Supporting Information

Surface biochemical modification of poly(dimethylsiloxane) for specific immune cytokines response

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Table S1. Water contact angle measurements on PDMS samples with different silanization conditions

a. Control samples

Sample	WCA angle measured (°)	STD (°)
Native PDMS	116.6	0.7
Plasma-treated PDMS	< 5	ND
Plasma-treated PDMS in ethanol for 30 min	72.7	16.6

b. Silanized samples

APTES concentration in ethanol	Reaction time							
	15 min.		30 min.		45 min.		1 hour	
	WCA (°)	STD (°)	WCA (°)	STD (°)	WCA (°)	STD (°)	WCA (°)	STD (°)
10%	89.1	9.4	89.9	9.0	85.3	12.1	82.5	11.4
20%	86.3	4.7	89.4	7.4	77.9	2.0	101.9	1.2
30%	81.3	2.1	95.1	6.8	80.8	4.6	88.6	8.6
50%	87.9	10.2	92.1	3.3	95.8	5.4	96.7	6.4

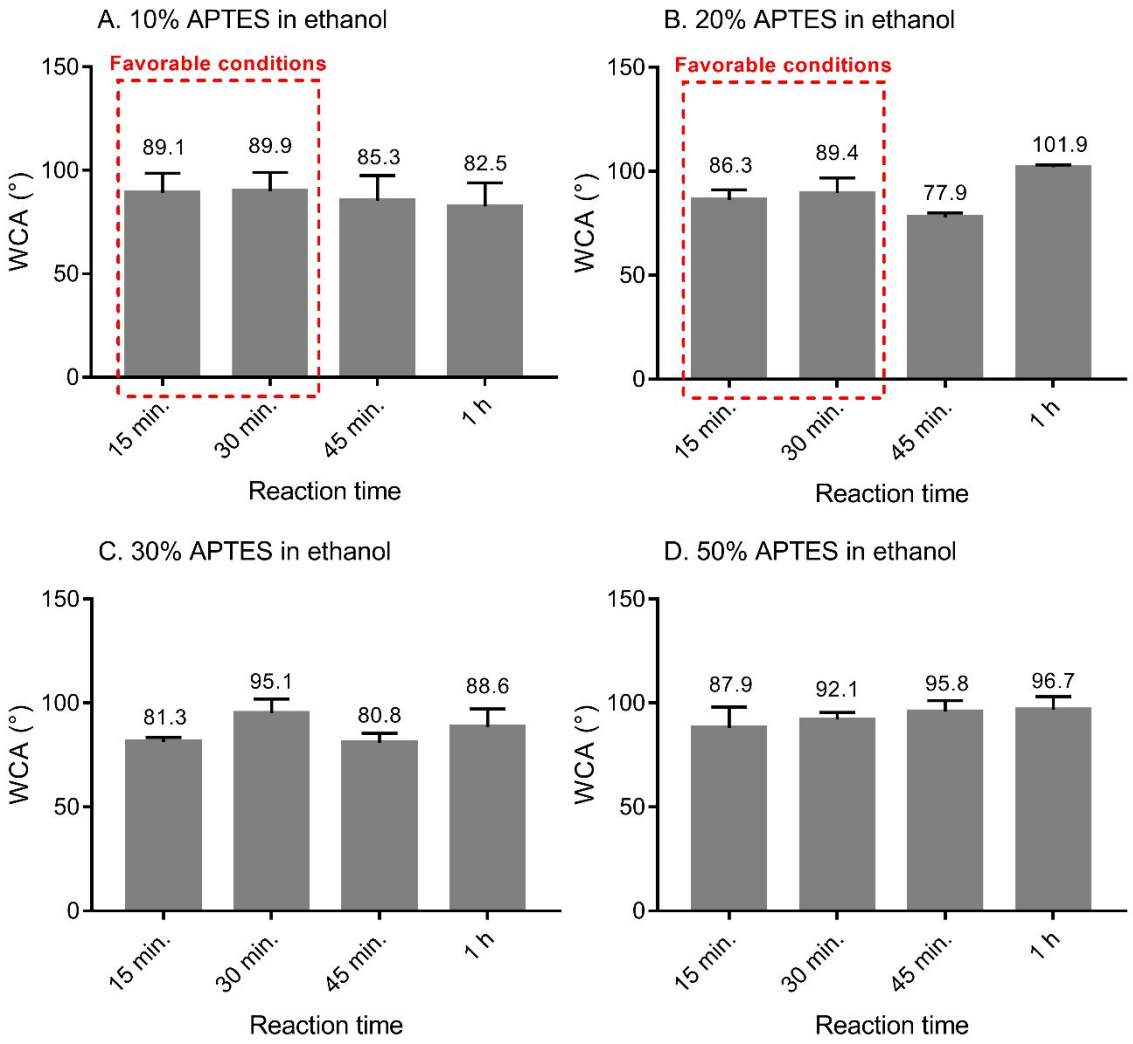

Figure S1. Water contact angle measurements function of reaction times (15, 30, 45 minutes and 1 hour) for different APTES concentration in ethanol: A:10%, B: 20%, C: 30% and D: 50%.

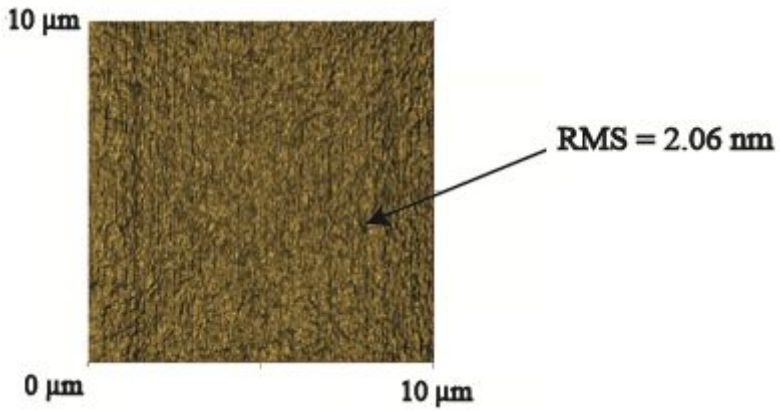

Figure S2: AFM topography performed on a 50-µm thick PDMS spin-coated surface in soft tapping mode.

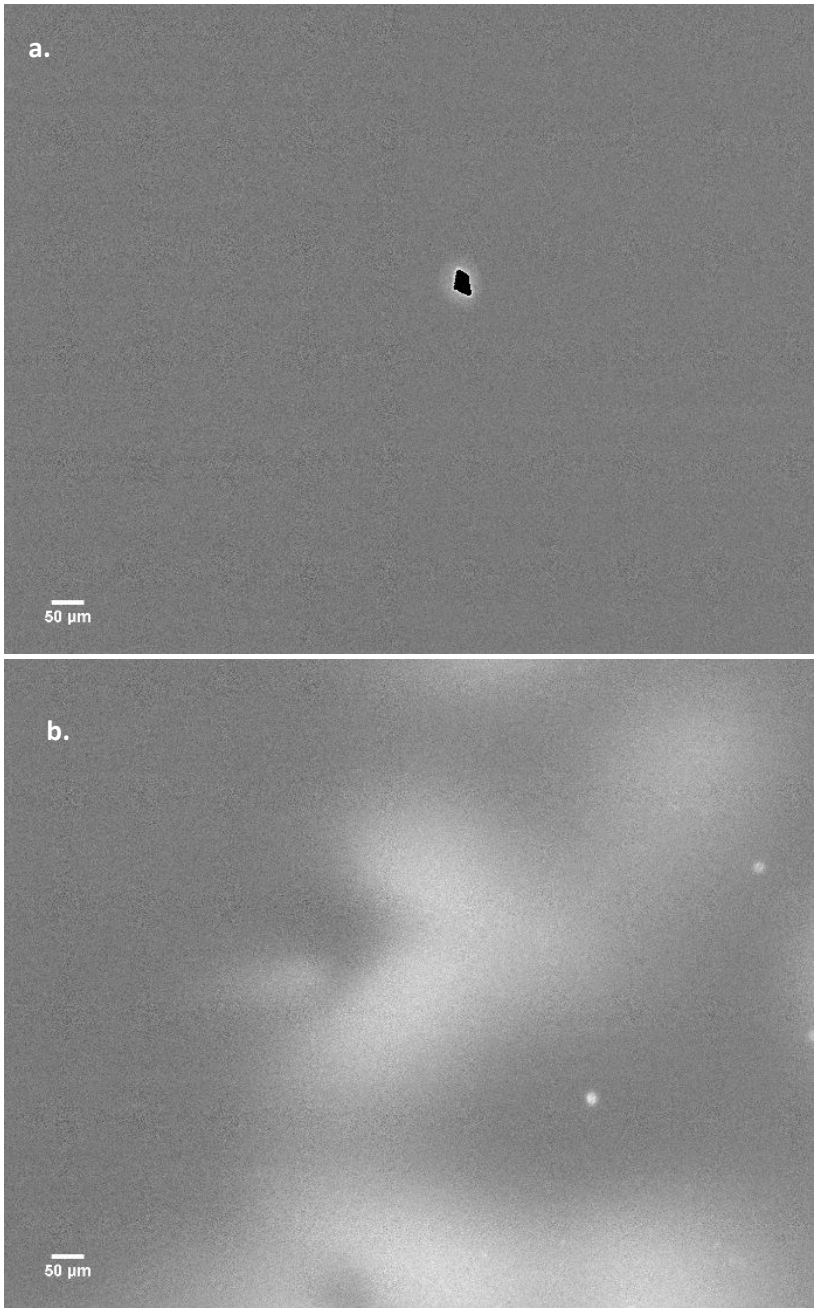

Figure S3: Fluorescence images of PDMS samples after reaction with fluorescamine: a) Control sample: plasma-treated PDMS sample put in ethanol for 30 min. in glovebox; b) Silanized PDMS sample with 20% APTES for 30 min. Magnification x10. Scale represents 50 µm. Filters used for fluorescamine observation are: excitation 360 nm, emission 470 nm. Acquisition time is 160 ms.

Fluorescence microscopy on functionalized PDMS surfaces with FITC-tagged antibodies

Microscope observations were realized with a large-field-inversed fluorescence microscope (Axio Observer, Zeiss) with a 10x magnification and acquisition time of 1500 ms at 475 nm exc.

Quantification of fluorescent signal on functionalized PDMS samples with FITC-tagged antibodies was done using Icy software. Figure S4 shows one histogram extracted from a silanized PDMS sample grafted with anti-TNF-α antibodies for immunocapture of 40µg of TNF-α and detection with FITC-conjugated antibodies. Blue histogram shows the raw fluorescence distribution from the microscope picture. A low-end and high-end threshold is applied here at 30- and 55-pixel value to filter out shadows and light aberration from the microscope as well as potential aggregates of high intensity values. The red curve shows the shape of the histogram after thresholding. Fluorescence intensities from the 0-255 possible pixel values are averaged (here a mean fluorescence intensity of 41.77 a.u. is obtained for this sample, corresponding to the maximum peak range of the red area of figure S6) and a Mean Square Error is evaluated based on pixel value deviation to the mean squared divided by total pixel number (here 9.36 a.u). This process is repeated on five pictures per sample. Concentration studies were done using sample in triplicates for each concentration level. Standard deviation (SD) is then calculated as described in the previous section.

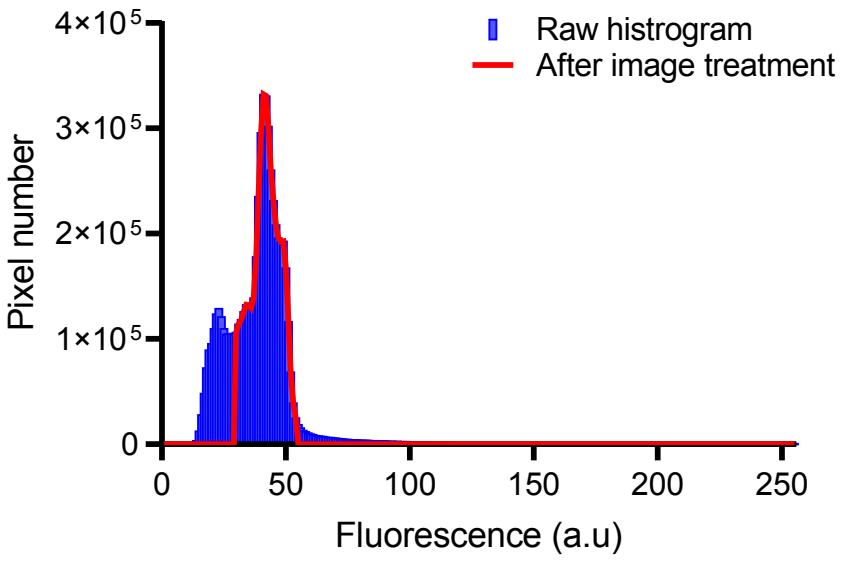

Figure S4: Fluorescence intensity histogram of a biofunctionalized PDMS sample for the immunocapture of 40µg of human TNF-α. Influence of the image treatment is shown with low and high-end cut-off threshold.