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Supplementary Information

A biocompatible and functional adhesive amine-rich coating based on dopamine polymerization

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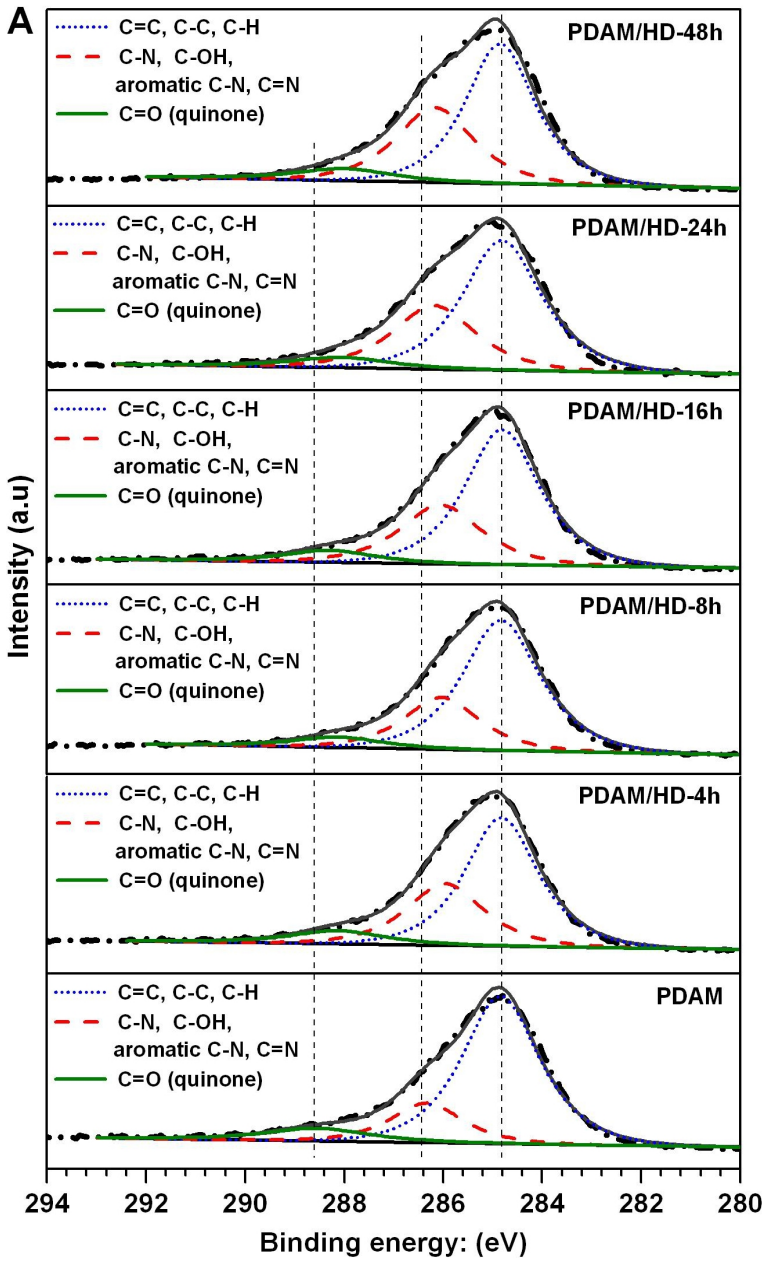
Materials and experiments

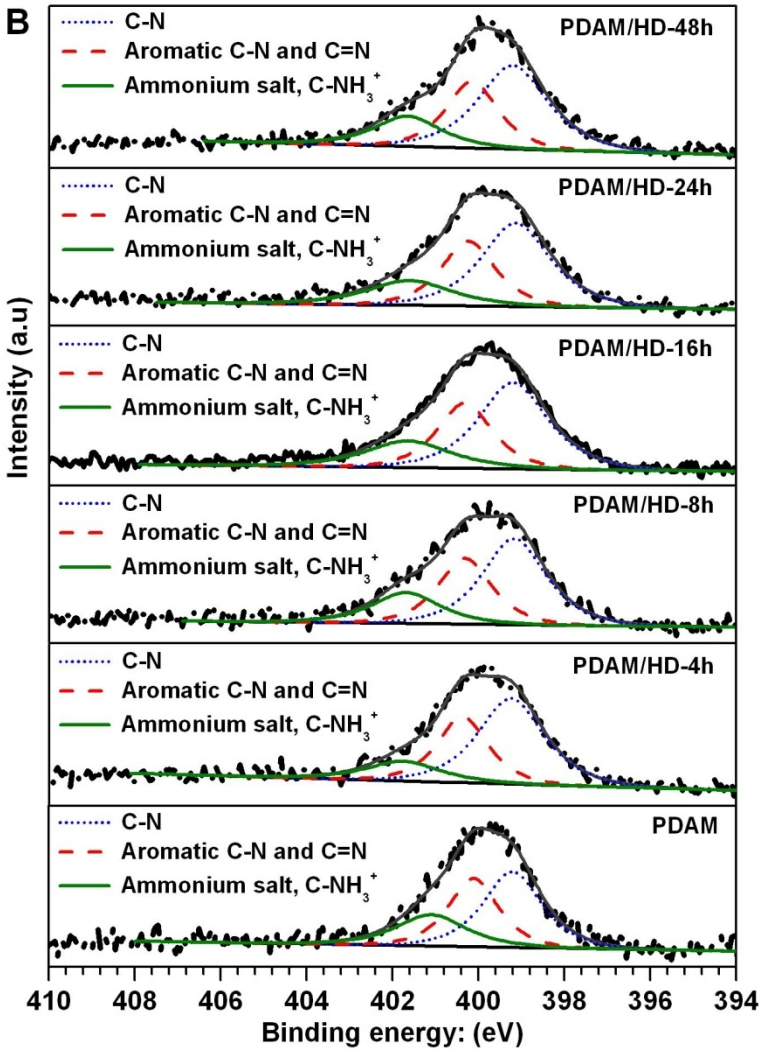
Macrophage Test

Peritoneal macrophages from SD rats (Dashuo Co., Ltd., Chengdu) were sterile harvested by flushing the peritoneum with a 10 ml cold Dulbecco's modified Eagle's medium (DMEM, Invitrogen, Canada). Cells were centrifuged (1200 rpm, 5 min) and resuspended in DMEM containing 10% fetal bovine serum, 1%-L-glutamine, 1% penicillin/ streptomycin, counted and viability determined by 0.2% trypan blue exclusion. Cell preparations with 95% viability or greater were used for experiments. The cells were suspended at a final concentration of 1×10^5 cells /ml in DMEM. Then 1 ml of the cells suspension were added onto each sample in a 24-well tissue culture plate and incubated (37°C, 5% CO_2), then washed with PBS for three times and cultured for 24 h. Thereafter, the supernatant for each sample was harvested and stored for IL-6 test. And the samples with adherent macrophages were rinsed for three times with PBS and fixed in 2.5% glutaraldehyde for at least 2 h, then the cells were observed by Leica DMRX fluorescence microscope (DMRX, Leica, Germany).

Table S1. Atomic compositions and ratios of the dopamine (nominal values), HD (nominal value) PDAM and PDAM/HD coatings obtained by XPS (n=3).

Samples	C (%)	N (%)	O (%)
Dopamine	72.7	9.1	18.2
HD	75.0	25.0	—
PDAM	76.9±0.2	7.2±0.4	15.9±0.3
PDAM/HD-4h	79.3±0.3	7.7±0.2	13.0±0.2
PDAM/HD-8h	79.1±0.2	8.4±0.4	12.5±0.1
PDAM/HD-16h	78.6±0.3	8.4±0.3	13.0±0.2
PDAM/HD-24h	78.0±0.5	8.8±0.4	13.2±0.2
PDAM/HD-48h	77.7±0.4	9.0±0.2	13.3±0.3


A
C=C, C-C, C-H
C-N, C-OH,
aromatic C-N, C=N
C=O (quinone)
PDAM/HD-48h
PDAM/HD-24h
PDAM/HD-16h
PDAM/HD-8h
PDAM/HD-4h
PDAM
Intensity (a.u)
294
292
290
288
286
284
282
280
Binding energy: (eV)


B
C-N
Aromatic C-N and C=N
Ammonium salt, C-NH3+
PDAM/HD-48h
PDAM/HD-24h
PDAM/HD-16h
PDAM/HD-8h
PDAM/HD-4h
PDAM
Intensity (a.u)
410
408
406
404
402
400
398
396
394
Binding energy: (eV)

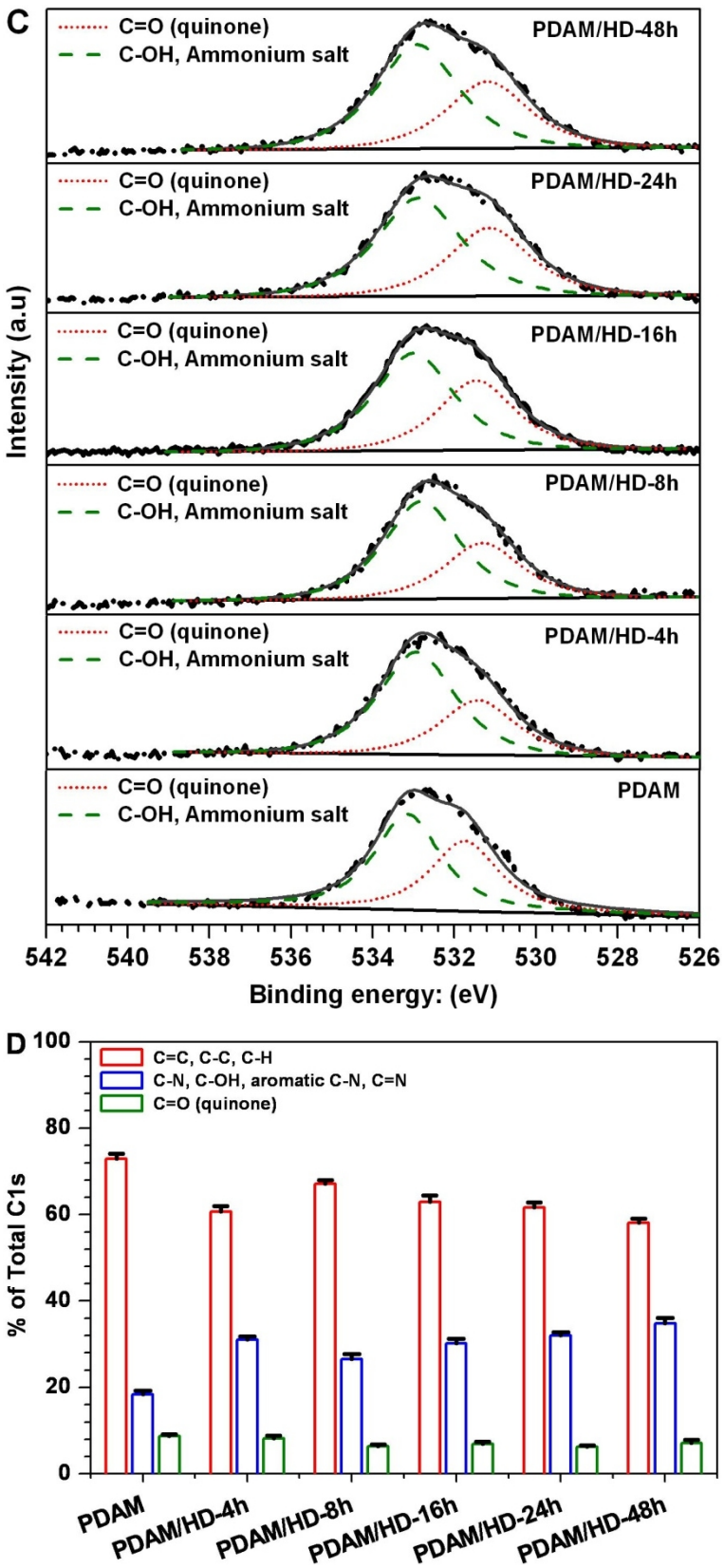


Figure S1. (A), (B) and (C) High-resolution C1s, N1s and O1s XPS spectra of the PDAM and PDAM/HD coatings obtained after defined polymerization times. (D) Results of XPS C1s peak fitting of PDAM and PDAM/HD coatings obtained after defined periods of polymerization.

Table S2. Atomic compositions of the PDAM/HD coating (obtained after copolymerized reaction for 48 h) before and after heparin conjugation obtained by XPS (n=3).

Samples	C (%)	N (%)	O (%)	S (%)
PDAM/HD	77.7±0.4	9.0±0.2	13.3±0.3	—
Hep-PDAM/HD	71.4±0.2	8.3±0.3	18.9±0.3	1.0±0.1

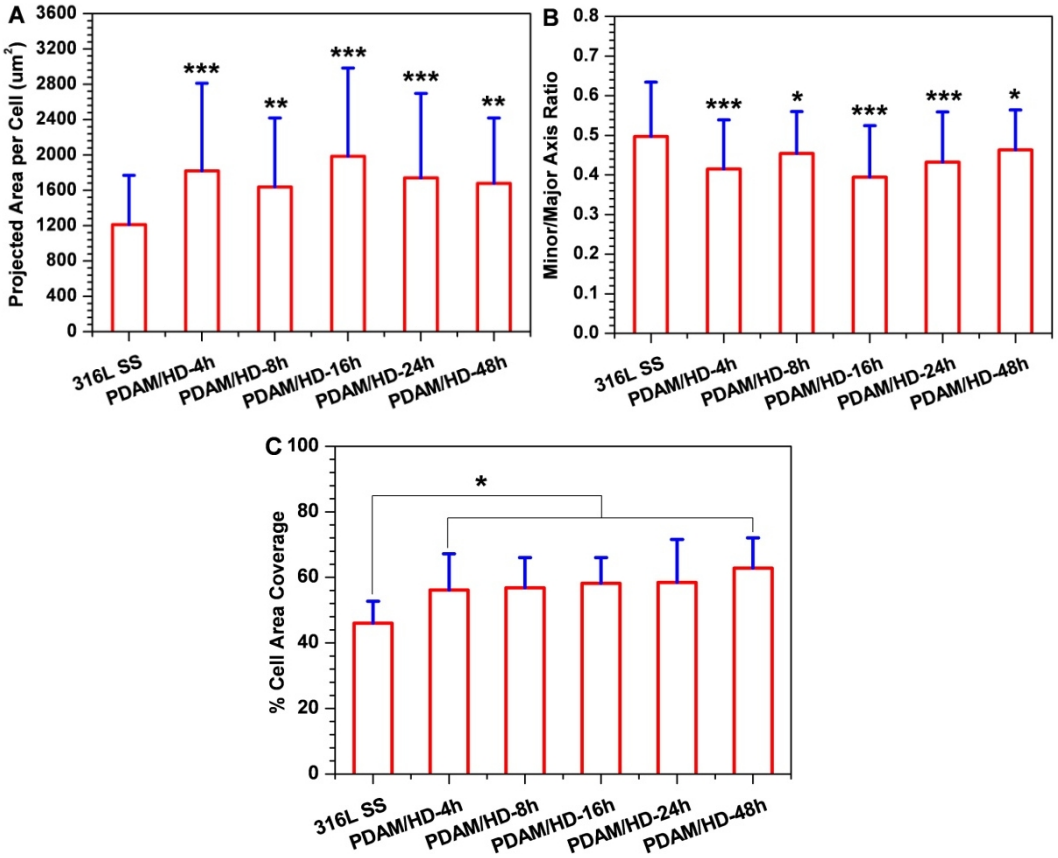


Figure S2. (A) Projected area per cell of HUVECs on the on the 316L SS and PDAM/HD surfaces after 1 day of culture, (B) Minor/major axis ratio and (C) Cover rage of cells are calculated from at least 100 cells from six different fields. Data presented as mean ± SD (n=4) and analyzed using a one–way ANOVA, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

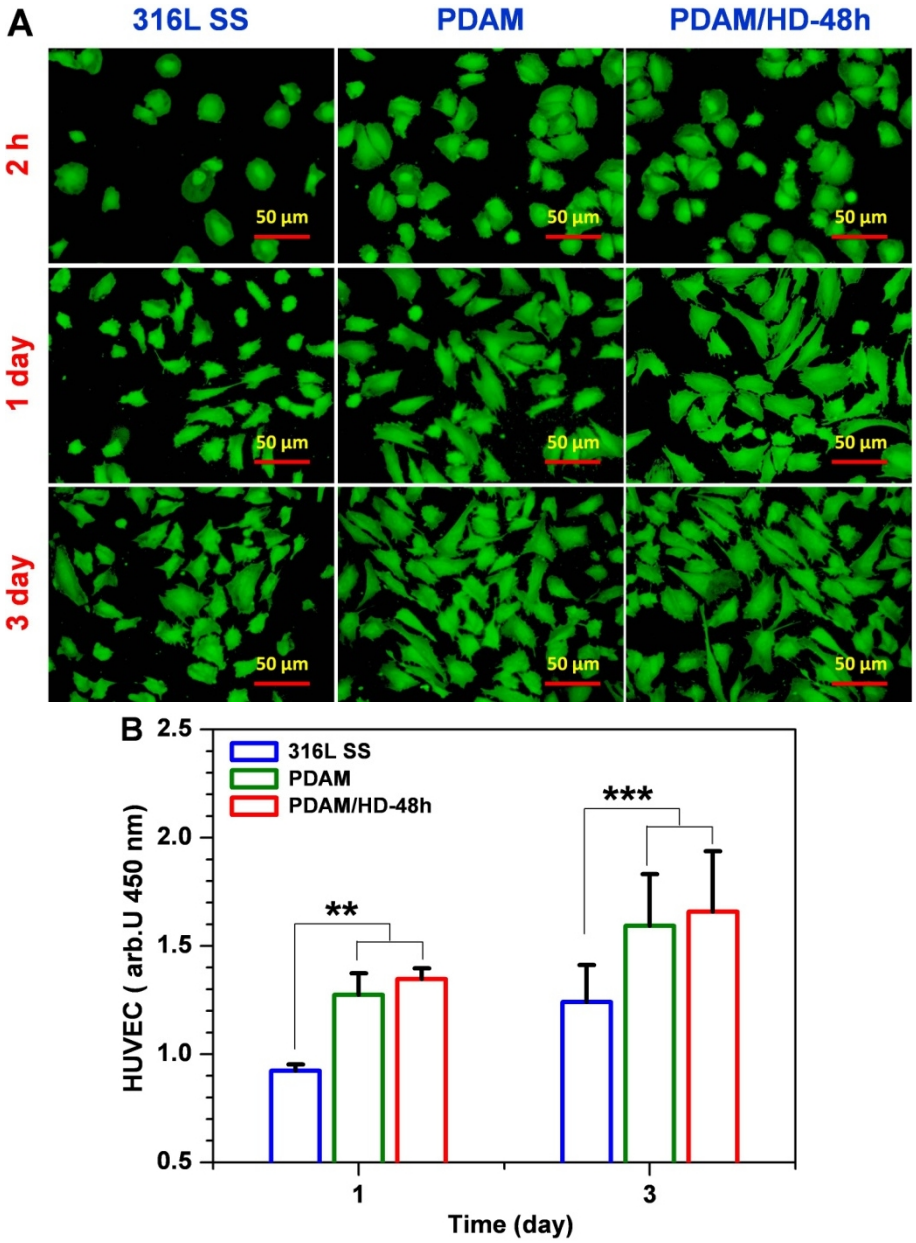


Figure S3. (A) Rhodamine123 stains of HUVECs on the 316L SS, PDAM and PDAM/HD surfaces after 2h, 1 and 3 days of culture; (B) Proliferation of HUVECs cultured on the 316L SS, PDAM and PDAM/HD surfaces for 1 and 3 days detected by CCK-8 Kit. Data presented as mean ± SD (n=4) and analyzed using a one–way ANOVA, **$p < 0.01$, ***$p < 0.001$.

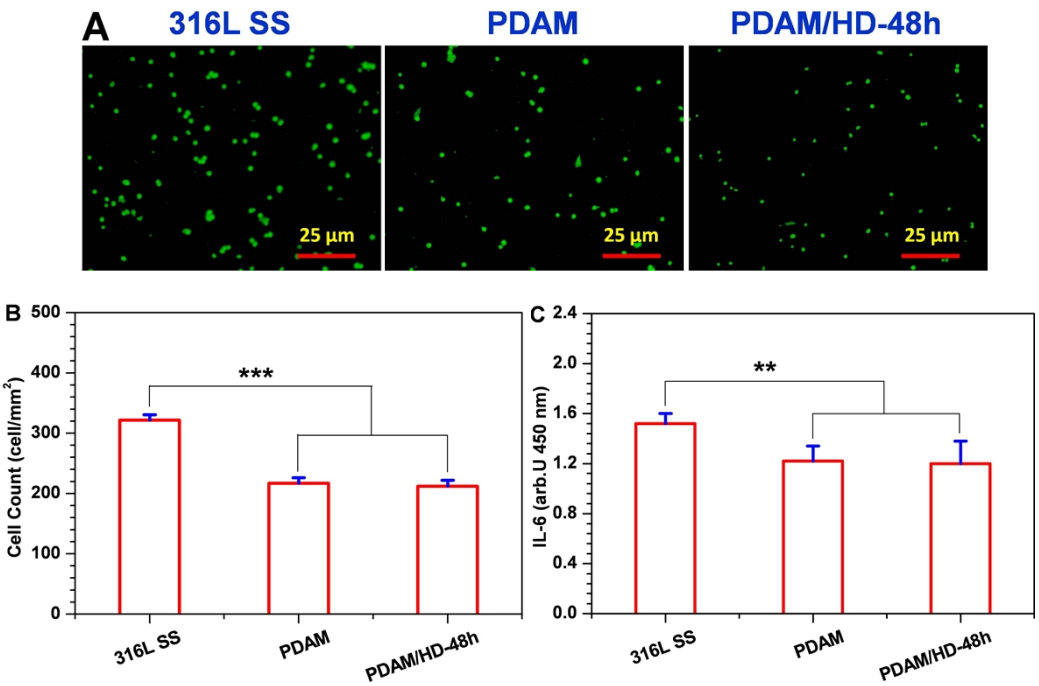


Figure S4. (A) Rhodamine123 staining of macrophage cultured on the 316L SS, PDAM and PDAM/HD surfaces for 1 day culture; (B) Adhered cell numbers, (C) IL-6 release at different samples after 1 day macrophage culture. Data presented as mean ± SD (n=4) and analyzed using a one–way ANOVA, **p < 0.01, ***p < 0.001.