

Electronic supplementary information

Parylene-C coated microporous PDMS structure protecting from functional deconditioning of platelets exposed under cardiostimulants

Hyojae Kim[1,†], Yeongseok Jang[2,†], Jinmu Jung[3,*], Jonghyun Oh[3,*]

[1]Department of Bio-Nano System Engineering, College of Engineering, Jeonbuk National University, Jeonju 54896, South Korea

[2]Department of Mechanical Design Engineering, College of Engineering, Jeonbuk National University, Jeonju 54896, South Korea

[3]Department of Nano-bio Mechanical System Engineering, College of Engineering, Jeonbuk National University, Jeonju 54896, South Korea

[†]These authors contributed equally to this article.

***Corresponding author**

E-mail: Jinmu Jung (jmjung@jbnu.ac.kr) and Jonghyun Oh (jonghyuno@jbnu.ac.kr)

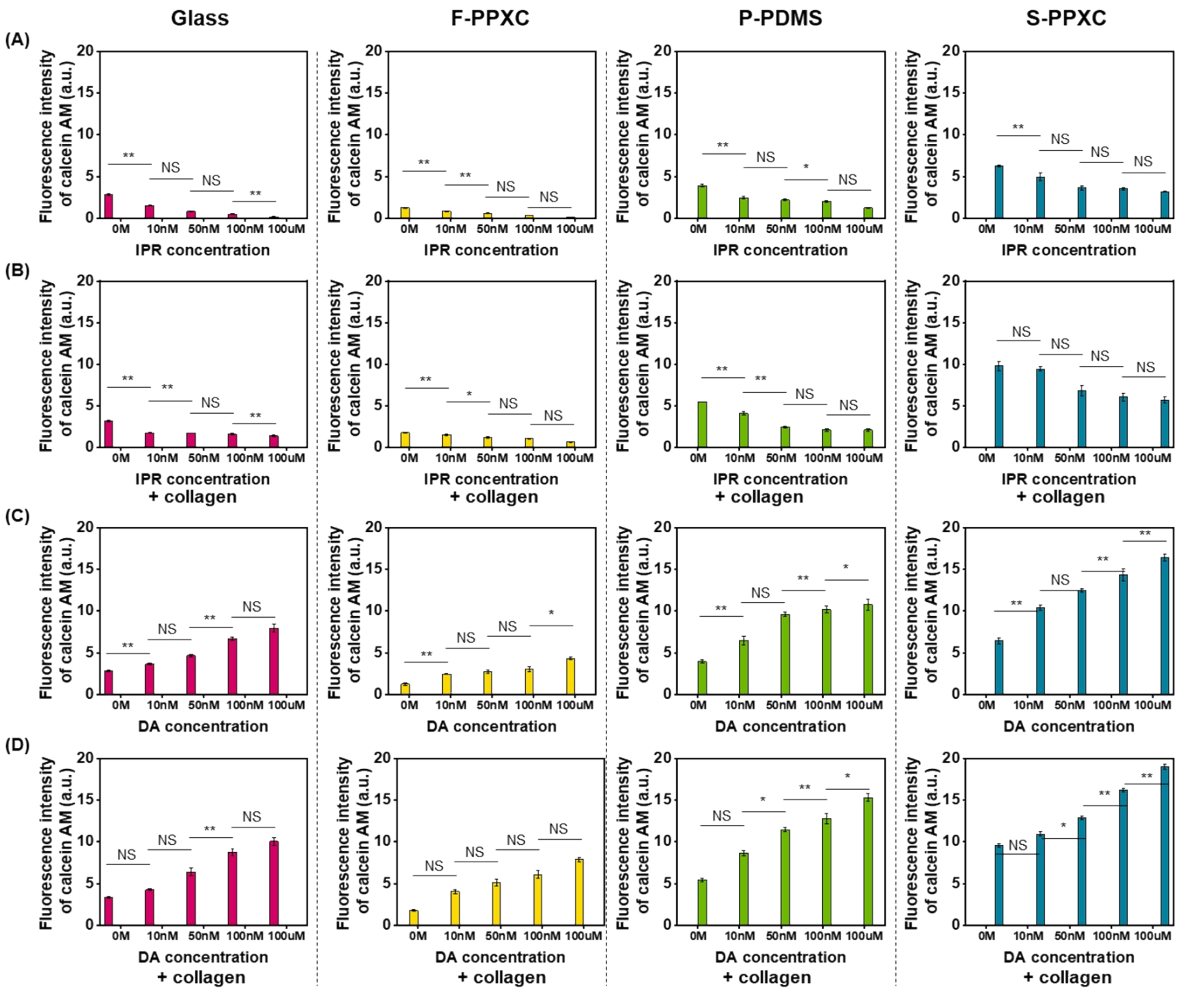

Figure S1. Fluorescence intensity analysis of calcein-AM on glass, F-PPXC, P-PDMS, and S-PPXC surfaces under different concentrations of IPR and DA for assessment of platelet adhesion. Fluorescence intensity of adhered platelets on each surface at different IPR concentrations without collagen (A) and with collagen (B). Fluorescence intensity of adhered platelets on each surface at different DA concentrations without collagen (C) and with collagen (D). The values are presented as the mean ± SD, n=5. Statistically significant differences between samples were determined using one-way ANOVA with Tukey's post-hoc multiple comparison tests, *: $p < 0.05$, **: $p < 0.01$, NS = not significant.

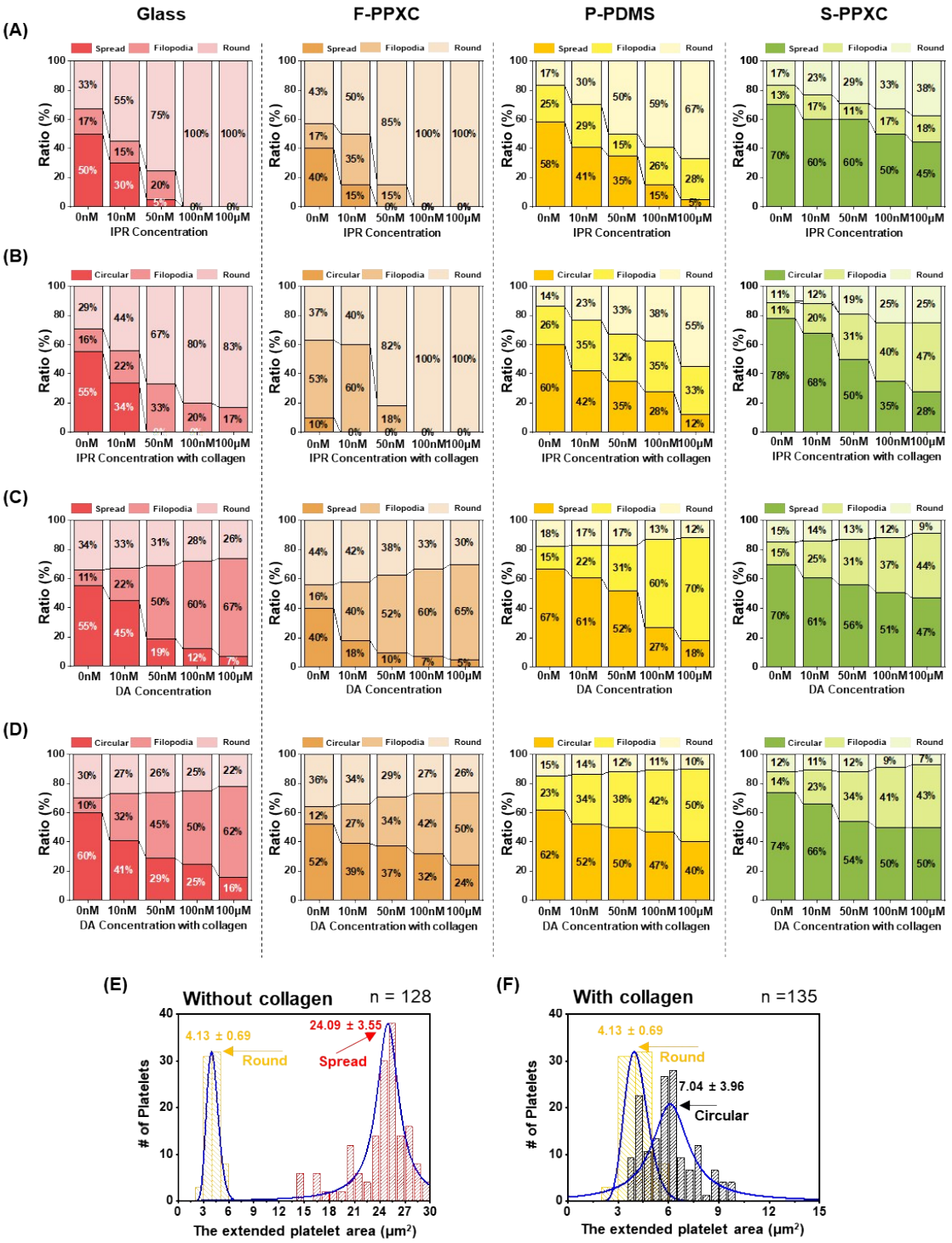

Figure S2. Morphological quantification of attached platelets on glass, F-PPXC, P-PDMS, and S-PPXC surfaces under different concentrations of IPR and DA. The morphology of adhered platelets was analyzed at different IPR concentrations without collagen (A) and with collagen (B). The morphology of adhered platelets was analyzed at different DA concentrations without collagen (C) and with collagen (D). Morphometric analysis of platelets was performed using AFM images by calculating the extended platelet area (n=100) with the software (Nanoscope Analysis v1.4, Bruker,

Santa Barbara, CA, USA). The extended platelet area was measured and calculated with mean ± standard deviation (SD) at different stages within the platelet spreading process. The mean value was used as a criterion to distinguish each platelet activation step. The minimal and maximal distribution area from resting platelets to fully spread platelets was ranged from 2 to 30 μm^2 on surfaces without collagen treatment. Platelets with area larger than 24 μm^2 were regarded as spread shape, and platelets with area smaller than 4.13 μm^2 were regarded as round shape. The distribution area between the spread and round shape was considered as filopodia (E). When treated with collagen, platelets with area larger than 7.04 μm^2 were regarded as circular shape, and platelets with area smaller than 4.13 μm^2 were regarded as round. The distribution area between the circular and round shape was considered as filopodia (F).

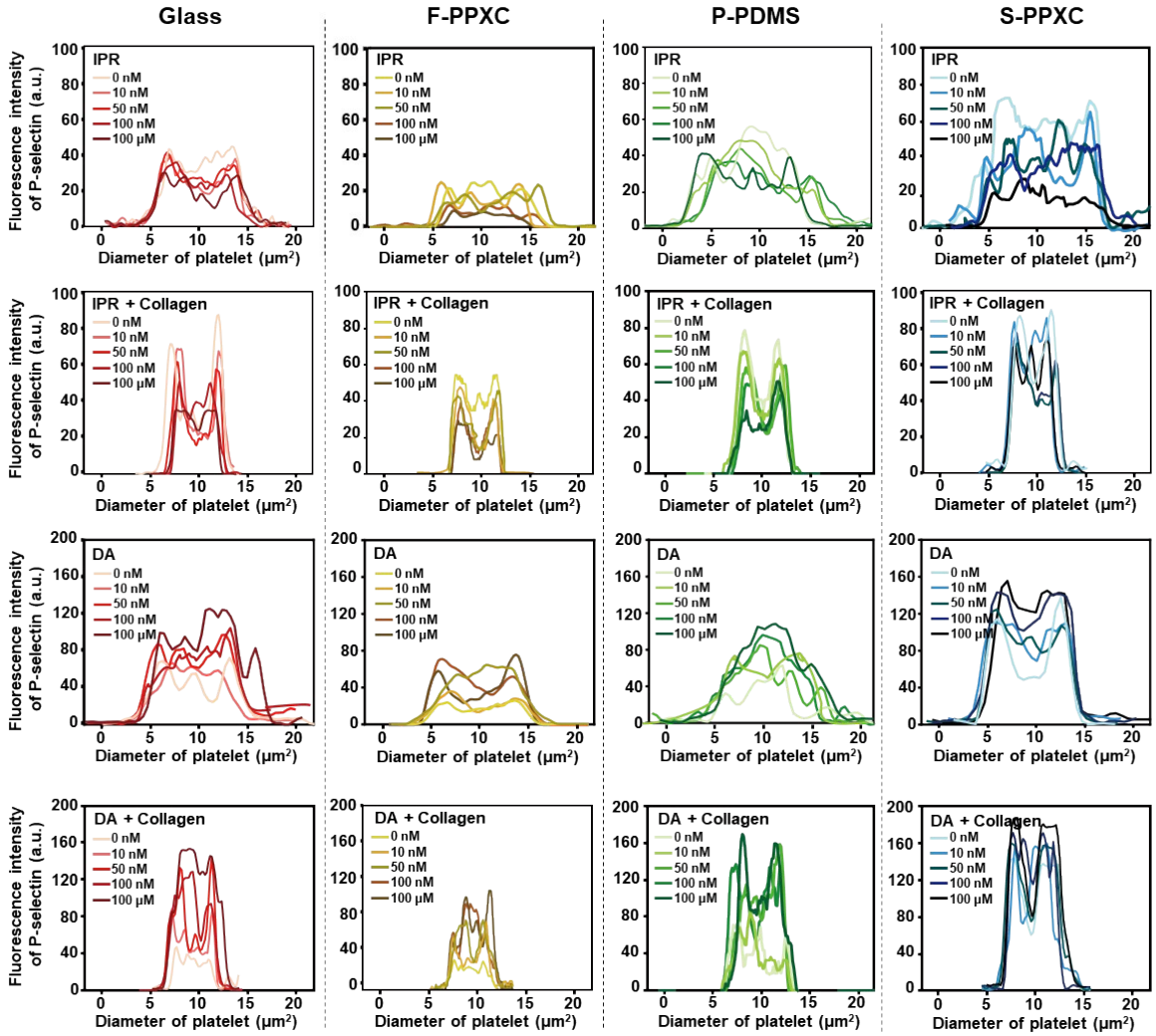

Figure S3. The activation state of individual platelets was analyzed measuring P-selectin line intensity of single platelets at each IPR and DA concentration. P-selectin line intensity of single platelets on glass, F-PPXC, P-PDMS, and S-PPXC surfaces under different IPR concentrations without collagen (A) and with collagen (B). P-selectin line intensity of single platelets on glass, F-PPXC, P-PDMS, and S-PPXC surfaces under different DA concentrations without collagen (C) and with collagen (D). Quantitative linear intensity profiles were analyzed across the whole platelet which were randomly selected from images of 20 platelets on glass, F-PPXC, P-PDMS, and S-PPXC surface under cardiostimulants with and without collagen respectively. All images were confirmed with consistent intensity profiles using Zen 2.3 Pro software and one representative profile was chosen for presentation.

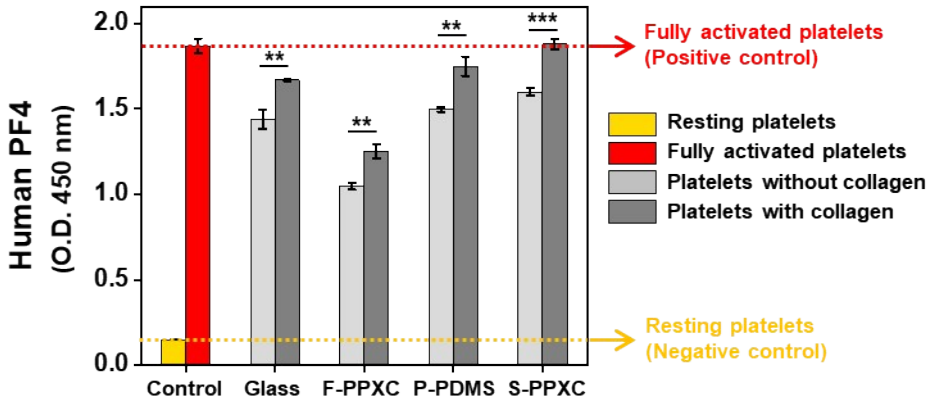

Figure S4. The experimental results of PF4 secretion by the effect of collagen without cardiostimulants when compare to a negative control and a positive control. Statistically significant differences between samples were determined using one-way ANOVA with Tukey's post-hoc multiple comparison tests, *: $p < 0.05$, **: $p < 0.01$, ***: $p < 0.001$.